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The future of farming on the urban edge: Insights from fifteen U.S. counties about farmland protection and farm viability

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Abstract

Farmland protection and farm viability are two important aspects of urban-edge farming. Surveys of landowners and informant interviews were completed between 2005 and 2007 in 15 U.S. counties to examine the opportunities and constraints that farmers face in these areas. Landowners' perceptions about the future outlook for their county's agriculture varied greatly. Many operators in counties producing long-established crops, such as corn and soybeans, rely heavily on wholesale markets for sales. In other counties, farmers depend on a mix of wholesale and direct markets. Study results show that over half the respondents relying on direct markets operate small acreage farms with low gross agricultural sales. Operators using primarily wholesale markets tended to be more optimistic about the profitability and accessibility of their markets and the outlook for agriculture in their county than those depending on direct markets. In additional results from the survey, almost a third felt that equal emphasis should be placed on farmland preservation and farm viability efforts in order to keep farming viable in their county, while approximately the same number felt the priority should be protecting agricultural land from development via growth management policies. The unique characteristics of agriculturally important counties undergoing urbanization pressures pose challenges and opportunities to researchers and developers to recognize and employ the strategies that will help maintain a viable agricultural sector for urban-edge farming.

Keywords: agricultural marketing, farm viability, farmland protection, landowner survey, succession

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Introduction and Background

For over 60 years, researchers have been concerned about the loss of farmland in the United States (Bogue, 1956). Thirty years ago, it was pointed out that farmland protection on the urban edge needs to emphasize farm profitability (Blobaum, 1982). Five years later, Johnston and Bryant (1987) noted that the many remaining farms in urbanizing areas have been able to adapt to prevailing conditions, demonstrating that they can remain viable despite strong development pressure. In the past decade, more attention has been 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. But the changing environment faced by farmers is complicating and intensifying these endeavors (Clark, Inwood, Sharp, & Jackson-Smith, 2007).

Population growth and mobility have led to intense demand for low-density "countryside" living and huge increases in household formation (Heimlich & Anderson, 2001). The newest National Resources Inventory report shows that over the last 20 years (1987 to 2007), approximately 34 million acres of land were newly developed, representing a 45 percent increase in developed land (USDA, NRCS, 2009). Over this time, cropland acres decreased a total of 12 percent and pastureland decreased 6 percent. While the threat to the agricultural sector as a whole may be limited because converted farmland represents a small portion of all farmland, specific segments of agriculture (Heimlich & Anderson, 2001), especially farmland closest to metro areas, may be greatly affected by farmland conversion. For instance, over a decade ago (in 1997), 86 percent of all the country's fruits, nuts, and vegetable production and 63 percent of dairy products were produced in "the most urban-influenced counties" (American Farmland Trust, 2003). Data from 2002 revealed that 55 percent of all U.S. farm sales were from farms located at the rural-urban interface (Jackson-Smith & Sharp, 2008).

Federal, state, and local laws have been enacted in response to the growing public interest in the loss of farmland. Among other issues, access to open and scenic landscapes, retention of the farming culture of the community, preservation of local and regional food production, environmental effects of development (e.g., loss of wildlife habitat, watershed protection), and the costs of development to communities, such as increased costs of public services (e.g., roads, sewer, and water services) that cannot be fully covered by residential use taxes, are often raised in the debate over farmland loss (AFT, 2007, Heimlich & Anderson, 2001; Hellerstein et al. 2002; USDA, ERS, 2005).

Some of the key federal, state, and local agricultural protection programs include agricultural protection zoning (APZ), agricultural use-value tax assessments, and the purchase or transfer of development rights (PDR or TDR programs). Many jurisdictions have developed farmland retention programs employing a mix of regulations, incentives, and purchase easements to secure or encourage protection of working lands for the many services they provide (AFT, 1997; Daniels & Bowers, 1997; Libby, 2002). All 50 states have at least one farmland protection program.

Daniels (1999) has argued that "Farmland Protection makes sense only if agriculture is a profitable business" (p. 228). However, farmers in urbanizing areas must compete with non-farmers for the services of land and water, while maintaining an income flow sufficient to pay the higher labor and other costs associated with operating in an urbanizing environment. In some cases, farmers may adjust by shifting to more capital-intensive commodities and by adding enterprises that take advantage of proximity to nonfarm populations (Heimlich & Anderson, 2001; Johnston & Bryant, 1987).

Researchers and advocates have compiled a long list of the potential benefits for small and midsized farmers near metropolitan areas. There are opportunities for marketing vegetables, fruits, and other products through high-value urban markets, such as restaurants and farmers' markets, and through high-volume purchasers like schools and hospitals. There are also high-value nonfood products

purchased by urban and peri-urban consumers, such as nursery plants and Christmas trees, as well as opportunities for agritourism. Farmers may be able to access a larger pool of seasonal labor as well as benefit from greater off-farm employment opportunities themselves. Among other benefits, there is a greater diversity of financing mechanisms (including for leasing land) and a larger variety of production intensities, especially with regard to fruits and vegetables, in urban-edge areas (Bryant & Johnston, 1992). Many of the solutions suggested for continued farm viability on the urban edge have focused on direct and niche marketing. By its very nature, however, increasing direct and high-value markets for many farms on the urban edge is only one piece to the puzzle given that these products are often produced on relatively smaller acreage farms (Gale, 1997) than traditional field crops (e.g., corn and soybeans, or orchards).

Census of Agriculture statistics also reveal that those farms in the "middle" or those that "operate in the space between the vertically integrated commodity markets and the direct markets" (Kirschenmann, Stevenson, Buttel, Lyson, & Duffy, 2008) are likely at more risk than other farms. These "midsized farms are the most vulnerable in today's polarized markets, since they are too small to compete in the highly consolidated commodity markets and too large and commoditized to sell in the direct markets" (Kirschenmann et al., 2008). Between 1997 and 2007, this "disappearing middle" has meant that farms with gross sales of $100,000 to $499,999 decreased 15 percent and those with gross sales of $50,000 to $99,999 decreased 24 percent. The only increases occurred in farms with less than $2,500 in gross sales (increasing 30 percent) or more than $500,000 (increasing 65 percent) (USDA, NASS, 2009). Examining agriculture's midsized sector from a farm size perspective also reveals a decrease: the number of farms between 50 and 1,999 acres in size decreased over the same period (1997 to 2007), while those with smaller and larger acreage increased in number (USDA, NASS, 2009).

