

GROWING THE DESERT: URBAN AGRICULTURE
LAND USE POLICY IN THE AMERICAN WEST

by

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Abstract

The term “food system” refers to anything involving the production, processing, distribution, selling, consumption, and disposal of food. Research on food systems is an increasingly active area of focus in several academic disciplines. Moreover, communities around the world are taking an active interest in food from policy and planning to grassroots organizing and entrepreneurial activity. A particularly active area of research revolves around case studies that attempt to explore the institutional climate for urban agriculture in specific communities, including policy efforts and barriers to urban agriculture implementation. In the United States in particular, several recent studies have focused on and compared cities like Portland, Seattle, Boston, Philadelphia, Chicago, San Francisco, among others.

However, notably absent from food systems and urban agriculture literature in the United States is any treatment of the American West, specifically the arid and semi-arid regions between the West Coast mountains and the 100th meridian. This region has grown rapidly in population and developed urban and suburban area in the last several decades and is home to some of the largest metropolitan areas in the country. Little is known, though, about how these communities are dealing with urban agriculture. Further, peculiarities of climate, geography, legal and institutional structures, history, and culture in the West compared to other regions may influence the development of urban agriculture systems in Western cities. This thesis attempts to fill this gap in knowledge.

In this thesis, I utilize detailed case studies in two Western cities, Albuquerque and Denver, to examine whether these communities approach urban agriculture differently between each other and compared to other cities in the country because of the region in which they are located. Interview responses are analyzed and compared, and background research on existing policies, ordinances, planning efforts, grassroots organization, and nonprofit work is examined to elucidate similarities and differences in how local governments interact with various urban agriculture stakeholders.

I: Introduction

The way food is produced, processed, distributed, and consumed has vast impacts on the environment, the economy, and society. Agricultural industrialization since the mid-twentieth century created a situation in which a large number of residents of most developed countries who live in cities and suburbs are unaware of where, how, and by whom their food is produced. However, recent increases in environmental awareness and the popularization of concepts of sustainability have piqued interest in how people feed themselves. This increased interest is no longer solely the realm of a small, environmentally minded subset of the population—it has reached into the depths of large-scale U.S. retail, processing, and distribution. The interest in local food across the developed world is doubtlessly growing. Although this interest affects many facets of economic, political, and cultural life, land use issues take on particular significance where local food systems in growing urban areas are concerned.

Food production, processing, distribution, retail, consumption, and waste management together define the operational components of a food system. They prove to be extremely complex issues in the built environment, specifically in large metropolitan areas. The complex histories of urban areas demonstrate an ongoing, deliberate separation of food production, necessary for human existence, from the act of existing for the vast majority of urban and suburban dwellers. As the percentage of people living in urban areas recently passed fifty percent globally and

over eighty percent in the United States, this disconnect affects a growing portion of people. For example, in the United States, the percentage of the workforce employed in agriculture declined from forty-one percent in 1900 to two percent in 2000 (Dimitri, Effland, and Conklin 2006). This major employment shift, along with the rapid spatial expansion of cities in the post-World War II suburban housing boom in cities across the country, necessitated the creation of an extensive agricultural infrastructure system designed to deliver inexpensive food to growing urban and suburban areas. Changing cultural values, including an evolving notion of the primacy of privacy and home ownership and enduring conflicts of race and class in large cities, informed and accompanied a change in the financial and land use regulatory environment that also contributed to the industrialization of agriculture and its removal from the urban environment. Additionally, the glut of chemical production capacity after the end of World War II spurred a shift to the manufacturing and use of synthetic fertilizers and pesticides. This contributed to the sharp decline in agricultural employment, as ensuing economies of scale and the introduction of very large farm equipment vastly increased the amount of land one person could manage. These factors, while hardly the entire story, went a long way toward divorcing cities from the act of food production, processing, and distribution.

Why, then, has there been notable attention paid to food systems in urban areas lately? American cities have many reasons for desiring to encourage the development of robust, sustainable, and resilient local food systems. Urban

agriculture, which includes home and community gardens, the economic activity resulting from small-scale sales of homegrown food, rearing animals for food in cities, small market farms, and entrepreneurial endeavors on brownfield sites, as well as the systems of processing, distribution, consumption, and waste management that deliver food around the urban area, is in fact increasingly a topic of interest for local and regional governments, in addition to the ongoing interest from entrepreneurs, nonprofits, and citizens in their private lives. This interest has grown for a variety of reasons, including public health, economic and community development, and sheer volume of public interest. Another major reason for the increased interest in urban agriculture is that a growing segment of the population and decision makers are interested in building more sustainable, resilient, and ecologically responsible cities.

Although the word “sustainable” has multiple and complex meanings, in this case it refers to “the ability to meet the needs of the present without compromising the needs of future generations” (World Commission on Environment and Development 1987: 57). Cities may aim to become more sustainable by creating laws and incentive structures to safeguard land and other natural resources, prevent sprawl, and reduce reliance on nonrenewable energy, for example. An increasing number of cities and regions around the nation and world are developing sustainability plans, which provide policy guidelines and goals that reflect an overall desire to maintain a high quality of life for residents while conducting business in a

more sustainable fashion. Resilient in this case refers to “the capacity of the city (built infrastructure, material flows, social functioning, etc.) to undergo change while still maintaining the same structure, functions and feedbacks, and therefore identity” (Holling 1973, quoted in Pearson, Pearson, and Pearson, 2010 p. 7). Some urban areas are attempting to deal with threats posed by climate change and other perturbations with engineering solutions and by enhancing the ability of the ecosystems in their surrounding environments to absorb changes in temperature, precipitation, diseases and pests, and other elements related to global climate. Facing an uncertain future, communities, food policy councils, and regions have begun to plan for not only sustainability but also resilience. Many local and regional governments have sought to promote local food economies with public land use policy, and advocacy groups work within and at the edge of those policies. These promotions include regulations such as zoning, public-private partnerships, provision of infrastructure, formation of task forces and commissions, comprehensive plans, land market manipulation, and other strategies. Which policies government employs to this end, and their relative successes, depend in large part on a combination of social and political factors within and outside an urban area.

To date, the most prominent examples of urban agriculture as part of a local food system in the United States are cities and communities where ecological conditions are conducive to farming and where agriculture plays important political

and cultural roles. The urban agriculture experiences of these communities, which include cities such as Chicago, Portland, San Francisco, and Boston among others, will be expanded upon in greater detail in the literature review. Their efforts form the basis for ongoing evaluation of whether planning and policy interventions in local food systems are having their desired effects, a research topic of critical importance in the planning field.

Cities in the vast American West, on the other hand, have received scant attention to that effect. Urban areas there, including Los Angeles, Phoenix, Las Vegas, Denver, Albuquerque, and Salt Lake City, are younger compared to many other cities, have seen explosive growth in recent decades, and face additional challenges to the food system that other cities in different environments might not face. These challenges may include an inhospitable climate (primarily in the form of lack of water and arable soils), differing legal and cultural conceptions of water rights and land use, and a different political landscape. However, in the face of a changing climate and an uncertain future regarding water, energy, and political situations, these rapidly growing cities located in deserts and mountains have an additional imperative to make themselves more resilient and sustainable.

This thesis seeks to expand on existing research by studying how cities in the American West are addressing, interacting with, and shaping issues of urban agriculture and sustainability. It employs a case study approach on two Western cities: Denver, Colorado, and Albuquerque, New Mexico. The analysis takes two

primary forms. First, I present a brief overview and analysis of the regional context, current policies, laws, plans, discussions, land use change, and natural resource constraints relative to urban agriculture in each city. Second, I employ a series of semi-structured interviews with planners, policymakers, local advocates, entrepreneurs, nonprofit leaders, and other major stakeholders in local food issues to deepen our understanding about how urban agriculture fits in the larger context of their respective communities.

This thesis first asks how and to what extent governments, advocacy groups, planners, and citizens in these two large metropolitan areas in the American West are promoting and interacting with urban agriculture. It examines whether the lessons learned from successes and failures of urban agriculture policy in other locations can be applied to these environments. And it asks whether a different land use approach to urban agriculture is required because environmental conditions, political and legal issues, and cultural attitudes toward land use are different in the American West. In particular this thesis seeks a greater understanding of the ways in which water, land use trends, and differing conceptions of the best uses of land shape both the public's interest in urban agriculture and the land use policies that cities employ to that end.

In analyzing these cases, it becomes clear that while urban agriculturalists in Albuquerque and Denver share many barriers and opportunities with like-minded people in other cities around the country, there are noticeable differences both

between these two cases and other cities around the country and between the two case cities themselves.

Because this topic has not been addressed in academic literature, few questions will be definitively answered. Essentially, I take some familiar questions about urban agriculture and land use policy that typically are not given a regional environmental, cultural, and legal context and ask them in a new way that begins to address what happens when those contexts are applied to specific places. The case study approach I employ has both obvious drawbacks, being inherently difficult to generalize from, and obvious advantages, allowing communities that may find themselves facing similar challenges in a similar environmental, economic, and social context to draw selectively on the lessons learned by communities in the study. The ultimate question—whether urban agriculture is sustainable in Western cities in the long run—remains unanswered, but this thesis begins the process of building that body of knowledge.

II: Literature Review

1) Role of Food Systems in City Planning

Modern popular interest in local foods, food systems, and urban agriculture specifically can be categorized in three primary areas. First, the local food movement as commonly portrayed in wealthier communities and nations is based on the role of food in culture and quality of life and is in some ways an outgrowth of the Slow Food movement that began in Italy in the 1980s (Halweil and Prugh 2002). Second, disadvantaged communities around the world have increasingly emphasized viewing the ability to access healthy, nutritious food as a human right and a strategy for community empowerment. Third, interest in sustainable agriculture in the context of environmental quality and an increasingly dysfunctional and unsustainable industrial food system has gathered attention from those who care about such issues. These broad categories are not mutually exclusive; in fact, they are interrelated.

One need not look to academic literature to see the cultural impact of this growing interest. Even industrial retail giant Wal-mart is seeking to cash in on consumer interest in local food (Kummer 2010). Widely known statistics and trends on farmer's markets, community gardens, and Community-Supported Agriculture (CSA) bear this out. In 1994, there were 1,755 registered farmers markets in the United States; in 2011, that number has grown to 7,175, an increase of more than 400 percent over that span. The explosive growth of farmers markets has not

tapered off over time either, with the growth from 2009 to 2011 exceeding 136 percent, the largest 2-year increase since the USDA began tracking farmers markets in 1994 (U.S. Department of Agriculture 2011 (a)). Likewise, the number of community gardens in the U.S. has grown from approximately 6,000 in 1997 to around 18,000 today (American Community Gardening Association n.d.). CSA, a form of direct relationship between farmers and consumers in which consumers pay at the beginning of the growing season and receive boxes full of vegetables, fruits, meats, and/or dairy products at regular intervals throughout the season, has also grown in popularity. McFadden (2004) catalogs this growth, noting that CSA farms numbered approximately 60 in 1990 and 1,700 in 2004. It is clear that more and more people are taking part in local food systems as consumers, producers, or somewhere in between. Countless stories in the national press, magazines, blogs, television, and books reinforce this rapid expansion of interest.

An examination of academic literature also demonstrates a deep fascination from a planning, design, and policy standpoint with food as an essential element of society, as well as a rising modern interest in food systems, and specifically in urban agriculture, among planners, policymakers, and researchers. Food systems in academic literature long resided in the realms of rural sociologists, agronomists, and ecologists. Perhaps the earliest work on urban agriculture from a modern planning and policy perspective is Ebenezer Howard's *Garden Cities of To-Morrow*, in which Howard lays out his vision for future cities that incorporate municipal ownership of

agricultural land as part of the urban landscape (1902). Howard envisioned a vast network of small, mostly self-sufficient cities of 30,000 people organized around central squares and public markets, with agricultural land tied directly to everyday life and essential for broadly maintaining a moral character and connection to nature that the large cities of his day lacked. This concept of the modern city as bereft of any connection to nature *vis a vis* the pastoral landscape left behind is also reflected in Lewis Mumford's books and films and even further back, by authors like Henry David Thoreau, among many others.

In a more modern context, however, urban planners have only recently come to consider food systems to be within their purview. This came as a result of a seminal article by Kaufman and Pothukuchi (2000), which caused academics and practitioners who focused on the built environment to consider the role food plays in local and regional metropolitan areas. Central to the authors' argument is the notion that if a primary focus of the public planning and policy process is the "improvement of human settlement" by addressing the interconnections between various facets of the economy and society, food overlaps so many of these categories (transportation, land use, environmental quality, economic development, to name a few) that it should be a major area of concern for local governments. In the time since that article was published, an evolving body of literature on urban agriculture has begun to describe where projects are occurring, who is involved, and how they impact and are impacted by governing authorities and land markets. This body of

research has focused largely on the global importance of urban agriculture in both developed and developing countries, the roles it plays in community development and environmental improvement, and how these interest impacts and is impacted by land use policy.

Due to the influence of Pothukuchi and Kaufman's article and rising public interest and engagement in food issues, the American Planning Association (APA) has become deeply involved in food systems planning. In 2007, the body released a 24-page "Policy Guide to Community and Regional Food Planning," which covers some of the information presented here by making recommendations on specific actions planners could take to accomplish broad goals related to food systems (American Planning Association 2007). In 2011, the APA published another, longer report on urban agriculture, entitled, "Urban Agriculture: Growing Healthy, Sustainable Places" (Hodgson, Campbell, and Bailkey 2011). Other groups, including nonprofits and government agencies, have developed national resources for people interested in food systems issues that planners may find useful. For example, the American Community Gardening Association (ACGA) has produced a guide to starting and operating a community garden, and the Environmental Protection Agency recently released a guide to running an entrepreneurial urban farm as a business as part of its commitment to the Partnership for Sustainable Communities (U.S. Environmental Protection Agency 2011). That partnership, which also includes the Department of Transportation and the Department of Housing and Urban

Development, represents a new mode of collaborative planning occurring at the federal agency level. The APA, ACGA, and EPA are but a few examples of the organizations and agencies that seek to include food systems planning—and urban agriculture—in the overall planning efforts at multiple scales.

Recently, Raja, Born, and Russell (2008) briefly catalog the increasing involvement of the APA and private foundations in food systems planning. Their work also assesses the different levels of priority assigned to various potential elements of food systems planning by planners they surveyed; they argue that although there is wide variation in the kinds of interventions communities prioritize, the survey demonstrates growing recognition of the need to engage in food systems planning by planning professionals. Additionally, they offer profiles of six communities nationwide that are attempting to promote healthy eating by building up local food systems: Marin County, California, Madison, Wisconsin, Philadelphia, Pennsylvania, Louisville, Kentucky, Portland, Oregon, and Buffalo, New York. In examining recent efforts in these communities, the authors provide what they assess to be the valuable lessons for planners from each locale. Lastly, they provide a brief treatment of a number of possible planning interventions to encourage healthy eating through food planning, which fall under the broad categories of information generation, coordination and facilitation, programmatic efforts, plan making and design, and regulatory and zoning reform. Throughout, they reinforce Kaufman and Pothukuchi's (2000) argument that the food system is a

natural sphere of activity for land use and community planners because it intersects so frequently with other elements of public concern.

Specific tools of land use policy can, according to the evolving field of food systems planning, be especially useful in supporting, removing barriers to, and providing resources for urban agricultural activities. These tools and techniques will be addressed in the third section of this chapter.

2) Urban Agriculture

Although cities occupy two percent of the planet's land area, they consume seventy-five percent of its resources (UNEP 2005). Among the earth's roughly seven billion inhabitants, a full fifty percent now live in urban areas, including an average of seventy-five percent in the most developed nations and forty-five percent in less economically developed regions (Engelman 2009). More people living in cities than not is a new paradigm of global demographics and has major implications for how people and the natural environment interact.

Until the second half of the twentieth century, growing food in urban areas was the norm, not the exception. Globally, the importance of urban agriculture cuts across national and cultural boundaries. For example, De Bon, Parrot, and Moustier (2008) review trends in urban agriculture primarily in Africa and Southeast Asia. They highlight both the potential social and environmental benefits as well as the potential hazards of urban agriculture, such as unintended human health

consequences that result from heavy urban soil pollution. Pearson, Pearson, and Pearson (2010) note that, globally, urban agriculture engages some 200 million people and up to 80 percent of households in some nations, accounts for 15 percent of fruit and vegetable production in Australia, and forms an integral part of food security for many. Despite their assertion that urban agriculture in developed countries fulfills more of a recreational purpose, those authors state that the benefits of urban agriculture to cities in terms of sustainability cannot be ignored.

Urban agriculture can also provide benefits in terms of community development. Kaufman and Bailkey (2000) focus on entrepreneurial for-profit urban agriculture, citing projects in Chicago, Boston, and Philadelphia. They discuss not only the projects themselves, but also the interactions between them and various public, nonprofit, and community-based organizations and institutions and how their environments for doing business are constrained or enabled by these interactions. Beginning from the premise that urban agriculture can play a vital role in revitalizing vacant urban areas as well as produce large quantities of food (and thus economic activity), Kaufman and Bailkey (2000) find that government, private foundations, and community development corporations can play a huge role in supporting entrepreneurial urban agriculture; they also find that while there is widespread support for less controversial urban agriculture activities like community gardens, there is considerably more skepticism toward entrepreneurial activity.

