

*Sustaining Agriculture in Urbanizing Counties: Insights from 15 Coordinated Case Studies* (a study funded through a grant from the National Research Initiative of USDA's Cooperative State Research, Education, and Extension Service: Grant #2004-35401-14944)

## **Chapter 1: Research Objectives and Methods<sup>1</sup>**

### **1. Introduction: Time Context**

The credit crisis that seriously discouraged housing and other developments on agricultural land began in 2007, by some people's calculations in August of that year. Under a grant provided by the National Research Initiative Program of USDA's Cooperative State Research, Education, and Extension Service in the fall of 2004, we studied the conditions shaping the viability of farming in 15 metro-area counties in 14 states. Each selected county is both agriculturally still important but also subject to substantial development pressures. The majority of our research efforts took place in 2005 through mid-2007, when those pressures were high or just beginning to diminish. Also during most of that period, market prices were mediocre for grains, milk, and certain other types of major products raised in the studied counties. Therefore, since we studied the viability of urban-edge farming under difficult conditions, many of the successes we found are models of achievements against considerable odds. If they worked in 2005 to 2007, they may be feasible in less challenging situations. At the least, the positive and negative outcomes we identified in those years may serve as bases of comparison for viability evaluations conducted in the same or similar counties in future years.

Adding to the future relevance of our findings, we believe, is our emphasis on causal relationships. We used regression analyses and other tools to get at the conditions that shaped agriculture's viability in our sample of urbanizing metro-area counties. For example, rather than only reporting that zoning worked well in protecting agricultural land in this or that county, we used in-depth interviews with local experts to discover explanations for such success. And, rather than just offering the percentages of agland owners, by county, who planned to develop their land, we used statistical analysis to identify traits of the owners and their farm operations that, other things being equal, predicted who expected to convert land out of agricultural use. In another two examples, we studied (1) why so many farmers in the sampled counties were able to rely heavily on foreign migrant laborers and (2) how farm operators adapted to the closure of local implement dealers and other agri-service businesses.

### **2. Motivation for the Research**

Beginning at least with Donald Bogue's study "The Spread of Cities" (1956), researchers concerned about the survival of agriculture on the urban edge tended to emphasize the loss of agricultural land and/or policy efforts to prevent it (e.g., Coughlin, Keene, Esseks, Toner, and Rosenberger, 1981). In 1982 Roger Blobaum pointed out that "efforts to preserve agricultural land on the urban fringe put little emphasis on making farms more profitable" (Blobaum, 1982). Five years later, Johnston and Bryant (1987) asked the important question of why there were still so many farms in urban areas across the United States and Canada, and proposed that it was due

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<sup>1</sup> The principal authors of this chapter were Dick Esseks and Kate Clancy.

to the positive adaptation that farmers had exercised to suit prevailing conditions, demonstrating that many farms could remain viable despite strong development pressure. The authors argued that farmers did this by exploiting opportunities “characteristic of rural urban fringe environments” (p. 10).

In the past decade there has been more attention paid to the need to simultaneously improve the markets and incomes of farms on the urban edge because, among other reasons, so much food is produced there. Using 1997 Census of Agriculture data, the American Farmland Trust calculated that 86% of all the country’s fruits and nuts, 86% of its vegetables production, and 63% of dairy products were produced in “urban-influenced counties” (American Farmland Trust, 2008). The Economic Research Service (ERS), also working from 1997 ag census data, estimated that 61% of vegetable acres were in metro areas (Heimlich and Anderson, 2001). From the 2002 census, Douglas Jackson-Smith and Jeff Sharp (2008) calculated that “55 percent of all farm sales in the United States were from farms located at the rural-urban interface” (p. 1).

However, even recently, authors of this research report have found it difficult to convince some advocates of farmland protection and smart growth that preventing the conversion of agland is not enough. To realize the full agricultural benefits of restrictive zoning, purchase of development rights, or urban growth boundaries depends on “whether farmland remains in an active agriculture use” (Nickerson, 2001, p. 27). The alternatives can include “farmettes” that have just enough production to qualify for agricultural-use tax assessment or larger parcels that seriously underperform for lack of good markets or effective management.

Researchers have compiled a long list of the benefits to farmers and urban dwellers of the presence of farms near metropolitan areas. Farmers can access a larger pool of seasonal labor to harvest high-value crops; there are greater off-farm employment opportunities; and there are many opportunities for marketing to urban populations, such as restaurants and farmers’ markets, and for products new to the farmer such as nursery plants and Christmas trees, as well as agritourism (see, for example, Maryland-National Capital Park and Planning Commission, 2005). There tends also to be a greater variety of socioeconomic production types such as part-time farmers and more family members working off the farm. Among other things is a greater diversity of financing mechanisms (including for land rental) and a larger variety of production intensities (especially with regard to fruits and vegetables; Bryant and Johnston, 1992).

A dictionary definition of “viability” is “capable of working, functioning, or developing adequately,” and a more specific one for business enterprises is the state of being “financially sustainable” (Merriam-Webster, 2006). *Farm* viability has been defined as (1) “a state where a farm may continue to operate, expand, and meet the goals of the farm owner” (Heinrich-Schiller Joint Venture, 2004, p. 210), and (2) as “a quality that includes ‘longevity, respect, a positive working environment, encouragement to innovate, and a belief in an agricultural future’” (Somerset County, 2001, in Heinrich-Schiller Joint Venture, 2004, p. 211). Of course, the continuation of farming near or in metropolitan areas may require effective farmland preservation programs (e.g., restrictive zoning, cluster zoning, purchase of development rights, and/or transfer of development rights—topics covered in Chapter 3 of this report). Also needed may be programs designed to keep preserved land in active agricultural use, such as encouraging consumers to purchase locally grown food, educating farmers about diversifying or switching

into value-added or other new products, providing financing for beginning farmers, recruiting sufficient migrant workers, and helping with the intergenerational transfer of management and ownership—topics discussed in Chapters 2 and 4 of this report.

### **3. Research Objectives**

As stated in our application for the National Research Initiative Grant that made this study possible, our *main objective* has been “to identify conditions under which farming may remain viable as important agricultural counties transition to become mostly urban and suburban in land use.” Given this principal objective, we selected 15 such areas to study and pursued the subsidiary objectives of determining

- the kinds of agricultural products that were being successfully raised there (discussed in Chapter 2);
- the adequacy of marketing outlets for crops and livestock products (also discussed in Chapter 2);
- the supply and affordability of land for farming and ranching (Chapter 3);
- the adequacy of other major inputs of production—field labor, new farmers, veterinarians, credit, and agriservice businesses that supply equipment, repair services, chemicals, water, etc. (Chapter 4); and
- the future outlook for agriculture, including agland owners’ plans for converting any of their land to nonfarm uses, current operators’ expectations about continuing to farm there, both surveyed agland owners’ and interviewed local leaders’ predictions about the status of agriculture in their counties in 2016 and also in 2026, and whether the leaders would encourage young people with agricultural backgrounds to farm or ranch there (Chapter 5).

For each of the major kinds of marketing outlets and inputs of production, we inquired about the existence and effectiveness of government or private programs to help with the quantity or quality of supply. We aimed to report on the degree of success (and causes of the observed effectiveness) of such programs as preserving farmland, promoting the direct marketing of locally grown food, recruiting seasonal workers, linking new farmers with retiring operators, and protecting water supplies needed for agriculture.

### **4. Justification for Our Research Focus**

Before asking the reader to wade into our discussion of research methods, we must first justify the choice of research focus. Is protecting farmland and otherwise nurturing viable agriculture on the urban edge an important enough goal for local communities or the country as a whole?

As mentioned earlier, the counties in metro areas or otherwise subject to urban influence have been producing most of the nation’s fruits, nuts, vegetables, and dairy goods. However, scholars like John Fraser Hart (2002) argue that the same types of products can be grown more efficiently outside urbanizing areas, as farmers (or their successors) sell their urban-edge land and reinvest the capital gains in better-sized and -equipped farms one or more counties away from metro areas. On the other hand, farmers’ markets are proliferating in urban and suburban areas (Brown, 2001). A USDA survey counted 4,385 farmers’ markets operating in 2006, a 150% increase over 1994. Although many vendor-growers from nonmetro-area farms can successfully transport their produce to those markets, local producers have the advantage of inviting customers to visit their

farms to see where and how food is produced and—if they (the consumers) are inclined—to pick what they buy and take home to eat.