To study the nexus of farmland preservation and farm viability, a multidisciplinary team of researchers funded by USDA's National Research Initiative set out to identify the conditions facing farms in agriculturally important areas in the United States that are also subject to development pressures, focusing on 15 counties in 14 states in the U.S. This paper describes some of the findings of the project. The overall study aimed to determine:

- the types of agricultural products being successfully raised in the study's counties;
- the adequacy of marketing outlets for crops and livestock products;
- the supply and affordability of land for farming and ranching;
- the adequacy of other major production inputs (e.g., field labor, new farmers, credit); and
- the future outlook for agriculture in those counties based on the perceptions and plans of landowners and agricultural leaders.

This article focuses primarily on the marketing pieces of the research, incorporating other aspects to inform the discussion. Relying on both primary data and the Census of Agriculture, we first examine each of the county's agricultural marketing indicators and then address the future outlook for agriculture in these counties. Most of the project's research took place between 2005 and 2007, when development pressures were high or just beginning to decline.

Research Methods

Fifteen U.S. counties with urban-edge farming conditions were chosen for the study (see table 1): three from the Pacific Coast region, four from the Mid-Atlantic/Northeast region, five from the Corn Belt region, and three from other parts of the country. The latter group included highly scenic areas with important agricultural sectors threatened by a special set of development pressures, such as first- and second-home buyers, as well as tourism entrepreneurs attracted to the scenic landscapes and related recreational opportunities. Regional

references in this article, however, are for illustrative purposes only, and do not imply that counties were chosen by region. Instead, the geographic unit of reference for the study was the county level. This unit was chosen because in agriculturally important areas, the county is often the framework for many actors relevant to the continued viability of agriculture. In addition, the countywide landscape tends to be large enough to be the loci of policies and programs critical to the survival of agriculture.

To develop the sample, over 180 counties across the U.S. were identified that met the following criteria: (1) the county had a significant agricultural sector (defined as reporting at least $50 million in gross farm sales in the 1987 Census of Agriculture); (2) having an increase in population between 1990 and 2000 of at least 5 percent occurring from a substantial base of urbanization or urban influence, defined as at least 33 percent of the county's total land surface being subject to medium or high "urban influence" (data provided by USDA, ERS; represented in Heimlich & Anderson, 2001, p. 47), and (3) each county's land in agricultural use in the 1987 Census of Agriculture covered 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.

Out of this sample, researchers chose the set of 15 counties. These counties were chosen with the intent of studying a diversity of geographic features, major agricultural products raised, and land-use tools utilized to protect farmland and farming. Of the four key growth management policies designed in part to protect farmland from conversion to nonagricultural uses, including restrictive zoning, purchase of development rights (PDR) or transfer of development rights (TDR), agricultural use-value assessment for property tax purposes, and right-to-farm ordinances, nine out of 15 counties had all of these policies in place, with 10 having PDR programs and four having TDR programs.[1] (See Esseks, Oberholtzer, Clancy, Lapping, & Zurbrugg, 2009, for a detailed look at each of the programs in each county.) The selected counties also varied in the size of their metro areas and the extent of urban influence within their boundaries (see table 1, following page). In the end, these counties were chosen not for comparative purposes per se, but to help examine and elucidate the set of issues that face historically agricultural counties that are undergoing urbanization pressures.

Along with the Census of Agriculture, two primary sources of data were used: a survey of landowners and a series of interviews with experts and stakeholders in each of the 15 counties. A number of county-specific case studies were developed from the data, as well as an overall project report (see http://www.unl.edu/plains/about/research_report

[1] *Restrictive zoning* or *agricultural protection zoning* (APZ) refers to county and municipal zoning ordinances that support and protect farming by stabilizing the agricultural land base. APZ designates areas where farming is the desired land use, generally on the basis of soil quality as well as a variety of locational factors. Other land uses are discouraged. The density of residential development is limited by APZ. Maximum densities range from one dwelling per 20 acres in the eastern United States to one residence per 640 acres in the West. *Purchase of development rights* (PDR) programs compensate property owners for restricting the future use of their land. *Transfer of development rights* (TDR) programs enable the transfer of development potential from one parcel of land to another, and are often used to shift development from agricultural land to designated growth zones located closer to municipal services. Agricultural use-value assessments include differential assessment programs that allow officials to assess farmland at its agricultural-use value, rather than its fair market value, which is generally higher. *Right-to-farm laws* are designed to accomplish one or both of the following objectives: (1) to strengthen the legal position of farmers when neighbors sue them for private nuisance; and (2) to protect farmers from antinuisance ordinances and unreasonable controls on farming operations. A growing number of counties and municipalities are passing their own right-to-farm legislation to supplement the protection provided by state law. (All definitions for these terms, and more information about these tools, can be found at American Farmland Trust's Farmland Information Center, http://www.farmlandinfo.org).