Other authors have made important contributions to understanding and acting on urban agriculture. Jarosz (2007) describes emerging “alternative food networks,” or AFNs, whose complexities result from increasing urbanization and increasing demands by urban residents for local, seasonal food. Lapping (2004) discusses the benefits of strengthening local economies, particularly food economies, in the face of a globalizing food system. Likewise, McKibben (2007) tracks the evolution of an old landfill in Burlington, Vermont that now supports hundreds of acres of community farming in making a similar argument for strengthening local economies. Cohen (2007) describes how some suburban developers are incorporating small community gardens and farms into new developments. Campbell and Salus (2003) describe how land use policy and citizen-based land trusts collaborate to preserve an important source of local food in Madison, Wisconsin. This example also combines urban agriculture and community-supported agriculture with affordable housing in a unique land use policy experiment in community development.

Additionally, there is a body of literature and experience linking urban agriculture with community development and environmental justice. As C. Pearson states in his introduction to the urban agriculture issue of the Journal of International Agricultural Sustainability, “the impact of diminishing greenspace or urban food system failure will hit society’s poor first and hardest” (2010, p. 3). In the same issue, two articles deal explicitly with the role urban agriculture can play

in community development (Seymoar et al 2010; Karanja et al 2010). Growing Power, a nonprofit organization based in Milwaukee and Chicago, claims that its focus is on helping provide “equal access to healthy, high-quality, safe and affordable food for people in all communities,” particularly focusing on underserved and often minority populations in those large urban areas (Growing Power 2011). Also in Milwaukee, the Victory Garden Initiative harkens back to those World War II-era large home gardens that increased food security by promoting the growth of large home gardens (Victory Garden Initiative 2011). Redwood (2010) discusses the role of urban agriculture in alleviating the food insecurity of the urban poor. He stresses the importance of designing land use policies “in a way that accepts agriculture as a legitimate land use,” as well as policies that encourage the development of markets in which to purchase food produced in urban areas (Redwood 2010: 6). Because addressing the sustainability of cities includes making them more resilient, addressing development equity concerns is an integral part of promoting urban agriculture.

Previous literature also addresses how the environmental benefits of urban agriculture make it integral to efforts at making cities more sustainable. Pearson, Pearson, and Pearson (2010) single out the potential for urban agriculture to contribute to low-carbon-emissions plans, open space, waste recycling, mitigation of urban heat island effects, and others. Partnerships between urban food production and other institutions, such as restaurants, grocery stores, and large institutions like

universities can help recycle organic waste back into food production. Concerning water quality and stormwater runoff, urban agriculture enterprises, particularly community gardens, can decrease impervious surface area and help slow the rate of water runoff, positively impacting water quality and limiting erosion.

A major argument for urban agriculture as an element of city sustainability involves participants reducing their reliance on food imported into the urban area. Pirog and Benjamin (2003) analyze the average distance various fresh fruits and vegetables travel to institutions in Iowa using a Weighted Average Source Distance calculation. They arrive at the often-quoted figure that non-local (out-of-state) produce travels an average of 1,500 miles to reach its destination in Iowa. Despite debates over the carbon dioxide emissions and energy efficiency associated with different forms of food transport, there appears to be some evidence that food shipped long distances has a different taste and nutritional profile, although the issue is far from settled (Harvard University 2010). However, lest one forget that food is a political force, Desrochers and Shimizu (2012) recently published an economics book disputing the validity of eating locally, characterizing it as a solution looking for a problem. Regardless of the economics of food transport, consumers are increasingly indicating their preference for food grown nearby at farmer's markets and through growing their own food, indicating that they place some non-economic value on this characteristic.

As an element of open space and green infrastructure, urban agriculture is increasingly recognized as potentially able to increase biodiversity in urban environments. For example, although urban agriculture merits only one sentence in the short pamphlet entitled, "Ecosystems and Biodiversity: The Role of Cities," the United Nations Environment Programme recognizes that it contributes to "soil conservation, urban hydrology, microclimate improvement, and urban biodiversity" (2005, p. 1). In discussing the public health implications of urban agriculture, Brown and Jameton (2000) also argue that despite public health concerns such as soil contamination, pesticide drift, and bacterial content of compost, urban agriculture on balance has positive public health benefits, including reduced erosion and stormwater runoff, habitat preservation, improved air quality, and biodiversity enhancement in addition to smaller-scale benefits like personal and population health, increased exercise. Additionally, desire to start a community garden or other urban agricultural enterprise can prompt the remediation of empty lots or contaminated areas, even though contaminated soil is one of the more vexing challenges facing urban agriculture ventures (McKibben 2007; Kaufman and Bailkey 2000).

Other literature indicates the ways in which land use policy affects and is affected by the environment and by culture, and it is essential to understanding the prospects and potential pitfalls of urban agriculture (Jacobs 2000). Dillon illustrates some roadblocks that urban growers face in terms of zoning, property rights, and

evolving notions of whether certain agricultural practices are urban nuisances. “The challenge for cities,” she writes, “is to balance the potential to grow green businesses with the concerns of neighbors who don't want a thriving, for-profit enterprise next door, never mind the noise and smells that come from compost and small livestock” (Dillon 2010: par. 9). Even in communities with a strong network of community gardens, like Madison, Wisconsin, raising chickens for food outdoors was illegal until a 2004 ordinance, and slaughtering them is still prohibited (Mad City Chickens 2004). Kaufman and Bailkey (2000) identify cultural factors in the three cities they profiled in their work that contributed significantly to the state of entrepreneurial urban agriculture in those communities. For example, in Chicago, they found that the area’s strong historical ties to agriculture are one reason why despite slow movement by city government on some fronts, Chicago residents have always had the right to keep livestock within city limits. This effect can also be seen in Kansas City, Missouri, where recent passage of an urban agriculture ordinance that allows for sales of homegrown produce was in part made easier by a city code that had always allowed keeping animals, also due to the community’s agricultural past (Morales, Peck, and Covert 2012 (forthcoming)). Such research indicates that history and culture are important factors in what some communities deem acceptable and unacceptable urban activities, an observation that comes into play whenever discussing the potential pitfalls to new land use policies.

3) Land Use Planning

Land use planning, one of the primary areas of activity in the planning field, is the summation of all efforts on the part of landowners, planners, policymakers, developers, nonprofits, and other important interests to control and shape the uses of land. Land use planning in the public sector is most commonly associated with zoning, the most basic technique available to local governments for regulating land use. However, many other techniques have emerged as land use has become more complex and zoning's limitations have become more apparent. These techniques include purchase and transfer of development rights, creation of land banks, tinkering with land value and availability, formation of municipal or regional policy councils, comprehensive planning, public-private partnerships, land trusts, and several others. Many of these techniques merit a brief explanation with reference to planning for food and urban agriculture.

Zoning in its most basic form allows a local government to control what uses are allowed on any given piece of land. It forms the backbone of land use regulation. Most zoning codes were designed at least partially to protect residential property values from industrial and commercial uses and to strictly separate the urban from the rural. As a result, many of the zoning codes passed in the early- to mid-twentieth century can form a stiff barrier to the use of urban land for agricultural uses (Mukherji and Morales 2010). As previously mentioned, though, some cities have revised their zoning codes to clarify the rules regarding urban agriculture and

in some cases create whole new zones and districts in which agricultural activity is encouraged. The creation of new elements of the zoning code can be seen as enabling the ability to engage in some activities as well as constraining other activities. This was the case in Kansas City, where the City Council created protections in the zoning ordinance for not only growing food in urban areas but also selling it in residential areas. This expansion of the code to cover so-called “on-site sales” envisioned a specific vision of what would constitute acceptable urban agriculture activity, but it also enabled a newly legal form of economic activity, showcasing two primary roles that zoning can play in urban agriculture (Morales, Peck, and Covert 2012 (forthcoming)).

Other zoning innovations that pertain to urban agriculture include the use of planned unit development (PUD) or planned neighborhood development (PND) and the definition and delineation of diverse kinds of uses that might occur in an urban agricultural endeavor. PUD and PND differ from traditional zoning in that they act as a kind of floating overlay zone, allowing a developer to work closely with city staff throughout the planning and implementation process to make sure that a large project meets overall density and land use goals without being encumbered by ordinary zoning standards (Center for Land Use Education 2005). In PUD and PND, a city can establish a process of working with a developer to encourage urban agriculture as an element of a project, whether in the form of permissive use standards, allowing front yard gardens and on-site sales, or others. Albuquerque,

one of the communities profiled in this thesis, takes this approach. Other communities, including Madison, Wisconsin and Denver, Colorado have chosen to specify and define more diverse types of urban agricultural activity and set up a permitting process for some of those uses.

A complement (or precursor) to the activity of zoning is comprehensive planning. Early planning scholars and advocates, reasoning that engaging zoning without a plan for the future of a community could indicate government acting in an unreasonable and arbitrary fashion. Simply put, a comprehensive plan is an attempt by a community to determine its goals for the future and guidelines for how these goals might be achieved. What is or is not included in a comprehensive plan can offer a clue as to the level of importance of an issue or problem in that community. Communities that include food as a significant priority in comprehensive plans, including Dane County, Wisconsin and Marin County, California, demonstrate a commitment to addressing broad-scale issues of food security and access, community health and wellbeing, and sustainability (Raja, Born, and Russell 2008). Comprehensive plans look and function differently across the United States because under the federal system of government in the United States, each state chooses whether and how to empower local units of government to engage in comprehensive planning with no federal oversight or standards. The states that do require local governments to prepare a comprehensive plan differ in terms of what

a comprehensive plan should include and whether some communities are exempt, if any (Meck 2000).

Availability of land is one of the primary challenges facing urban agriculture, regardless of the specific urban area in question. Land tenure has emerged as a concern for many engaged in urban agriculture. Specifically, the tenure of community gardens is often an open question. In New York City, for example, the Green Thumb program, initiated in 1978 by city residents eager to turn some of the city's growing number of vacant lots into community garden space, did not protect the gardeners' tenure on that land. As a result, a battle between the city's desire to see these properties developed and residents' desire to protect their long-held garden space ensued in the late 1990s (Garfinkel-Castro 2011). Some of the aims of new urban development in general might conflict with the desire to have more urban agriculture in a city. For example, prioritization of increased densities and the use of tax incremental financing to encourage development of vacant and blighted lots has become an increasingly common tool cities use to encourage downtown development (Lawrence and Stephenson 1995). There may, therefore, be tension between the desires of some urban agriculture advocates, who want to see more underutilized land in cities be put into food production, and some advocates of New Urbanism principles like higher density and infill development.

One tool available to urban areas wishing to protect land from development, whether for urban agriculture or some other purpose, is the purchase of the

development rights associated with that land. These rights can be held in perpetuity as a conservation easement, or the city can facilitate the transfer of development rights from land it wishes to protect to land it wishes to see developed. Nordahl (2009) recommends that cities look to the marginal land they already own (for example, in rights-of-way and other land devoted to public infrastructure) to invest in fruit and nut trees and use public funds to protect these lands. Proponents of using public funds to protect urban land from development, whether for food production, recreation, open space, or some other purpose, argue that these values are public goods that deserve public investment. While the city can definitively protect land with this tactic, purchasing development rights in urban areas has a high opportunity cost, particularly as many have come to view dense urban areas as increasingly desirable places to live.

Land trusts and public-private partnerships have played an increasing role in land use planning in urban areas. Cities can facilitate the work that land trusts and other nonprofit organizations do by providing community development block grants or other funding mechanisms. They are sometimes aided in this effort by state and federal funding for open space and agricultural protection. Land trusts usually take one of two forms: community land trusts, which aim to acquire land for the purposes of affordable housing, and conservation land trusts, which aim to protect natural areas or agricultural land from development (Davis 2010). Inherent in the difference between these models is the kind of tension also seen in the

contrast between dense infill development and setting aside urban land for food production. However, some partnership models break this mold; a prominent example of this can be seen in Madison, Wisconsin, where the city of Madison used block grant funding to help a community and conservation land trust protect land for an innovative combination of subsidized housing, community garden, market farm, and natural area (Campbell and Salus 2003). While land trusts have been able to preserve land for urban agriculture in a more permanent way than zoning can, their efforts remain piecemeal and generally unable to protect large swaths of land or address sprawl in a systemic, meaningful way.

Local governments that seek to play more than a passive role in development of food systems and urban agriculture can set up city departments and offices specifically to provide resources, expertise, and training to people engaged in urban agriculture. This proactive, ground-level approach is often coupled with comprehensive planning. For example, the city of Seattle began participating actively in managing supply and demand for community gardens in 1973 with the establishment of the P-Patch program. This program, housed in the city's Department of Neighborhoods and administered by a nonprofit organization, is tied to the city's comprehensive plan, which aims to establish one community garden for every 2000 households in priority areas for dense, mixed-use urban development (Macdonald 2011). In Albuquerque, one of the cities profiled in this thesis, the comprehensive plan identifies open space protection as a key goal of the

community, and driven by citizen engagement, the city has enlisted the county and state and has invested in a process of working with landowners and farmers to keep land in agriculture in and immediately adjacent to the urban core.

Cities and metropolitan regions can also proactively engage in land use policy relating to urban agriculture, and the food system more generally, through the formation of food policy councils. According to the Community Food Security Coalition (n.d.), there are 102 food policy councils under various names in the United States. Thirty-four states contain at least one food policy council at the state, regional, county, or local level, and these bodies have a diverse range of focus, authority, and responsibility. Food policy councils generally contain representatives from all or most of the major stakeholders in the food system within a given sphere of influence. Some councils are strictly advisory and function as information providers to policymakers, while others are more directly integrated into the decision making process.

Nina Mukherji (2009) prepared a master's thesis entitled, "The Promise and the Pitfalls of Municipal Policy for Urban Agriculture." This work is important for three main reasons. First, it conducted some of the first primary research on the effectiveness of various potential land use policies regarding urban agriculture. In that capacity, it forms the basis for this section of the literature review. Second, it contributed to an ongoing discussion among public planners and policymakers about how best to engage the topic, as it was adapted into an article in the Zoning

Practice publication of the American Planning Association (Mukherji and Morales 2010). Third, it employed a case-study approach that was very influential to the proposal of this thesis topic and to its methodology.

Mukherji focuses specifically on the land use policy aspects of urban agriculture, undertaking case studies of Chicago, Boston, and Portland that address strengths and weaknesses of those cities' programs for promoting urban agriculture. Her study emphasized that a strong zoning code that supports urban agriculture ventures is helpful. However, the most successful land use policies also include strong bottom-up pressure from neighborhood associations and close work between planners, policy makers, and interest groups. This research, including the following work, on land use policy highlights the importance of regional and local government in creating the appropriate setting for a local food economy.

Mukherji (2009) identifies the following potential barriers to engaging in urban agriculture, even when citizen interest and knowledge is high:

- Financial barriers
 - Land acquisition
 - Contaminated soil
 - Cost of water
- Policy barriers
 - Zoning regulations that “stymie” urban agricultural activities
 - Outdated land use regulations that no longer apply (p. 21-23)

Part of this thesis, therefore, examines to what extent there are commonalities and disparities between the cities Mukherji studied and the two Western cities in this study. I use her typology as a starting point, but I want to know if additional barriers should be included. Therefore, her examination of what land use policies her study cities have used regarding urban agriculture is instructive.

In Portland, which has been known for leading the way planning innovations since the 1970s, the primary ways the city has encouraged urban agriculture are: favorable zoning, a livestock ordinance (last amended in 2008), a community gardens program that includes city land as well as leasing of private land, a school gardens program, composting for businesses, a farmer's market system, the Multnomah County Food Policy Council, and the merging of the Bureau of Planning and the Office of Sustainability. The city has produced three reports on urban agriculture: "Diggable City" from 2007, "Growing Portland's Farmers Markets," and a 2009 Climate Action Plan. Additionally, the city has ongoing projects, including a 50-year lease on a small urban farm and the City Hall Better Together Garden program. Lastly, as of 2009, the city was considering the following policies and programs to promote and encourage urban agriculture: including it in an update of the comprehensive plan, removing barriers to rooftop gardening, incorporating community gardens and affordable housing, expanding the availability of

community gardens, expanding their composting program, and gardening on unimproved streets.

Mukherji also catalogued the barriers that urban agriculture still faces in Portland. First, availability of land remains an issue, perhaps reflecting competing goals of urban agriculture and the densification required by the city's urban growth boundary. Second, the city charges urban agriculture operations city rates for water. Third, zoning impediments remain in multifamily, commercial, and industrial zones.

In Chicago, a much larger city, Mukherji observed the following programs and policies designed to encourage urban agriculture: favorable zoning, including an urban agriculture zoning overlay, chicken and compost ordinances, a Gardens Through the Parks program, school gardens in parks, the NeighborSpace and City Space programs, a land acquisition program, the city's notable Green Roofs program, GreenCorps, and farmers' markets. The city drafted an Open Space Plan in 1997 and the Eat Local, Live Healthy report. The city gives mid-term leases to urban agriculture outfits to help them secure land tenure, and the Growing Home project, begun in 2008, is an urban agriculture program of much repute.

However, Mukherji described Chicago's approach to urban agriculture as the least organized of the three cities she studied. Several different departments deal with the issue, making for a lack of centralization that can make it difficult for individuals to get involved. There are separate initiatives by the school district, the

Parks District (a separate agency separate from the city), and regular city departments.

Lastly, Boston regulates urban agriculture through: permissive open space zoning, a smart growth overlay zoning district, and a community gardens sub-district. Both the parks department and the department of neighborhood development own gardens, the city sells water at agricultural rates to urban agriculture outfits, and the Yard Sale program for vacant adjacent lots helps provide land for people interested in growing. Additionally, the city began a schoolyard initiative and a composting program in the 1990s, began coordinating businesses to implement rooftop gardens on grocery stores in 2008, included a chapter on community gardening in its 2006 open space plan, and formed a food policy council as a mayoral initiative in 2009. The city also leases and gives land to urban agriculture nonprofits and is considering making it easier to install green roofs and walls.

