Using Land Inventories to Plan for Urban Agriculture: Experiences From Portland and Vancouver

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Abstract

Problem: Urban agriculture has potential to make cities more socially and ecologically sustainable, but planners have not had effective policy levers to encourage this.

Purpose: We aim to learn how to use land inventories to identify city land with the potential for urban agriculture in order to plan for more sustainable communities by answering two questions: Do land inventories enable integration of urban agriculture into planning and policymaking? Do land inventories advance both ecological and social dimensions of local sustainability agendas?

Methods: We use case studies of two Pacific Northwest cities (Portland, Oregon, and Vancouver, British Columbia), comparing the municipal land inventories they undertook to identify public lands with potential for urban agriculture. We study how they were initiated and carried out, as well as their respective scopes, scales, and outcomes.

Results and conclusions: We find that the Portland inventory both enabled integration of urban agriculture into planning and policymaking and advanced social and ecological sustainability. In Vancouver similar integration was achieved, but the smaller scope of the effort meant it did little for public involvement and social sustainability.

Takeaway for practice: Other local governments considering the use of a land inventory should contemplate: (a) using the inventory process itself as a way to increase institutional awareness and political support for urban agriculture; (b) aligning urban agriculture with related sustainability goals; (c) ensuring public involvement by creating participatory mechanisms in the design and implementation of the inventory; (d) drawing on the expertise of institutional partners including universities.

Introduction

In recent years, planners and municipal policymakers have proposed tools and strategies to achieve greener cities that are both ecologically and socially sustainable.[1] One strategy that until recently has largely been overlooked is urban agriculture. *Urban agriculture* (UA) can include community and private gardens, edible landscaping, fruit trees, food-producing green roofs, aquaculture, farmers markets, small-scale farming, hobby beekeeping, and food composting.

A small but growing literature links UA with environmentally and socially sustainable communities. Commonly cited environmental benefits include the creation of vibrant green spaces, revitalized brownfield sites, improved air quality, food that travels a shorter distance from field to plate, preservation of cultivable land, cooler buildings, and improved urban biodiversity (Irvine, Johnson, & Peters, 1999; Mougeot, 2006; Rosol, 2005; Smit, Ratta, & Nasr, 1996). At the same time, scholars suggest that UA and other food policies provide a host of social benefits including: vibrant public spaces, community capacity building, participatory decision making, enhanced sense of place, food security, community safety, physical activity, social inclusion, and improved health and nutrition (Cole, Lee-Smith, & Nasinyama, in press; Dubbeling, 2001, 2006; Holland, 2004; International Development Research Centre & Urban Management Program for Latin America and the Caribbean, 2003; Mendes, 2006; 2007; Wakefield, Yeudall, Taron, Reynolds, & Skinner, 2007; Wekerle, 2004; Welsh & MacRae, 1998).

However, there is a dearth of research documenting specific examples of the ways in which planners and municipal policymakers in North America intervene to support and enable urban agriculture with a view to creating sustainable communities. Nor is there

sufficient analysis of the pressures, processes, and mechanisms that lead municipalities to enact urban agriculture initiatives or of the practical planning and policy implications of such interventions.

This article helps to fill this gap. Using case studies set in two Pacific Northwest cities (Portland, Oregon, and Vancouver, British Columbia) we examine how one particular tool, a public land inventory, was used to integrate urban agriculture into planning and policymaking processes to enhance sustainability. This tool identifies opportunities for UA initiatives on city-owned land and can be used to inform policy promoting UA, and to understand, analyze, and display the potential for UA. In both Portland and Vancouver, municipally supported inventories were undertaken not only to identify potential sites for UA, but to enrich understandings of how to plan for environmentally and socially sustainable communities.[2]

In this article, we analyze the development and early phases of implementation of each city's land inventory. Our focus on land inventories is not intended to imply that they are the most effective or desirable tool that a municipality can use to integrate UA into planning and policymaking processes to enhance sustainability. We do not wish to imply that land inventories function in isolation from other tools and processes; rather, our purpose is to examine them as one tool to be used in conjunction with others. We believe they yield insights applicable in other contexts, but recognize that local conditions will vary.

We compare the Portland and Vancouver inventories on how they were initiated and carried out, as well as their respective scopes, scales, and outcomes. We explore both whether the land inventories have enabled integration of urban agriculture into planning and policymaking processes, and whether they advanced environmental and social/participatory sustainability agendas in these municipalities. Because both inventories are still in relatively early stages of implementation, our findings are preliminary.

The article begins with an overview of existing research linking UA with improved environmental and social conditions in cities. It then moves to the cases of Portland and Vancouver, first reviewing their respective experiences, then comparing outcomes to date in relation to our two stated aims.[3]

UA and Sustainable Communities

The decoupling of food production from food consumption in cities is a recent phenomenon (Mougeot, 1994). Historically, cities and their *food systems*[4] have been inextricably linked, with urban populations depending on proximate food production and distribution systems to sustain themselves. But massive rural-to-urban migration over the latter half of the twentieth century, combined with the rise of mechanized farming, long-distance food transportation, refrigeration, and large-scale food processing have led to a loss of farmland near urban areas, while modern land use practices effectively prohibit agricultural activity in urban centers[5] (Pothukuchi & Kaufman, 1999; 2000). In many parts of the world, urban agriculture has now become associated with underdevelopment, land squatting, ineffective urban management, and related socioeconomic problems (Mougeot, 2006). Together, this has resulted in a false but enduring dichotomy between urban and rural food issues, particularly in the global north (Mougeot, 2006; Pothukuchi & Kaufman, 1999; 2000).