Table 1. Population and Urban Influence Indicators for the Study's 15 Counties

County	Closest city	2006 Population[a]	In 2003, in Metropolitan Statistical Area with population	Percent of county subject to high/medium urban influence, 1990[b]
Pacific Coast				
King (WA)	Seattle	1,826,732	At least 1 million	32/20
Sonoma (CA)	San Francisco	446,891	< 1 million	20/28
Ventura (CA)	Los Angeles	799,720	< 1 million	35/25
Corn Belt				
Lancaster (NE)	Lincoln	267,135	< 1 million	30/38
Dakota (MN)	Twin Cities	388,001	At least 1 million	67/33
Dane (WI)	Madison	463,826	< 1 million	29/42
DeKalb (IL)	West of Chicago	100,139	At least 1 million	27/63
Madison (OH)	Columbus	41,496	At least 1 million	52/48
Mid-Atlantic/Northeast				
Carroll (MD)	Baltimore	170,260	At least 1 million	9/91
Berks (PA)	Philadelphia	401,149	< 1 million	25/75
Burlington (NJ)	Philadelphia	450,627	At least 1 million	52/48
Orange (NY)	New York City	376,392	< 1 million	82/18
Highly Scenic				
Larimer (CO)	Fort Collins	276,253	< 1 million	17/35
Fayette (KY)	Lexington	270,789	< 1 million	79/21
Palm Beach (FL)	West Palm Beach	1,274,013	At least 1 million	24/31

[a] US. Census Bureau, American FactFinder: http://factfinder.census.gov/home/saff/main.html?_lang=en

[b] Data provided by USDA, ERS; data represented in Heimlich & Anderson, 2001, p. 47.

s.shtml for all these). The nine-page questionnaire was developed to study farm and ranch operations in 2005.[2] Questions were designed to examine traits of the respondents' owned land; marketing outlets used; assessments of the adequacy of agricultural inputs such as labor and credit; satisfaction with the markets and their profitability; demographic information about the landowners; and attitudes about the future viability of agriculture in their counties.

The sample of surveyed landowners for each county was randomly selected from a public list of parcel owners who qualified for property-tax assessment based on agricultural use. From these lists, a total of 300 landowners were randomly selected per county and surveys were mailed to these owners. Across the 15 counties, responses ranged from 100 to 174 usable questionnaires (response rates ranged from 40 percent in Palm Beach County, Florida, to 67 percent in Dane County, Wisconsin, with a median of 51 percent). A total of 1,922 landowners participated. Of this total, 64 percent identified themselves as farm operators and 22 percent identified themselves as nonoperators who were well informed about the farmland operations. While the remaining 14 percent of landowners answered questions about plans for the land they own, their opinions about policies concerning farmland preservation and farm viability, and their outlook on the future of agriculture in their county, they were not asked to respond to questions concerning the marketing aspects of the farm.

From late 2004 to February 2008, researchers also completed phone or in-person interviews with at least 15 knowledgeable observers in each county, for a total of over 350 interviews. The interviewees fell into four broad categories: (1) generalists who had a broad knowledge of the county's agricultural sector (e.g., Cooperative Extension staff or the county agricultural commissioner); (2) private-

[2] Copies of the survey are available from the authors upon request.

sector professionals with more specialized expertise, such as bankers who handled agricultural loans or mangers of farm equipment dealerships; (3) staff members of public and not-for-profit agencies who led programs designed to assist farmers and ranchers; and (4) farmers or ranchers producing products about which the survey and Census of Agriculture did not provide sufficient information.

Results: Agricultural Marketing and the Outlook for Agriculture in 15 U.S. Counties

Although all of the counties chosen for the study have been undergoing development pressures, the 2007 Census of Agriculture reveals diverse variations in market and farm level characteristics (see appendix A). In 10 counties, comparisons with the 2002 Census show rising farm numbers and decreasing average farm size. In other words, they recorded more but smaller farms, such as those in the 1 to 9, 10 to 49, and 50 to 69 acre categories. Just over half the counties lost farmland between 2002 and 2007, while seven of the counties (King, Dakota, Dane, DeKalb, Madison, Berks, and Fayette) gained farmland. Almost all the counties that added farmland by 2007 had lost land between the previous two censuses of agriculture (1997 to 2002)[3] (Esseks et al., 2009).[4]

Results: Agricultural Marketing Indicators in the 15 Counties

Across our sample of counties, in 2007 grains and oilseeds topped agricultural sales in four counties (Lancaster, Dakota, DeKalb, and Madison) (table 2). Nursery/greenhouse sales topped the list in Berks, Burlington, and Orange (tied with vegetables). In four counties (Dane, Carroll, Larimer, and King), dairy was the most important in terms of sales, fruits were in Sonoma and Ventura counties, horses in Fayette County, and vegetables in Palm Beach County. Also of note is that Carroll and Dane counties have large percentages of land in forage production for dairy and beef cattle, and soybeans and forage are in the top three crop items by acreage in a number of counties. Finally, nursery and greenhouse crops were among the top four moneymakers in 13 of 15 counties; much of the demand in this category is likely from nearby residential and other construction and the need for trees, shrubs, sod, and other similar products.

Across the 15 counties, the survey data suggest that respondents in eight of the counties relied on a mix of both direct and wholesale marketing (table 3), that is, in these counties, farmers had average sales of at least 20 percent in direct-to-consumer markets, with the exceptions being the five Corn Belt counties and Ventura and Palm Beach counties. However, in most counties, wholesale markets accounted for the majority of sales, with an average of 62 percent of total sales through wholesale markets, with direct marketing accounting for an average 27 percent across all counties (table 2). For six counties—five from the Corn Belt region and Ventura County—an average of more than three-quarters of all sales were in wholesale markets. Respondents in the top four counties in terms of percentage of sales through

[3] The 1997 and 2002 Census of Agriculture were used for the project study, as the 2007 Census of Agriculture was not reported until 2009.

[4] For five of these seven counties, the percentage increases between 2002 and 2007 were modest, from 1 to 4 percent. However, King and Fayette experienced increases of 18 and 14 percent respectively. Some explanations for these increases seem reasonable. For three Corn Belt counties (Dakota, DeKalb, Madison), a majority of the growth was in harvested cropland, especially acres in corn for grain (increasing between 20 to 33 percent), most likely due to better market prices for corn in 2007 than 2002. This may also be true of Dane County. However, both Dane and Berks counties recorded higher acres in the land-use category "woodland not pastured," but there is no evidence of significantly increased commercial activity on such land (such as cut Christmas trees, short-rotation woody crops, or maple syrup). It may be that this growth was mostly for scenic, environmental, or long-term timber harvesting. In King and Fayette counties, the recorded increase in farmland was primarily in pasture land. Inventories of both horses and "other cattle" rose in these two counties. Whether these two categories can account for the greater total land in pasture is not clear. It could be that it also includes low-density pasturing by landowners who were more interested in scenic and other lifestyle benefits than in commercial farming.