In analyzing her case studies, Mukherji focused on how they approach urban agriculture based on explicit permission in land use regulation, indirect efforts through technical assistance and marketing, and direct programs and funding. She also emphasized how each city in the study adapts to or is limited by its particular circumstances and set of values. For example, Chicago, which contains far more vacant land than both Boston and Portland, focuses on turning vacant land into urban agriculture projects. However, its size and diffuse responsibility make it,

according to Mukherji, a comparative underachiever. In contrast, she emphasizes the leadership of Boston's mayor, who has made urban agriculture a priority, and the strength of the city's neighborhood development organizations, with that city's relative success.

In their follow-up piece in *Zoning Practice*, Mukherji and Morales create a practical typology of urban agricultural activities that may help local governments decide what to do with various forms of on-the-ground activity. These categories fall along two continuums: the extent or dispersal of urban agricultural practices, and the intensity of those activities.

Extensive/Intensive Rural and peri-urban traditional farming	Extensive/Less Intensive Backyard and community gardens
Less Extensive/Intensive Nonprofit and entrepreneurial urban farms and farmers markets	Less Extensive/Less Intensive Limited to no urban agricultural activity

Figure 1. Typology of Urban Agricultural Activity. Mukherji and Morales, 2010.

In grouping urban agricultural activities in this broad typology, the authors both acknowledge the limitations of it, noting that there will be exceptions, and establish it as a potentially useful tool for policymakers, planners, neighborhood activists, and grassroots actors alike to prioritize activities for each community and tailor responses.

In sum, there is a burgeoning field of work regarding how local food and urban agriculture help create more resilient cities in terms of overall food

production, environmental effects, community development, and food security for urban communities. Although this literature is young, it is of growing importance in the planning field. In addition, work by Mukherji, Goldstein et al, and Kaufman and Bailkey, among others, is creating a increasingly rich body of knowledge about how cities and communities create and respond to demand for urban agriculture as a prominent use of land. A particularly popular area of interest is in case studies of specific communities. Because there is a seemingly never-ending combination of policies, programs, relationships, barriers, and opportunities that produce the particular on-the-ground expression of urban agriculture in each particular urban area, statistical analysis and generalization is extremely difficult. Rather, Mukherji's approach exemplifies the current state of local-level urban agriculture research—case study oriented, focused on how communities qualitatively differ in their approaches to urban agriculture, and committed to evaluating the relative successes of various approaches.

4) The West

Notably absent from these accounts of urban agriculture system development in the United States is how the movement is progressing and developing (if it is doing so) in areas of the country less amenable to growing wide variety of crops, particularly in the West. Though the recent economic downturn and housing crunch may complicate the picture somewhat, the American West

(defined as all the mostly arid or semi-arid land between the Sierra Nevada/Cascade Range and the eastern edge of the Rocky Mountains, also known as the intermountain West) is still considered the fastest-growing region in the nation (Ohlemacher 2005; Bernstein 2006). One of the primary problems policymakers, environmental advocates, and planners have faced in this region is urban sprawl (Gersh 1996; Duany, Plater-Zyberk, and Speck 2000). Additionally, the complicated role of agriculture in the history of the West has included attempts to transform the land using irrigation, with unintended but disastrous consequences (Jackson 2002). The necessity of using irrigation to grow nearly all crops in the desert means that any discussion of Western cities being able to increase their resilience by promoting urban agriculture must necessarily contend with issues of water rights. There is a relationship between water and urban sprawl in the West; so much of the landscape is so unsuited for irrigation that land values are relatively cheap, which encourages rapid outward expansion.

The role of agriculture in the American West, and its relationship to urbanization, is a widely covered topic. For example, Robbins et al. (2009) discuss conversion of agricultural fields to rural residential development from a sociological perspective, stressing that changing population makeup has dramatically changed preferences in the West. There is a deep and expanding literature on water rights in the West that cannot be treated in any great detail here (for example, see Powell 1895; Reisner 1993; Dumars and Minier 2004; Bolin et al 2008). Yet water rights

heavily influence what kinds of land use can take place, and this evolving knowledge cannot be ignored. Larson, Gustafson, and Hirt (2009) link urbanization and development of agricultural land to western water rights regimes and groundwater overdraft problems.

Unlike water law in the Eastern half of the United States, which is known as the riparian doctrine and which is borrowed from European water law and management, Western water law emerged ad hoc in response to scarcity as the West was settled. The dominant legal doctrine in the region is known as prior appropriation. The two major elements of this doctrine are first, that senior rights holders have priority over junior rights holders regardless of their physical location in the watershed, and second, that if an owner of a water right does not use his or her water, the right will be removed and granted to the next most senior (U.S. Bureau of Land Management n.d.). As a result, there is a strong incentive to put water to use on the landscape, regardless of that landscape's fitness for that particular use. This has tremendous consequences for agriculture in the West that urban agriculture proponents elsewhere in the country do not face. For example, as a result of changing attitudes about water and the importance of agriculture, central Arizona, a former agricultural center, has rapidly urbanized at the expense of most of its agricultural land (Hetrick and Roberts 2004). For another example, prior to the passage of Senate Bill 09-080 in 2009, Colorado residents were legally prohibited from capturing rainwater for use on lawns or gardens because of earlier

rights held by downstream users. However, rainwater harvesting is only allowed when on residential property that is supplied by a well or could qualify for a well permit (Waskom and Kallenberger 2009). It is also important to acknowledge the growing role that treated and filtered household nonsewage wastewater—so-called “greywater”—is playing in irrigation and groundwater recharge. Households and organizations may, at some expense, install a system to recapture water from sinks, showers, bathtubs, and washing machines for reuse for other purposes. Small-scale urban agriculture operations may benefit from the ability to reuse greywater (Faruqui and Al-Jayyousi 2002). However, each state regulates greywater reuse differently, and the public health concerns associated with such systems make investment in them costly (Gelt 1993). Additionally, similar to Colorado’s restrictions on rainwater harvesting, reuse of water that would otherwise enter surface and groundwater flows may run afoul of the doctrine of prior appropriations (Waskom and Kallenberger 2009). How water law impacts intensive urban agriculture in a thirsty landscape is one important subject of this thesis.

Of course, cultural attitudes in the West toward agriculture, land, and water depend significantly upon the sub-region of the West in question. It is important to avoid painting the region with broad strokes; just as there are some counties in the region that conform to the standard views of “New West” and “Old West” economies and attitudes, there are others that are changing due to forces exterior to regional attitudes themselves. In the American West, although urban agriculture proponents

face issues of property rights similar to elsewhere in the country, the history of settlement and law in the West may exacerbate the property rights issue in political discourse and everyday interactions (Long 2008). It remains to be seen whether regional political differences provide different roadblocks to its expansion than have been experienced elsewhere, and this thesis examines that issue.

The question of who owns which land is also of central importance to where urbanization and agriculture can or cannot occur. Unlike areas east of the hundredth meridian, government-owned lands have an enormous presence in the West. The federal government owns thirty percent of the total area of the United States, but of that total land, sixty percent of it lies in the eleven Western states. In some states, including Nevada, Utah, and Oregon, over half of the land is owned by the federal government. What forms these lands take makes a large difference in both land use immediately on those lands and the constraints on the growth of urban areas. For example, the Bureau of Land Management owns millions of acres, but the vast majority of it is used as ranchland or is mined for mineral and fossil fuel resources. More immediately, some of the best traditional agricultural land in some areas is owned by Native American reservations, which both impacts available agricultural land and constrains the growth of urban areas like Albuquerque. The question of who owns land matters a great deal in a number of important dimensions, not least because of water rights that are attached to property. The traditional physical infrastructure and social organization of the *acequias*, irrigation

districts and water delivery systems pre-dating the Spanish in this part of the southwest, persist today in Albuquerque (Rivera 1998). The presence or absence of this social institution could make for differences in how urban agriculture is viewed and pursued.

An additional issue to consider regarding Native American land, agriculture, and water use is the application of the prior appropriation doctrine to such land. Since the doctrine is based essentially on “first in time, first in right,” and Native American tribes can logically state a claim to being first in time on many water sources in the West, this has the potential to cause enormous problems for Western cities. For example, south of Phoenix, Arizona, the Gila River Indian community farms over 16,000 acres and use 200,000 acre-feet of water per year to do so. In 2004, the community won the rights to a total of 653,500 acre-feet per year in a settlement under the Arizona Water Settlements Act (Kraker 2004; U.S. Department of Justice 2010). This act gives them priority rights under Western water law to a great deal more of Arizona’s allocation under the Colorado River Compact. This was a controversial agreement, particularly among non-Native policymakers in Arizona, but if the enormous Navajo Nation in the northeast corner of the state is able to secure anything close to its historical water rights claims, the Gila River community claim will pale in comparison (Jenkins 2003). This potential outcome should provide additional incentives for large cities in the West to become dramatically more sustainable and resilient.

Literature specifically on urban agriculture in marginal environments, though, is sparse. Much of this work is historical. Lillquist (2010) describes how Japanese Americans interned in the American West during World War II developed a robust “urban agriculture” system in the internment camps despite ecological limitations. Murphy (2001) relays efforts of some towns in China to use urban agriculture to halt the advance of the desert by stabilizing soils. Alon (2007) discusses Israel’s long and complicated efforts to “make the desert bloom.” More to the point, Morris, Gatzke, and Curtis (2009) identify efforts in Las Vegas to create a local food economy by supporting local farmers and by creating a distribution system between farmers and restaurant owners who highly value local food. However, the focus of this work is on restaurants and their relationship with farmers who are near to, but not necessarily part of, the urban landscape.

Other aspects of urban agriculture in research similarly show a disregard for what might differentiate regions of the country. In a recent book on localism movements, Hess (2009) devotes a chapter to urban agriculture as an expression of localism in a globalist context. In particular, he singles out climate as one of the salient differences between cities he studied: “We examined a range of cities with different climates, land values, and rates of poverty. We conducted interviews of representatives of community gardens in Boston, Cleveland, Denver, Detroit, Philadelphia, Portland, Sacramento, San Francisco, and Seattle [...] [and] a case study on the city of New York” (Hess 2009: 140). However, the substance of the rest

of the chapter has little to do with that aspect of urban agriculture, instead focusing on the relationship between gardens, nonprofits, and government. Denver is the only city examined with what could be considered a marginal environment for agriculture, and again, Hess' analysis of Denver's urban agriculture regime does not substantively address issues of climate.

Similarly, a recent survey of 16 American cities explores urban agriculture practices in those communities. Again, Denver is the only city on the list with the unique cultural, political, legal, agricultural, and hydrological situations facing cities in the country's vast intermountain region. The authors briefly mention urban agriculture's role in "waterwise" policies designed to conserve water use, but they are concerned with more universal aspects of urban agriculture land use planning, including zoning for animals, involvement of entrepreneurial nonprofits, general goals of the comprehensive plan, and similar issues (Goldstein et al 2011). These are important considerations, to be sure, but they do not get at the larger issue of the viability of urban agriculture in arid Western cities.

Despite the paucity of academic work on the subject of local food and urban agriculture in the American West, some regions and localities there have nonetheless worked toward that goal. For example, in 2009, the state of Montana passed a law to fund Food Innovation Centers in the state (61st Legislature of Montana 2009). This legislation recognized major gaps in the state's food infrastructure and, as an economic development strategy, provided these funds to

encourage entrepreneurial solutions. In particular, legislators and advocates like Missoula's Community Food and Agriculture Coalition, sought to connect the state's myriad small-scale cattle ranchers with local consumers through new meat processing facilities and networks (Hubbard 2009). In Albuquerque, the advocacy group Urban Chickens takes advantage of the city's lenient poultry land use policies to encourage raising chickens to encourage food sustainability ("Albuquerque mix" 2008). Additionally, that article cites the president of the New Mexico Farmers' Marketing Association, who frames production-scale urban agriculture as going beyond subsistence agriculture into creating healthy communities. In Tempe, Arizona, an abandoned lot was recently turned into an urban garden that involved collaboration between land developers and local restaurants in a similar vein to the case in Nevada cited earlier (Nanez 2010). In Boise, Idaho, the Sustainable Community Connections of Idaho group is preparing a Treasure Valley Food Coalition to address food sustainability (including urban agriculture) in the area (SCCI 2010). Meanwhile, the city council and planning department are in the midst of creating a new comprehensive plan for the Boise area that, for the first time, addresses urban agriculture as more than just hobby gardening, aiming to create a local food system that "will help reduce the community's reliance on outside food sources, support the local economy, promote community interaction, increase access to fresh produce, promote community health and help Boise City maintain an identity that is distinct from other communities" (Hoffman 2010: par. 11). In all of

these cases, from Montana and Idaho to Arizona and New Mexico, municipal and regional land use policy and citizen interest converge in an attempt to create an urban agriculture regime. It is clear that alongside more traditionally food-conscious urban areas in wetter climates, cities in the arid and semi-arid U.S. West have begun to take sustainability seriously and are looking at urban agriculture as a key element of their futures from sustainability and community vitality angles alike. However, as far as I can determine, no researcher has taken a serious interest in how these attempts are unfolding, particularly given the unique physical and social environments in those regions.

In sum, there is extensive literature on agriculture and urbanization in the American West, and a young but growing body of literature concerning urban agriculture as it relates to urban land use planning and sustainability. Yet, it appears that the growth of urban agriculture and local food policy and advocacy in the American West's mountains and deserts has received almost no scholarly attention. As described by Pearson, Pearson, and Pearson (2010), the study of urban agriculture is in need of further work on the institutions that constrain and enable urban agriculture as part of local food and a sustainable city. In light of that recommendation, this thesis attempts to begin filling these gaps by broadly asking the following:

- What has happened in urban centers in the American West in terms of establishing local food networks and urban agriculture ventures?

- What land use policies have local governments implemented, considered, or rejected in response to interest from organizations and individuals to promote alternative food networks and urban agriculture?
- What are the problems and barriers these groups face, particularly regarding biophysical, political, and cultural constraints on agricultural activities?
- How do these stakeholders in food systems view the limiting factors of the local environment in relation to other challenges?

III: Methodology

While there are advocacy organizations, research and policy coalitions, city and regional planning departments, and citizens in the American West who have taken up the issue of urban agriculture and local food in a serious way, no body of research on these efforts exists.

In terms of methods, this thesis roughly parallels work by Mukherji (2009). It is largely qualitative in approach, relying on case studies conducted via interviews and informed by reviews of land use codes, comprehensive plans, planning reports, and local media coverage of urban agriculture and local food issues. Two western cities are focused on Denver, Colorado, and Albuquerque, New Mexico. These are major, growing urban centers in the intermountain west and share generally dry climates with abundant sunshine and a lack of good cropland compared to other cities around the nation where urban agriculture has taken hold.

These cities were chosen for a number of reasons. First, in the course of preliminary research, a rough institutional mapping was performed on many cities in the American West, including Phoenix, AZ, Tucson, AZ, Boise, ID, Logan, UT, Salt Lake City, UT, Missoula, MT, and the two selected cities. These institutional outlines demonstrated that some of these cities are much further along in thinking about the issue of food planning than others. Therefore, the cities chosen are on the cusp of the food planning agenda in the West rather than a representative sample. While

this poses risks to the research design, it must be emphasized that this research fills a major gap in understanding and is therefore preliminary in nature.

Second, as major urban centers that have experienced a high degree of population growth and suburban development, Denver and Albuquerque have evolved different land use policy approaches to the same issues: combating urban sprawl, redeveloping central cities, and including issues of sustainability in their comprehensive planning efforts. As noted in the literature review, cities and metropolitan areas have become increasingly cognizant of opportunities to affect food systems thanks to both innovations in the planning field and citizen interest in what could broadly be termed the local food movement. Importantly, these cities face very different challenges than each other, including population, demographics, climate, history, and others. These cases cover established but evolving urban agriculture regimes in similar climates with vastly different political situations, historical trends, conceptions of place, and other differences.

It is also important to note that the inclusion of Albuquerque poses a theoretical challenge due to its history of Spanish colonial water law. This history means that farmers and residents in that area may have different attitudes toward infrastructure, natural resources, and the political and cultural roles of agriculture. However, that fact works to the advantage of this work. Albuquerque is like many cities in the West and around the nation whose infrastructure and cultural landscape were shaped by a dominant organizational model. Because this research

is exploratory, drawing out this connection may help cities around the American West more accurately apply the lessons of a diverse group of cities to their own unique circumstances.

This study attempts, through case-study interviews of planners, urban farmers, researchers, citizens, and advocacy groups, to identify the factors that have affected and continue to affect efforts to implement and act on urban agriculture land use policy. I use open-ended, semi-structured interviews to get a sense of the state of urban agriculture and local food issues in their communities, their impressions of the regulatory environment and how it has changed over time, the impacts of the political environment, principal barriers to urban agriculture, and where they see urban agriculture in their communities in the future. This is used to broadly compare urban agriculture in Denver and Albuquerque to efforts undertaken in wetter climates in an attempt to identify factors that affect the development of local food and urban agriculture networks. This component of the research follows from Mukherji's 2009 thesis.

The interview portion of this research consists of six interviews in Albuquerque and five in Denver, for a total of eleven interviews. Prior to conducting the interviews, a human subjects training was completed through the UW-Madison Social and Behavioral Sciences Institutional Review Board, and the protocol and written informed consent forms were submitted to and approved by the IRB. The interviews took place with city and regional planners, non-profit advocates, and

entrepreneurs. The interviews are semi-structured and designed to get interview subjects talking at length about their experiences and perspectives. However, I attempt to guide subjects toward identifying how the unit of analysis—local government—is interacting with interest in urban agriculture as an element of alternative food systems. The eight main topics on which I attempted to engage each interview subject included:

- Overall interest in urban agriculture in and the form that interest level has taken in recent years;
- The nature and quality of interactions between agencies of local government and organizations engaged in urban agriculture;
- Recent changes in land use policy and planning efforts and how those efforts have impacted activity on the ground;
- The most significant barriers facing urban agriculture;
- The impact of water law, infrastructure, policy, and attitude on urban agriculture;
- The availability of land as it affects the development and practice of urban agriculture;
- And views on the short- and long-term future of urban agriculture in their communities.

