

Urbanization Affects a Large Share of Farmland

Although actual urbanized area accounts for only 2.9 percent of the U.S. land base, urban influence affects about 17 percent of the Nation's agricultural land. Local, State, and Federal governments have increased their efforts toward preserving agricultural lands and their associated rural amenities.

In recent decades, urban development has pushed outward from city centers, in a form that increasingly intersperses urban activities with farm activities in traditionally rural areas. Farmers in urbanizing areas sometimes face constraints on their farming activities when new neighbors object to odors, dust, noise, chemical use, disposal of farm wastes, and other agricultural practices. Farmland values inevitably rise above their value in agricultural production as land becomes valued for its future use in nonfarm activities (see box, "Importance of Farm Real Estate"). Factors unrelated to agricultural production, such as urban proximity and potential for recreational use, become important determinants of farmland values. Many consumers and rural residents alike feel that the irregular pattern of development that typically accompanies recent urbanization affects the quantity and quality of some nonmonetary benefits stemming from agricultural land use that previously may have been taken for granted. These nonmonetary benefits can include recreational opportunities, aesthetic enjoyment from viewing landscapes and wildlife, environmental quality, and nostalgia related to the moral, historic, and cultural significance of rural life. But, since these "rural amenities" cannot be bought and sold in a marketplace, collective action is needed to conserve them. While it is neither the sole nor, in all cases, the best form of response to these felt needs, government effort to preserve farmland has become an increasingly common approach. In recent decades, local, State, and Federal governments, as well as nongovernmental organizations, have increased their efforts toward preserving agriculture-related amenities via legislative initiatives to preserve farmland.

Growing Conflict Over Land Use Priorities

As the United States has become increasingly urban, with approximately 79 percent of the population currently residing in urban places, residential and commercial development has spread further from city centers, consuming more agricultural land in traditionally rural areas. The unplanned, relatively low density growth is often typified by discontinuous residential development (often interspersed with idle land, and often connected by commercial corridors along busy roads) that relies on automobiles for transportation. The level terrain that makes farmland advantageous for agricultural production also makes these lands attractive for housing and commercial uses. The favorable climates that are associated with major national production centers for many high-valued fruit and vegetable crops mean that these areas, especially, are subject to intense pressure from urban development.

Farmland is no longer an unlimited resource, as it was at the time of westward expansion, resulting in more conflicts over land use priorities. Nowhere is this conflict more evident and more intense than at the urban fringe, which is the principal interface between agricultural and nonagricultural uses of farmland. Along urban fringes, conflicts develop between farmers and new suburban neighbors over farm odors, early morning noise, commuting inconvenience, perceived health hazards posed by chemical applications, and so forth. Farmers also may face greater economic pressure from water and land use restrictions. Some farms on the urban fringe face crop-yield deterioration from urban smog, theft, and vandalism. Although production near urban areas also has some offsetting economic advantages, the rural/urban conflicts, plus the economics of rising farmland values and property taxes, give some farmers incentive to sell farmland for nonfarm development. In some cases, the land remains in use for the production of agricultural products, but the type and intensity of agricultural production changes.

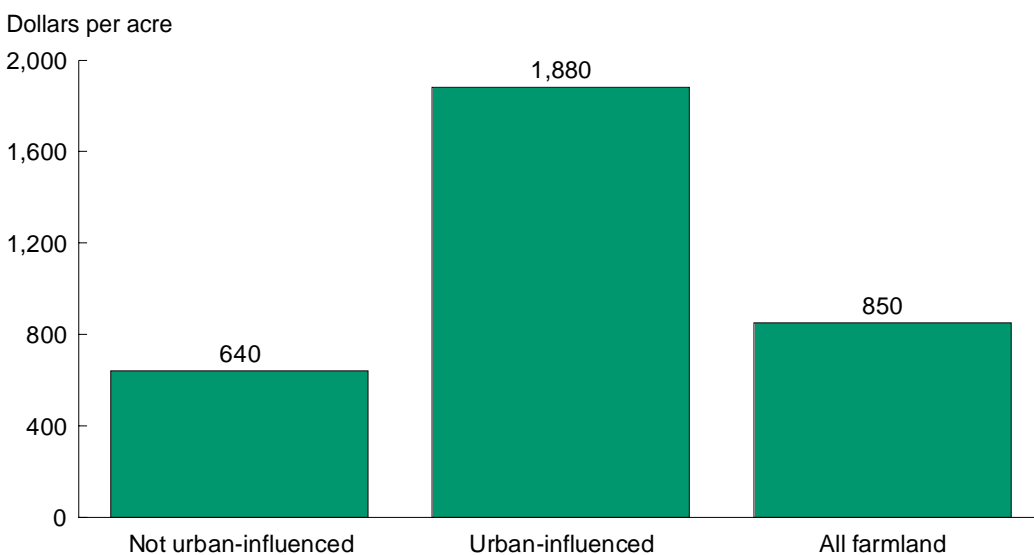
How Much Farmland Subject to Urban Influence?