However, the split between food production and cities has not been universal and shows signs of being repaired (Mougeot, 1994). A growing number of cities are revising existing UA policies or formulating new ones (American Planning Association Food System Planning Committee, 2006; van Veenhuizen, 2006), suggesting UA is again considered a legitimate concern of city planning. Significant policy initiatives indicate a renewed commitment to UA and a new view of its function in cities. For instance, a London Assembly Environment Committee (2006) report calls for benchmarks to protect and enhance the city's food resources. In the same year, the City of Vancouver, included community gardens as a "community amenity contribution"[6] for the first time (City of Vancouver, 2006). In the City of Montral, which has the largest municipal urban agriculture program in Canada, community gardens have their own land use designation (Cosgrove, 2001). Municipalities are now more involved in UA at least in part because it has emerged as a strategy to achieve urban sustainability. Local governments have begun to recognize that in addition to increasing local food production, UA contributes to resource recycling and conservation, therapy and recreation, education and safe food provision, green architecture, open space management, social inclusion, and public health (APA Food System Planning Committee, 2006; Mougeot, 2006). Furthermore, international organizations including the International Development Research Centre (IDRC) and Resource Centres on Urban Agriculture and Food Security (RUAF) have developed substantial program and research resources to support municipalities in building their capacity for UA.

Reflecting the increasing municipal interest in UA, scholars are examining a number of its dimensions. These include UA as a strategy to improve food security and nutrition (Cole et al., in press; Dahlberg, 1999; Power, 1999), gender and UA (Hovorka, 2003), population health and UA (Wakefield et al., 2007), and the economic impacts of UA (Norberg-Hodge, Merrifield, & Gorelick, 2002; Nugent, 1999a; 1999b). In the growing research on UA, this article contributes to at least two specific subliteratures: (1) UA, land use planning, and sustainability (relating to the question of integration of UA into planning and policymaking processes); and (2) UA, participatory governance, and community development (relating to the question of advancement of a municipal sustainability agenda that encompasses not only ecological goals but also social/participatory goals).

Literature on UA, Land Use Planning, and Sustainability

A small but growing literature asks why food has been overlooked as an issue of relevance to urban planners (Argenti, 2000; Koc, MacRae, Mougeot, & Welsh, 1999; Mendes, 2006; 2007; in press; Mougeot, 2006; Pothukuchi & Kaufman, 1999; 2000; Rocha, 2001; Wekerle, 2004). Pothukuchi and Kaufman's (2000) article reports findings of a survey of 22 U.S. city planning agencies. The study revealed a number of reasons why planners have not engaged with food system issues, including UA. First, planners felt that the food system was not their turf, pointing instead to the built environment and land use regulation as their primary responsibilities. Second, many planners perceived the food system to be a rural rather than an urban issue, underscoring the false dichotomy between urban and rural food policy. Third, as public sector workers, planners felt unqualified or unwilling to take the lead on what they perceived to be a private sector issue. Fourth, planners cited a lack of funding to initiate and implement programs and services. Fifth, many planners reported that they did not perceive any problems with the current food system. Sixth, planners said they did not know about community groups they could work with on food system issues. Last, they reported lacking knowledge about food issues.

Since Pothukuchi and Kaufman's (2000) pioneering study, others have concluded it to be legitimate for planners to intervene on food system issues (Born & Purcell, 2006; Bouris, 2005; Clancy, 2004; Koc et al., 1999; Wekerle, 2004). In 2004, both *Progressive Planning* and the *Journal of Planning Education and Research* published special issues on food system planning. On May 11, 2007 a policy guide on community and regional food planning was approved by American Planning Association (2007).

Often implicit in these developments is attention to the links between UA and sustainability agendas. For instance, recent research examines the use of community gardens to revitalize brownfield sites through urban greening (Rosol, 2005). Earlier scholarship examines the design implications of community gardens in medium to high density urban contexts (DeKay, 1997). Links between ecological restoration and community gardening now also appear more commonly in the literature (Irvine et al., 1999). Increasingly, these links reflect concerns over the urban impacts of climate change, peak oil, and a new global food crisis.

Literature on UA, Participatory Planning, and Community Development

The second subliterature relevant to this article focuses on links between UA, participatory planning, and community development. UA has been shown to support a host of sustainability goals including environmental protection, public health and nutrition, poverty reduction, community capacity building, participatory decision making, social inclusion, and community economic development, among others. As a result, UA typically involves a wide range of people, and has been identified as an exemplary "networked movement" because of its cross-sectoral nature and its citizen-led approach to knowledge and solutions (Wekerle, 2004; Welsh & MacRae, 1998). Its benefits have been found to accrue not only to community members, but equally to municipal authorities, who, by involving multiple stakeholders in decision making, are more likely to develop policies that meet the needs of both the municipality and its constituents, particularly marginalized groups (Mougeot, 2006). At the same time, more inclusive and participatory decision making has been shown to promote citizen participation and buy-in at all levels (Dubbeling, 2006; Holland, 2004; International Development Research Centre & Urban Management Program for Latin America and the Caribbean, 2003; Mougeot, 2006; Wekerle, 2004.). The literature also theorizes that UA contributes to social capital and civic engagement. A growing body of research examines community garden sites, finding that social capital is produced, accessed, and used by a network of community gardeners and seeks to understand whether participation in community gardening enhances civic democracy and the public sphere (Glover, Shinew, & Parry, 2005).

Thus, the literature has explained why planners did not intervene much in food issues for many years and why that is changing now. It also indicates that UA can benefit not only the natural environment, but also the social environment. The remainder of the

article focuses on land inventories in Portland and Vancouver, and how they were used to identify potential sites for urban agriculture and to plan for socially and environmentally sustainable communities.