Proximity to urban or suburban customers is also an advantage to other farms that sell directly to customers. The latter may visit on-farm stores and stands or temporary tailgate points of sale alongside roads in towns. Another direct-making outlet facilitated by geographic proximity is the Community-Supported Agriculture (CSA) channel, whereby groups of clients pay subscriptions for regular supplies of food through the harvesting season (Strochlic and Shelley, 2004).

Our focus on urban-edge agriculture has a strong policy purpose. Individually or together, members of the research team have worked on both the farmland preservation side of promoting peri-urban agriculture (Lapping and Daniels, 2004; Esseks, Nelson, and Stroe, 2006; Sokolow and Zurbrugg, 2003) and on the farm-business viability side (Clancy, Higgins, and Oberholtzer, 2001). This research project was a marriage of scholars with varying expertise but a common interest in understanding what conditions promote and hinder the success of urban-edge agriculture.

As with any field study, we authors identify, from our period of interviews and surveys, key causal conditions (of farm viability on the urban edge) that we believe are likely to persist for some or many years. In subsequent chapters we discuss such factors as the difficulty of agricultural uses (even with improved market prices) to compete for land against housing and other developed uses, the strengths and limitations of farmland preservation tools, the threats to farm viability resulting from nuisance complaints and suits raised by nonfarmer neighbors, the shortages of labor and water for agriculture, and the skill and time demands of direct marketing. Moreover, we intend to update our report, particularly following release of data from the 2007 Census of Agriculture, following new telephone and e-mail communications with local stakeholders, and through our own visits to at least some sites. In fact, we welcome comments on this research report—criticisms or confirmations of our findings and suggestions for improvement—from every reader. We plan to set up a project blog site. Before then, please send your input by e-mail to [jesseks@msn.com](mailto:jesseks@msn.com).

### ***Public Funds Expended on Farmland Preservation***

Another justification for our research is that governing authorities in many metro-area counties have committed themselves to preserving farmland and agriculture. Table 1.1 has relevant excerpts from the formally adopted growth plans for the 15 counties chosen for this study.

Governmental interest in farmland preservation has consisted of more than words. A lot of money has been spent. From August 1989 to August 2008, the government of Berks County, Pennsylvania, contributed \$52 million to preserve 509 farms with a total of 54,191 acres. Helping to protect those acres (through purchase of their development rights) were \$61.6 million in state funds and \$806,100 in federal money. Maryland's Carroll County preserved 52,196 acres of farmland between 1980 and 2007, using \$83.6 million of county funds, \$43.4 million from state sources, and \$1 million from the federal government (Carroll County Land Preservation, 2007). Between April 1997 and March 2004 Larimer County's Open Lands program protected 26,233 acres of agricultural land, using \$11.1 million of their own money and \$16.3 million from

state and private sources, including \$2.5 million in landowner donations of parts of the value of their development rights (Larimer County Parks and Open Lands Department, 2008).

<b>Table 1.1. Excerpts from Growth Plans for the 15 Counties in This Study</b>		
<b>Studied County</b>	<b>Agricultural Preservation Objectives in the County's Comprehensive or Land-use Plan</b>	<b>Selected Policies Found in the Plan to Achieve Those Objectives</b>
<b>Pacific Coast</b>		
King County, WA	Agricultural and forest lands are protected primarily for their long-term productive resource value. However, these lands also provide secondary benefits such as open space, scenic views and wildlife habitat. (p. 14)	Designated Agricultural Production District lands shall not be annexed by cities. (p. 15) King County shall identify appropriate districts within the Rural Area where farming and forestry are to be encouraged and expanded. (p. 17)
Sonoma County, CA	Protect lands currently in agricultural production and lands with soils and other characteristics which make them potentially suitable for agricultural use. (Goal LU 8)	Avoid conversion of lands currently used for agricultural production to non-agricultural use. . . . Discourage uses in agricultural areas that are not compatible with long term agricultural production. (Goal LU-8-1)
Ventura County, CA	1. Preserve and protect irrigated agricultural lands as a nonrenewable resource to assure the continued availability of such lands for the production of food, fiber and ornamentals. 2. Encourage the continuation and development of facilities and programs that enhance the marketing of County grown agricultural products. (pp. 19-20)	<i>Discretionary development</i> located on land designated . . . as <i>Prime Farmland</i> or <i>Farmland of Statewide Importance</i> . . . shall be planned and designed to remove as little land as possible from potential agricultural production and to minimize impacts on topsoil. . . . 4. The Public Works Agency shall plan transportation capital improvements so as to mitigate impacts to important farmlands to the extent feasible. 5. The County shall preserve agricultural land by retaining and expanding the existing <i>Greenbelt Agreements</i> and encouraging the formation of additional <i>Greenbelt Agreements</i> . (p. 20)
<b>Corn Belt</b>		
Lancaster County, NE	An important relationship exists between the urban, rural, and natural landscapes. Urban and rural development maximizes the use of land in order to preserve agriculture and natural resources. (p. 5)	Acknowledge the fundamental Right to Farm. Preserve areas throughout the county for agricultural production by designating areas for rural residential development—thus limiting potential conflicts between farms and acreages. (pp. 8-9)
Dakota County, MN	Goal 2: Preserve agricultural land and farming. (p. 16)	While the county cannot preserve farmland through the use of zoning authority [which is vested in the townships], it . . . could assist township government in the use of purchase of development rights (PDR), transfer of development rights (TDR), conservation easements or clustering techniques . . . and help townships identify areas of prime agricultural land . . . for preservation. (p. 16)
Dane County, WI	1. Identify areas of Dane County suitable for long-term preservation and viability of diverse agricultural enterprises and resources. Protect or encourage protection of those areas for the benefit and use of current and future generations. 2. Maintain Dane County's status as one of the nation's most productive and economically viable agricultural areas. Keep farming economically viable in Dane County through the 21st century. (p. 34)	Develop and implement new tools, such as Purchase of Agricultural Conservation Easements (PACE), Transfer of Development Rights (TDR) and conservation subdivisions to meet agricultural resource goals. . . . Ordinances and regulations, which restrict noise, odors, keeping of animals or other activities that could inhibit typical farm operations, should not apply in locally designated agricultural areas. . . . Actively promote and develop direct-marketing alternatives for all agricultural foods and products. (p. 35)