In recent years, concern over farmland preservation has been renewed. State and local governments have implemented or considered farmland preservation measures. For example, an unusually large number of State and local initiatives to influence urban development were on the November 1998 ballots, potentially adding to an already long list of existing programs. The Federal Government has also taken an increasing interest in the issue. This widespread concern may be a reaction to the spread of urban influence far beyond the borders of statistically defined “urbanized areas” (see appendix “Data and Definitions” in this issue for the precise definition). “Urban-influenced” is a broader term (defined later for purposes of this analysis), referring to farmland subject to the spreading economic and social influence of “urbanized areas.”

Although urban influence affects farms and rural areas in a number of ways, its effect on land values is probably the easiest to observe. When urban development spreads to rural areas, the value of urban fringe farmland increases as its value for future commercial, industrial, and residential uses grows. For most parcels in urban-influenced areas, crop and livestock production generates relatively less in net returns per acre than would nonagricultural uses. Consequently, when urbanization spreads to rural areas, the market price of potentially developable farmland is driven above its economic value for farm use. In States where farmland is in great demand for conversion to urban use, relatively large proportions of the market value of farmland is attributable to the nonfarm demand.

USDA’s National Agricultural Statistics Service annually collects information on farmland values via the national June Agricultural Surveys (JAS), (see box, “Urban Influence: Data and Classification”). Using data from the JAS for 1994-96 in conjunction with a Geographic Information System (GIS), we examine two aspects of urbanization: How large is the urban-influence zone in terms of farmland acres? And how much does this influence change farmland values? For the United States, the average value of parcels *not* subject to urban influence is \$640 per acre (fig.1). The average value is nearly three times higher for those parcels classified as “urban-influenced,” averaging \$1,880 per acre. Combining those two categories, the average value for “all” farmland is \$850 per acre.

Figure 1
Average farmland values by classification, 1994-96
Urban influence raises farmland values



Source: Calculated by ERS from USDA’s National Agricultural Statistics Service, June Agricultural Survey data.

The effect of urbanization on farmland values can be estimated by assuming that the value of agricultural parcels not subject to urban influence represents the value of land for purely agricultural use. The effect of urbanization, then, can be estimated by finding the difference between market value and agricultural value. Applying that technique to the analysis of JAS data yields results indicating that urban influence accounts for 25 percent of the market value of all U.S. farmland (\$210 of the \$850 per acre average) (fig.2). For parcels within the urban-influence zone, urban influence constitutes 66 percent of market value (\$1,240 of the \$1,880 per acre average).

While the large direct effect of urbanization on farmland values is well known, the extent of the urban-influence zone is less understood. In Ohio, for instance, where the State's farmland is subject to the sometimes overlapping influence of three large, yet widely spaced metropolitan areas, a large proportion of the State's farmland is urban influenced. The statistical design properties of the JAS data can be used to estimate the number of acres subject to urban influence (see box, "Urban Influence: Data and Classification"). Using the same rural/urban-influenced classification scheme, ERS estimates that about 17 percent of U.S. farmland acres are subject to urban influence (fig. 3).