Case 1: City of Portland Diggable City Project
Regional Context

Portland is the center of a growing metropolitan area in the Pacific Northwest. The city of 130 square miles is home to almost 540,000 people, with over 2.1 million residents in the region. Portland is shaped by the Oregon state land use planning system that requires each city or metropolitan area to set an urban growth boundary (UGB). The UGB limits and controls what then-Governor Tom McCall colorfully referred to in the 1970s as "sagebrush subdivisions, coastal condo-mania, and the ravenous rampage of suburbia" (McCall, 1973),[7] while protecting farm and forest lands. This system has met these goals over the past three decades. A study comparing the Portland metropolitan region and 14 other cities between 1990 and 2000 found that without urban containment Portland would likely have expanded over an additional 88 to 279 square miles of rural land (Northwest Environmental Watch, 2004). However, for the same reasons the system works to protect farm and forest lands outside of the UGBs, it also calls for efficient use of land within. Metro, the regional government for the Portland metropolitan area, is required to maintain a 20-year supply of buildable land for residential development. This policy has worked in favor of denser development, but puts a premium on land inside the UGB. Other forces, such as increasing housing demand, employment, and wages have contributed to increasing land values in Portland (Nelson, Pendall, Dawkins, & Knaap, 2002). This has made available land more precious to developers and economic development advocates. Consequently, urban agriculture has struggled with the perception that it is an incompatible and inefficient use of urban land that could command higher financial returns.

Those advocating protections for green and open spaces faced similar resistance in the past; after passage of Senate Bill 100 (the law which established the Oregon land use planning system), little attention was given to the importance of open spaces within UGBs. However, public opinion came to favor protecting wildlife habitat and open spaces in the 1990s, after much advocacy work. Realizing that jurisdictions are unlikely to protect green space if such protection reduces their buildable land, the Metro Council passed Resolution 97-2562B in 1997, which allowed an exception for the decline in net buildable land from green space preservation consistent with Title 8 of the Growth

Management Functional Plan.

Local Political Context

Portland is a city that has long been on the forefront of sustainability, and its commitment reflects the local political context. Portland was the first U.S. city to adopt a strategy to reduce emissions of carbon dioxide in 1993 and one of the first municipalities in North America to make sustainability a priority, creating an Office of Sustainable Development (OSD) in 2000. This office initially focused on solid waste and recycling, green building, and energy; its purview has since grown to include renewable resources and sustainable food systems. Innovative policies on global warming, recycling and composting, green building, and transportation options have institutionalized sustainability issues in city code, setting the stage for incorporating sustainability into the city's new comprehensive plan currently under development.

Thus Portland's support for UA exists within the context of a preexisting commitment to principles of sustainable development. Further, Portland's culture of food has expanded in recent years. Long known for its microbrews, Portland's wine industry has developed considerably over the past years. Many of the trendiest restaurants buy local produce, meats, cheeses, and wine from local farmers. The region boasts 32 separate farmers' markets, 20 community-supported agriculture (CSA) operations, and the City of Portland alone manages 30 community gardens, with many more maintained by churches, community groups, and suburban communities. National food-related organizations such as The Food Alliance and Ecotrust are headquartered in Portland, with dozens of grassroots food advocacy groups also active in the city. Many of these efforts are focused on helping to create a greener, healthier, more self-sufficient city, and combined, they create fertile ground for food policy to take root in city government.

Food Policy Council

Beginning in the mid-1990s, local food activists began working with the City of Portland and Multnomah County to raise the profile of food policy and food issues in the community. One outcome in 2002 was the establishment of a food policy council advising and reporting to both governments on food policy issues. The resolution the city passed to create the council (Multnomah County also passed such a resolution) said "urban land use policies and rules negatively [affect] local food production and distribution" (City of Portland, 2007a). Since 2002, the Portland/Multnomah Food Policy Council has worked on such far-reaching issues as local institutional purchasing, small-

scale food system assessments, support of immigrant and refugee farmers in the Pacific Northwest, developing commercial food composting, bringing electronic benefit transfer (food stamp) capability to local farmers markets, and researching policies to protect farmland. In 2005, the City of Portland for the first time funded a full-time staff person to work on food issues; this funding has been renewed yearly since that time. More recently, a community visioning project in Portland spoke with over 17,000 Portlanders and identified sustainability as one of the core community values. In that context, many Portlanders spoke of the importance of access to community gardens and locally produced organic foods.

The Diggable City (DC) Project

Inspired by a successful community garden project on property surrounding a municipal pump station, in November 2004 Portland Commissioner Dan Saltzman proposed inventorying all city-managed lands to determine whether they would be suitable for community gardens or other UA uses.[8] The council unanimously supported the resolution, which included statements indicating the importance of UA to the city. These included the following benefits:

- Community gardens are important neighborhood gathering places that contribute to the city's parks and open space system and support neighborhood livability;
- Urban gardening supports self-sufficiency and access to healthy food for Portland residents;
- The Community Gardens Program encourages organic gardening, building healthy soil, new and heirloom plant varieties, composting, cover cropping, food sustainability, [and] intergenerational activities.

However, the council did not budget funds or commit city staff to carrying out the resolution. Thus, Commissioner Saltzman's office sought the aid of graduate students in the Urban and Regional Planning program at Portland State University. A team of eight individuals with varied planning backgrounds in environmental and community development and GIS, as well as media and design, assembled to complete the task. Within six months, the project team delivered a GIS-based inventory of public land and an extensive GIS methodology. The team also recognized that this project could potentially engage a large audience on the implications of urban food production. To this end, students also analyzed the local and regional context for UA including relevant state and local land use laws; considered the challenges of and opportunities for using public lands for UA projects; documented stakeholder interviews on video; and prepared

and presented a final set of recommendations to the city council. They named the project "The Diggable City," capturing its spirit.