Table 2. Wholesale and Direct-to-Consumer Markets in 15 Counties: Survey Responses and Census of Agriculture (N=920)

County		Survey Responses		Census of Agriculture Sales Direct-to-Consumer
		Wholesale markets	Direct markets	
	N	*Average percentage of total sales*[a]		*Percentage of total sales*
Madison, OH	40	89%	7%	0.1%
Lancaster, NE	61	87	10	0.3
DeKalb, IL	70	87	9	0.2
Dakota, MN	75	83	8	1.0
Ventura, CA	76	79	12	0.3
Dane, WI	54	82	7	0.6
Berks, PA	46	59	24	0.6
Sonoma, CA	67	66	25	0.7
Carroll, MD	51	53	33	1.8
Palm Beach, FL	66	58	17	0.1
Orange, NY	69	46	40	7.4
King, WA	55	40	46	2.6
Burlington, NJ	78	42	34	1.1
Larimer, CO	62	30	50	0.7
Fayette, KY	50	29	42	0.04

[a] Percentages do not add to 100% due both to reporting errors by respondents and to reporting of "other" sales, which includes those not fitting into the wholesale or retail category (e.g., agritourism, boarding horses). The latter types of sales were generally small in most counties; however, they did account for relatively large percentages in Fayette (39 percent), Palm Beach (27 percent), and Burlington (22 percent) counties. In those three cases, virtually all the "other" enterprises were horse-related.

wholesale markets—Madison, Lancaster, DeKalb and Dakota—sold most of their products to private grain elevators or growers' cooperatives and elevators. Operators from Dane County, with its major dairy sector, relied mostly on processors, coops, and grain elevators. The two most important outlets for Ventura County respondents were growers' cooperatives and processors. Respondents in five counties—Orange, Burlington, King, Larimer, and Fayette—sold proportionally much less to wholesalers—from 29 percent to 46 percent.

The interviews with key informants in each county gave us additional information in regard to wholesale outlets. In those counties with substantial grain production, most of the informants in a county who discussed marketing outlets described grain markets as still adequate for farmers. In these areas, operators had choices of marketing outlets, including local grain elevators, producer cooperatives, and out-of-county buyers. On the other hand, markets for livestock, dairy, and fruits and vegetables garnered mixed reviews across counties in terms of the adequacy and profitability.

Between the 1997 and 2007 Censuses of Agriculture, direct-to-consumer sales had grown by more than 100 percent in seven counties, a phenomenon supported by the interviews. Compared to the national average in 2007 of 0.4 percent (Census of Agriculture), direct-to-consumer market sales in nine of the 15 counties ranged from 0.6 to 7.4 percent (table 2), probably demonstrating the advantage to farmers of better access to urban consumers in those counties. Among our survey respondents, the average percent of total sales attributed to direct marketing (including direct-to-consumer sales and direct-to-retail outlets, such as retailers, institutions, and restaurants) ranged from 7 percent in Madison and Dane counties to half of all sales in Larimer County[5] (table 2). The leading category of direct-to-consumer sales in 13 of the counties was on-farm marketing (e.g., farm stands and U-pick operations). All of the top five counties by this measure—Larimer, King, Orange, Burlington, and Carroll—had sizable

[5] Direct marketing percentages from the survey respondents differ greatly from those from the Census of Agriculture. However, it is important to note that survey respondents reported the percentage of their sales by marketing outlets, but these percentages were not related to their gross farm sales. The Census of Agriculture computes the percentage of sales accounted for by direct-to-consumer sales, and since most agricultural sales are generated by the largest farms, which presumably are using primarily wholesale markets, the percentage of total direct sales is small. Our survey data, however, indicate the level of dependence on these markets as a percentage of respondent sales in the counties.

populations and belonged to or in proximity to a metropolitan statistical area with at least 1 million inhabitants.

Informant interviews also supported our supposition that proximity to large population concentrations promoted relatively high levels of direct-to-consumer sales. However, the relative importance of direct sales varied considerably among those interviewed, many of whom noted that the direct-marketing and/or niche (e.g., organic and specialty products) producers in their counties appeared to have small overall sales and be part-time farmers. For example, in Fayette County, these types of operators were described by informants as having "more the small farm acreages," in Larimer County as being "small acreage farmers," and in King County as "small diverse agriculture."

The survey data support the perceptions of these informants. Among the 278 owner-operators who reported at least 10 percent of total sales coming from direct markets, 66 percent brought in less than $50,000 in 2005 and 46 percent less than $10,000. Moreover, 63 percent of the total classified themselves as part-time farmers. Some of the local experts whom we interviewed noted that while production on these farms might be bringing high-value crops to the county, direct marketing accounted for a small portion of the county's total sales, and they questioned the overall potential of these products to preserve a viable agricultural sector. In contrast to this notion, however, many informants felt that the types of products farmers should start producing in their county were those likely to appeal to urban and suburban consumers, such as organic products, niche foods, high-value or value-added products, vegetables, and fruit.

The survey and interviews also provided an ideal venue for asking about seven agricultural marketing programs that might be operating in the county to assist farmers. These included programs to assist with both wholesale and direct marketing. Among the 15 counties, programs on marketing directly to consumers and with diversifying products had the highest levels of support, albeit from a little under half of respondents. Assistance with wholesaling had an average support rating of 45 percent and received majority approval in only three counties.