The interview protocol approved by the IRB and used in this research is included at the end of this thesis as Appendix A.

The other aspect of this research involved reviewing comprehensive plans, zoning codes, state and local laws, policy reports, and other land use policy documents pertaining to urban agriculture and the establishment of local food systems in the study cities. I sought to discover similarities and differences between cities with respect to the kinds of activity they do or do not allow and how they are framing the issue. I also reviewed local news media coverage of urban agriculture and local food systems to gain further understanding of how the cities are engaging with other stakeholders and addressing the issue.

This thesis is important because it concerns the choices that decision makers are making and will make in cities around the country that affect local food systems. Populations living in areas where it is not practical to grow crops without hydrology-altering irrigation may be interested in local food economies, and those whose job it is to create policy have a responsibility to determine the feasibility of urban agriculture for people as both citizens and stakeholders in the policy process. Whether a city in the southwest can adopt similar policy regimes around local food production as a city in the Midwest or Northeast is an important implication of this thesis, the conclusions of which could help guide land use policy in harsher environments. This thesis is aimed at planners, policymakers, entrepreneurs, and advocates who wish to promote alternative food systems in urban areas. As these actors determine how to proceed and how to engage various levels of government, organizations, and individuals, they can look to the policies, relationships, programs,

and barriers at play in the examples presented here to identify common ground and learn from others' experiences.

I proceed by breaking the body of this thesis into two sections by city: section 1 presents the case study of Albuquerque, while section 2 accounts for Denver. I break each section down into introduction, urban agriculture basics, zoning and permitting changes, comprehensive planning, public-private partnerships, water policy and planning, and cultural, political, and legal influences. Following the two cases, I present preliminary comparative analysis of the content of the interviews and background research in an effort to identify similarities and differences both among the two cases and between the cases and other cities. Particularly, I focus on whether the issues of water, land, culture, and law that make this region unique from others in the U.S. translate into differences in how urban agriculture systems develop here and how they are perceived from within. Lastly, I reflect on limitations of the research and suggestions for future study.

IV: Case Studies and Discussion

1) *Albuquerque, New Mexico*

Introduction

Albuquerque, New Mexico is the largest city in the state, with a city population of 545,852 and a regional population of approximately 908,000 in the Albuquerque Metropolitan Statistical Area (U.S. Census 2010(a, b)). The city of Albuquerque's population density is 2,926 people per square mile, lower than many other cities its size. At 35 degrees north and 107 degrees west, it roughly shares latitude with Flagstaff, Arizona, Bakersfield, California, and Amarillo, Texas. It is also the county seat of Bernalillo County, which has a population of 662,564 but a population density of only 571 people per square mile, despite containing the city of Albuquerque (U.S. Census 2010). This indicates that vast swaths of open country surround Albuquerque. The metro area is smaller in both population and size compared to Denver, and very rural, agricultural lands can be found minutes from downtown along the Rio Grande River.

Located near the northern edge of the Chihuahuan Desert, which encompasses 175,000 square miles in Mexico and the U.S. states of Arizona, New Mexico, and Texas, Albuquerque is more arid than Denver. It receives 9.5 inches of precipitation per year on average, most of which comes during the summer rainy season. Due to its location and elevation, its climate could aptly be described as high desert—it regularly experiences warm, sunny days and a sharp drop in temperature

at night (Earp, Postlethwait, and Witherspoon 2006). As a result, the growing season in Albuquerque is between 150 and 191 days, depending on elevation within the MSA (National Weather Service n.d.). The Rio Grande River, the second longest river in the United States, passes directly through the city at an altitude of around 4800 feet (Earick 1999). Albuquerque is bordered on roughly three sides by Native American lands and on the fourth by the Sandia Mountains. While the city's official elevation is 5,312 feet, its topography rises sharply from the river to the edge of the mountains, leading to sharp differences in soil, climate, and weather between different areas of the metropolitan area. Most soils in the Albuquerque area are desert soils with calcic B Horizons and very little or no O Horizon (very low organic matter). This is consistent with many arid and semi-arid environments where vegetation is sparse (Tischler n.d.). For example, while the soils in the Rio Grande floodplain contain a mixture of deep sand, silt, and clay soils that make for generally good agricultural conditions. To the west of the river, deep sand dominates, while to the east headed up the piedmont to the Sandia Mountains, soils are a mix of clay and sand, eventually giving way to weathered granite (Albuquerque Area Extension Master Gardeners 2006). As such, agriculture in Albuquerque has been most prevalent along the Rio Grande River, from settlement by Native Americans to the colonial Spanish to 20th and 21st century commodity farmers.

Albuquerque is governed by a mayor-council, or strong-mayor, form of municipal government, with a city council based on nine districts. The current

mayor, Richard Berry, has been in office since 2009. Albuquerque, like nearly all other major metropolitan areas in the West, has grown explosively in population over the last several decades. The city recorded a 22 percent growth between 2000 and 2011, and the metro area grew even faster, at a rate of 27 percent over the same period. Like many Western cities, it was a latecomer to the trends in urban decay and revitalization seen in Eastern cities in the mid-twentieth century. As its low population density shows, Albuquerque is not a dense urban area in comparison to older, more compact cities in the Eastern and Midwestern U.S. (“Albuquerque, New Mexico” 2011). Regardless, the area did experience significant suburbanization after World War II, but in the absence of dense urban development prior to that period, the vast majority of Albuquerque reflects a vehicle-oriented, sprawling development pattern with poor walkability.

Population projections by the University of New Mexico show Bernalillo County, where Albuquerque is located, growing to near 1 million by 2025 (Bureau of Business and Economic Research 2008). The presence of the University of New Mexico, the largest institution of higher education in the state, provides the city (particularly the downtown and Nob Hill neighborhoods) with a sizeable population of young people. In 2007, *Men’s Fitness* magazine named Albuquerque its “fittest city,” thanks to a conscious effort to develop and promote its outdoor recreation opportunities (“Albuquerque tops fittest city list” 2007). In recent years, the creation of New Mexico’s only Business Improvement District in downtown

Albuquerque, the Downtown Action Team, has spurred renewed interest in infill redevelopment and densification in the downtown area (www.downtownabq.com). Interest in the downtown area, particularly Old Town Albuquerque, has grown generally of late after the city's 32nd attempt at downtown redevelopment. While this may seem to be an unusual figure, Albuquerque has met with recent success renewing development interest in its downtown area after 31 attempts that met with little success (Sonoran Institute 2008). Nevertheless, the city still faces sizeable challenges of poverty, particularly reconcentration of poverty in more suburban areas (Kneebone et al 2011). The city's housing market weathered the market crash better than many others; the real estate bubble never inflated much in the first place. Indeed, the area's geographic limitations may have prevented this from happening (Lee 2011).

Urban Agriculture Basics

Albuquerque is home to a large and growing number of urban agriculture operations, as well as strong and committed involvement by local government agencies. The inventory of urban agricultural activity in the area includes at least 10 community gardens, 14 farmers markets, 11 CSA farms broadly in the Albuquerque area, a 50-acre community farm run as a public-private partnership with a nonprofit, and 316 acres of farmland actively managed by the city.

The popularity of urban agriculture in Albuquerque, as in most other US cities, has increased dramatically in recent years. All interviewees from the Albuquerque area made note of this fact and provided different examples. Sarah Wentzel-Fischer, manager of the Downtown Growers Market, the largest of the 14 area farmers markets, notes that there has been approximately a 20% increase in numbers of customers and vendors at farmers markets around the city (2012). The downtown market increased from four vendors a few years ago to more than 50 today (Gould 2012). Wade Patterson, at Sawmill Community Land Trust, which contains a large urban agriculture component, notes that he fields at least one call a week from people seeking his advice on community gardens and has received multiple visits from Bernalillo County extension agents seeking presentations on community gardening (2012).

The city council, former mayor Martin Chávez, and current mayor Richard Berry have been active in promoting community gardening. Chief among recent efforts is a recent community gardens task force, convened by Mayor Berry, that produced the Community Gardens Study Group report in 2010. The city has no coordinated community gardens policy like the one in Seattle, and the report is merely advisory. It contains a number of policy recommendations that would create high levels of support for community gardens, including: allowing community gardens in all zoning districts; permitting a limited amount of on-site sales to allow gardeners to share their harvest and build community; and revision of the municipal

code to remove confusing language that could unintentionally prohibit community gardens, among others. One potential issue facing community gardens in the area is that most of them are located on private land, which may cause issues of tenure insecurity in the future, although this has not been a problem to date (Patterson 2012). Nevertheless, the city has shown an increasing willingness to tackle a variety of urban agriculture issues.

Albuquerque's land use planning supports for urban agriculture include the following:

- Permissive zoning
- Form-Based Code
- Permissive livestock ordinances
- New Mexico Agriculture and Food Policy Council
- Open Space preservation program by city and Bernalillo County
- Strong commitment to public investment in agricultural protection
- Strong public-private partnerships
- Community Gardens study group report and recommendations
- Climate Action Plan that addresses local food and agriculture
- Urban agriculture education focused county extension service
- Mid-Region Council of Governments and Land Link program

Zoning and Permitting Changes

Zoning is one of the most basic and widely understood tools available to local government to regulate land use. Albuquerque's zoning code last received a significant change in 2009, when a form-based code was adopted as Ordinance 08-58. This code, like many form-based codes, eschews more traditional use-based land use regulation in favor of regulation of various types of buildings and how they must relate to the street and surrounding neighborhood. This code includes five new zones: two transit-oriented development zones, one mixed-use development zone, one infill development zone, and one Planned Neighborhood Development (PND) zone (City of Albuquerque, 2009). According to Mukherji and Morales (2010), one way cities can encourage urban agricultural activity is to promote it and support it as an important variety of open space in the creation of Planned Unit Development. While this research did not examine whether applications of the form based zones in the city has resulted in PNDs with urban agriculture components, this may be one strategy for success.

Besides the form-based code, there have been no recent major changes to the zoning code regarding urban agriculture. Curiously, Albuquerque's zoning code does not explicitly address urban agriculture, other than the animal policies (below). However, it does address it in a roundabout fashion by allowing agricultural uses in certain residential districts (City of Albuquerque 2009).

The city's zoning and permitting with regard to urban agriculture are some of the most permissive in the nation among many cities that are adopting or have adopted similar ordinances, including Denver. Regarding chickens, Albuquerque limits the number of birds at 15, which is very high compared to other cities (LaBadie 2008). Additionally, it allows backyard slaughter, does not limit location of chicken coops in terms of property lines and setbacks, and does not impose a fine (LaBadie 2008). Additionally, the relevant ordinance in the city's code (14-16-2-6, describing permitted uses in residential districts) allows for cows, goats, horses, and sheep, provided they are kept from grazing other properties and do not exceed animals-per-square-foot standards. Beekeeping is also a permitted use in Albuquerque. Although it is not addressed in the code, it has traditionally been allowed because it is not prohibited (Gould 2012). Albuquerque is not surrounded by a high number of large, more politically conservative suburbs to the same extent that Denver is, and its more visible and immediate agricultural history has made livestock ordinances for urban agriculture a virtual non-issue at the policy level.

Interviewees in Albuquerque had a mostly neutral to positive response concerning the city's handling and vision of urban agriculture. Several observed that the city has presented no serious obstacles to urban agriculture in their time at their positions, but also remarked that city government tends to be reactive about such matters rather than proactive. The city planning department prepares not only a citywide comprehensive plan, but also smaller-scale sector, or district, plans for

distinct areas. The city has approached urban agriculture mostly at this sub-municipal level, and its activity on the subject is more prevalent in some sectors than in others. Other comments from interviewees engaged in urban agriculture reveal the observation that city (like any other) bureaucracy moves somewhat slowly, and that while the city and county governments are full of people who support what they are doing, it can take time to get things accomplished. For example, Sarah Wentzel-Fischer, manager of the Downtown Growers Market, laments the somewhat arcane permitting system for farmers markets. While the growers markets currently operate under a memorandum of understanding with the city, markets technically fall under “special event” permitting despite their relative consistency and longevity, resulting in a permitting process Wentzel-Fischer describes as “trying to put a square peg in a round hole” (2012). These kinds of issues are common across the country.

Comprehensive Planning

The Albuquerque area falls under the purview of many planning efforts, some broader and some narrower in scope. Albuquerque’s comprehensive plan, the Albuquerque/Bernalillo County Comprehensive Plan and Planned Growth Strategy, was last amended in 2002. The comprehensive plan’s overall goals for the city are: provide for a range of housing options; encourage mixing of uses; reduce the distance residents need to travel to access basic needs; encourage a variety of

transportation choices; promote walkable neighborhoods; prioritize “human over automotive scale;” and make older neighborhoods as desirable as new ones (City of Albuquerque 2002). The 2002 plan does not mention urban agriculture, food production, or local food, but it does prioritize preservation of agricultural land in peri-urban areas where the soil and topography make sense. Recently, Mayor Richard J. Berry initiated a new comprehensive planning process entitled, “ABQ The Plan,” which is still in its early phases. “The Plan” is a planning effort that aims to create a long-term vision for the city, mostly surrounding large public projects. Little has been done beyond some visioning and a brief bit on the city website, which merely states a small number of projects being pursued, including a bike route master plan, bus rapid transit, and a river corridor improvements plan (2011). It is unknown what effects any of these efforts or whatever overarching vision emerges will have on urban agriculture.

Like many larger cities, Albuquerque has a series of “sector plans” that address smaller sections of the city. Some of the sectors in the city of Albuquerque that have sector plans include Nob Hill (2004), Downtown (2011), Northwest Mesa Escarpment (1987), and Sawmill (2002). Additionally, the Coors Corridor, on the west side of the river, was the subject of a 1984 corridor plan (“Planning Dept. Publications and Documents” 2012). It is at the sector planning level, states Gould, a city planner, that most of the urban agriculture-related legwork is being done.

The city of Albuquerque also has a climate action plan that deals with local food and urban agriculture. Like an increasing number of cities nation- and worldwide, Albuquerque is concerned about building resilience to potential future climate change vulnerabilities. Unlike Denver's climate plan, which contains no mention of urban agriculture or local food issues, the Albuquerque plan devotes a section to "Local Food and Agriculture." This plan ties the concept of producing more of residents' food locally explicitly to the city's goals for greenhouse gas emissions reductions by 2020, 2030, and 2050.

Albuquerque falls under the purview of the Mid-Region Council of Governments (MRCOG), a regional planning body covering Bernalillo, Sandoval, Torrance, and Valencia counties in central New Mexico. MRCOG, formed in 1969, performs planning, policy, and networking services on a wide variety of issues, including transportation, agriculture, workforce development, employment, land use, water, and economic development. While not possessing the legal authority of regional governments in Portland, Oregon and the Twin Cities in Minnesota, MRCOG performs many planning functions at an advisory level, its primary goal being to provide local governments within its jurisdiction with data and plans to help them make better informed decisions. In addition, as the Metropolitan Planning Organization for the Albuquerque metro area, MRCOG is responsible for managing and operating the New Mexico Rail Runner Express, the Albuquerque-to-Santa Fe commuter train (Mid-Region Council of Governments n.d.). MRCOG's work

regarding urban agriculture includes its agricultural programs through the Agricultural Collective, which will be discussed later in this section.

According to city planner Maggie Gould, there have been discussions recently regarding creating a larger urban agriculture vision for the city, potentially revolving around food security, but nothing definitive has come out of them (2012). Albuquerque has the benefit of precedents in other communities, such as Portland's *Diggable City* local foods plan and Denver's *Denver Seeds* plan (discussed later in this thesis), if it chooses to engage in such a planning process.

Public-Private Partnerships

The city of Albuquerque and Bernalillo County play a large and active role in land preservation. While some cities preserve agricultural land by employing an urban growth or service area boundary, establishing farmland protection zoning, or using purchase or transfer of development rights, Albuquerque is fairly unique in that it engages in outright acquisition of large amounts of land—currently at 366 acres and counting—to be held as public trust. The city itself, through its Open Space Division, owns and manages this land for both crop production and wildlife habitat. Albuquerque's approved 2012 fiscal year budget includes protection of open space as prominent community development and environmental protection goals. It protects open space (which includes urban agriculture) with a combination of trust funds and general obligation bonds, and in FY 2011 it funded open space

acquisition and renovation at the level of \$1.3 million. The open space expendable trust fund was funded for FY 2012 at \$2.7 million, a 3.5% increase. Additionally, the city adopted a development impact fee in 2005, and every year since, open space has received \$0.25 for every \$1 in impact fees collected. However, despite the attention given open space protection, the city does not address urban agriculture specifically (City of Albuquerque (a) 2012). This process of land acquisition was, according to Kent Swanson of the Open Space Division, driven by a large number of citizens who wished to preserve open space and the city's agricultural heritage (2012). This willingness to pay for large public acquisition of open space reflects the city's distinct cultural and historical influences, which will be discussed later. While the city engages with groups engaged in urban agricultural activity, it does so on an as-needed basis, and there is no formal structure in place (Gould 2012).