To develop the land inventory, the project team worked closely with GIS staff at four city bureaus whose responsibilities gave them management control of some city-owned lands. They formatted and assembled existing map data into a single, legible, data table (Balmer et al., 2005). Once consistently formatted, the team compared high-resolution aerial photos to these bureaus' property maps to assess and assign relevant attributes to each record, including tree canopy, the presence of buildings and parking, the type of agricultural potential, a subjective suitability rank based on a visual assessment of the site, and notes describing other characteristics of the site. Using this information, the team classified properties into the simple categories shown in Table1 based on likely potential UA use. Aggregating various agricultural uses into four generalized categories allows flexibility in the future, since each category includes many possible uses that share similar requirements. A total of 430 separate properties were included in the inventory; when adjacent properties were combined there were 289 locations.

Upon initial analysis, many of the sites did not appear to be ideal for agricultural purposes: Some were completely covered with tree canopy, others were in industrial areas, and some were located in floodplains or contained areas of steep slope. Nevertheless, such sites were neither removed from the database nor from consideration for future urban agriculture projects. For example, a site covered with trees, while not suitable for row cropping, was retained in the inventory for possible alternative farming techniques (e.g., forest farming, berry or mushroom cultivation). Likewise, a paved property could be used for container gardens, greenhouses, or a farmers' market site. In this way, the inventory maintained opportunities for a wide variety of uses, and included all of the city-owned lands rather than excluding some (Balmer et al., 2005).

Table 1. Diggable urban agriculture categories.

Category	Pervious su
Community gardens	At least 7,500 sq. ft.
Small-scale growing operations	Less than 10,890 sq. ft. ()

Large-scale growing operations	More than 10,890 sq. ft. ()
Growing on impervious surfaces	At least 5,000 sq. ft.

A technical advisory committee made up of city employees and community members helped develop evaluation criteria and advise on progress. The DC project team also organized focus groups of individuals active in the local food system (area farmers, community activists, permaculture practitioners, and academics); conducted surveys of community gardeners and farmers' market shoppers to determine their interest in potential UA projects; and interviewed many additional stakeholders. These outreach efforts greatly informed the criteria the project used and its recommendations, and expanded the understanding of the potential for urban agriculture in Portland (Balmer et al., 2005).

At the project's conclusion, the DC project team recommended the following:

1. Develop an inventory management plan. The Portland OSD, the Portland Office of Neighborhood Involvement, and the Portland/Multnomah County Food Policy Council should develop a plan for administering these sites that is just, equitable, and sensitive to the needs and characteristics of surrounding communities. Inventory data should be accessible to community groups, educators, farmers, and residents interested in using the lands identified.
2. Expand the inventory and develop evaluation criteria. To fully realize the potential of UA in Portland, the city should expand the inventory further by involving more city bureaus in reviewing parcel suitability and in developing criteria more completely.
3. Form an Urban Agriculture Commission. The city should create an Urban Agriculture Commission of residents and a city representative to review plans and policies and make recommendations on urban agricultural issues, similar to its Urban Forestry Commission.
4. Adopt a formal policy on UA. Given stakeholder awareness of the inventory and support for UA activities, the city should craft a comprehensive UA policy addressing its environmental, health, and social benefits and providing a vision for the future of UA in Portland.
5. Conduct a comprehensive review of policy and zoning. The city should conduct a detailed review of Portland's current policy and zoning to identify obstacles that

could be mitigated to improve the opportunities to realize UA.

On June 8, 2005, Portland's City Council unanimously accepted the DC report and tasked the Portland/Multnomah Food Policy Council with moving the project forward over the subsequent eight months. The Food Policy Council explored recommendations 1 and 5 with an Urban Agriculture Subcommittee, returning to the council eight months later with a new report that was received positively. As part of that subcommittee, the Food Policy Council worked with one planner in the city's Bureau of Planning and one from the city's Bureau of Development Services to review the student work and to analyze how to remove land use policy and zoning barriers to UA. Some recommendations were quite straightforward: For example, in some zones, the code allows agriculture but prohibits "outdoor work activities," so that changing the language could remove the prohibition on UA. Other issues identified, such as changing the zoning on specific city-owned parcels to allow for agriculture, would require more time and effort, including a public process.

The Food Policy Council also developed a draft inventory management plan, which included a request for proposals process for project ideas needing access to land. The plan is currently being tested with several pilot projects, including a community garden in a currently underserved area; an immigrant farmer apprenticeship program adjacent to and run by a farm currently operating on city property; and a nursery producing container-grown native plants on paved land for use in Portland area wetland restoration, streamside revegetation, and stormwater management projects (see Shandas & Messer, this issue).

The OSD, which oversees the work of the Food Policy Council, is currently working to implement the pilot projects and this past year identified 40 of the inventoried properties (shown as large dots in Figure1) as having strong potential for urban agriculture projects. The first priority will be for the community to gain access to and develop projects on these sites.

Challenges to developing projects on these sites include the often long process of finalizing a lease with whichever city bureau owns the land; the absence of city or other funding to support improvements like fencing and installing water meters (costing together upwards of $20,000 to $30,000 per property); and the lack of concrete goals or a city mandate to develop UA projects.