Results: Indicators of the Future of Farming in the Study's 15 Counties

We wanted to know what landowners and agricultural leaders thought about the future of agriculture in their counties. One question asked of survey respondents was whether they had plans to develop part or all of their farmland for nonagricultural purposes over the next 10 years. The largest segment of respondents in each county (table 3)—from 24 percent in Lancaster County to 70 percent in Fayette County—expected *no part* of their farmland to be developed. On the other end, the percentage of owners anticipating *all of their land* to be developed varied, from only 1 percent in Ventura and Carroll counties to 25 percent in Palm Beach County. It is important to note, however, that sizable numbers of respondents were either unsure about developing their land or skipped the question. This data reveal certain counties where land seems to be in great threat of development, while in other counties, a good portion of landowners expect to be holding on to most of their land, at least for the next 10 years.

Farmers planning to exit from agriculture, and especially those without plans for succession and younger farmers (less than 55 years old for the purposes of this study), may signify trouble for the viability of the county's agricultural sector. Figure 1 shows that across the 15 counties, among the surveyed operators who were less than 55 years old, the level at which owners planned to stay varied greatly from only 35 percent in Larimer County to 85 percent in Sonoma County. The median was 68 percent. Among the respondents 55 and older, the range was narrower—from 18 percent (Lancaster County) to 52 percent (Fayette County), with 46 percent as the median. Larimer and Palm Beach counties stand out in having relatively low values for both age groups, leaving the impression that most of the older and younger operators were planning, at the time of the survey, to quit farming. The percentage of respondents who expected a close relative to take over the farm varied widely, from 21 percent in Larimer County

Table 3. Survey Respondents' Expectations of the Amount of their Farmland They Expect to Develop within 10 Years, by County, 2005 (N=1,922)

	— percent of respondents —					
County	None	1–24%	25–74%	75–99%	100%	Unsure or no response
Pacific Coast						
King, WA	55%	12%	13%	0%	8%	13%
Sonoma, CA	62	21	5	1	2	9
Ventura, CA	53	18	7	2	1	19
Corn Belt						
Lancaster, NE	24	12	11	6	22	24
Dakota, MN	39	23	14	2	8	14
Dane, WI	45	20	10	3	3	20
DeKalb, IL	51	8	9	2	11	19
Madison, OH	60	19	3	3	2	14
Mid-Atlantic/Northeast						
Carroll, MD	55	14	9	5	1	16
Berks, PA	67	10	6	0	4	13
Burlington, NJ	56	9	7	4	11	14
Orange, NY	41	14	16	3	8	18
Highly Scenic						
Larimer, CO	34	14	10	10	17	15
Fayette, KY	70	3	6	1	11	9
Palm Beach, FL	28	5	17	6	25	20

Note: Ns for different counties include King, WA (103); Sonoma, CA (108); Ventura, CA (105); Lancaster, NE (157); Dakota, MN (136); Dane, WI (174); DeKalb, IL (171); Madison, OH (107); Carroll, MD (140); Berks, PA (123); Burlington, NJ (140); Orange, NY (133); Larimer, CO (117); Fayette, KY (100); and Palm Beach, FL (108).

to 54 percent in Carroll County, with a median of 31 percent.

To get a sense of the future viability of agriculture in the counties, survey respondents were asked to think ahead to the kind of future they felt agriculture had in their county 20 years hence. Figure 2 shows that, across the 15 counties, those who saw a "bright" future were in the minority, from only 2 percent in King County to 24 percent in Sonoma County, with a median of 8 percent. Those who anticipated a "modest" future ranged from 10 percent in King County to 51 percent in Madison County, with a median value of 36 percent. In combining the "bright" and "modest" percentages, we get values stretching from only 12 percent in King County to 72 percent in Madison County. In 12 of the 15 counties, however, less than a majority of the surveyed owners saw either a bright or modest future for agriculture.

Given the reliance on both direct and wholesale markets for sales in many counties, the data were examined for differences in the perception of

Figure 1. Percentage of Survey Respondents Expecting to be Farming "10 years from now" and Plans for Succession, 2005 (N=1,922)