DeKalb County, IL	One of the County's goals is to protect the County's agricultural heritage and prevent the conversion of prime farm land [98% of the total land in the county] to non-agricultural uses. (p. 41)	Expansion of existing isolated subdivisions and development of new isolated subdivisions and non-farm single-family residences is strongly discouraged in this Plan. . . . Economic conditions favor clustering of farm activities without urban intrusion for successful agriculture. The Plan shows adequate opportunities for development of housing and employment in the County while preserving the rural integrity of the County. (p. 41)
Madison County, OH	Madison County puts a high value on its agriculture land, agriculture heritage, and its agriculture values. This is evident in the countryside and also in the Farmland Preservation Plan adopted by Madison County. (p. 12)	Madison County will discourage the conversion of prime agriculture lands to nonagricultural uses. The County will guide land development to those areas that are shown as urban services areas on the Land Use Plan Map. . . . Existing agricultural uses shall be protected from conflicting development. (p. 55)
<b>Mid-Atlantic</b>		
Carroll County, MD	[T]he [Agricultural] District is primarily composed of lands which, by virtue of their highly productive soils, rolling topography and natural beauty, are the very essence of the County's farming heritage and character.	The intent of this article is to recognize the need for and appropriateness of very limited residential development in the Agricultural District, but to prohibit residential development of a more extensive nature. It is the further purpose of this district to maintain and promote the open character of this land as well as to promote the continuance and viability of the farming and agri-business uses.
Berks County, PA	Goal: To preserve and promote the agribusiness system, agricultural community, and rural character of Berks County: Agriculture plays a major role in the economy of Berks County. Quality soils, a favorable climate, and close proximity to major markets make Berks an ideal location for the agricultural industry. (p. II-2)	The County will identify, maintain, and preserve the most viable agricultural land for agricultural use, and support agriculture as a primary land use and a valued element of the County's economy. While respecting individual property rights, the overriding consideration is to maintain the agricultural economy and to conserve farmland for future agricultural use. (p. II-3)
Burlington County, NJ	A major aspect of preserving this significant past [the county's ] is an acknowledgement of the importance of the country's farming industry. Considered a leading agricultural county in the United States, Burlington has more acres devoted to farming than any other county in the state. (p. 6)	The county has a comprehensive land preservation program designed to ensure that 25,000 acres of vital farmlands and 3,480 acres of open space are protected. (p. 8)
Orange County, NY	The Future of Agriculture—The need for direct efforts to help reduce the costs and provide incentives to help overcome market forces that encourage the conversion of farms to residential and commercial development. (p. 6)	Orange County has been a leader in agricultural preservation efforts as shown by adoption of New York State's first Agriculture and Farmland Protection Plan, and active participation in purchase of development rights programs. Yet the continued viability of farming remains a challenge. Through the leadership of the County's Agriculture and Farmland Protection Board, the County will move to update its Agriculture Plan to address ways to improve the economic vitality and diversity of agricultural pursuits in the County. (p. 16)
<b>Highly Scenic and Recreational</b>		
Larimer County, CO	Faced with a state law permitting 35-acre splits "without any county land use review," and with many people willing to create home sites meeting that minimum lot size, Larimer County instituted "the Rural Land Use Process [that] uses incentives to encourage alternative developments to help retain the rural and agricultural lands of Larimer County." (Website, p. 1)	Up-zoning to increase residential density in rural areas shall not be approved. Extension of higher density development patterns approved prior to adoption of this Master Plan shall not be used as justification for approval of new rezoning or lot size variance requests which result in higher density. (Website, p. 1)

Fayette County, KY	Maintain and enhance the agricultural economy, horse farms, general agricultural farms, and rural character in the Rural Service Area. (p. 18)	Preserve adequate land for the equine industry; protect equine operations from encroachment; and promote future equine industry growth in the region. . . . Support and encourage existing horse breeding and racing operations and encourage expanded capital investment and new farm development as tools for local and international investment and economic development. (p. 18)
Palm Beach County, FL	Prevent urban sprawl through establishment of urban development areas, and encourage urban revitalization and redevelopment programs. . . . [P]rotect agricultural land and equestrian based industries (FLUE-1, p. 3)	The County shall designate properties with one of the three agricultural categories to ensure compatibility with surrounding future land uses, and to prevent encroachment of incompatible uses into agricultural areas. . . . The County shall not violate the Right-to-Farm Act. (FLUE-27, p. 56)

Sources: King County [WA] Department of Development and Environmental Services, 2005, *King County Countywide Planning Policies* (Seattle); Sonoma County [CA] Permit and Resource Management Department, *Sonoma County General Plan—Land Use Element*; County of Ventura [CA], Resource Management Agency, Planning Division, 2005, *Ventura County Comprehensive Plan: Goals, Policies and Program*; City of Lincoln and Lancaster County [NE], 2006, *2030 Lincoln/Lancaster County Comprehensive Plan*; Dakota County, Minnesota, 1999, *Dakota County 2020 Land Use Policy Plan*; Dane County Department of Planning and Development, 2007, *Dane County, Wisconsin, Comprehensive Plan*, chapter 5; DeKalb County, Illinois, 2003, *DeKalb County Unified Comprehensive Plan*; Madison County Commissioners, 2005, *Madison County, Ohio, Comprehensive Plan*; Carroll County, Maryland, no date, *Zoning Ordinances*, article 6; Berks County, Pennsylvania, 2008, *Berks Vision 2020: A Comprehensive Plan for the County of Berks*; Burlington County, 2008, *Burlington County, New Jersey: An Economic Resource Guide: Balanced, Beautiful Burlington, New Jersey*; Orange County, New York, 2003, *Orange County Comprehensive Plan: Strategies for Quality Communities, Executive Summary*; Larimer County [CO] Planning Division, 1997, *Larimer County Land Use Plan: 3.2 Rural Land Use*; Lexington-Fayette Urban County Government, *The 2007 Comprehensive Plan for Lexington-Fayette County, Kentucky*; Palm Beach County, 2005, "Future Land Use Element," *1989 Comprehensive Plan: Revised 11-26-07*.

## 5. Research Methods

This discussion of the project's research methods addresses the following questions:

- In our study of farm viability in growing metro areas, why did we focus on counties rather than on some other geographic unit(s)?
- How did we choose the particular 15 counties that comprise our sample?
- How did we gather data on those counties?
- In addition to seeking information to describe the major products, land, and other inputs of the agricultural sector in each county, we were particularly interested in the behavior and attitudes of agricultural landowners. During 2006 a total of 1,922 such owners across the 15 counties participated in our mailed survey. Sixty-four percent of them (1,237) were also farm operators. Why did we focus on the owners rather than just farm operators?
- How were the surveys conducted?
- To supplement data gathered from the surveyed landowners, we also interviewed a total of 357 leaders of the agricultural sectors in the 15 counties. How were they selected?
- How were the interview data gathered?
- And, in trying to make sense of the collected survey, interview, and other data (such as data from printed or online documents), what types of analysis and general rules of evidence did we follow?

### ***A. Focusing on Agriculturally Important Counties in Growing Metro-Area Counties***

First we need to justify our choice of “unit of analysis,” which Russell Schutt (1999: 618) has defined as “the level of social life on which a research question focused.” Our unit of analysis is the county, for the following reasons:

- In agriculturally important areas, the county is often the framework for many actors relevant to the continued viability of agriculture: the Farm Bureau and other farmer organizations with county-level offices and memberships, the county Soil and Water Conservation District, and county offices of USDA’s Farm Service Agency, its Natural Resources Conservation Service, and the land-grant university’s Cooperative Extension Service.
- The countywide landscape tends to be large enough to be the loci of conflicts critical to the survival of agriculture, including municipalities competing with each other and county governments over control of undeveloped land, and also, exurbanite households fighting with nearby farmers over what are acceptable farming practices.
- A very rich source of data on agriculture in the United States, the federal government’s Census of Agriculture, provides information (for public use) on farming and ranching at the national, state, and county level, but not on individual farms or ranches. Conducted every fifth year, this census allowed us to compare a large variety of measures of agricultural activity per county across its 1987, 1992, 1997, and 2002 editions.

### ***B. Our Sample of 15 Counties***

We sampled counties in two stages:

**1. In the first stage**, we identified 181 metro-area counties across the country that met these four criteria and related standards:

- They had significant agricultural sectors as of the beginning of the 15-year comparison period for ag census data, with “significant” defined as reporting at least \$50 million in gross farm sales for the 1987 census.
- Each county’s land in agricultural use in the 1987 census was not trivial in size, which we defined as covering the equivalent of at least one full “township,” a geographic unit used by the Public Lands Survey for most of the country, consisting of 36 square miles of land (or 23,040 acres).
- Between 1990 and 2000 each county’s population increased by a significant amount—at least 5%.
- That increase occurred from a substantial base of urbanization or urban influence. We were interested in counties in which, toward the beginning of the comparison period, development already was likely to have posed a substantial risk to agriculture’s viability. Otherwise, sustaining agriculture with public and private actions might justifiably have been on no one’s agenda in the early 1990s. We defined a “significant base” as at least 33% of the county’s total land surface being subject to what researchers at the USDA Economic Research Service (ERS) measured as “urban influence.”<sup>2</sup>

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<sup>2</sup> Using Natural Resources Inventory data, the ERS study developed an index of “urban influence” that measured, for each 1990 census block, its accessibility to the populations in other blocks within a 50-mile radius. The more people in those blocks and the closer the blocks with numerous residents, the higher the measure of urban influence for the block being classified. A census block is a “subdivision of a [census tract](#) (or, prior to 2000, a block numbering area); a block is the smallest geographic unit for which the Census Bureau tabulates 100% data. Many



**2. In the second stage**, we used telephone and e-mail contacts with scholars and practitioners to obtain their recommendations as to which counties we should study from the list of 181 selected in the first stage. The particular 15 we have studied were chosen for their diversity—in geographic features, major agricultural products raised, and land-use tools to promote viable agricultural sectors.