Included in this acreage is the Rio Grande Community Farm, a diverse 50-acre area. The Rio Grande Community Farm is part of the larger 138-acre Los Poblanos Open Space, the largest single piece of Albuquerque's Open Space program. As the most prominent public-private urban agriculture partnership in the metro area, the Rio Grande farm reflects a commitment on the part of local government to making Albuquerque's open space multifunctional and accessible to a wide variety of people with different interests. Located only a few miles from downtown and hemmed in by urban areas, Rio Grande Community Farm is the epitome of urban agriculture. In addition to the community farm, the Los Poblanos

fields contain significant wildlife habitat area, land grown in alfalfa for cattle, and an educational center. Most importantly, the acquisition of this land, in 1997 happened because of financial contributions from the city (through a voter-approved quarter cent sales tax increase), Bernalillo County, the Village of Los Ranchos, and New Mexico state government (City of Albuquerque 2012).

Many of the interviewees not employed by local government shared the general observation that while the city of Albuquerque itself was mostly reactive and neutral regarding urban agriculture, Bernalillo County's extension service has been much more proactive. For example, Bernalillo County is heavily involved in gardening and farming education (Anonymous, 2012). A common barrier to urban agriculture identified across communities, not just Western cities, is the need for education. This is a rich field for public-private partnerships, and Bernalillo County in particular has been very active in this area. This includes a newly created class that aims to teach aspiring farmers the business side of how to run a small, diversified market farm, which complements the Land Link program (see below) and the city and county's shared desire to protect open space, including agricultural land.

Another helpful program designed to capture private sector demand for farmland and irrigation rights, employed by the MRCOG, is entitled Land Link. This program is designed to connect aspiring farmers without access to land with people who are offering some of their land to someone who will put it into agriculture. The

deals reached by landowners and land-seeking farmers often involve an incentive to the farmer, including offering land for free in exchange for paying the water bill. The major advantage to the landowner is that while many of them do not wish to farm themselves, water rights, which in the West must be put to productive use to be kept, can remain with a property if someone else is able to use them (Anonymous 2012). The program has antecedents; for example, the FarmLink program in the Seattle, WA area, begun in 2000, functioned much in the same way (Brooks 2000). A crucial difference, however, is that that program was begun in response to a growth management law in Washington State designed to protect farmland, while the MRCOG program is a response to genuine interest in farming absent any cogent farmland protection plan. The vast majority of the land being offered in the program lies within Albuquerque's city limits, and while that does not necessarily mean that the agriculture is surrounded by urban uses, this places it within the realm of urban agriculture (Anonymous 2012). The willingness of local government to acquire land and development rights to protect agricultural land and open space and the centrality of this mission in comprehensive planning in the area also may help ease the pressures on existing farmland and give community gardens a sense of security they might not otherwise have.

Food Policy Councils

North of Albuquerque, in the state capital of Santa Fe, the organization Farm to Table works to further the creation of opportunities for sustainable and successful food systems activity. The three primary programs that Farm to Table runs are a farm-to-school program, a marketing network for farmers—especially minority, small-scale growers—in the Southwest, and one of the nation’s largest food policy councils. This initiative, called the New Mexico Food and Agriculture Policy Council, aims to “identify key food and agriculture policy issues and opportunities and address these priorities. [...] [It also works to] build the capacity of agencies, organizations, individuals and communities to advocate for local, state and national food and agriculture policies that most benefit all New Mexicans” (farmtotablenm.org). The food policy council’s work covers the entire state, but some of its work centers on the Albuquerque urban area.

The MRCOG also serves some functions of a food policy council in its four-county service area. The MRCOG Agricultural Collaborative operates the Land Link program and aims to build networks among agriculture- and food-related stakeholders in its four counties (Logan 2012). It also hosts meetings and networking events for people working in agriculture and local food, provides maps of food and grow-it-yourself resources, collaborates with the Growers’ Market Alliance and Bernalillo County extension to put on workshops and special events, and blogs about food and agriculture issues. However, the Agricultural Collaborative

is a program, not a statutory office or mandated service, and like many other programs it is dependent on federal funding. As a result, such work can be slow going and incremental (Logan 2012).

Nonprofit and Entrepreneurial Activity

While still small compared to other, larger cities, the nonprofits and businesses engaging in urban agriculture are growing in number and stature in Albuquerque. The significant increase in farmers and patrons at the area's farmer's markets, and the number of new farmers getting into the business within the urban area indicate rising interest and grassroots action in urban agriculture. The Sawmill Community Land Trust is a nonprofit membership organization focused on developing "vibrant, prosperous neighborhoods through the creation and stewardship of permanently affordable housing and sustainable economic opportunities." Sawmill acquired 27 contiguous acres northwest of downtown from the city, which had purchased the vacant land in 1995 and rezoned it for mixed-use redevelopment. Starting in 1999, the land trust began work on the Arbolera de Vida development, which when complete will contain 93 owner-occupied affordable homes, two large apartment complexes with a mix of lofts and senior housing, neighborhood retail, and significant open space (www.sawmillclt.org). In particular, Arbolera de Vida has a large community garden, of which Wade Patterson, Sawmill's project developer, is particularly proud (2012). This project is strongly reminiscent

of Madison, Wisconsin's Community GroundWorks, the community land trust with affordable housing and urban agriculture components discussed in the literature review.

Additionally, the food co-op in Albuquerque, La Montañita, plays multiple roles in the urban area's food system development. La Montañita, which has branches in Santa Fe and Gallup in addition to two in Albuquerque, recently got into the local food distribution business. Its food distribution warehouse serves as the hub for a 300-mile "food shed" around Albuquerque, and the co-op purchases from over 900 different local producers. La Montañita considers consumer education about fair and sustainable food one of its primary goals and engages in advocacy on behalf of those ideas, beyond simply being a purveyor and distributor of local food (www.lamontanita.coop).

Wentzel-Fischer has worked with farmers who sell at the growers markets to establish a business class for market growers, which when combined with the Land Link program at the Agricultural Collaborative could potentially have a multiplier effect on the economic viability of larger-scale urban agriculture in the Albuquerque area. These classes are quite popular, and Wentzel-Fischer believes they could help area farmers overcome a general lack of a viable market, which she identifies as a major barrier (2012).

Water Policy and Planning

Like all Western cities, water rights in the Albuquerque area are allocated using the doctrine of prior appropriation. Unlike many other places in the West, however, the Spanish *acequia* system of irrigation management and governance persists in Albuquerque and elsewhere in New Mexico to this day. The effects of this history and its modern infrastructure and cultural legacy impact the issues facing urban agriculture in the area.

Water is a past, present, and future concern for everyone farming or just living in the Albuquerque area. Historically, the area around the Rio Grande River has been irrigated by the *acequia* system since the 16th century, and by Native Americans prior to the arrival of the Spanish (Patterson 2007). The ditches of the *acequia* system are not only still in place, they also still function well and provide water to many landowners who maintain these rights. Management of the *acequia* system is covered in great detail in sources like the ones mentioned above, but it suffices to say that these water rights greatly impact the availability of water to potential or existing urban agriculture ventures in the Albuquerque area. According to Kent Swanson, virtually all water rights in New Mexico have been claimed, and it can be difficult to obtain water rights for agricultural purposes (2012). The primary issue is not a strict lack of water, *per se*, but rather cost; for organizations and individuals with ditch water rights, water is nearly free, but for anyone not fortunate enough to own *acequia* rights, water is prohibitively expensive. Swanson

notes that it costs the city of Albuquerque roughly \$10,000 per year to water the 50 acres of crops at the Rio Grande Community Farm, a cost of \$200 per acre (2012).

One local government policy innovation, the Mid-Region Council's Land Link program, also helps address water access issues. In some Land Link matches, the landowner who makes his or her land available owns a certain amount of water rights. Under the doctrine of prior appropriations, which governs water rights in the West, if an individual's water rights are not put to use on the land in some fashion, they are lost to more junior rights holders. This creates an incentive for landowners with water rights to use the water, even if their land is not in agricultural production. One reason for Land Link's success, according to an employee of the Mid-Region Council's agricultural cooperative, is that many of these landowners would prefer to see their land in agricultural production instead of just pouring water over a field of grass, which puts aspiring farmers at an advantage (Logan 2012). Combined with farming business classes coordinated by Wentzel-Fischer and others, the explosive growth of interest in farmers markets, and the distribution work being performed by La Montañita, this water use dynamic may help to enhance rather than limit urban agriculture.

Nearly all the interviewees from the Albuquerque area viewed water as a significant barrier to urban agriculture. Specific responses, however, varied from seeing water issues as an ultimate limiting factor to seeing it as a factor that can be overcome in time. Gould sees water as not an insurmountable problem for backyard

gardeners. However, once a backyard gardener begins to set her or his sights higher and tries to acquire more land to grow on for entrepreneurial or community garden purposes, water becomes a much bigger problem. As Gould and others describe it, ditch water is nearly free, but no new wells are being dug, and municipal water is expensive (2012). In contrast, an anonymous interviewee from Albuquerque sees the chronic water issues in that city as both limiting and liberating in the sense of ditch access and agriculture being valued so highly and the cultural associations people have with the *acequia* system leading to greater acceptance of urban agriculture communitywide (Anonymous 2012). Patterson (2012) suggests a policy change for the city and the Middle Rio Grande Conservancy District, which manages water supply, that would carve out an exemption or allowance for community gardens to keep gardeners from having to borrow water from neighbors, a poor long-term solution to the issue.

An additional issue facing the water aspect of urban agriculture in Albuquerque described by open space planner Kent Swanson is the increasing cost of maintenance of the *acequias*. As land along the *acequias* has been subdivided down over the years, gaining access to the ditches for cleaning and maintenance has become more and more difficult. Every landowner in the Middle Rio Grande Conservancy District pays a small amount of tax toward maintenance, but some, including Swanson, wonder if that money will continue to be sufficient into the future (2012).

Cultural, Political, and Legal History

Interviewees in Albuquerque had nuanced views of the effects of their community's history and culture on urban agriculture. In particular, expressions of the urban-rural divide prove a strong theme throughout the interviews, and views on the role of Native American and Spanish cultural and physical legacies provide crucial context. For example, Wade Patterson, of Sawmill Community Land Trust, sees a move back toward "traditional lifeways," in which people of Spanish or Native American backgrounds bring some of the practices of their ancestors back to practice, including traditional modes of agriculture (2012). For example, Patterson emphasized the diversity of crops grown in the traditional *acequia* farms during the Spanish presence in the Albuquerque area and even further back into pre-Columbian history (2012). This diversity included a robust seed trade among Mesoamerican tribes in the area, and the co-planting of corn, beans, squash, amaranth, and wild greens in ways that conserved water and soil health (Brothers 2011). The cultural richness of pre-industrial agriculture in Albuquerque, and in other areas of the southwest, appears to be making a comeback.

Four interviewees mentioned the urban-rural divide as a serious cultural issue impacting the degree to which urban agriculture is practiced in Albuquerque. Patterson (2012) provides some historical context:

What you used to have was a collection of smaller irrigation networks that were democratically controlled. [...] If there is less water that year, everyone

gets less water. In the 1920s, there was a move to really transform the area into a different economic model. A state agency was created that put levees along the river to control flooding. They took control of these democratically controlled water systems and took over management of them. The idea was, “we’re going to increase the production of this area and will be sending cotton and other products around the country and we’re going to make a mint.” Well, then the Depression happened, and then World War II came. A lot of those farmers went bust and took on wage labor jobs in Albuquerque and the whole economy shifted. That was the watershed moment that separated people in Albuquerque from agriculture.

Patterson also argues that the variety and diversity of agriculture in the Albuquerque area that disappeared in the 1930s to be replaced largely by cotton and alfalfa, but the rising popularity of farmers markets is driving resurgence in diverse growing (2012). It is clear from interviews that people in Albuquerque are proud of their long history of cooperative water management. In an illustrative example of the interconnected nature of environment and culture, this pride is born of scarcity, and the city’s identity is at least partially built around this history.

Gould discusses the difficulties of managing larger and more commercial scale operations, whether urban or rural, and how those difficulties translate to a fundamental difference between the increasing popularity of growing in small, urban areas and the larger farms that have become more rare in Albuquerque over

time. This might fairly be described as another form of the urban-rural divide. This disparity between urban and traditional rural agriculture is certainly not limited to Albuquerque, but the history behind the cooperative *acequia* model places the divide into relevant local context.

Sarah Wentzel-Fischer, of the downtown market, provides yet another perspective on the urban-rural divide. In asking, “Who grows, and who owns land,” she argues that issues of race and class divide the rural community in New Mexico just as they do in agricultural areas around the nation. She suggests that this may be less of a problem in the Albuquerque area than in surrounding rural areas, but because it contains such a large Latino population and has a distinct Spanish heritage, the city might be reasonably described as more sensitive to these issues than most (2012).

In thinking about urban agriculture in terms of race and class, the “urban-rural divide” mentioned by so many interviewees appears to be a particular local expression of this tension that is seen in many American cities. While none gave any indication that some racial or ethnic groups or economic classes in Albuquerque are any more likely to be resistant to urban agriculture, the interviewees described this tension in a ways that raise questions about access and who benefits from new urban agriculture regimes. In particular, it would be useful to delineate the demographic breakdown of new farmers using the Land Link program to approximate whether the renewed interest in urban agriculture based in

Albuquerque's unique history is translating to diverse racial, ethnic, and economic classes and groups.

2) Denver, Colorado

Introduction

Denver, Colorado is the capital of and largest city in the state of Colorado. The city's population in 2009 was 610,345, and the Denver MSA contained more than 2.8 million people, making it the 21st largest MSA in the nation and the second-largest in the Mountain West, surpassed only by Phoenix (www.city-data.com (b)). Like Albuquerque, Denver sits at a high altitude; its nickname, "Mile High City," comes from its official elevation of 5,280 feet above sea level, marked at the state capitol building. At 40 degrees north and 108 degrees west, it roughly shares latitude with Chico, California, Columbus, Ohio, and Baltimore, Maryland (National Weather Service). Cherry Creek and the South Platte River converge near downtown Denver, and since Denver is on the eastern edge of the Rocky Mountains, that water flows eventually to the Mississippi River and the Gulf of Mexico, rather than to the Pacific Ocean.

Denver sits at the transition between the Great Plains to the east and the Front Range of the Rocky Mountains to the west. It has a semi-arid climate, receiving about 15.5 inches of precipitation per year. Like Albuquerque, Denver has a broadly sloping topography and soil that is not generally suited to agriculture. In Colorado, soils are more often than not relatively alkaline, due in part to rainfall and parent rock material. While many vegetable crops in fact prefer soil that is slightly acidic (pH < 7.0), Colorado's alkaline soils most commonly have a pH of between 7.0 and

7.8, a range that can pose problems for gardeners and farmers (Whiting 2011). Additionally, farmers and gardeners in Denver (and in many parts of Colorado) face soils that are heavy in clay content and low in organic matter, a condition linked to the low rainfall in the region and therefore lower levels of vegetation cover compared to other states and regions (Pohly 2010). In particular, the Denver and Pierre Shale formations in the Denver area are noted for their massive water absorption when wet and rapid desiccation when dry, which causes structural engineering issues in addition to being poorly suited for agriculture (Chao et al 2008). Also like Albuquerque, Denver is prone to sudden shifts in weather; snowstorms are not unheard of in October and April, and Chinook Winds coming down from the mountains to the west can rapidly warm the temperature, even in winter (Denver.com n.d.). Unlike Albuquerque, which is bound on two sides by Native American lands and on another by mountains, the Denver metro area has few physical boundaries, save for the Rocky Mountains 50 miles to the west. As a result, the Denver metro area is much more populous and much larger geographically than the Albuquerque metro area.

Denver has a strong mayor and city council form of city government. While the council is nominally nonpartisan, the overall politics of the metro region are complicated. The city of Denver currently has a reputation of being fairly progressive and liberal, while the sprawling suburbs tend to be more conservative (Wyatt 2012). Colorado as a state was dependably conservative in national races for

a number of decades, but voted for President Obama in 2008, and Denver's growing population of minorities and young professionals may be at least partly behind that trend (Wyatt 2012). The Denver area is expected to add 1.3 million people to its total population by 2030, equaling roughly a 50% increase over the current population, with downtown and the northeast side absorbing a large portion of that increase (City of Denver 2012).

It is likely that a sizeable portion of that increase is due to Denver's increasing attractiveness to a population that values sustainability and specifically sustainable urbanism. In 2008, Denver was ranked 11th in overall sustainability rankings nationwide, and 12th in "Local Food and Agriculture" in the SustainLane rankings (Goldstein et al 2011). The Denver area is currently considered a hot destination for young professionals, many of whom are interested in living in vibrant urban areas in an environmentally conscious way (Jackson 2012). Although it is still an auto-heavy city, the recent launch of a light rail system has attracted nationwide interest and local ridership (Migoya 2012). The LoDo District, on the northwest side of Denver's downtown, underwent a radical transformation from neglected warehouse district to mixed use, New Urbanist mecca and is now the center of downtown Denver's nightlife (Lower Downtown Historic District 2008). Despite the city's overall efforts at sustainability, however, only one percent of food consumed in the metro area was produced in Colorado in 2010, according to the Denver Department of Environmental Health (2011). Definitions of "food" and

“local” matter, and different jurisdictions have different methodologies for estimating this number. For example, some studies estimate spending on local produce is as high as 16 percent for residents of the state of Colorado, Larimer County, and Boulder County (McFaddin and Sullins n.d.). Besides hinting at the need for more thorough studies in the future, these variable numbers indicate the lack of a comprehensive approach to analyzing food systems in Colorado as a whole and in Denver specifically. This lack of emphasis is not necessarily a surprise; Adam Brock (2012), Operations Manager at GrowHaus, a local entrepreneurial urban agriculture nonprofit, observes that for Denver, sustainability efforts typically involve energy and carbon emissions, with less of a focus on planning initiatives and urban agriculture.