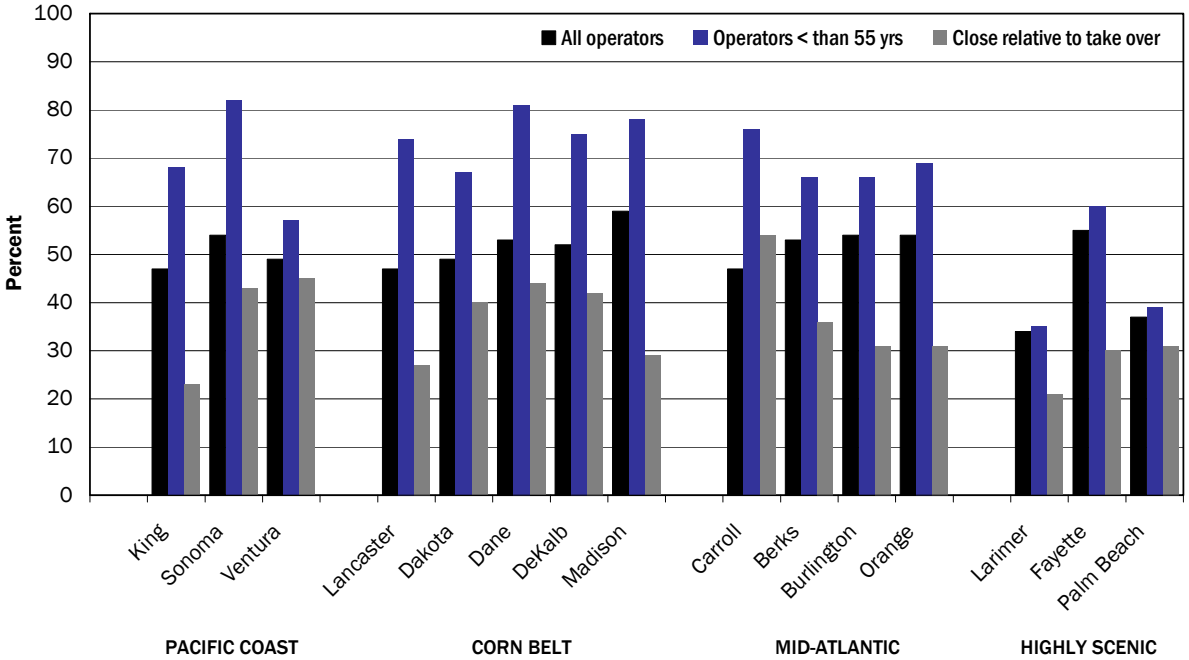
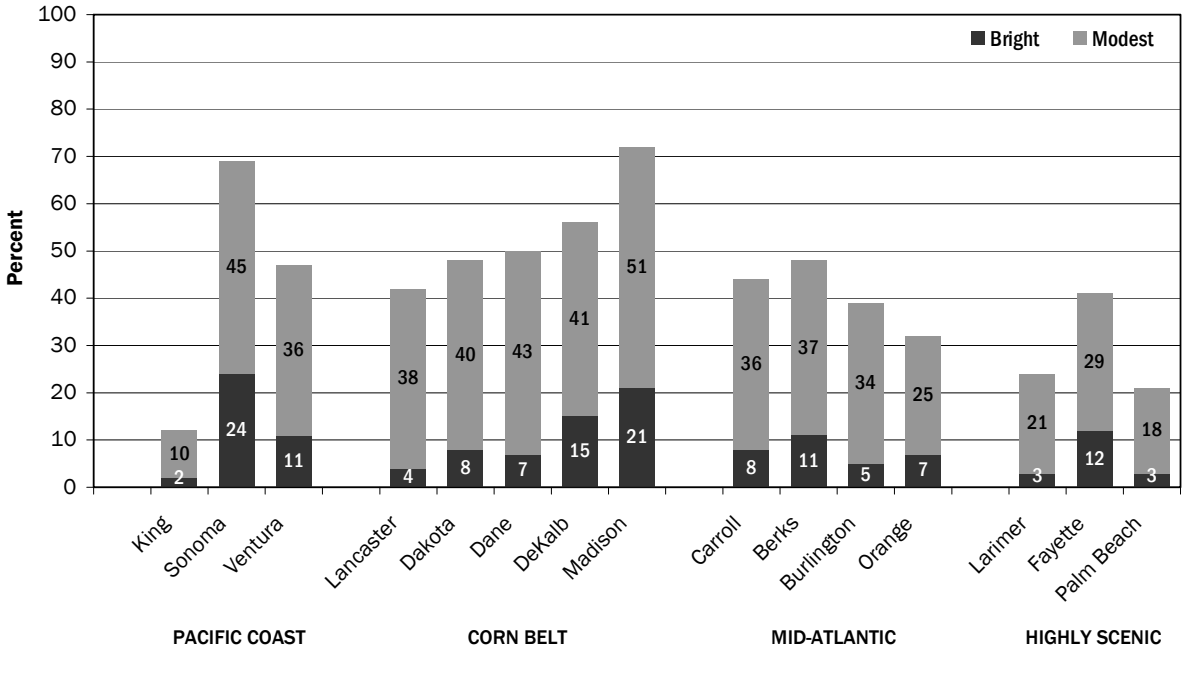


Figure 2. Percentage of Survey Respondents Reporting that Agriculture Has a "Bright" or "Modest" Future in the County in 20 Years, 2005 (N=1,922)



respondents using primarily direct versus wholesale markets. To do this, respondents were defined as relying on direct markets (including either direct-to-consumer or direct-to-retail outlets) if those markets accounted for 50 percent or more of gross sales; in the same way, respondents were defined as relying on wholesale markets (including processors, distributors, growers cooperatives, grain elevators, and others) if those markets accounted for 50 percent or more of gross sales (table 4). The latter were somewhat more "optimistic" about their markets and the future of agriculture in their county compared to their direct marketing counterparts. Specifically, they tended to be more satisfied with their access to markets, slightly more satisfied with the profitability of their markets, and they anticipated a better outlook for agriculture in the county. However, they were no more likely to expect to be farming in the county in 10 years and only a little less likely to expect development of their farmland in that time.

Of course, this does not explain the differences that might occur in specific counties. In the larger study (Esseks et al., 2009), using logistical regression techniques it was found that in six cases (King, Dane, DeKalb, Burlington, Larimer, and Palm Beach), the higher the percentage of total sales marketed via wholesale outlets, the *more* likely the respondent were to be very or moderately satisfied with accessibility of markets. Three counties (Burlington, Orange, Palm Beach) recorded that same relationship with direct marketing. However, in the case of Ventura County, the greater the percentage from direct marketing, the *less* likely the farmer was pleased with the accessibility of markets. In Ventura County, specifically, those using direct markets for more than 50 percent of sales owned farmland in fruit, vegetable, and nursery crop production. In terms of profitability, in three counties (DeKalb, Madison, and Carroll), the likelihood of satisfaction tended to *increase* when the percentage of the operator's total sales marketed through direct outlets was higher, while in three others (King, Dane, and Palm Beach), relatively greater proportions of total sales through wholesale channels predicted satisfaction with profitability.

Predictions by agricultural leaders about how farm enterprises may change in their county 10 years into the future revealed many similarities across the counties and provide a consistent picture with anecdotal information and trends in the Census of Agriculture regarding farm size. This picture is one of agricultural sectors still tied to crops long established in the county (e.g., grains and oilseeds in the Corn Belt and grapes in Sonoma), with farms consolidating into even larger farms (mentioned during informant interviews in 7 out of 12 counties). At the same time, informants expected an increase in the number of small farms (a point raised in 10 out of 12 counties), with many of these farmers expected to engage in marketing to urban consumers and consumers interested in niche products such as organic foods, sheep and goat products, specialty herbs, and others.