While the number of projects built to date as a result of this inventory remains small, the

DC project continues to generate interest among both policymakers and community members, many of whom perceive UA to have social, physical, and environmental benefits. The Portland/Multnomah Food Policy Council and the general public have kept the project active for the past 2 years, and city bureau managers appear to have grown more comfortable with the idea. In September 2007 visionPDX, the community-wide visioning process, identified locally grown food as a priority, linking UA to community connectedness, sustainability, and social equity.

Preliminary Assessment of the Portland Case

We are interested in whether land inventories have enabled integration of urban agriculture into planning and policymaking processes, and whether the land inventory process advances a municipal sustainability agenda that encompasses both environmental and social dimensions. In Portland's case, there are preliminary indications that both of these questions can be answered affirmatively. Multnomah County, which includes the city of Portland as well as additional land, took its cue from the DC inventory to create the County Digs project. County Digs promotes opportunities for UA by making appropriate surplus county and tax-foreclosed properties available to local governments, community groups, and nonprofit organizations for such purposes. The county's surplus and tax-foreclosed property will be reviewed by a Green Space Review Committee on an annual basis for appropriate inclusion in this project, thus incorporating UA into an ongoing process.

Public support and awareness of the inventory has also increased the level of discourse about UA in civic conversations. In addition to support for the project expressed in multiple documents prepared by advisory boards to the city, the inventory was specifically referenced by numerous respondents in the visionPDX community visioning process, where both UA and access to healthful foods showed up as a strong theme. A summary of community input found that "many people envision more urban gardening in the future, with eco-roofs, converted parking-lots, vacant lots, and other underutilized spaces providing food for the city's residents" (City of Portland, 2007b). In a new process to rewrite the city's comprehensive plan, the Bureau of Planning is hearing from advocates like the Portland/Multnomah Food Policy Council and local gardening and health organizations, and from the OSD, that UA and healthful foods should be part of the discussion. The DC project remains relevant through sustained community interest and advocacy.

UA has also been linked to community resilience in a broader conversation about sustainability in Portland. The Portland Peak Oil Task Force, an advisory body appointed by Portland City Council, recommended in 2007 that the city devote more resources to implementing the DC project as a step toward localizing food production, thereby hoping to reduce reliance on fossil fuels and impacts of declining energy resources on the community.

The way in which the project was carried out has also advanced the city's sustainability agenda. The broad participation of local food advocates, farmers, and community leaders in developing the DC inventory yielded a natural set of stakeholders and supporters to move the project forward. Many of these supporters became active participants in a 20-member technical advisory committee for the subsequent Food Policy Council report, exploring how different models of UA could be used on city properties in the inventory.

UA was considered important to sustainability by visionPDX, as the following, from the Vision Committee, suggests:

[Enlarge Image]

Figure 1. The Diggable City project inventory of potential sites for urban agriculture in Portland.
A primary challenge in the coming years will be to overcome current disparities to ensure that all residents have access to public resources such as greenspaces, walking and bike paths, public transportation, community gardens and locally grown, healthful food so that each of us, regardless of location, can choose to live with less environmental impact. (City of Portland, 2007c)

In visionPDX, equity and sustainability were considered as two parts of a single set of goals. The inclusion of UA in this discussion suggests that it is emerging as a key ingredient for a sustainable Portland.

Case 2: City of Vancouver UA Inventory
Regional Context

Vancouver is a city of approximately 600,000 inhabitants in a metropolitan region of just over 2 million. It is the largest city in the province of British Columbia and the third largest in Canada. Regional development goals are set out in Metro Vancouver's Sustainable Region Initiative.[9] In addition, provincial legislation protecting agricultural land has existed since 1973. This legislation, created the Agricultural Land Reserve (ALR), and has had significant impact on land use and urban development in the region. The ALR includes approximately 11.6 million acres of the province's land most suitable for agriculture (only 5% of the province's land base). Despite boundary changes over the decades, its area remains approximately the same. Up until the 1970s, approximately 14,800 acres of prime agricultural land were lost each year to urban development and other uses. By restricting urban development on farmland, the ALR encourages efficient forms of growth and the reduction of sprawl, acting as a de facto urban containment boundary[10] (Agricultural Land Commission, 2007).

Local Political Context

Like Portland, metropolitan Vancouver's commitments to sustainability and livability are reflected in the local politics of the City of Vancouver. Vancouver is recognized both locally and internationally for progressive urban governance and for planning based on principles of sustainability. The city has a history of leadership on sustainability, and began to institutionalize its responses in 1990 with the creation of the Special Office for the Environment (SOE). In April 2002, the city adopted a definition of what a sustainable Vancouver would be, along with a set of principles aiming to coordinate the city's sustainability policies. To facilitate this goal, a Sustainability Sponsor Group, made up of senior city employees, was approved and funded by the city council in 2002.

What began as a focus solely on environmental concerns broadened over the course of the 1990s to include social and economic aspects of sustainability. On May 24, 2005, the Vancouver City Council approved a definition of social sustainability to be used for developing the social component of the city's sustainability objectives. Currently, Vancouver continues to pursue sustainability in all aspects of development including transportation systems, energy conservation, and green buildings. Vancouver's newest initiative is EcoDensity, an approach to planning for growth while reducing the city's ecological footprint.