- **Regional diversity:** As Table 1.2 indicates, the 15 counties consist of three metro-area counties from the Pacific Coast, four from the Mid-Atlantic region, five from the Corn Belt, and three from diverse parts of the country (Colorado, Kentucky, and Florida) whose important agricultural sectors were threatened by a special set of development pressures—first- and second-home buyers, as well as tourism entrepreneurs, who were attracted to extraordinarily scenic landscapes and related recreational opportunities. Larimer County’s main agricultural areas sit at the edge of the Rocky Mountains’ Front Range; Fayette County is situated in Kentucky’s Bluegrass region with its many scenic horse farms; and Palm Beach County in Florida has been an oceanside playground and retirement destination for generations.
- **Size of metro areas.** Besides regional diversity, the selected counties varied also in the size of their metro areas and the extent of urban influence within their boundaries. Eight of the 15 counties belonged to metropolitan areas with fewer than 1 million total residents, while the other seven (King, Dakota, DeKalb, Madison, Carroll, Burlington, and Palm Beach) had at least 1 million residents (Table 1.2). In five of the latter seven—Dakota, Madison, Burlington, Orange, and Fayette—the county’s own population and commuting patterns caused more than half its total land to be considered under “high urban influence” as of 1990 (Table 1.2).<sup>3</sup>

This geographic diversity translates into considerable variation in traits critical to agriculture’s viability—traits such as population growth, land still being farmed, rate of loss of farmland, demand for housing, frost-free days, and average annual rainfall. Table 1.2’s entries present this diversity. Also, readers who review this table may find counties that are similar to where they live or to areas of interest to them for other reasons.

**Population growth:** The residential populations of the three highly scenic and recreational counties increased during the 1990s by 16% to 35%, while the three Pacific Coast counties grew by 13% to 18%, the five Corn Belt study sites expanded by 9% to 29%, and the four Mid-Atlantic counties added 7% to 22% (Table 1.2).

**Land still being farmed:** Total acres in farms or ranches also varied considerably—from a low of 41,769 acres (or just about 65 square miles) recorded by the 2002 census for King County to over a half million acres (or 781 square miles) in Sonoma, Dane, Larimer, and Palm Beach counties (Table 1.2). Overall farm acreage in the four Mid-Atlantic counties varied in the rather narrow range of 107,977 (Orange) to 215,679

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blocks correspond to individual city blocks bounded by streets, but blocks—especially in rural areas—may include many square miles and may have some boundaries that are not streets. . . . Over 8 million blocks are identified for Census 2000” (taken from the “Glossary” of the US Census Bureau’s American FactFinder: [http://factfinder.census.gov/home/en/epss/glossary\\_c.html](http://factfinder.census.gov/home/en/epss/glossary_c.html)).

<sup>3</sup> For a definition of “urban influence,” see footnote 1 above.

acres (Carroll), while the Corn Belt counties started at 245,886 acres in Madison County and extended to 515,475 in Dane.

**Loss of farmland:** Much of the differences in land farmed were related to variation in the total size of the counties and the proportion of the total that was farmable. Also relevant was the loss of farmland. Between 1987 and 2002 agriculture's share of the county's total land declined in 10 of the counties by 0.9 percentage points (King County) to 20 percentage points (Fayette County; see Table 1.2). Five counties recorded percentage-point *increases*, ranging from 0.1 (Lancaster) to 7.7 (Sonoma). However, for those counties—Sonoma, Ventura, Lancaster, Dakota, and Burlington—some of those increases may be due to changes between the 1997 and 2002 censuses in how farms were surveyed. USDA's National Statistics Service (NASS) took over full responsibility for the census<sup>4</sup> and reported using more comprehensive lists of farms and ranches to which to send the census forms (Sumner, Brunke, and Bervejillo, 2004). Because the 2002 *Census of Agriculture* contains both data for that year and entries that represent adjustments for 1997 based on the new sampling procedures, we could compare the adjusted 1997 figures for total acres in farms to those of the originally published 1997 census. For 13 of our 15 counties, the 1997 land totals increased by 0.8% to 25.5% (with a median of 4.1%), while in two cases there were small decreases—of 0.04% (Burlington) and 1.4% (Larimer). The wider sampling nets may have obscured losses of farmland and overstated gains since 1987.<sup>5</sup>

**The relative demand for housing:** As a rough measure of the demand for housing, we used each county's 2006 median value for owner-occupied homes and compared it to the median for the *country as a whole*, which in the 2006 American Community Survey was estimated to be \$185,200 (U.S. Census Bureau, 2007). The medians for our three West Coast counties range from \$394,100 (King) to \$648,000 (Ventura) and exceeded that national median by 112.8% to 249.9% (Table 1.2). For the five Corn Belt counties, the differences ranged from minus 22.5% (Lancaster County) to plus 33.9% (Dakota), while in the four Mid-Atlantic counties it went from minus 19.2% (Berks) to plus 96.4% (Carroll), and for the three scenic counties, minus 15.6% (Fayette) to plus 77.4% (Palm Beach).

**Frost-free days and annual rainfall:** In Table 1.2, the differences in frost-free days and inches of annual rainfall reflect the geographic locations of the studied counties. Ventura County in southern California and Palm Beach in Florida avoid frost for nearly the entire year. King County in western Washington State, Sonoma County on the northern California coast, and Carroll County in Maryland, tend to enjoy more than 200 days frost free. Parts of Berks County get above 200 days, while the other nine counties usually record fewer than 200. Rainfall numbers are also very diverse, extending from

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<sup>4</sup> The U.S. Census Bureau began preparations for the 1997 ag census, and then NASS completed. However, the 2002 census was the first one that NASS "conducted . . . from start to finish" (Allen, 2004).

<sup>5</sup> The problem is that we lack estimates for 1987 that are consistent with the new sampling frame for 2002. Therefore, we compared the unadjusted 1997 totals for land in farms with those for 10 years earlier (1987) that also did not take into account the new sampling techniques. In these comparisons, the losses "originally" measured for eight of our counties were 0.7 to 19.6 percentage points *higher* relative to the 1987-to-1997 comparisons using the adjusted figures for 1997. The median increase was 5.4 points. In three other counties, the *gains* (1987–97) found with the initially published 1997 figures were 2.5 to 9.6 points *less* when we used the adjusted 1997 data. Moreover, in another two counties, losses recorded under the older sampling regime changed to gains under the new. However, in one additional case the acres lost were greater, while in a second the difference was tiny.

as few as 15.6 inches in southern California’s Ventura County and 15.8 inches in a “rain shadow” area of Larimer County to 59.4 inches in Palm Beach County, where agriculture benefits from a moist Atlantic Coast climate. The differences in rainfall are related to the percentages of harvested cropland that were irrigated (Table 1.2). That is, the less rainfall, the higher the irrigation percentages tend to be.<sup>6</sup>