Table 4. Outlook of Respondents Using Direct and Wholesale Markets, 2005

	— Percent of farmers —	
Aspect	Direct market farmers	Wholesale farmers
Very/moderately satisfied with access to markets	55%	70%
Very/moderately satisfied with market profitability	33	36
Bright/modest outlook for agriculture in county	36	46
Expects to be farming 10 years from now	48	49
Expects to develop between 50-100% of land within 10 years	17	13

N=225 for direct market farmers and N=559 for wholesale farmers.

Informants considered certain crops and livestock —horses in Fayette County, wine grapes in Sonoma County, and high-value fruits and vegetables in Ventura County—more profitable than others, apparently because these are desired by urban consumers. Horse-related enterprises were also important in at least five of the studied counties' agricultural pictures and will likely continue to be unless the number of wealthy families declines in these communities. Hay was a profitable crop in many places, although it may be a small part of total farm income. If used for horses or other livestock it would be a viable crop; if used as straw for construction, it may be profitable as long as development is robust. The future of the landscaping sector for agriculture will probably also be influenced greatly by the amount of new development.

Dairy and livestock presented perhaps the most pessimistic sector in our study. In most of the six counties in which dairy recorded the first or second largest volume of sales in the 2002 Census of Agriculture (King, Sonoma, Dane, Carroll, Orange, and Larimer counties), key informants expected declines because of low profits, problems with succession (e.g., price of land too high for new entrants), and environmental conflicts (such as over manure odors and flies). One issue raised by many informants in regard to livestock in general was the impact of increasing suburbanization and urbanization; that is, as more people move to these agricultural areas, there seemed to be less tolerance of large livestock operations, causing many of those interviewed, including operators, to be pessimistic about the future of livestock production in these areas.

For some time, one of the foci of agricultural development has been value-added food processing as a way for farmers to capture more of a commodity's food value. Informants in most counties noted that there was limited processing infrastructure, except for traditional enterprises like dairies and slaughterhouses, and that these were declining. There were exceptions, such as Berks County, which has a strong agricultural processing infrastructure, and in some counties those interviewed believed that processing of locally grown agricultural products, such as cheese from milk, wine from grapes, or small-scale livestock processing, will increase in the future.

Conclusion and Recommendations

Views about farming, farmland preservation, and the future of agriculture in the 15 urban-edge counties were quite varied. For example, on one end of the spectrum, Palm Beach, Larimer, and Lancaster county landowners reported the highest percentage of farmland expected to be developed over the next 10 years. In addition, Larimer and Palm Beach had the lowest number of farmers under the age of 55 planning on farming in 10 years. Not surprisingly, these two counties also had the lowest number of respondents (after King County) reporting that agriculture in the county had a bright or modest future. On the other end of the spectrum, the same indicators—including land not expected to be developed, operators under 55 still planning on farming in 10 years, and a bright or modest outlook for agriculture on the part of respondents—describe four counties with the highest level of farmer optimism. Agricultural production and land use in these counties—Madison, DeKalb, Sonoma, and Dane—are still very much focused, both in terms of the amount of land in production and the value of sales, on commodities such as grain, soybeans, and corn, as well as commodities that have been long established, such as grapes in Sonoma County and dairy in Dane County.

Although much of the discussion around urban-edge farming centers on alternative crops and marketing avenues, it is clear that farmland protection and farm viability efforts must also concentrate on how land devoted to these more traditional enterprises, which account for the majority of farmland in these counties, will be secured given the economics of urban-edge farming. This becomes even more critical given previous research. Results from Clark and Irwin (2009) highlight that many communities contain farmers who are not likely to adapt to urban-edge conditions because they may be in contractual relations that cannot be changed, may have

previous investments that require them to continue what they are doing, do not rely on farm income and therefore are not motivated to change what they are doing, have perceptions about what real farming is that keep them from doing new things, or need to keep in mind what the local community considers agriculture to be.

Many of the farms in the studied counties fall into the category of midsize farms, defined by their gross sales, farm size, and markets. This middle sector of agriculture has experienced the greatest loss in farm numbers in the last 15 years. Informant interviews uncovered clear indications that "agriculture of the middle" is declining in many of the studied counties. As mentioned earlier, informants often described the future in many of the counties as one of both consolidation of production on large farms and increasing numbers of small farms direct-marketing high-value products. These agricultural leaders suggest that midsize farms are vulnerable, and yet given the number of acres they represent, they are essential to maintaining an agricultural sector that is productive over the long term. On the land preservation side, this points to the need for more strategic land-use planning. On the marketing side, it means additional research on, and importance given to, developing food value chains, exploring options for scaling up to regional markets, and assessing the factors affecting the profitability of enterprises of different sizes producing, processing, and distributing different commodities.

Following expectations about urban-edge farming in many of the 15 study sites, large numbers of farmers rely on direct markets for a good portion of their sales. The Census of Agriculture indicates higher-than-average direct-to-consumer sales in many of the counties, and the survey data support this. However, these farms tend to have low total agricultural sales and farmers slightly less satisfied with their markets and less optimistic about the future of agriculture in their county. Many of these farms are small and, as mentioned earlier, while they are bringing high-value crops to the county's markets, many informants questioned their overall potential to preserve a viable agricultural sector because they represent such a small portion of total agricultural sales. That said, many farmers are using direct-to-consumer markets and developing alternative agricultural products. It may be that some of these smaller farms increase their sales and "become the backbone of a resilient future peri-urban industry" (Clark, Inwood, Sharp, & Jackson-Smith, 2007). Thus, it is vital that the availability of technical assistance and funding programs that relate to direct marketing and alternative agricultural products be supported and better promoted at the local, state, and national levels, and that new programs be developed in areas currently lacking these programs.

When survey respondents were asked what interested stakeholders should do to keep farming viable in their county, 29 percent felt that equal emphasis should be placed on the goals of land preservation and helping farmers to farm more profitably. A little over a third felt that the priority should be to help protect agricultural land from development (via zoning or purchase of development rights, for example). Sixteen percent felt that interested parties should help farmers to farm more profitably, while 14 percent agreed with the choice to do "nothing and let private forces guide things."