As an extension of the city's commitment to sustainability, the City of Vancouver has been a national leader in municipal food system planning. Even without an official food

policy mandate or coordinated urban agriculture strategy, the City of Vancouver provided funding and other support for a wide range of urban agriculture activities. However, it did not take a direct role in urban agriculture and other food policy initiatives until relatively recently. On December 11, 2003, after more than a decade of community advocacy, Vancouver City Council approved a Food Action Plan for creating a just and sustainable food system for the City of Vancouver, which identified UA as a priority. In July 2004, a municipal Food Policy Council was established with a mandate to provide advice to the city on food-related issues. In addition, two staff positions were created to support the burgeoning food policy mandate. (Currently one staff position remains.) Since that time, a growing number of city developments and initiatives have included community gardens, edible landscaping, and/or farmers markets in their plans, which are the result of a combination of staff support, the work of the Food Policy Council and community groups, and growing awareness of the role of food decisions in a range of city planning priorities.

As the city's food policy mandate evolved, urban food production was identified as one of a number of solutions (City of Vancouver, 2003; 2006), though the policies, programs, and regulatory tools that were needed to support UA were lacking. Thus, the city initiated a UA inventory using Portland's DC project as an example.

The City of Vancouver's UA Inventory

As with the Portland DC project, the inventory began as a collaboration between a local university, the University of British Columbia (UBC) and the city. In Vancouver's case, the inventory began through a graduate internship at the City of Vancouver's Social Planning Department in 2005.[11] That same summer, *The Diggable City: Making Urban Agriculture a Planning Priority* (Balmer et al., 2005) was released in Portland. Vancouver modeled its inventory on the one described in the Portland report.

The City of Vancouver owned a number of unoccupied properties with UA potential, but had very little data with which to begin effective planning, and no guiding principles, targets, or goals for implementing UA, or clear process for taking advantage of emerging opportunities. The inventory documented existing city activities and policies supportive of UA, as well as identifying suitable sites the city owned or leased, and opportunities to expand UA initiatives. Its purpose, defined by the priorities in Vancouver's Food Action Plan (City of Vancouver, 2003), was to support land use decision making, to serve as a public resource to build awareness, to support the city's

existing sustainability commitments, and to contribute to a citywide UA strategy.

The City of Vancouver Social Planning Department established a working group to guide the inventory that included city staff, Food Policy Council representatives, community members, and graduate students. The inventory was carried out primarily by the graduate student in collaboration with city staff in a number of departments. Most of the land that would be inventoried was managed either by the Vancouver Department of Engineering or the Canadian Department of Public Works, although additional sites were identified through advisory meetings with the working group and community consultations.[12] Data were collected from participating city departments, and then mapped using the City of Vancouver's GIS mapping program. The suitability of each potential site for UA was determined with evaluative criteria, GIS analysis, and site visits.

As was done in the DC project, site attributes were assembled in a database, and the sites were categorized by size and the types of use they might accommodate. The inventory includes sites that have broad potential for various agricultural uses, from container gardens or markets on paved properties to large-scale urban farming and greenhouse facilities. Individual sites will require further analysis before they are known to be suited to a particular agricultural use, but considering diverse potential uses allows many opportunities to expand UA in Vancouver. The final project identified 77 potential sites for UA, as illustrated in Figure2.

The project also included a review of city and regional policies and initiatives, a comparative analysis of best practices in UA in four other North American cities, an analysis of challenges and opportunities for urban agriculture, and recommendations to the City of Vancouver. The review was carried out by the planning intern under the supervision of city staff. Although it was smaller in scope than the inventory conducted in Portland, it does provide a starting point from which to further analyze available sites for their UA potential.

The Vancouver inventory project also identified key challenges facing urban food production in the city. Some of the most basic include which sites to convert to UA first, who should manage them, who should pay for start-up and operational costs, and who should have access to them. Since Vancouver continues to grow in both population and property values, the availability of land is another significant obstacle to promoting UA. Unlike other North American cities, Vancouver has few vacant or abandoned properties

in its central core, and is almost completely built out. The market value of land is high and housing demand continues to grow. The low revenues UA produces cannot compete with the rents from other forms of development, and though it does provide social and environmental benefits, these are difficult to quantify. Some UA can occupy small spaces that do not compete with development, such as street rights-of-way and rooftops.

Last, finding adequate funding will also be a challenge. Although the Vancouver City Council has supported creating more opportunities for UA, it has allocated few resources to support implementation. For example, no funding is in place to complete the analysis of specific sites. The City of Vancouver has paid for creating most of the existing community gardens. Start-up costs can run from $5,000 to $8,000 and may include labor, management, water, tools, rent, and insurance. However, there is no management system in place to ensure that funds are well spent. Adding such oversight is an important priority.

The Vancouver inventory yielded three recommendations on how the City of Vancouver should maximize the potential of UA:

1. Provide access and support. Develop an inventory management plan to expand the inventory and administer the use of the sites; make the data accessible to the community; develop use-specific evaluation criteria collaboratively with relevant city bureaus; and raise awareness of how UA contributes to the city's sustainability.
2. Review zoning and policy. Conduct a comprehensive review of policy and zoning regulations to mitigate obstacles and improve opportunities for UA; formalize a UA policy to provide a vision for the future.
3. Develop institutional support. Establish mechanisms to facilitate cooperation and partnerships between relevant city departments, food banks, and other community services to promote UA; fund and staff a formal municipal community garden program to manage UA initiatives throughout the city.

As is true in Portland, few UA projects have been implemented to date as a result of the Vancouver inventory. However, the inventory has sparked interest among city staff and community members and has contributed to further studies. On May 30, 2006 Councilor Peter Ladner called for the city to work with the Vancouver Food Policy Council to create 2010 new garden plots in the city between January, 2006 and January, 2010, as an Olympic legacy.[13] The motion was passed unanimously. Councilor Ladner has challenged other municipalities in the region to do the same. These could include community-shared gardens on rooftops, balconies, or on the ground; private gardens

that are part of the Sharing Backyard program; and gardens that participate in the city's Grow a Row, Share a Row program.