Urban Agriculture Basics

Denver, like most other large U.S. cities, is home to or near to an increasing number of farmers markets, CSA farms, backyard gardens, and other forms of urban agriculture. According to Abbie Harris of the nonprofit Denver Urban Gardens, the Denver area is now home to 118 community gardens. She remarks that while several years ago only four or five gardens were being established per year, that number is now at 15 to 20 per year, with no signs of slowing down (Harris 2012). Additionally, there are 15 farmers markets in locations around the metro area (US Department of Agriculture 2011 (b)). Farms that operate using a CSA business

model also have a significant presence in Denver, with 21 such farms have share pickup sites in Denver (Moore Consulting 2011).

The success of Denver Urban Gardens, the simultaneous efforts of several relatively young entrepreneurial urban agriculture organizations, and directed leadership on the part of the Mayor's office illustrate the explosive growth of interest in local food in Denver.

Denver's efforts to engage with urban agriculture from a planning and policy perspective are as follows:

- Permissive zoning – innovative commercial farming provisions
- Recent and ongoing efforts to revise and clarify zoning and permitting
- Denver Seeds initiative – citywide vision for urban agriculture
- Denver Sustainable Food Policy Council
- Use of goats as weed management
- City composting program
- Denver Regional Council of Governments – Regional Resource Team

Zoning Changes and New Ordinances

Denver's zoning code was updated in 2010 to reflect new understandings of "garden" and "urban gardening." In the new code, "garden" is defined as a "facility for the growing and cultivation of fruits, flowers, herbs, vegetables, and/or ornamental plants." In contrast, an "urban garden" is a "public or private facility for

the growing *and/or selling* of fruits, flowers, vegetables, or ornamental plants by one or more persons” (emphasis added). The city created this designation to distinguish entrepreneurial urban agriculture (“less extensive/intensive,” according to Mukherji and Morales’ typology) from less intensive forms. Urban gardens as a potential use of land can have accessory buildings for storage, equipment, irrigation, and other uses and are permitted with zoning review in nearly all zones (certain types of open space are exempted). This designation has been nationally recognized as a significant achievement in urban agriculture land use policy, going beyond most community garden ordinances to single out expansion of entrepreneurial urban farming as an important land use goal (John et al. 2011). However, Tina Axelrad, principal city planner for Denver, cautions that this new element of the code is meant to apply to community gardens and CSA worker share models, not commercial farming.

Contrary to some updated zoning codes, the 2010 Denver code does not actually contain new zones for urban agriculture. Rather, it clarifies definitions and provides new structure. Unlike in Kansas City, where a new zoning ordinance allows on-site sales of locally grown food in residential areas, the Denver code prohibits it (Harris 2012). Allowing on-site sales in some form was specifically mentioned as an important goal for urban agriculture advocates going forward by two interviewees (Bertini 2012; Kraft 2012). According to the zoning code, sales of food produced are allowed in residential districts as long as it is accessory to a specified nonresidential

use. As such, there is nothing to keep residents of an area from selling their produce at a farmer's market located on civic or institutional space, for example, but they cannot yet sell from their own yards, as they can now do in Kansas City and other communities. Another change in the recent zoning update included allowing aquaculture and enclosed vertical farms in mixed-use zones (Axelrad 2012).

A couple of recent victories for urban agriculture advocates have resulted in new ordinances clarifying and codifying keeping food producing animals and bees. As mentioned in the literature review, this is certainly a national trend. Urban agriculture advocates in the city of Denver recently went through a bruising but successful battle to pass a food bearing animals ordinance. Poultry and goats are now allowed via a conditional permit (Kraft 2012; City of Denver 2010). Since the passage of Council Bill 548 in 2008, which amended the zoning code, beekeeping is also permitted (Mukherji and Morales, 2010). According to Axelrad (2012) these two ordinances "elicited strong reactions in the community, both pro and con." Crucial to the proponents' victory, she remarks, was providing a good deal of education to members of the public and to city council members to help them envision what the physical results of the proposed ordinances would be. She also noted, however, that the city had always allowed these activities but that the permitting was convoluted and difficult to obtain. The new ordinances cleared a path through process, permitting, and cost for a maximum number of animals and beehives.

The city is currently engaged in the process of making permitting for livestock easier, but as Kraft (2012) mentions, “many people in Denver are sort of waiting to see what happens in Oakland,” which entered mostly uncharted territory recently in debating rules on slaughtering in urban areas. The contrast with Albuquerque here is instructive; after all, the latter has a permissive and relatively noncontroversial chickens and bees policy. Regardless, Kraft and Bertini expressed positive opinions of city staff, noting that they have been helpful in getting such issues on the agenda of the city council. There has not been a great deal of permitting applications since their passage—as Axelrad (2012) put it, “the floodgates have not opened”—but this could be because people had been engaging in these activities anyway.

Comprehensive Planning

In Denver, as in Albuquerque, there are multiple layers of comprehensive plans at different scales. First, there is the vision for the seven-county Denver metro area, created by the Denver Regional Council of Governments. At the city level, the latest comprehensive plan was written in 2000 and updated in 2002 with the land use and transportation plan entitled, “Blueprint Denver.” The Denver area is also home to a multitude of neighborhood-, corridor-, and district-scale plans.

In the 2000 comprehensive plan, community gardens are mentioned only in a picture caption, and no mention is made of any other form of urban agriculture.

However, it marks an effort by the city to take seriously the then-young concept of sustainability. The primary challenge for city and civic leaders as they go about their business, the plan asserts, is to ask, “Does this action improve the quality of life for people?” It goes on to state, “if livability is the ‘what’ of Plan 2000, then sustainability must be the ‘how’” (City of Denver 2000, 5). While urban agriculture was apparently not a part of that vision in 2000, sustainability was, in the form of renewable energy, water conservation, walkable communities, and open space preservation, to name a few.

In 2005, then-Denver mayor John Hickenlooper (now Colorado’s governor) began the Denver Sustainable Development Initiative, which evolved out of his signing an international sustainability agreement of mayors. Chief among the components of that initiative is GreenPrint Denver, a comprehensive sustainability planning effort created by Hickenlooper’s Executive Order 123 in 2007. GreenPrint Denver, while not a “comprehensive plan” in the traditional sense, aims to introduce sustainability as a core component of what Denver stands for in all its endeavors. Its mission emphasizes both the public value of sustainability and its business sense. GreenPrint Denver’s initiatives and accomplishments span a wide array of sustainability categories, including achieving energy efficiencies, greenhouse gas reduction, water quality protection, and more. GreenPrint’s significant work to date is at least partially responsible for Denver’s rise in the rankings of the most sustainable and environmentally conscious cities in the nation. However, the only

mention of food systems or urban agriculture on GreenPrint's website is a copied definition of the latter from Wikipedia.

The city's climate action plan, unlike that of Albuquerque, makes very little mention of food and urban agriculture as one strategy to address climate vulnerability, merely referring on two occasions to the need to reduce the waste and emissions associated with food and on one to the role farmers are playing in the growing "Buy Local" ethos (City of Denver 2007). However, at least one smaller-scale comprehensive planning effort underway includes a local food component. The Denver Livability Program, a Transit-Oriented Development effort underway across the region, includes construction of a community kitchen to serve as a local food and urban agriculture hub and serve as a food-related business incubator (Axelrad 2012).

A new initiative begun by Mayor Hancock, Denver Seeds, will establish a city vision for urban agriculture. Its goals are to "support small businesses, create jobs, and shift food production away from large out-of-state industrial operations toward local growers" (Heirloom Gardens 2011). The mayor's election platform included explicit promises to address urban agriculture in new ways, a position that was encouraging and exciting to Sundari Kraft. The initiative is still in its formative stages, and the participants in this study have expectations ranging from skeptical to optimistic (Kraft 2012; Brock 2012; Bertini 2012; Harris 2012). This emphasis on encouraging urban agriculture as an explicit economic development tool places

Denver at the forefront of comprehensive planning for urban agriculture. However, the focus so far has been primarily on the production side, with less attention paid to processing, distribution, access, and consumption, meaning Denver still does not have a comprehensive vision of urban agriculture.

Like Albuquerque, the Denver area is home to a regional planning organization, in this case the Denver Regional Council of Governments (DRCOG). DRCOG serves many important functions, including transportation planning, overall regional planning, natural disaster planning, providing technical assistance for smaller jurisdictions, and more. DRCOG produced a food asset study that used geographic information systems (GIS) to analyze proximity to food outlets and other food access issues, which can help identify communities that would be good homes for a “food hub” (John et al. 2010). Additionally, DRCOG recently won one of the federal “Partnership for Sustainable Communities” grants for developing an implementation plan for its *Metro Vision* regional planning effort. As part of that plan, DRCOG is assembling a Regional Resource Team to address substantive areas like transportation, housing, and urban agriculture in a holistic fashion.

Nonprofits and businesses

Denver’s nonprofit urban agriculture scene is increasingly diverse. It boasts one of the most successful nonprofit community gardens programs in the country, and there are a growing number of small, entrepreneurial organizations that work

on urban agriculture, food security, and education. The key to Denver's community garden scene is Denver Urban Gardens, which has helped create more than one hundred community gardens in its twenty-seven years of existence.

Denver's entrepreneurial urban agriculture organizations now include Denver Urban Homesteading, Heirloom Gardens LLC, Feed Denver, and GrowHaus, among many others. All these small establishments appear to have at least some educational component, and many of them take different approaches to some of the same issues. For example, Denver Urban Homesteading, owned and operated by James Bertini, focuses chiefly on education, holding workshops and classes on how to create sustainable livelihoods in urban areas. Heirloom Gardens also includes a core educational component, but its approach is geared toward apprenticeships as experiential education.

Despite commonalities among these young and growing organizations, there is a spirit of collaboration among them. Adam Brock (2012) reflects on this situation:

Right now, there are lots of different players trying to figure out how to do this on a commercial scale. [...] Not all the endeavors out there will pan out. Some will lose sustainability, others will lose buy-in from the community. We are getting to the point where there is cooperation among groups working on these issues, but we aren't quite there yet. There has always been a bit of a collaborative culture here in Denver.

Brock's thoughts indicate a belief that sustainability and community support are equally important parts of being involved in grassroots urban agriculture in Denver, as well as awareness that despite huge unmet demand for local food and agricultural knowledge in his city, something is gained by similar organizations working together.

One particularly innovative approach in Denver, advocated by Heirloom Gardens in particular, is Neighborhood Supported Agriculture (NSA). Unlike the more traditional CSA model, NSA is a particularly urban creation that involves not only distribution of farming risk among shareholders, but also distribution of actual growing space. As Kraft describes it, Heirloom Gardens farms on small bits of land on the lots of multiple independent landowners. The arrangement often involves the landowners getting a share of the food grown in return for allowing Heirloom to use the space. Kraft relies on the work of apprentices, who receive NSA shares as payment for work they do. Heirloom Gardens also sells shares to other members of the public in the fashion of a standard CSA operation (2012). Kraft describes other small, innovative entrepreneurial activities in the Denver area, including truck farms.

Another private organization with significant profile in the Denver area is Feed Denver, a nonprofit group whose mission is to "foster local food security and sustainability through the development of urban farming by providing innovative tools, techniques and training for individuals, organizations and disadvantaged

communities” (Feed Denver n.d.). Feed Denver has helped establish several urban farming operations in the Denver area; The Urban Farm at Stapleton (discussed below) was its first project, and others include Sunnyside Farm and the 42nd and Steele Street Parking Lot Farm.

Public-Private Partnerships

In contrast with Albuquerque, which spends considerable public money to protect and manage agricultural land within the urban area, Denver does not so directly spend on the land and practice of urban agriculture. However, the city mentions urban agriculture, and specifically encourages production-scale, commercial urban agriculture as one of its strategic initiatives in partnership with the Colorado State University Extension service. This initiative is obviously connected with the Denver Seeds program begun by Mayor Hancock in 2011. However, no money is included in the budget for this initiative. Additionally, while the city has budgeted over \$4 million in FY 2012 for “environmental sustainability,” it is not clear how much of that, if any, is for urban agriculture (City of Denver (b) 2012).

In addition to administrative support from the city when pushing for new ordinances and comprehensive planning efforts, urban agriculture efforts have received other forms of support, particularly from state and county governments. Higher levels of state government are also playing a role in supporting Denver’s

burgeoning urban agriculture outfits. According to Brock (2012), GrowHaus receives significant support from Live Well Colorado, a nonprofit organization with a strong partnership with the Colorado Department of Health.

Local government involvement in urban agriculture also takes the form of support for nonprofit initiatives, including The Urban Farm at Stapleton (TUF), a youth-education based nonprofit organization that began as a horsemanship education site in 1993 but has since evolved into a large and successful urban farm that serves 3,000 children a year and provides education around a variety of agricultural issues. This year, the farm will begin offering community garden plots, adding to the diversity of agricultural activities at this reclaimed airport site near the boundary between Denver and Aurora, one of its inner-ring suburbs. A significant source of funding for TUF is through the Scientific and Cultural Facilities District, a multi-county nonprofit partnership that manages the funds from a voter-approved one-tenth of one percent sales and use tax increase in the seven county Denver region and allocates them to arts and science organizations that serve a broader public interest.

Additionally, departments of local government have been very accommodating to efforts by Denver Urban Gardens to improve land tenure security for community gardens by locating on public lands. While the decentralized community gardens efforts in Albuquerque run the potential risk of limited tenure security, as Patterson notes, Abbie Harris at DUG has made working with new

gardens to establish secure tenure a priority. The city-wide reach of DUG as the go-to organization for community gardening in the Denver area may contribute, as it does with the P-Patch program in Seattle, to greater institutionalization of community gardening as a viable and durable land use.

Food Policy Councils

Former Mayor Hickenlooper created the Denver Sustainable Food Policy Council (SFPC) in 2010 partially in response to the lack of attention paid to food and urban agriculture issues in the comprehensive, land use, and transportation plans. The council, like many others, plays an advisory role. It has no paid staff and no budget, so the *ex officio* local officials, like Tina Axelrad, and local entrepreneurs, like Sundari Kraft, have deliberately tried to hold it to serving as a sounding board for new ideas. The food producing animals and beekeeping discussions pushed the council into action not long after its formation, so as a result, it has not taken many steps beyond that. Axelrad hopes that it will eventually, among other activities and services, provide an annual community forum at which members of the public can come share ideas and concerns (2012).

Current Mayor Michael Hancock, elected in 2010, has made urban agriculture a priority in Denver. As Mukherji (2009) portrays it parallels between Denver and Boston both emphasize the importance of executive leadership in increasing the profile of urban agriculture as it contributes to broad community-wide goals.

However, interview subjects in Denver have mixed feelings about the food policy council. Bertini (2012) observes that while “people have this impression that everybody in this local food scene is all buddy-buddy and mostly has the same agenda, that is far from the truth. There has been competition between, and petty behavior on the part of, many in Denver, particularly on the food policy council.” Additionally, some on the food council privately worry that the administration’s focus on urban agricultural production might divert critical resources from other aspects of the local food system. The politics and makeup of food policy councils depends on leadership and on various local factors that make it difficult to generalize from city to city.

The Live Well Colorado program, in partnership with the Colorado Department of Health, released a “Food Policy Blueprint” in 2010. Live Well Colorado’s goal is to increase healthy eating, specifically of fruits and vegetables, among all Coloradans. As such, it serves many of the functions of a food policy council, pointing out gaps in knowledge and making policy recommendations based on public outreach and research. In particular, it emphasizes increasing access to healthy food through schools and local production. Among its recommendations pertaining to local urban agriculture policy and activity are:

- Allow and incentivize local food production
- Incentivize value-added processing of fruits and vegetables

- Have a comprehensive transportation policy that integrates with food availability
- Use community development block grant funding to encourage urban agriculture

Water Policy and Planning

Colorado, like New Mexico and the rest of the West, is governed according to the doctrine of prior appropriation. While two small rivers converge in Denver, it does not have the agricultural history or the *acequia* infrastructure of Albuquerque. The 2010 zoning code update did not address how access to water is obtained for urban farms and gardens, despite an increased emphasis on urban agriculture. So, for example, it is still widely illegal to harvest rainwater from rooftops in Colorado, which is certainly a constraint on urban agriculture.

While Sundari Kraft does not identify water as one of the main barriers to urban agriculture in Denver, she does observe that the difficulties backyard growers in particular face regarding water increase dramatically in dry years, when Denver Water (the municipal water utility) imposes restrictions. In an effort to promote innovative policy responses to the needs of urban agriculture, Kraft has approached Denver Water to ask about the possibility of exempting people who grow some of their own food from water restrictions, but she laments that this conversation will likely wait until the water situation becomes more serious.

Unlike in Albuquerque, where everyone interviewed seemed acutely aware of the limitations of water access, infrastructure, and cost, those in Denver seemed slightly more sanguine about it. Adam Brock, of GrowHaus, believes that the cost of water in Denver is far too cheap. While the city of Albuquerque faces huge costs to irrigate the Rio Grande Community Farm, and other landowners without access to *acequia* water face a difficult task indeed, Brock states that water is by far the cheapest of the utilities his operation pays. However, Abbie Harris of DUG disagrees with that assessment, observing that water tap fees are a community garden's largest single cost and laments the fact that it is still illegal under most circumstances to collect rainwater in the state of Colorado (2012). Differences between Brock and Harris may reflect different visions and expressions of urban agriculture, the difference between 118 small community gardens depending largely on volunteer and individual initiative (an "extensive/less intensive" use according to Mukherji and Morales' typology) and a more capital-intensive urban farming operation ("less extensive/intensive"). Even though interviewees in both Denver and Albuquerque on the whole identified water as a barrier of some kind or degree to urban agriculture, its prevalence as a major issue differed qualitatively between interviewees in the two cities.