Our results suggest that the long-term viability of urban-edge agriculture will likely depend on a variety of factors, including types of products produced, climate and other environmental conditions, strength of urbanization pressures, and the size of nearby markets for both wholesale and direct-to-consumer products, as well as the effectiveness of growth management policies. This and other analyses demonstrate that while a number of farmers have adapted to urban-oriented agriculture, the future of agriculture looks quite different in different areas (Clark, Jackson-Smith, Sharp, & Munroe, 2007). Urban fringe counties need to increase their efforts to maintain a viable agricultural sector by taking into account the unique farming and demographic characteristics of their county. There are areas of the country that are experiencing urbanizing pressures where direct marketing of agricultural products has not caught the interest of farmers in the county (e.g., Corn

Belt region). Research and development efforts need to be undertaken differently in these areas where wholesale markets dominate farming than in areas where direct marketing has entered and benefited the farming culture.

At the same time, ongoing research is needed to examine changes to agriculture taking place in these and other urbanizing counties over time. Certainly over the last few years the economic downturn in the United States has caused a decrease in development pressure from both the residential and business sectors. Changes in the economic climate need to be accounted for in research, and studies that examine locations over time will help us understand farmers' adaptations to economic circumstances. We also need to know more about the right mix of markets and policy instruments for individual farmers in peri-urban areas and how to help farmers discern what path might be most successful for them. We need a better understanding of the characteristics of midsize farms in different areas of the country. It will also be useful to have much more information on what policies and logistical infrastructure are found in peri-urban areas where the farm sector is growing or stable. Finally, research that identifies planning assessments and approaches that have successfully incorporated the concepts of farm viability and regional food security into the planning process would of great interest and use.

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Appendix A. Farm and Market Indicators from the 2002 and 2007 Census of Agriculture

County	Farmland change (acres)	Farm numbers change	Avg. size of farm (acres) change	Top sales, commodity group, 2007	Top crop items by acres, 2007
King (WA)	+18% to 49,285	+16% to 1,790	+4% to 28	milk and dairy (27%) nursery/greenhouse (26%) other animals (1.5%)	forage (11%) corn for silage (2.4%) vegetables (2.0%)
Sonoma (CA)	–15% to 530,895	–1% to 3,429	–15% to 155	fruits/tree nuts (56%) milk and dairy (17%) poultry and eggs (13%) nursery/ greenhouse (8%)	grapes (12%) forage (3%) apples (1%)
Ventura (CA)	–22% to 259,055	+5% to 2,437	–26% to 106	fruits/tree nuts (51%) vegetables (24%) nursery/greenhouse (24%)	vegetables (14%) avocados (8%) lemons (8%)
Lancaster (NE)	–6% to 421,409	+6% to 1,698	–11% to 248	grains/oilseeds (73%) cattle and calves (8%) milk and dairy (6%) nursery/greenhouse (3%)	corn for grain (30%) soybeans (28%) forage (6%)
Dakota (MN)	+4% to 246,026	+7% to 1,065	–2% to 231	grains/oilseeds (35%) cattle and calves (26%) nursery/greenhouse (20%) milk and dairy (8%)	corn for grain (45%) soybeans (17%) forage (5%)
Dane (WI)	+4.% to 535,756	+15% to 3,331	–10% to 161	milk and dairy (44%) grains/oilseeds (23%) cattle and calves (10%) nursery/greenhouse (3%)	corn for grain (32%) forage (14%) soybeans (13%)
DeKalb (IL)	+3.0% to 370,772	+14% to 930	–9% to 399	grains/oilseeds (60%) cattle and calves (19%) hogs and pigs (17%) nursery/greenhouse (2%)	corn for grain (67%) soybeans (23%) wheat for grain (1.5%)
Madison (OH)	+0.8% to 247,913	–1.6% to 718	+2% to 345	grains/oilseeds (78%) milk & dairy products (9%) hogs and pigs (7%) cattle and calves (4%)	soybeans (44%) corn for silage (37%) wheat for grain (4%)
Carroll (MD)	–3.6% to 141,934	+8.5% to 1,148	–11% to 124	milk and dairy (26%) nursery/greenhouse (23%) grains/oilseeds (19.4%) cattle and calves (7%)	corn for grain (21%) forage (19%) soybeans (12%)
Berks (PA)	+3.0% to 222,119	+10.6% to 1,980	–7% to 112	nursery/greenhouse (34%) milk and dairy (23%) poultry and eggs (19%) grains/oilseeds (7%)	corn for grain (23%) forage (22%) soybeans (12%)
Burlington (NJ)	–22.9% to 85,790	+1.8% to 922	–24% to 93	nursery/greenhouse (41%) fruit/tree nuts (29%) vegetables (12%) grain/oilseeds (10%)	soybeans (22%) corn for grain (10%) forage (7%)

Orange (NY)	–25% to 80,990	–9.1% to 642	–18% to 126	vegetables (30%) nursery/greenhouse (30%) milk and dairy (20%) cattle and calves (3%)	forage (29%) vegetables (7%) corn for silage (5%)
Larimer (CO)	–6.1% to 489,819	+12.3% to 1,757	–16% to 279	milk and dairy (33%) cattle and calves (21%) nursery/greenhouse (18%) grains/oilseeds (7%)	forage (9%) wheat for grain (2.4%) corn for grain (2%)
Fayette (KY)	+14.2% to 135,969	+9.8% to 810	+4% to 168	horses (81%) other animals (14%) tobacco (2%) cattle and calves (1%)	forage (16%) tobacco (2%) corn for grain (2%)
Palm Beach (FL)	–1.9% to 525,658	+13.8% to 1,263	–14% to 416	vegetables (44%) other crops and hay (33%) nursery/greenhouse (20%) fruits/tree nuts (1%)	sugarcane (56%) vegetables (15%) sweet corn (5%)

Source: USDA, NASS, 2009 (county highlights).

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