We know of two follow-up projects. In the first, three UBC graduate student interns with the Vancouver Social Planning Department conducted a second phase of the inventory in the spring of 2007. It expanded the inventory to include public lands owned by other departments, as well as quasi-public properties, such as those belonging to schools and churches. Properties were identified through visual assessment on the city's GIS application (VanMap), as well as through community consultations. It was designed to help city staff respond to inquiries about potential sites, although further analysis will be required before implementation. The expanded inventory identifies 639 sites with potential for UA although further analysis is needed to determine site suitability. In a second follow-up project, a UBC geography class, in consultation with the Society Promoting Environmental Conservation, prepared a resource guide called *Growing Gardens: A Resource Package on How to Start Your Own Community Garden*, offering information and pointers for garden site development, holding community consultations, and accessing resources from various city departments (Burkholder, Ng, Nui, & Solanki, 2007).

[Enlarge Image]
Figure 2. The inventory of potential urban agriculture sites in Vancouver.
Preliminary Assessment of the Vancouver Case

There are some indications that Vancouver's land inventory has integrated UA into planning and policymaking processes. We conclude that the inventory has been recognized as a tool that will help city staff identify available land to assist community members who wish to start new gardens and other forms of UA as part of Councilor Ladner's previously mentioned initiative to expand community gardens, rooftop gardens, and edible landscaping throughout the city. The city council also endorsed draft operational guidelines for community gardens in 2006, and allocated community amenity contributions to developing new community gardens in 2007, some of which were identified in the inventory. Supporting the second phase of the inventory in 2007 also indicates continued municipal interest in using the tool.

Since the inventory was conducted, the City of Vancouver has begun developing a green building strategy (GBS) as one of many initiatives underway to reduce

environmental impacts of buildings and related infrastructure. The GBS proposes 15 specific changes to bylaw and zoning guidelines, including one related to urban agriculture. The approved council report on the GBS states that the strategy will aim to "contribute to a sustainable food system by ensuring provision of permanent facilities for urban agriculture on rooftops, podiums and ground-level landscaped areas such as courtyards" (City of Vancouver, 2007a, Appendix A). Formulating the GBS has been an interdepartmental process that has raised awareness about UA among city departments and agencies. The city is also developing a set of urban agriculture guidelines on shared garden plots and edible landscaping for private developments (City of Vancouver, 2007b). While not yet formally approved, they are intended to assist applicants in preparing, and city staff in assessing, development applications.

We cannot say with certainty that the inventory caused these policy developments, most of which apply to private lands, unlike the inventory. However, they do demonstrate the growing robustness of the City of Vancouver's commitment to UA. We believe the inventory was a basic first step to this, since it supports city planners' and policymakers' taking UA into consideration when making decisions about land use and development, or existing parallel policy processes such as the GBS.

We also conclude that while the inventory built upon a preexisting municipal sustainability agenda, it also contributed to this agenda. It highlighted the link between UA and broad sustainability goals of other city initiatives: green building, eco-density, neighborhood planning, and social planning. However, we observe only limited links between the inventory process and advancing the social dimensions of sustainability in the Vancouver case, particularly where broad public participation is concerned. The Vancouver inventory was largely an internal process, directed by the Social Planning Department, though it involved the Food Policy Council and the Engineering Department as key actors. The scope was smaller than in the Portland case, and there was less public awareness of the inventory and participation in its development. And though the inventory process may have increased the awareness of UA's potential among city staff and the city council, more buy-in will be needed. The inventory has strengthened relationships between city departments, community groups, and UBC, but its potential as a public engagement tool has not been fully realized, though it did lead to several subsequent reports and student and community-led projects with more public involvement. For example, the second phase of the inventory identified additional sites on public land that were included in six community consultations as part of CityPlans,

Vancouver's neighborhood visioning program. The results demonstrated that Vancouver citizens strongly support UA and hope to see more of it in their communities.

Discussion and Conclusions

Thus we found that the Portland inventory both enabled integration of urban agriculture into planning and policymaking and advanced social and ecological sustainability. Vancouver achieved similar integration into planning, but the smaller scope of the effort meant it did little for public involvement and social sustainability. We also identified a number of important similarities and differences between the two cases that may be instructive for better understanding links between land inventories, UA, and sustainable communities.

Similarities Between Portland and Vancouver

Both Portland and Vancouver aligned UA with existing municipal policy directions and priorities, most notably, sustainability agendas. In Vancouver's case the specific focus was a sustainable development paradigm aiming to achieve social, environmental, and economic benefits. In Portland's case, the initiative contributed to a food policy program managed by the OSD, which emphasized growing food locally among other social and ecological goals. Thus, in both cases UA contributed to sustainability in ways that went beyond food production.

In both cases, political champions or other community leaders advanced UA. This was particularly true in Portland, where City Commissioner Dan Saltzman put forward the resolution to inventory all lands managed by the city in order to discover their potential for community gardens or other UA uses. Although Vancouver's leadership was until recently not linked specifically to the inventory, nor even to UA, the city did have an official food policy mandate championed by city councilors in a previous administration. In both cases, leadership also arose through city departments and community partners. In both Vancouver and Portland, community organizations had long been aware of issues related to local food systems, and citizens in both cities had significant knowledge and experience before the inventories took place.

Another similarity is that in both cases, the cities used partnerships with local universities. In Vancouver, graduate student interns from UBC regularly worked on food policy projects, and the city's Social Planning Department had ongoing partnerships with UBC's Faculty of Land and Food Systems and Simon Fraser University's Centre for Sustainable Communities. In Portland, budget constraints led the Commissioner's office

to ask master's students in the urban and regional planning program at Portland State University to spearhead the project.