Cultural, Political, and Legal History

Regarding politics and Denver and Colorado in general, Kraft (2012) interprets the Colorado political scene as fairly complicated:

There is a libertarian bent in Colorado overall. In Colorado, there is a culture of farming, to each their own, and the independent cowboy vibe. On the Front Range, though, there is a clash of cultures. Actually, the underlying current of libertarianism is actually helpful when fighting over-gentrification. The city's identity has everything to do with how it approaches urban agriculture.

Adam Brock (2012) adds, in a similar vein, that because Denver is the most isolated big city in the nation, it is torn between consciously trying to build a unique identity and becoming more cosmopolitan. In Denver, he adds, a large progressive faction counters and is countered by an undercurrent of Midwestern conservatism. Brock may have been referring to the roots of the modern anti-environmental movement in the Sagebrush Rebellion and "wise use" movement in the West, although the interview did not make that clear (Jacobs 1995). A large proportion of the Denver area's recent population growth can be attributed to the in-migration of recent college graduates and highly educated workers from other areas of the country (Frey 2011; Metro Denver 2011). This gives credence to the interviewees' observations that Denver is still trying to figure out its cultural identity.

Denver's history more closely traces that of the West as a whole, from Old West to New West, than Albuquerque's does. Originally a destination for gold

miners, Denver evolved into an important railroad hub, then a nexus of ranching and cattle activity in the late 1800s, then into a capital of the fossil fuel industry (“Denver: History” 2009; Pankratz 2007). The federal government’s decision to locate a number of important services and branches, as well as military installations, near Denver provided an extra jolt to the region’s growth and stature. As the transition from the extractive, boom-and-bust “Old West” to the tourism- and technology-based “New West” has occurred across the region, Denver may well serve as an indicator city for this process, up to and including its transformation into a center of technology, planning, and sustainability innovation today (Gersh 1996).

The entrepreneurs interviewed in this research strongly emphasized the social justice component of urban agriculture in the Denver area. Education and empowerment, too, play a major role in the missions of these social entrepreneurial endeavors. This emphasis ties in with Mayor Hancock’s emerging strategy on urban agriculture. Denver Seeds, is directed largely at the production side of the local food system with an eye toward job creation and economic empowerment. This new city vision does not yet include retail access, processing, distribution, or waste, and at this point it is difficult to assess Denver’s urban agriculture system in terms of food justice and sovereignty.

V: Discussion

This thesis began by asking whether there are salient differences in how Western cities are engaging in urban agriculture compared to other cities around the U.S. because of uniqueness of geography, environment, culture, and political and legal institutions. However it is clear that urban agriculture in the two cities studied shares not only many similarities but also important differences. The other component of the analysis, comparing Albuquerque and Denver with previously studied communities in other parts of the country, reveals more similarities than differences both in the tools that communities use and in the strengths and weaknesses of each approach. However, Albuquerque demonstrates more differences compared to other cities than Denver does. I will explore possible reasons for this based on the analysis presented here and on the work of others.

1) Similarities and Differences – Case Cities

To start, in both Denver and Albuquerque, interviewees shared a perception that how a city views itself plays a large role in how urban agriculture looks and functions. Each city identified strongly with the U.S. West as a region, as demonstrated in comments by interviewees. For example, interviewees in both cities responded to an inquiry about land prices by noting that the population densities in their communities pale in comparison with older cities on the coasts. “Denver,” Kraft wryly observes, “isn’t exactly overcrowded compared with most

cities on the East Coast. Land availability is not a huge problem” (2012).

Additionally, interviewees discussed Denver’s continual push to establish a unique local identity, and in Albuquerque they discussed the important role that community pride in the agricultural history and cooperative water management tradition plays in ongoing support for urban agriculture. While the specific tenor of those discussions obviously varies according to local conditions, the focus on community identity as a major driver of urban agriculture land use policy was a common theme in both Denver and Albuquerque.

Additionally, mayoral leadership in both cities has played or may soon play an important role recently in promoting urban agriculture. In Albuquerque, Mayor Berry’s “ABQ The Plan,” as yet unimplemented and in the beginning stages of discussion, will involve large public projects, which could include infill development with an urban agriculture component along the lines of Sawmill Community Land Trust. In Denver, the previous mayoral administration has been extremely active on the environmental front since 2005, although urban agriculture did not appear as a major priority until the campaign and election of Mayor Hancock.

Identifying barriers to urban agriculture was one of the primary purposes of this thesis. It is instructive to consider what interviewees identified as the major barriers in their communities. In an unstructured format interviewees were asked to free-list what they saw as the most important barriers to urban agriculture in

their communities, so the list below is iterative and does not reflect preconceived notions of barriers. Barriers identified by interviewees were classified as below with the goal of providing a category into which each barrier could fit without creating too many categories and thus reducing the ability of the analysis to demonstrate meaningful similarities and differences. Figure 2 (next page) indicates the proportion of interviewees in each city that identified the following barriers to urban agriculture:

- Land (cost or availability)
- Money and funding (e.g., startup capital)
- Education and communication issues
- Regulations and permitting
- Political/Ideological (e.g., the “urban-rural divide”)
- Water (cost, infrastructure, shortage)
- Site issues
- Labor availability

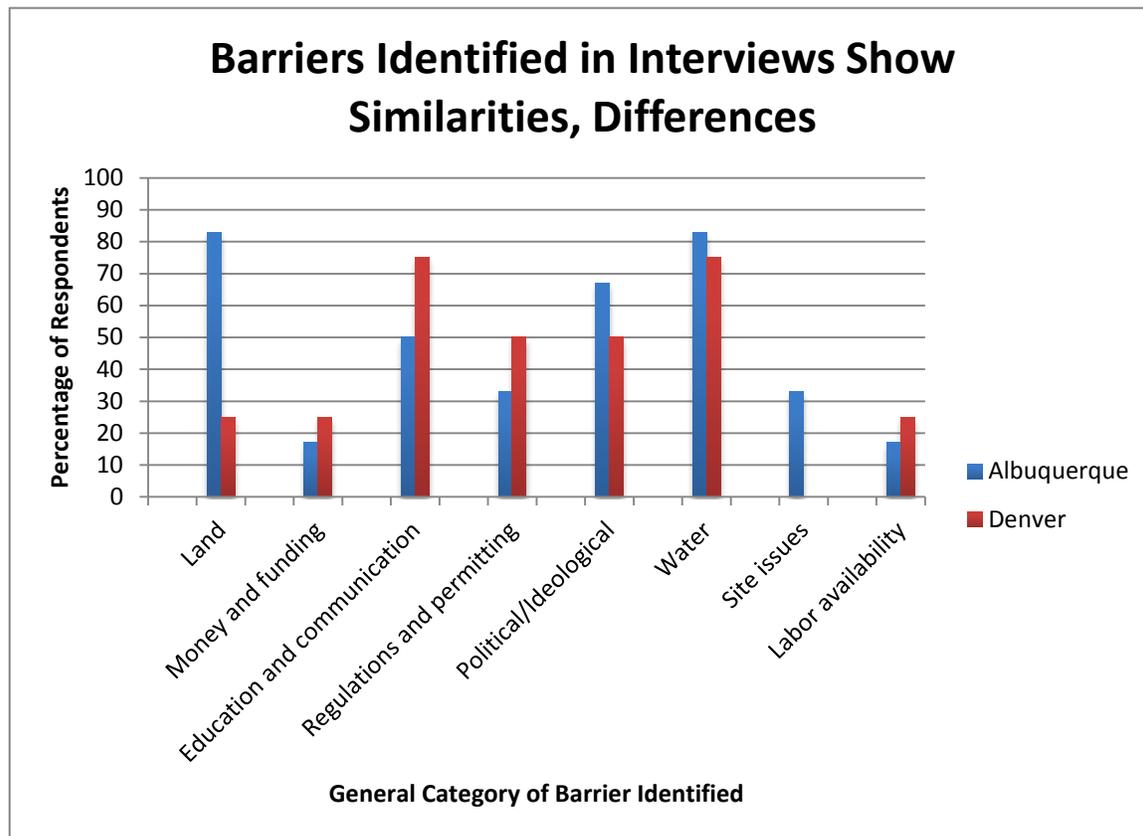


Figure 2. Developed from interview results, $n_{\text{Albuquerque}} = 6$, $n_{\text{Denver}} = 4$

In Albuquerque, five of six interviewees mentioned water as a barrier to urban agriculture. Four also discussed the cost and availability of land, broadly speaking. The next most commonly mentioned barrier, the urban-rural divide, was mentioned by four interviewees. However, the interviewees expressed a variety of nuanced perspectives, even within a single barrier category.

For example, not all interviewees who expressed that water was a barrier in Albuquerque believe that it is solely a limiting factor. One anonymous respondent stated that water is “limiting, but also liberating” in the Albuquerque area. Specifically, this respondent observes that the presence of the *acequia*

infrastructure and culture engenders in many residents a “broader interest and acceptability” of urban agriculture and local food. The anonymous respondent and Lora Logan of the MRCG’s Agricultural Collaborative both remark that the Land Link program is as successful as it is partially because of the importance of water rights and the value that some landowners place on seeing their land in agricultural production even if they do not want to be the ones using it for agricultural production. In that same vein, Wade Patterson identifies water as a barrier, certainly, to urban agriculture, but he believes that it is one that can be overcome through new techniques and cooperation. To the extent that the interviewees’ comments provide a window into the mentality of the residents of Albuquerque, this idea demonstrates that while urban agriculturalists there take water seriously, they use this severe limitation as an opportunity to innovate against the odds.

One compelling difference between Albuquerque and Denver that emerges when examining their respective zoning codes is the treatment of animals. Albuquerque employs among the most liberal regulations for chickens and beekeeping among large cities. Denver, on the other hand, has only recently come around to revising its zoning on this thorny issue, and only after heated public debate. More importantly, Albuquerque has never even had a beekeeping ordinance, treating it as a permitted use by virtue of omission. This suggests that it has been permissive with regard to “farm” animals in the urban context for a longer time.

Based on the this research, it appears that urban agriculturalists in Albuquerque are both more aware of the limits of geography and climate and slightly more innovative in responding to it, at least from the public land use planning and policy perspective. The most important difference between Albuquerque and Denver in terms of each city's overall approach to urban agriculture is that Albuquerque's local governmental entities (city, county, or regional planning association) have been more committed to using public funds and public-private partnerships to make urban agriculture a prominent and accepted land use in the area. This is evident both in the monetary and staff resources committed to open space and farmland protection and in the citizen-driven concern that prompted that protection in the first place. Denver, while very committed to sustainability, has not focused on urban agriculture to the same extent, although that appears to be changing.

It is not completely clear from the case study research why Denver is home to a booming industry of small entrepreneurial urban farming outfits and Albuquerque is not. Potential reasons might include the overall size of the metropolitan areas (2,500,000 to 900,000), a greater proportion of young professionals who view Denver as an enticing, modern, high tech destination, the relative strengths of Denver's economy providing startups access to capital, among other factors. While Albuquerque has a large amount of land dedicated to urban agriculture, a large percentage of it is in city- and county-owned land or peri-urban

farming operations protected with public dollars. Based on information gathered in interviews, Figure 4 (below) clarifies what I see as the strengths and weaknesses of each community's approach to urban agriculture.

Strengths and Weaknesses of Urban Agriculture Approaches

	Albuquerque	Denver
Strengths	<ul style="list-style-type: none"> Urban agriculture included in comprehensive and climate planning Active public engagement in land protection Water infrastructure - <i>acequia</i> history still functions Cultural commitment to using scarce water for agriculture Strong and active county extension service and regional planning body Public-private partnerships History of cooperative irrigation management 	<ul style="list-style-type: none"> Mayoral administration shows strong focus on urban agricultural production Robust network of collaborative entrepreneurial enterprises Support for urban ag initiatives from various levels of government Commitment to zoning and permitting innovation to encourage urban ag Active regional planning body Public-private partnerships Libertarian politics in state lend themselves to urban ag
Weaknesses	<ul style="list-style-type: none"> Relatively less leadership from city government Zoning code does not address urban ag Less secure land tenure for community gardens 	<ul style="list-style-type: none"> No comprehensive planning efforts address urban ag City sustainability efforts do not address urban ag More complex local government landscape, greater potential for opposition

Figure 3: Synthesized from interviews in case study communities

Denver's population is composed of many people who moved there from somewhere else; it was the nation's tenth fastest-growing metro area in 2008, and survey participants in a 2008 Pew Research Center poll identified it as the most popular city in America (Sherman, 2009). This is perhaps due to its outdoor amenities, sunny climate, diverse economy, and growing reputation as an interesting urban area. Its multifaceted cultural identity, another attraction of the region, may also lead to its less focused and more entrepreneurial approach to urban agriculture.

While Denver sits along a river like Albuquerque, it does not share having over five hundred years of history of cooperative irrigation management and a rich and diverse cultural heritage around agriculture. Denver is, as Brock describes, a "cow town" at heart, but modern Denver was shaped as much by the fossil fuel industry as by cattle and ranching (Pankratz, 2007; Historic Denver, 2008). There is little empirically based generalization possible from this observation, but it suggests that history matters, and that history is based in culture and climate. Where Denver and Albuquerque mostly share in climate, they differ significantly when it comes to regional culture and therefore identity. This, as I discuss in the final section of this thesis, is a fertile area for future social science and humanities research.

Broader media coverage of urban agriculture in the West is increasing despite the paucity of academic studies on the practice. Examples can be seen, as discussed in the literature review, not only in environmentally-minded publications

like *High Country News* (Hoffman, 2011) and *Grist* (Hanscom, 2012), but also in mainstream news outlets in major cities in the West and Southwest, like the *Arizona Republic* and the *Denver Post*. While the role of local media in covering urban agriculture issues can be ambiguous and play off the controversy, there is no doubt they serve an important function. The way in which Sundari Kraft and other advocates for chicken and beekeeping ordinances in Denver successfully created enough grassroots support for those laws depended heavily on the use of social media and networking to sway public opinion. According to Kraft, her coalition succeeded because while she and her allies were able to mobilize social media resources to quickly and perceptibly change the nature of the public discussion. Opponents (particularly neighborhood groups) relied on more traditional organizing and were “swamped” by chicken and beekeeping advocates (2012). This is a common theme in urban agriculture fights throughout the nation, not just in the West; for example, in Kansas City, MO, a crucial element to the successful passing of an urban agriculture ordinance was the supporting coalition’s use of a listserv to quickly coordinate supporters to testify at public hearings and to discuss strategy and tactics (Morales, Peck, and Covert 2012, forthcoming). Regardless, the way the residents of a city view it influences the way the public perceives changes to urban agriculture rules and policies, and this research indicates that the things that make Western cities different—geography and climate, infrastructure, politics, law, and culture—deeply inform the ways they identify themselves.

Differences between Denver and Albuquerque may help illustrate how broad differences in environment, culture, history, law, and other factors can produce different outcomes in policy and grassroots action. These factors can be traced across different geographies, including states, watersheds, metropolitan regions, and neighborhoods. To be sure, differences in these factors likely do not explain all or even most of the variations in policies, practices, and attitudes. However, the limitations on and opportunities surrounding urban agriculture in the U.S. West in general should receive greater attention, without forgetting that vast differences among smaller geographies and how those limits and opportunities are expressed at the local scale are equally important.

2) Analysis of Case Cities Compared to Other Cities in U.S.

The other primary component of the analysis in this research involves comparing Albuquerque's and Denver's approaches to urban agriculture to those of previously studied communities in the United States. As noted in the literature review, previous research on urban agriculture land use policy in the U.S. has focused almost exclusively on coastal, non-arid places and have eschewed discussions of ecological limitations to agriculture in general or urban agriculture as a subset. As Mukherji observes, "In developing [an urban agriculture] policy regime for a city, it is helpful not only to imitate practices from other cities that have proven effective, but also to think holistically about the institutional, political, cultural,

historic and geographic context of the city” (2009, p. 88). This is, in essence, the crux of any such case study analysis and is the motivation for this research.

I will broadly compare the urban agriculture regimes in Albuquerque and Denver with Mukherji’s study of Portland, Chicago, and Boston, and Goldstein et al.’s reviews of Atlanta and Minneapolis, among others.

In comparing Albuquerque and Denver to Portland per Mukherji’s analysis of the latter, the first apparent similarity is the emphasis on urban food production from the city level in both Denver and Portland. The crucial difference, however, is that in Portland, the city controls all the community gardens and thus limits their expansion according to demand (2009). By contrast, in Denver, community gardens are all run by a single *nonprofit* entity, Denver Urban Gardens, which gives a degree of autonomy and experimentation that might be lacking in a solely municipal approach.

Boston, the third city Mukherji profiles in her research, takes a different approach that makes for valuable comparisons with Albuquerque and Denver. The city strongly emphasizes gardening in public spaces, particularly community gardens, over less intensive urban agriculture types, like home gardening. Boston’s zoning contains a separate community garden district as well as a Smart Growth Overlay district, both of which have been effective in protecting urban agriculture, according to Mukherji. This backs up the importance Mukherji and Morales (2010) place on permissive and creative zoning in encouraging and not inhibiting urban

agriculture. Denver's code revisions in 2010, while not creating whole new districts or sub-districts, adds different categories of urban agriculture as distinct uses that are broadly permitted. Albuquerque's zoning code, while significantly behind the curve when it comes to code revisions to support urban agriculture, recently adopted an optional form-based zone, which could act in the same fashion as a Smart Growth overlay zone and place a high priority on the functions that urban agriculture can serve in a neighborhood.