<b>Table 1.2 Geographic Traits of Studied Counties</b>			
<b>Pacific Coast</b>	<b>King County, WA</b>	<b>Sonoma County, CA</b>	<b>Ventura County, CA</b>
2006 population <sup>1</sup>	1,826,732	466,891	799,720
Population growth, 2000–2006 <sup>1</sup>	5.2%	1.8%	6.2%
Population growth, 1990–2000 <sup>1</sup>	15.2%	18.1%	12.6%
All land in county (acres) <sup>2</sup>	1,360,668	1,008,562	1,180,991
Total acres in farms or ranches, 2002 <sup>2</sup>	41,769	627,227	332,371
Total acres as percentage of all land, 2002 <sup>2</sup>	3.1%	62.2%	28.1%
Farmed or ranched land as percentage of all land, 1987 <sup>3</sup>	4.0%	54.5%	27.9%
<i>Percentage-point difference, 2002 versus 1987 level</i>	-0.9	+7.7	+0.2
Percentage subject to “high urban influence” as of 1990 <sup>4</sup>	32.0%	19.6%	35.4%
Percentage subject to “medium” or “medium-low urban influence” <sup>4</sup>	19.6%	28.2%	25.4%
As of 2003, located in a Metropolitan Statistical Area with a population of:	At least 1 million	Fewer than 1 million	Fewer than 1 million
Name of metro area	Seattle-Tacoma-Bellevue	Santa Rosa-Petaluma	Oxnard-Thousand Oaks
Median value of owner-occupied homes, 2006 <sup>1</sup>	\$394,100	\$618,500	\$648,000
Percentage difference between county’s median and national median for owner-occupied homes, 2006 <sup>1</sup>	+112.8%	+234.0%	+249.9%
Median household income, 2006 <sup>1</sup>	\$63,489	\$60,821	\$72,107
Frost-free days	253 (Seattle)	206 (Santa Rosa)	359 (Los Angeles)
Average annual rainfall (inches)	36.2 (Seattle)	31.0 (Santa Rosa)	15.6 (Oxnard)
Percentage of total harvested cropland that was irrigated, 2002 <sup>2</sup>	28.8%	76.1%	69.5%
Total harvested cropland acres, 2002 <sup>2</sup>	10,165	91,537	102,262
Total number of separate farm operations, 2002 <sup>2</sup>	1,548	3,447	2,318

<sup>1</sup>US. Census Bureau, American FactFinder: [http://factfinder.census.gov/home/saff/main.html?\\_lang=en](http://factfinder.census.gov/home/saff/main.html?_lang=en)

<sup>2</sup>USDA National Agricultural Statistics Service, 2002 Census of Agriculture:

<http://www.agcensus.usda.gov/Publications/2002/index.asp>

<sup>3</sup>USDA Economics & Statistics Systems, Ag Census: The US Census of Agriculture, 1987, 1992, 1997:

<http://agcensus.mannlib.cornell.edu/>

<sup>4</sup>USDA Economic Research Service

<sup>6</sup> The Pearson correlation coefficient for these two variables across the 13 counties for which we had data on irrigated harvested cropland was a statistically insignificant -.148. However, when the outlier percentage for Palm Beach County was omitted, the correlation rose to -.711 (significant at the 0.01 level in a 2-tailed test).

<b>Corn Belt</b>	<b>Lancaster County, NE</b>	<b>Dakota County, MN</b>	<b>Dane County, WI</b>	<b>DeKalb County, IL</b>	<b>Madison County, OH</b>
2006 population	267,135	388,001	463,826	100,139	41,496
Population growth, 2000–2006	6.7%	9.0%	8.7%	12.6%	3.2%
Population growth, 1990–2000	17.2%	29.3%	16.2%	14.2%	8.5%
All land in county (acres)	536,884	364,544	769,213	405,860	297,880
Total acres in farms or ranches, 2002	448,600	235,763	515,475	359,352	245,886
Total acres as percentage of all land, 2002	83.6%	64.7%	67.0%	88.5%	82.5%
Farmed or ranched land as percentage of all land, 1987	83.5%	60.3%	74.1%	94.7%	89.7%
<i>Percentage-point difference, 2002 versus 1987 level</i>	+0.1	+4.4	-7.1	-6.2	-7.2
Percentage subject to “high urban influence” as of 1990	29.5%	67.2%	28.7%	27.4%	52.2%
Percentage subject to “medium” or “medium-low urban influence”	37.5%	32.8%	41.8%	62.9%	47.8%
As of 2003, located in a Metropolitan Statistical Area with a population of:	Fewer than 1 million	At least 1 million	Fewer than 1 million	At least 1 million	At least 1 million
Name of metro area	Lincoln	Minneapolis-St. Paul-Bloomington	Madison	Chicago-Naperville-Joliet	Columbus
Median value of owner-occupied homes, 2006	\$143,500	\$247,900	\$225,700	\$189,000	\$104,300*
Percentage difference between county’s median and national median for owner-occupied homes, 2006	-22.5%	+33.9%	+21.9%	+2.1%	-43.7
Median household income, 2006	\$48,564	\$70,502	\$57,693	\$51,055	\$46,252 (2004)*
Frost-free days	160 to 175	About 166	147 to 159	165 to 170	About 165
Average annual rainfall (inches)	26.9	27.3	33.0	37.4	38.5
Percentage of total harvested cropland that was irrigated, 2002	5.4%	24.2%	3.7%	0.3%	NA
Total harvested cropland acres, 2002	314,148	191,924	360,910	340,614	214,411
Total number of separate farm operations, 2002	1,607	997	2,887	816	730

\*US Census Bureau, State and County QuickFacts: <http://quickfacts.census.gov/qfd/states/39/39097.html>

<b>Mid-Atlantic</b>	<b>Carroll County, MD</b>	<b>Berks County, PA</b>	<b>Burlington County, NJ</b>	<b>Orange County, NY</b>
2006 population	170,260	401,149	450,627	376,392
Population growth, 2000–2006	12.8%	7.4%	6.4%	10.3%
Population growth, 1990–2000	22.3%	11.0%	7.2%	11.0%
All land in county (acres)	287,440	549,683	514,927	522,456
Total acres in farms or ranches, 2002	147,252	215,679	111,237	107,977
Total acres as percentage of all land, 2002	51.2%	39.2%	21.6%	20.7%
Farmed or ranched land as percentage of all land, 1987	58%	44.3	20.0%	22.0%
<i>Percentage-point difference, 2002 versus 1987 level</i>	-6.8	-4.9	+1.6	-1.3
Percentage subject to “high urban influence” as of 1990	9.1%	25.0%	51.8%	81.8%
Percentage subject to “medium” or “medium-low urban influence”	90.9%	75.0%	48.2%	18.2%

As of 2003, located in a Metropolitan Statistical Area with a population of:	At least 1 million	Fewer than 1 million	At least 1 million	Fewer than 1 million
Name of metro area	Baltimore-Towson	Reading	Philadelphia-Camden-Wilmington	Poughkeepsie-Newburgh-Middletown
Median value of owner-occupied homes, 2006	\$363,800	\$149,700	\$259,300	\$319,300
Percentage difference between county's median and national median for owner-occupied homes, 2006	+96.4%	-19.2%	+40.0%	+72.4%
Median household income, 2006	\$74,106	\$50,039	\$68,090	\$64,947
Frost-free days	235 (Baltimore)	170–214	166–186	143–183
Average annual rainfall (inches)	44	41	44–46	41
Percentage of total harvested cropland that was irrigated, 2002	0.5%	0.8%	22.9%	NA
Total harvested cropland acres in 2002	99,790	154,108	154,108	54,654
Total number of separate farm operations, 2002	1,058	1,791	906	706

<b>Three Highly Scenic and Recreational Counties</b>	<b>Larimer County, CO</b>	<b>Fayette County, KY</b>	<b>Palm Beach County, FL</b>
2006 population	276,253	270,789	1,274,013
Population growth, 2000–2006	9.8%	3.9%	12.6%
Population growth, 1990–2000	35.1%	15.6%	31.0%
All land in county (acres)	1,664,832	182,090	1,263,428
Total acres in farms or ranches, 2002	521,599	119,098	535,965
Total acres as percentage of all land, 2002	31.3%	65.4%	42.4%
Farmed or ranched land as percentage of all land, 1987	34.5%	85.4%	52.2%
<i>Percentage-point difference, 2002 versus 1987 level</i>	-3.2	-20.0	-9.8
Percentage subject to “high urban influence” as of 1990	16.5%	79.3%	24.0%
Percentage subject to “medium” or “medium-low urban influence”	35.3%	20.6%	30.8%
As of 2003 located in a Metropolitan Statistical Area with a population of:	Fewer than 1 million	Fewer than 1 million	At least 1 million
Name of metro area	Fort Collins-Loveland	Lexington-Fayette	Miami-Fort Lauderdale-Miami Beach
Median value of owner-occupied homes in the county, 2006	\$244,000	\$156,400	\$328,500
Percentage difference between county's median and national median for owner-occupied homes, 2006	+31.7%	- 15.6%	+ 77.4%
Median household income (2006)	\$53,745	\$44,211	\$51,677
Frost-free days	170 (Denver)	197	Below freezing days are rare
Average annual rainfall (inches)	15.8 (Fort Collins)	45.9 inches	59.4 inches
Percentage of total harvested cropland that was irrigated, 2002	77.2%	4.3%	97.5%
Total harvested cropland acres, 2002	64,332	26,264	428,683
Total number of separate farm operations, 2002	1,564	738	1,110

NA = Not applicable.