Differences Between Portland and Vancouver

We find it very important that Portland engaged many community partners in the entire process from design to implementation whereas Vancouver did not. In this way, the Portland inventory became what the scholarly literature identifies as a "networked movement," promoting more inclusive and participatory local decision making, and encouraging citizen engagement and buy-in. Portland also convened an advisory council made up of stakeholders, including community gardening staff, planners, and representatives from city bureaus. Dozens of food activists were interviewed and involved in the project. Portland also used nontraditional outreach techniques that highlighted storytelling and relating personal experiences. One notable example was a 22-minute documentary created by the students that won an award in a local film festival, and has since been distributed to many local and national interest groups as an educational tool. In contrast, Vancouver's inventory had a lower profile, and was led by a single city department. Now that the inventory is complete and support for UA is growing in Vancouver there are signs that this may be changing. The 2010 garden plots challenge is one indicator of this shift.

Acknowledgments

Notes

1. Since definitions of *green* communities do not necessarily include the social dimension of development, we purposely refer instead to whether communities are

sustainable. Accepted definitions of sustainability (although they themselves vary) often evoke balance between ecological and social goals, including quality of life, care for the environment, ecological carrying capacity, thought for the future, the precautionary principle, fairness and equity, participation, partnerships in decision making, long-term planning, resilience, and viability (Hanson & Lake, 2000, p. 8; Jepson, 2001; Rees & Wackernagel, 1996).

2. This article is based on a workshop delivered by the authors in October 2006 at the Food Secure Canada/Community Food Security Coalition conference in Vancouver, British Columbia. All of the authors were involved either in creating the land inventories, or as members of municipal planning staffs facilitating them.

3. Since cities in the global south have been proposing potential solutions to their own serious urban food system vulnerabilities for some time (Argenti, 2000; Dubbeling, 2001; 2006; Food and Agriculture Organization of the United Nations, 1998, 2000a, 2000b; International Development Research Centre & Urban Management Program for Latin America and the Caribbean, 2003; Koc et al., 1999; Mougeot, 2000; Rocha, 2001), more and better comparative research on this topic could be very useful to U.S. and Canadian planners. Moreover, it is important to note that a number of cities in the global south have successfully undertaken land inventories to further UA agendas, inlcuding Cienfuegos, Cuba; Rosario, Argentina; and Dar es Salaam, Tanzania. However, a close examination of these cases is beyond the scope of this article.

4. The American Planning Association Food System Planning White Paper, prepared by the APA Food System Planning Committee, defines a food system as "the chain of activities connecting food production, processing, distribution and access, consumption, and waste management, as well as all the associated supporting and regulatory institutions and activities" (APA Food System Planning Committee, 2005, p. 2).

5. Notable exceptions in the global north include the promotion of household and community gardening for food security in times of economic and political crisis (e.g., the discussion of British allotments and Canadian war gardens in Mougeot, 2006).

6. In the City of Vancouver, private applicants for rezonings may be required to provide community amenity contributions (CACs) to help address growth costs, area deficiencies, and/or other community needs and impacts likely to result if the rezoning request is granted. CACs may be provided as cash contributions or as in-kind amenities. In-kind CACs are generally capital facilities, but may also involve associated operating costs (City of Vancouver, 2005).

7. This quotation comes from McCall's now-famous opening address to the 1973 Legislative Assembly on January 8, 1973. Later that year, after much campaigning and negotiation, Oregon's Senate Bill 100 was passed, creating the state's innovative land use system.

8. The City of Portland's bureaus and agencies are managed by a mayor and elected

commission of four others. Commissioner Dan Saltzman's portfolio includes the following Portland bureaus: Office of Sustainable Development; Children's Investment Fund; Portland Parks & Recreation; and Cable and Franchise Management.

9. The Sustainable Region Initiative (SRI) provides "a framework, vision, and action plan for Greater Vancouver based on the concept of sustainability that embraces economic prosperity, community well-being, and environmental integrity. The intention is for Metro Vancouver to be the catalyst for a process which has many owners and many actors who are engaged in the task of providing for a better region for this and future generations" (Metro Vancouver, 2008).

10. The ALR was not intentionally designed as an urban containment boundary, and growth management is beyond the scope of the Agricultural Land Commission Act.

11. The Social Planning department hosted the graduate intern as part of ongoing partnerships with UBC's Faculty of Land and Food Systems and School of Community and Regional Planning, as well as Simon Fraser University's Centre for Sustainable Communities. The intern, who proposed the idea of an inventory, then worked under the guidance of city staff to design and carry out the project. The inventory became the basis of the intern's final graduating project (Kaethler, 2006).

12. The Vancouver inventory found that many of the city departments contacted could not provide records on vacant or underutilized land under their management, meaning much remained to be done to complete a comprehensive review of available city land.

13. Vancouver and Whistler, British Columbia will host the 2010 Winter Olympic and Paralympic Games

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List of Figures

[Enlarge Image]
Figure 1. The Diggable City project inventory of potential sites for urban agriculture in Portland.

[Enlarge Image]
Figure 2. The inventory of potential urban agriculture sites in Vancouver.

List of Tables

Table 1. Diggable urban agriculture categories.

Category	Pervious su
Community gardens	At least 7,500 sq. ft.
Small-scale growing operations	Less than 10,890 sq. ft. ()
Large-scale growing operations	More than 10,890 sq. ft. ()
Growing on impervious surfaces	At least 5,000 sq. ft.