A similarly apt comparison can be drawn between the way Albuquerque sees urban agriculture, if such an attitude can be generalized for the whole city, and the way Chicago sees it. Mukherji concludes in her study of Chicago that the city "does not see urban agriculture as a potentially important food source, but primarily as a form of open space and a tool for community development" (p. 89). In a similar vein, Albuquerque somewhat lacks the focus on urban agriculture as a significant source of food and a cure for the ills of food deserts, instead viewing it largely as a crucial element of open space.

However, Albuquerque and Chicago differ dramatically in the reasons for this emphasis. As previously discussed, Albuquerque's long history with diversified "urban" agriculture and the *acequia* infrastructure and social institution is at least partially responsible for the city's strong emphasis on open space protection. In contrast, Chicago's open space emphasis is on community development, and the lack of an overall strategy and resulting reliance on community groups much more

resembles Denver's current approach. The climate of entrepreneurship and experimentation with different models of urban agriculture in Denver that interviewees noted and applauded may or may not change as the Denver Seeds initiative gains detail and traction. As it does so, Denver would do well, per Mukherji's analysis, to ensure that its urban agriculture initiatives proceed with an eye to planning goals, a particular strength of Portland's *Diggable City* plan.

In their review of sixteen cities' urban agriculture programs, Goldstein et al. (2011) narrow their focus to specific policy and planning initiatives. Atlanta, Georgia, an up-and-coming player in urban agriculture policy and planning innovations, has addressed the issue through long-range sustainability planning, code changes, creating community gardens in public parks, an urban farm design competition, and others. In comparing Albuquerque to Atlanta, the first salient point is that both have long histories as agricultural regions and today are relatively low-density, sprawling urban areas (Atlanta much more so). That history may at least partially account for the permissiveness of their codes when it comes to livestock. Like Albuquerque, Atlanta does not mention urban agriculture as a separate entity in its zoning code, as Denver and other cities do. One specific area of concern in Albuquerque, the sclerotic permitting process for farmers markets, received an overhaul in Atlanta in an attempt to streamline the process.

The Minneapolis-Saint Paul area is similar to the Denver area in many ways. Both are physically large metropolitan areas with around 3 million inhabitants, are

relatively flat and situated on rivers, and have reputations as forward thinking in terms of regional planning and transit. Additionally, both have histories as centers of industrial agriculture, with Denver's history as a ranching hub and Minneapolis as one of the grain capitals of the world. Goldstein et al. describe Minneapolis as providing "enthusiastic encouragement" to a "thriving" urban agriculture scene (p. 29). Minneapolis was one of the earlier cities to create a sustainability plan (in 2003), which not only set broad sustainability goals but also created trackable indicators. Similarly, Albuquerque officially places local foods and urban agriculture under the sustainability umbrella in its Sustainability Plan. In 2009, the city added a Local Foods indicator and began the Home Grown Minneapolis (HGM) program, which is similar to the Denver Seeds initiative but is much more far-reaching, emphasizing not only production and job creation, but also sales, distribution, consumption, public health, and equity. Additionally, HGM involves conducting a land inventory and producing an urban agriculture policy plan to identify needed changes in city code. In other words, HGM is the kind of comprehensive urban agriculture and local foods plan lacking in both Denver and Albuquerque. However, Denver is farther ahead on creating the changes in its code, and the trend seems to be toward more changes going forward.

3) *General Discussion*

Some important questions raised in this research include: how do Western cities like Phoenix and Salt Lake City that also have histories in cooperative irrigation management (the Hohokam civilization and the Mormon settlers, respectively) approach water from an urban agriculture standpoint? Do smaller but emerging metro areas in the region, like Boise, Missoula, Spokane, and Tucson have similar approaches to each other and to other, larger metros in other parts of the country where urban agriculture has received the most attention? Are there identifiable “Western” characteristics in each of these communities that play a part in shaping their attitudes and actions? Employing broad, city-by-city comparisons like the one above will undoubtedly be thought provoking and may be of considerable value for both research and decision-making.

The research in this thesis begs additional work on processing and distribution issues. Wide variations in the type of urban agriculture food production occurring in a community could have very different meanings for how that food is distributed. For example, urban agricultural food production in Albuquerque is likely to occur on land with pre-existing water rights or *acequia* ditch access. By contrast, the relatively low cost of water in Denver has allowed small entrepreneurial outfits like Heirloom Gardens to create a decentralized and spatially distributed Neighborhood Supported Agriculture program. Aside from the volume of food produced, both forms of production are heavily influenced by local

organizational and institutional arrangements and have divergent implications for processing and distribution of local food within the urban area.

Albuquerque and Denver have dynamic and increasingly complex approaches to urban agriculture land use policy and planning and have much to share with other communities. There can be no doubt, however, that they are not necessarily at the cutting edge. One of the most interesting questions, then, is why a city like Minneapolis is ahead of Denver in comprehensively planning urban agriculture, considering the numerous resemblances. A partial explanation might be the complicated Western politics of the Denver area, but the dichotomies discussed in Denver are equally present in the Twin Cities. Another explanation might be that cities in areas where agriculture is more difficult, like the U.S. West, are slow to the punch when it comes to envisioning a place for urban agriculture. Alternatively, Albuquerque clearly takes great pride in its long history of urban agriculture and cooperative irrigation management in a physical environment that is somewhat hostile to agriculture. Will protection of urban agriculture take similar precedence in Atlanta, which faces a considerable water supply crisis currently? While these important questions cannot be definitively answered here, such comparisons are vital to understanding what urban agriculture in the U.S. will look like in the future.

VI: Limitations and Suggestions for Future Research

This thesis employed a detailed case study approach to explore urban agriculture in the U.S. West. This approach contains both advantages and disadvantages. The particular strengths of case studies include: the ability to explore a community's idiosyncrasies in depth; the capacity to capture peoples' attitudes toward a subject at a high level of nuance and complexity; and increased sensitivity to the institutional structures, legal backdrop, and historical-political contexts that drive much of municipal policy and grassroots action. However, case studies also bring certain inherent disadvantages. For instance, it has been argued that case studies are of limited utility when trying to generalize the lessons learned from one case to problems in another case. The nature of a case study, delving deep into the particulars of what makes a particular case unique or different, potentially limits that case's utility to other, different places.

As mentioned in the discussion, attempts at understanding how other Western cities are approaching urban agriculture could be fertile ground for future research. Additionally, issues of race, class, poverty, equity, and food access differ dramatically from region to region and state to state, reflecting the decentralized nature of political decision making in the United States. These are among the hardest issues to generalize in research and yet are some of the most important facing food systems planning. Since case studies are inherently limited in their generalizability, similar research in other cities would help provide important depth

to understanding these issues. However, mere replicas of this research in other communities will not suffice. Rather, future research on urban agriculture in the U.S. West should attempt to not only examine what makes a particular community “Western,” but also what makes it different when it comes to urban agriculture from similar communities in other parts of the region.

Another potential avenue for this rich area of research is the use of a survey methodology. Conducting a survey of community gardeners in Albuquerque or any other Western city could help identify to what extent people engaged in urban agriculture are aware of the water, land, and political issues that are identified in this thesis and elsewhere. Additionally, surveys of the general population in a Western city could help gauge broad attitudes toward land use, specifically as it relates to local food enterprises and urban agriculture.

It could be argued that the results of this research might change depending on the specific methodology employed. Due in part to limitations in response rate for requests for interviews and in part due to research design, the mix of participants differs slightly between cities. For example, I made no concerted effort to speak with traditional farmers or Native American activists, among many groups, in the case study communities, despite speaking to urban agriculture entrepreneurs, farmers market coordinators, and metropolitan council employees who work with farmers. As such, the interviews I conducted were not directly matched between

cities and were not necessarily indicative of the full range of perspectives in each community.

Emerging research on the food production capacity and social consequences of urban farms and community gardens could prove fruitful as more research is conducted on urban agriculture. For example, Smith (2011) examined the socioeconomic value of food produced at community gardens in Madison, Wisconsin and discovered, among other things, that community gardening in that city tends to occur for noneconomic reasons and among a relatively well-off subset of the population. Similar research efforts elsewhere are crucial to understanding whether reasons for participating in urban agriculture vary from place to place and region to region. Future research should focus particularly on the utilization of elements of the urban agricultural system by members of different racial, ethnic, and socioeconomic groups in different communities. For example, based on the work in this thesis, it would be compelling to track the economic development impacts of initiatives such as Denver Seeds and whether its results are available and accessed widely across groups. Similarly, in Albuquerque, research should be conducted on the ethnic, socioeconomic, and gender-based composition of the cohort of new farmers accessing land in the urban area through the Land Link or other programs.

More policy and planning analysis should be directed toward understanding how a dramatically larger footprint for urban agriculture impacts the environment. For example, what would be the effect on water supply in an arid city like

Albuquerque if 25 percent of vacant properties were converted to community gardens, and would this have a real effect on food security? This is an example of a compelling research question that could build upon this thesis. Other academic fields have much to contribute here. For example, geospatial modeling and analysis could help understand what ecosystem services could be improved if various forms of urban agriculture were actually implemented on a large scale. Finally, as mentioned previously, transportation planning and engineering has already made great strides in building a body of knowledge around local food processing, packaging, and distribution, but as urban agriculture comes to be better understood as a potent sustainability, development, and community empowerment tool, its widening scope and scale raises additional issues about processing, distribution, and waste disposal in the urban area.

This thesis is exploratory by nature. Rather than exploring a new angle on a well-traveled path, the goal was to look at an area of the world that has received essentially no scholarly attention when it comes to urban agriculture and ask, “What is happening with urban agriculture in large cities in the west?” As such, it perhaps raises more questions than it answers. The ultimate question implied by my research—the long-term sustainability of urban agriculture in Western cities—remains unanswered.

VI: References

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VIII: Appendices

Appendix A: Interview Protocol

For Expedited Review by Social Sciences Institutional Review Board

Thesis Title:

“Growing the Desert: Urban Agriculture Land Use Policy in the American West”

Description:

The following is my introductory/explanatory information for the potential interview subjects in this research effort. The questions are intended to elicit from interviewees their professional thoughts, impressions, and informed opinions about urban agriculture in their communities.

Email/Phone Script – Matt Covert Research Protocol

Hello, my name is Matt Covert. I am a graduate student in the Nelson Institute for Environmental Studies at the University of Wisconsin-Madison.

I am writing my Master’s thesis on the land use policy of urban agriculture in urban areas in the intermountain American West.

I am especially interested in how cities in the region are interacting with rising interest in urban agriculture from individuals, companies, and advocacy groups. Additionally, I am curious about how biophysical, legal, and cultural factors unique to the region are impacting expressed local interest in local food issues.

This interview is aimed at gaining a better understanding of how the city of [Denver, Albuquerque] is engaging the issue of the relationship of local land use policy to urban agriculture, meaning back- and front-yard gardens, community gardens, small market farms in the urban area, entrepreneurial food systems organizations, animals raised for food in the city, nonprofits engaged in urban agriculture activity, and other similar issues.

Because this research is interview- and case study-based, your professional perspectives are welcomed. If you are available to participate, I have a written informed consent form that I am required to send you. This form explains matters including confidentiality and what participation in the interview would entail.

It would help me move the study forward if I receive a reply from you, either positive or negative, within three (3) days. [N.B. This last sentence will not be used during a phone call follow-up.]

Questions:

1. How would you describe interest in urban agriculture in [Denver, Albuquerque] in the last several years?
 - a. If there has been increased interest, how long has this interest been around?
 - b. Has the interest changed in form over the period (for example, become more spatially or sectorally focused)?
2. What specific form does this interest in urban agriculture take?
 - a. Who has been expressing interests (individuals, non-profits, businesses)?
 - b. How are these expressions of interests different among these groups?
3. Please describe the nature of discussions and interactions between the city and those who are interested in urban agriculture.
 - a. Has the city led or followed on urban agriculture, or some mixture?
 - b. If it has, how has it?
 - c. If it hasn't, in your opinion, why hasn't it?
4. The zoning map and code say “ _____ ” is allowed in _____ district. Is this accurate? If so, is the ordinance having its desired effect?
 - a. *This question will be repeated for multiple aspects of land use policy, including land banking, providing resources, assisting organizations with land tenure, and comprehensive planning.*
5. In your opinion, what are the most significant barriers faced in attempting to develop urban agriculture in (Denver, Albuquerque)?
6. Do you think that the existence and viability of urban agriculture is affected by access to water rights and/or water infrastructure? What is your understanding of the specific challenges that water rights access as well as distribution and allocation pose for the development of urban agriculture?

7. Does urban agriculture face cultural and political opposition or apathy in your community? If so, what is the nature of that sentiment, and how widespread is it?
8. Does the availability of land at a reasonable cost affect the development and practice of urban agriculture? Does the nearby presence of Native American or federal lands that constrain the growth of the municipal area impact the availability of land for agricultural use?
9. Speculating into the future, what do you believe will be the place of urban agriculture in this community?
 - a. What will be the factors that take the issue from where it is now to where you think it may go?
 - b. What are the factors that are likely to be the most significant obstacles in this potential transformation?
10. Are there other things you would like to comment upon that touch on my research topic that we have not yet addressed?

Appendix B: UNIVERSITY OF WISCONSIN-MADISON***Research Participant Information and Consent Form***

Title: Growing the Desert: Urban Agriculture Land Use Policy in the American West

Principal Investigator: Harvey M. Jacobs, PhD, Professor, Department of Urban and Regional Planning and Nelson Institute for Environmental Studies (phone: (608) 262-0552) (email: hmjacobs@wisc.edu)

Major Faculty Advisor: Harvey M. Jacobs, PhD, Professor, Department of Urban and Regional Planning and Nelson Institute for Environmental Studies

Primary Contact: Matt J Covert (phone: (509) 954-0052) (email: mcovert@wisc.edu)

DESCRIPTION OF THE RESEARCH

You are invited to participate in a research study about the ways in which your community promotes, regulates, and interacts with urban agriculture, or the growing, processing, distributing, and selling of food within your urban area.

You have been asked to participate because you have been identified as someone whose professional work is strongly tied to urban agriculture in your community and who would be able to offer interesting professional thoughts, perspectives, and opinions on the matter.

The purpose of this research is to gain a better understanding of how cities in the American West, faced with different legal, cultural, and ecological conditions than most other communities around the country, are using land use planning and policy to address growing interest in urban agriculture.

This study will include six to eight other people from your urban area whose professional work is equally relevant to urban agriculture and seven to nine people from a similar urban area elsewhere in the West.

The research will be conducted in the form of a loosely structured interview based around a series of open-ended questions. These interviews will take place over the phone.

Audio tapes will be made of your participation unless you request otherwise, which you are free to do. Only I will hear the audio recordings. I will transcribe the

content into document form to aid my analysis of the case study. These tapes will be retained indefinitely unless you request their destruction.

WHAT WILL MY PARTICIPATION INVOLVE?

If you decide to participate in this research, you will be asked to provide your thoughts and opinions on land use policy and urban agriculture in your community in response to open-ended questions.

Your participation will last approximately 1 hour per session and will require 1 session, which will require 1 hour in total.

ARE THERE ANY RISKS TO ME?

There will be no social, psychological, or legal risks from participating in this study.

If you believe there might be employment consequences from your participation based on the opinions, thoughts, and perspectives you provide as a professional, you are free to decline the interview or request your name and identifying information be kept anonymous.

ARE THERE ANY BENEFITS TO ME?

There are no direct benefits to you for your participation.

HOW WILL MY CONFIDENTIALITY BE PROTECTED?

There will probably be publications as a result of this study. Your name and professional association may be used unless otherwise requested.

If you participate in this study, we would like to be able to quote you directly either using your name or without using it. If you agree to allow us to quote you in publications by name, please initial the first statement at the bottom of this form. If you agree to allow us to quote you in publications without using your name, please initial the second statement at the bottom of this form. If you would not like to be quoted in publications at all, please initial neither statement, and your statements will not be published.

WHOM SHOULD I CONTACT IF I HAVE QUESTIONS?

You may ask any questions about the research at any time. If you have questions about the research after you leave today you should contact the Principal Investigator and major professor, Harvey M. Jacobs, PhD at (608) 262-0552 or researcher Matt Covert at (509) 954-0052.

If you are not satisfied with response of research team, have more questions, or want to talk with someone about your rights as a research participant, you should contact the Education Research and Social & Behavioral Science IRB Office at 608-263-2320.

Your participation is completely voluntary. If you decide not to participate or to _____ I give my permission to be quoted directly in publications using my name.

_____ I give my permission to be quoted directly in publications without using my name.

withdraw from the study it will have no effect on any services you are currently receiving.

Your signature indicates that you have read this consent form, have had an opportunity to ask any questions about your participation in this research, and voluntarily consent to participate. You will receive a copy of this form for your records.

Name of Participant (please print): _____

Signature

Date

Appendix C: List of Interviewees

Albuquerque

- Kent Swanson – Planner, Open Space Division, Albuquerque – 18 January 2012
- Sarah Wentzel-Fisher – Market Director, Albuquerque Downtown Growers Market – 26 January 2012
- Maggie Gould – City Planner, Planning Department, City of Albuquerque – 25 January 2012
- Wade Patterson – Project Coordinator, Sawmill Community Land Trust – 25 January 2012
- Lora Logan – Manager of Agricultural Collaborative, Mid-Region Council of Governments – 13 February 2012
- Anonymous – Mid-Region Council of Governments – 13 February 2012

Denver

- James Bertini – Founder and owner, Denver Urban Homesteading – 24 January 2012
- Abbie Harris – Development and Communications Coordinator, Denver Urban Gardens – 24 January 2012
- Sundari Kraft – Owner, Heirloom Gardens LLC – 21 February 2012
- Adam Brock – Director of Operations, GrowHaus – 22 February 2012

- Tina Axelrad – Principal City Planner, Department of Community Planning and Development, City of Denver – 8 March 2012