- **Major crops:** In Table 1.3, the list of the three most important types of agricultural products per county in value of sales is relatively diverse, except that the 2002 census found the product category “Nursery, greenhouse, and floriculture” to rank among the top three kinds of products in 12 of the 15 counties, including at least two counties in

all three regions and also in the special scenic group of counties. The new homes, schools, stores, offices, and other facilities constructed in the nearby urbanizing areas provided many customers for trees, shrubs, sod, bedding plants, etc. Also frequently found near large urban populations are dairy farms. The market value of dairy products ranked among the highest three types by sales for eight of our studied counties. Other types of crops or livestock in the top three were as follows: vegetables in five counties, fruits (or fruits and berries) in four, cattle and calves in four, and grains (plus soybeans) in all five Corn Belt counties, plus Carroll County, and two counties each for poultry and hogs/pigs.

- **Governmental programs:** Table 1.3 lists various land-use policies of state and local governments that affect the viability of agriculture in the studied counties. Of course, other types of governmental intervention are also relevant and will be discussed in later chapters. However, since the land constraint tends to be the most serious for continued commercial farming in metro-area counties, our selection criteria included variety in land-use policies.
  - Twelve of the 15 studied counties required large minimum lot sizes (e.g., 20 to 40 acres) both as a financial disincentive to building nonfarm homes on agriculturally zoned land and as a tool to keep overall density low (i.e., agricultural protection zoning).
  - In eight counties “urban growth boundaries” or “urban services areas” had been established to shape and phase the expansion of sewer, water, and other urban services.
  - In 11 counties we found programs operating that purchased the development rights to farm or ranch land. That is, agland owners voluntarily sold to public or private agencies their rights to build homes, stores, etc., on their land.
  - In one county (Burlington), there were programs at the state and town level that successfully engineered the transfer of development rights from agricultural parcels marked for preservation (“sending” areas) to other properties planned for relatively dense development (“receiving” areas). Developers working in the latter type of area paid owners of the agricultural parcels in “sending” areas for the value of the building rights they surrendered and that could be transferred to the developers’ properties. Transfers of this nature had taken place also in Palm Beach and Larimer counties. In a rural township of a third county, Orange, legislation authorizing such transfers was in place.
  - All 14 states in which our 15 study sites are located had right-to-farm laws designed to give producers some protection from private nuisance complaints (e.g., against farm odors, dust, noise) or from regulations imposed by local government to prevent perceived nuisances.
  - All states also had laws authorizing property-tax assessments on the basis of the land’s capability to generate income from agricultural use rather than on its often much higher market value that incorporates its development potential.

### ***C. How Were Data on the 15 Counties Collected?***

We used three main sources:

- 1. The federal government’s every-five-year Census of Agriculture:** The census surveys as many of a county’s farm and ranch operations as possible, given the lists of farms and

ranches that the enumerating agency has been able to compile for its census mailings and the willingness of addressees to cooperate. The census aims to survey the operators of “any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the Census year” (USDA, 2008). Federal law (under Title 7 of the United States Code) requires participation. There have been both “long” and “short” forms of the census questionnaire. For example, the 2002 long form (which farmers were required to submit by February 3, 2003) comprised 24 pages, divided into 24 sections, with up to 26 questions per section, many consisting of multiple parts. For each of our 15 counties, Table 1.2 lists the total numbers of separate operations and the total acres in farms or ranches that the 2002 census estimated.

<b>Table 1.3</b>		
<b>Studied Counties</b>	<b>Top Three Types of Agricultural Products by Market Sales, 2002 Census of Agriculture*</b>	<b>Major Policies Affecting Agricultural Land Use</b>
<b>Pacific Coast</b>		
King County, WA	<ol style="list-style-type: none"> <li>1. Nursery, greenhouse, and floriculture</li> <li>2. Dairy products</li> <li>3. Vegetables</li> </ol>	<ul style="list-style-type: none"> <li>• Large minimum lot sizes to limit number of new homes built on agriculturally zoned land (a form of agricultural protection zoning, or APZ)</li> <li>• Urban growth boundaries (UGB) to shape and phase the extension of urban services</li> <li>• Purchase of development rights to agland (PDR) that limits its development</li> <li>• Right-to-farm (RTF) legislation that aims to protect against unfair nuisance complaints</li> <li>• Agricultural use value (rather than full market value) as the basis for property tax assessment (UVA)</li> </ul>
Sonoma County, CA	<ol style="list-style-type: none"> <li>1. Fruits</li> <li>2. Dairy products</li> <li>3. Nursery, greenhouse, and floriculture</li> </ol>	APZ, UGB, PDR, RTF, UVA
Ventura County, CA	<ol style="list-style-type: none"> <li>1. Fruits</li> <li>2. Nursery, greenhouse, and floriculture</li> <li>3. Vegetables</li> </ol>	APZ, UGB, RTF, UVA
<b>Corn Belt</b>		
Lancaster County, NE	<ol style="list-style-type: none"> <li>1. Corn, soybeans, sorghum, and wheat</li> <li>2. Cattle and calves</li> <li>3. Poultry</li> </ol>	APZ, cluster zoning, RTF, UVA
Dakota County, MN	<ol style="list-style-type: none"> <li>1. Corn, soybeans, wheat, and oats</li> <li>2. Nursery, greenhouse, floriculture and sod</li> <li>3. Cattle &amp; calves</li> </ol>	APZ, urban services area (imposed by metropolitan wastewater treatment service), PDR, RTF, UVA
Dane County, WI	<ol style="list-style-type: none"> <li>1. Dairy products</li> <li>2. Corn, soybeans, wheat, and oats</li> <li>3. Nursery, greenhouse, floriculture, and sod</li> </ol>	APZ, PDR, RTF, UVA
DeKalb County, IL	<ol style="list-style-type: none"> <li>1. Corn, soybeans, wheat, and oats</li> <li>2. Hogs and pigs</li> <li>3. Cattle and calves</li> </ol>	APZ, UGB, RTF, UVA
Madison County, OH	<ol style="list-style-type: none"> <li>1. Soybeans, corn, and wheat</li> <li>2. Hogs and pigs</li> <li>3. Dairy products</li> </ol>	APZ, PDR, Agricultural Districts to protect managerial freedom to farm, RTF, UVA
<b>Mid-Atlantic</b>		
Carroll County, MD	<ol style="list-style-type: none"> <li>1. Dairy products</li> <li>2. Nursery &amp; greenhouse,</li> <li>3. Corn, soybeans, wheat, and barley</li> </ol>	APZ, PDR, RTF, UVA

Berks County, PA	1. Nursery, greenhouse, and floriculture 2. Poultry 3. Dairy products	APZ, PDR, Agricultural Security Areas to protect managerial freedom to farm, RTF, UVA
Burlington County, NJ	1. Nursery, greenhouse, floriculture, and sod 2. Fruits & berries 3. Vegetables, melons, and potatoes	PDR, state and township transfer of development rights (TDR), RTF, UVA
Orange County, NY	1. Nursery, greenhouse, floriculture, and sod 2. Dairy products 3. Vegetables and potatoes	PDR, Agricultural Districts to protect managerial freedom to farm, TDR in one town, RTF, UVA
<b>Highly Scenic and Recreational</b>		
Larimer County, CO	1 Dairy products 2. Cattle and calves 3. Nursery and greenhouse products	APZ, cluster zoning (i.e., to promote clustering of rural residences and preservation of residual farmland), UGB, PDR,TDR, RTF, UVA
Fayette County, KY	1. Horses 2. Tobacco 3. Nursery, greenhouse, and sod	APZ, Consolidation of city and county government, UGB, PDR, RTF, UVA
Palm Beach County, FL	1. Vegetables and sugar cane 2. Nursery, greenhouse, and sod 3. Fruits	Cluster zoning, UGB, TDR, leasing more than 1,700 acres (in 2007) of county-owned land to farmers, RTF, UVA

\*The product types are taken from the 2002 census's Table 2, "Market Value of Agricultural Products Sold," but are modified where necessary, such as when the full category bore the title "Nursery, greenhouse, floriculture, and sod," but our investigation of other tables in that year's census found that no sod had been harvested in the particular county. Another example is where the full category was "Vegetables, melons, potatoes, and sweet potatoes," but the tables on crops harvested indicated that only vegetables had been produced.

**2. Survey of agricultural landowners:** Although the ag census provides a wealth of data per county about farms, ranches, and their operators, we were interested in learning also about the *owners* of agland. They are the ones who decide whether or not to accept developers' bids for their land or to act as land subdividers themselves. They can refuse to pay for (or share in) the costs of maintaining or improving their cropland, pasture, farm buildings, fences, and other facilities. For lack of planning for retirement or death, they can jeopardize the continued viability of their farm operations. Without a family member or other successor lined up to farm the land, it will be sold, perhaps in pieces. Even with a successor in place, it may be necessary to sell at least part in order to pay off heirs or creditors. The nine-page questionnaire that we mailed out in 2006 focused on:

- traits of their owned land, such as number of acres, what was being raised there in 2005 and what marketing outlets were used;
- the owners' assessments of the adequacy of agricultural labor, credit, water, other inputs of production, and of the markets for their land's products, including their satisfaction with the markets' profitability;
- traits of the owners, themselves—age, education, occupation, gross revenue from farming, and their farm revenue's share of total net household income; and
- a number of attitudes that could shape the future viability of agriculture in the county:
  - To what extent were they satisfied with the farmland preservation policies operating within their counties?
  - Over the 10 years following the survey, how much (if any) of their currently owned farmland in the county did they expect to be developed for residential, commercial, or industrial use?
  - In the five following years, was it likely that they or the farmers of their land (if they were not also the operators) would "make any agricultural investments" on



the land, such as erecting, replacing, or enlarging buildings, fences, and conservation or irrigation facilities?

- Was a succession plan for transfer of the ownership and management of the land already written or under consideration?
- Among the owners who were also operators, did they expect to farm in the county for at least another 10 years?
- And what kind of future did the owners expect for agriculture in the county 20 years into the future: “Bright, modest, none at all, not sure”?

The surveyed traits of the land, owners, and their assessments of the adequacy of production inputs and marketing outlets were used to test hypotheses about causes of their plans for, and attitudes toward, the future.

***Sampling procedures:*** The sample of surveyed landowners in each county was randomly selected from a public list of owners of parcels that under state law qualified for property-tax assessment based on their agricultural use rather than on their full market value. In Chapter 3, Table 3.7 describes, by state, the main conditions for qualifying for agricultural-use assessment.

Because we were seeking to survey persons likely to know about agricultural operations on their land in the county, we removed from the computer-readable lists (that we purchased from assessment offices) all the owners whose home zip codes indicated they lived outside the studied county. From these adjusted lists we randomly selected about 300 owners per county. In Berks and King counties, there were so many nonfarm forestry parcels in the files that drawing a supplementary sample was necessary. We learned of the forestry-land cases when many of their owners returned the questionnaires (in postage-guaranteed envelopes) and indicated in the first (and only) question they answered that their land had not been farmed the previous year.

***Numbers and types of respondents:*** Across the 15 studied counties, we received usable questionnaires from 100 agland owners in Fayette County to 174 in Dane County (see Table 1.4). From 43.1% (Dane) to 89.3% (King) of the respondents identified themselves as farm operators as well as owners. Another 7.0% (Fayette) to 36.4% (Madison) were not currently operators but classified themselves as nevertheless having “detailed information about how my farmland there [in the subject county] is operated.” Twenty-three percent of these well-informed non-operators were retired farmers, while another 25% were retired from other occupations and perhaps also had the time to observe carefully how their land was farmed.

<b>Region or Type of County</b>	<b>County and State</b>	<b>Total Landowners Surveyed</b>	<b>Number (and Percentage) Who Were Owner-Operators</b>	<b>Number (and Percentage) Who Otherwise Were Informed about Land's Ag Operations</b>	<b>Response Rate (%)</b>
<b>Pacific States</b>	King County, WA	103	92 (89.3)	8 (7.8)	41.2
	Sonoma County, CA	108	90 (83.3)	14 (13.0)	43.2
	Ventura County, CA	105	89 (84.8)	12 (11.4)	44.1
<b>Corn Belt</b>	Lancaster County, NE	157	81 (51.6)	54 (34.4)	57.9
	Dakota County, MN	136	88 (64.7)	30 (22.1)	63.6
	Dane County, WI	174	75 (43.1)	63 (36.2)	66.9
	DeKalb County, IL	171	82 (48.0)	52 (30.4)	65.3
	Madison County, OH	107	51 (47.7)	39 (36.4)	51.2
<b>Mid-Atlantic States</b>	Carroll County, MD	140	72 (51.4)	16 (11.4)	56.7
	Berks County, PA	123	62 (50.4)	41 (33.3)	42.9
	Burlington County, NJ	140	95 (67.9)	24 (17.1)	52.2
	Orange County, NY	133	93 (69.9)	25 (18.8)	47.5
<b>Highly Scenic Counties</b>	Larimer County, CO	117	88 (75.2)	17 (14.5)	58.5
	Fayette County, KY	100	89 (89.0)	7 (7.0)	49.5
	Palm Beach County, FL	108	90 (83.3)	12 (11.1)	39.6
<b>Totals</b>		1,922	1,237		

**Response rates:** Following procedures recommended by the American Association for Public Opinions Research (AAPOR), we calculated the response rates by dividing the returned, usable questionnaires by the total number of owners *eligible* to participate in the survey.<sup>7</sup> The resulting rates ranged from 39.6% in Palm Beach County to 66.9% for Dane County, with the median being Madison County's 51.2% (Table 1.4).<sup>8</sup> Given these modest (but not bad) levels of response, the report stresses where the survey findings are supported by our interviews with local experts. In the absence of corroboration, the questionnaire data can only suggest the conditions that prevailed in the studied counties' agricultural sectors, 2005 to 2006.

### **3. Interviews with knowledgeable observers and participants in the county's agricultural sector:** From late 2004 to February 2008 there were phone or in-person

<sup>7</sup> Excluded from the total "eligibles" were the cases where sampled owners or relatives informed us that their land had not been farmed, they had sold the land, the owner had recently died or was too sick to participate, the cases where our mailings to them were returned as undeliverable (and we checked for any mistakes in our use of public files to obtain the addresses), and when one other adjustment was made. The American Association for Public Opinion Research (AAPOR) allows for estimating "what proportion of cases of unknown [i.e., potential] eligibility is actually eligible," provided that we have persuasive evidence to support the estimate (AAPOR, 2004, p. 29). As suggested by AAPOR (p. 36), we assumed that, among the potential respondents with whom we had not had any communication, the percentage eligible for the survey was the same as the percentage we found among the owners who (1) were reached by mail and (2) indicated that they still owned land that had been farmed the previous year. For example, let us say that we heard from 150 sampled owners, of whom 135 (90%) filled out the questionnaires and 15 wrote that either their land had been sold or had not been farmed at all in 2005. Let us say further that we had not heard from another 150 owners to whom we had mailed questionnaires. We assume that 90% of them (135) were similarly circumstanced, i.e., their land had been farmed, and they were eligible for the study. Their numbers (135) are placed in the denominator of the response-rate ratio, along with the 135 cases whose questionnaires had been filled out. The response rate is therefore 135 divided by the sum of 135 plus 135, or 50%.

<sup>8</sup> Since we surveyed agland owners rather than farm and ranch operators, we could not assess the representativeness of our 15 samples by reference to the findings of the Census of Agriculture. Also, the lists of owners from which we drew the samples included too few traits to make satisfactory comparisons of the responding owners to all listed owners.

interviews with 16 to 36 knowledgeable observers of, or participants in, each county’s agricultural sector (Table 1.5). Across the 15 counties, the interviewees totaled 357, almost all of whom were spoken with by members of our research team. In eight of the 357 cases, we had access to sources that provided recorded or transcribed interviews with informants in three studied counties.

As indicated in Table 1.5, the interviewees fall into four broad categories:

- 1) a group we classified as *generalists* because their jobs gave them broad knowledge of their counties’ agricultural sectors—such as by being a senior Cooperative Extension adviser, the county executive director of USDA’s Farm Service Agency, the district conservationist of USDA’s Natural Resources Conservation Service, manager of the Soil and Water Conservation District, executive director or manager of the county Farm Bureau, the county planning director or the senior planner, farmer members of the county legislature, and the county agricultural commissioner, among others;
- 2) *private-sector professionals with more specialized assignments*, such as bankers who handled agricultural loans, managers of farm equipment dealerships and other ag input services, realtors and attorneys specializing in rural land, and leaders of crop or livestock associations;
- 3) *staff members of public and not-for-profit agencies who led programs designed to assist farmers and ranchers*, such as extension educators working with livestock or vegetable farmers, administrators of farmland preservation programs and of agricultural protection zoning, managers of farmers’ markets, leaders of programs for young or new farmers, and officers of environmental groups that supported local agriculture;
- 4) *farmers or ranchers producing specialty products* such as vegetables for direct marketing, flowers, wine grapes, and agritourism, among other kinds of products about which our survey and census sources did not provide sufficient information.

In interviewing these informants, we were required to follow protocols that were reviewed and approved by university officers charged with protection of the privacy and other interests of human subjects.

<b>Region or Type of County</b>	<b>Generalists</b>	<b>Private-Sector Providers of Services to Farmers and Ranchers</b>	<b>Leaders of Assistance Programs for Farmers and Ranchers</b>	<b>Farmers and Ranchers of Specialty Products</b>	<b>Total</b>
<b>Pacific States</b>					
King County, WA	2	6	8	2	18
Sonoma County, CA	7	5	8	9	29
Ventura County, CA	5	4	4	3	16
<b>Corn Belt</b>					
Lancaster County, NE	6	8	9	4	27
Dakota County, MN	11	5	8	0	24
Dane County, WI	4	6	6	4	20
DeKalb County, IL	6	11	5	0	22
Madison County, OH	5	11	0	0	16
<b>Mid-Atlantic States</b>					
Carroll County, MD	7	5	7	1	20
Berks County, PA	2	10	8	1	21

Burlington County, NJ	5	6	14	5	30
Orange County, NY	4	8	13	8	33
<b>Scenic and Recreational Counties</b>					
Larimer County, CO	6	15	14	1	36
Fayette County, KY	7	11	9	2	29
Palm Beach County, FL	5	3	3	5	16
<b>Totals</b>	82	114	116	45	357

#### 4. “Rules of Evidence” for:

##### A. *Descriptions of features of the agricultural economies per county*

- On the whole we felt confident about the usefulness of the county-level data found in the every-five-year Census of Agriculture. As discussed above, comparisons between findings for the 2002 census and previous ones must take into account the changes in sampling procedures between the 1997 and 2002 censuses.
- For describing features of the counties’ agricultural sectors not covered in these censuses, we used data from our agland owner surveys and/or the interviewed local experts. In these cases, when making a descriptive statement (such as “Credit was generally adequate for farm operations” or “Large-lot zoning was strictly enforced”), we required agreement among sources, such as at least two local experts, and no one or a minority contradicting them, and—even better—corroboration from the surveyed owners.

##### B. *Attitudes of county’s agland owners*

As discussed earlier, the survey questionnaire aimed to measure agland owners’ attitudes about the present and the future that were likely relevant to the continued viability of agriculture in the studied counties: their perceptions of the profitability of markets for the ag products raised on their land, their plans (if any) for developing their land over the following 10 years, whether the farm operators among them planned to continue farming in the county for at least another 10 years, whether they expected any investments in farm buildings on their land in the next five years, and their predictions about the health of agriculture in the county 20 years into the future.

##### *Statistical tool for explaining agland owner attitudes*

The responses to the questions that sought to measure these attitudes lent themselves to being allocated to one of two categories—“yes” or “no”:

- “Yes, at least some development was expected in the next two years,” versus “no development” or “not sure”;
- “Yes,” respondent intended to continue farming for at least 10 years, versus “no,” or “not sure”;
- “Yes,” some investments in farm buildings likely, versus “no” or “not sure”;
- “Yes,” agriculture’s future would be “bright” or at least “modest,” versus “dim,” “none at all,” or “not sure.”

Given our interest in these attitudes with two levels of measure, we used logistic regression as an explanatory tool because it is especially suited for identifying predictors of one of two outcomes, such as “yes” versus “no” (Hosmer and Lemeshow, 1989; Menard, 2002). For example, this tool found that, in three counties, surveyed owners were *more* likely to plan to develop at least some of their land in the county if they believed the statement “In

controversies between farmers and nonfarmers . . . local government authorities tended to . . . side with the nonfarmers.”<sup>9</sup> For six counties, the regression analyses indicated that development was *less* likely if the owners believed that local government zoning was “very helpful” or at least “modestly helpful” in maintaining an adequate supply of land for farming.<sup>10</sup>

***C. Formally authorized features of public programs (such as agricultural zoning, purchase of development rights, right-to-farm laws, and guest worker programs)***

For sources on formal program features, like the minimum parcel sizes required for building a new house in an agriculturally zoned area, we relied on:

- printed and online documents issued by the responsible public agency, or
- descriptions from at least two independent sources, including interviews with program administrators, program clients, or other knowledgeable observers (e.g., Cooperative Extension staff), and/or the findings of university studies, again subject to the conditions (described above) for situations where such sources disagreed.<sup>11</sup>

***D. Implementation and effectiveness of public programs***

For our assessments of the nature and effectiveness of program implementation, we relied also on a combination of two or more separate sources, including program documents; interviews with program administrators, clients, and/or knowledgeable observers; university studies; and a fourth type of source available only for certain public programs. For agricultural use-value assessment, right-to-farm, zoning, and purchase of development rights programs, we could use survey findings. Our 2006 surveys asked the responding agland owners to evaluate the effectiveness of those four kinds of programs in their counties.

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<sup>9</sup> These particular findings are discussed in Chapter 5.

<sup>10</sup> The degree of being more or less likely is measured by a coefficient called an “odds ratio,” which tells us, other predictor variables in the analysis held constant, how much does the likelihood (or odds) of a “yes” answer, such as about development, increase or decrease when the predictor measure (e.g., whether local government sides with nonfarmers) increases by one level (such as from “no,” nonfarmers are not favored, to “yes,” they are favored). In our discussion of such findings (in Chapters 2 and 5), we report only statistically significant variables. Here, statistical significance deals with the issue of whether the findings of relationships are such that sampling error alone could account for them. In other words, if we somehow had been able to survey all agland owners in a county, would we have found the odds ratio for the hypothesized variable to be actually zero, indicating no relationship whatsoever? We regard as significant only predictors where (in a Wald test of statistical significance) there was less than a 12.5% chance that in the population as a whole their odds ratios would be zero.

<sup>11</sup> Not surprisingly, when evaluating a particular program, we did not rely exclusively on the opinions of two or more administrators of that program.