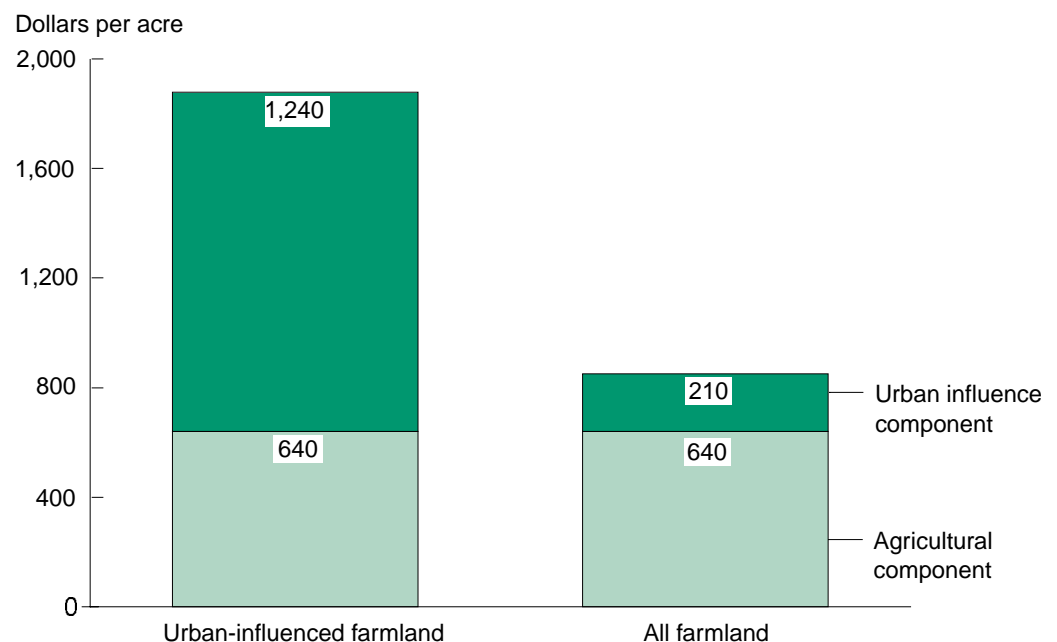
The national perspective obscures the wide regional variation in urban influence. One would expect that the most heavily populated areas, such as along the eastern seaboard, would yield the largest effects on farmland value and the largest percentages of farmland acres that are subject to urban influence. This is borne out by results from an analysis of 20 Land Resource Regions as defined by USDA's Natural Resources and Conservation Service. Figure 4 illustrates three regions for which results are reported in table 1: the predominantly agricultural Northern Plains, the moderately urbanized Corn Belt, and a heavily urbanized area labeled the North Atlantic Slope covering parts of Virginia, Maryland, New Jersey, and southeastern Pennsylvania.

In the Northern Plains, very little farmland is subject to urban influence. Only 9 percent of acreage is classified as urban-influenced (table 1). In this region, the average value of all farmland is only 6 percent higher than the average value of strictly agricultural land.

Figure 2

Urban-influenced and rural components of average farmland values, 1994-96

Urban influence adds an average of 25 percent to U.S. farmland values

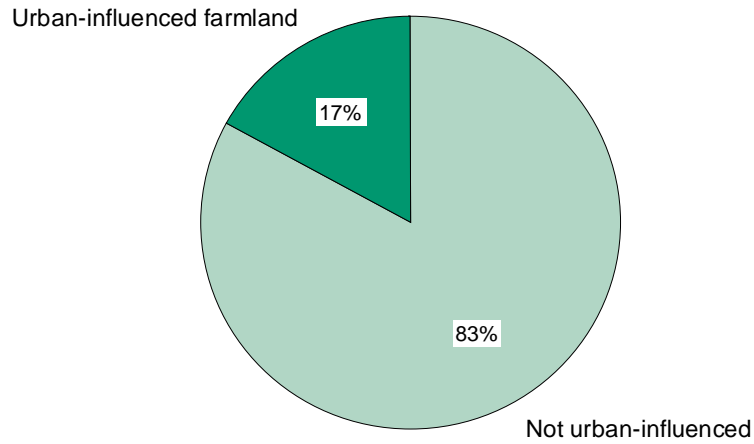


Source: Calculated by ERS from USDA's National Agricultural Statistics Service, June Agricultural Survey data.

Figure 3

Rural versus urban-influenced farmland, 1994-96

While less than 3 percent of land is officially designated as "urban," 17 percent of farmland is "urban-influenced"

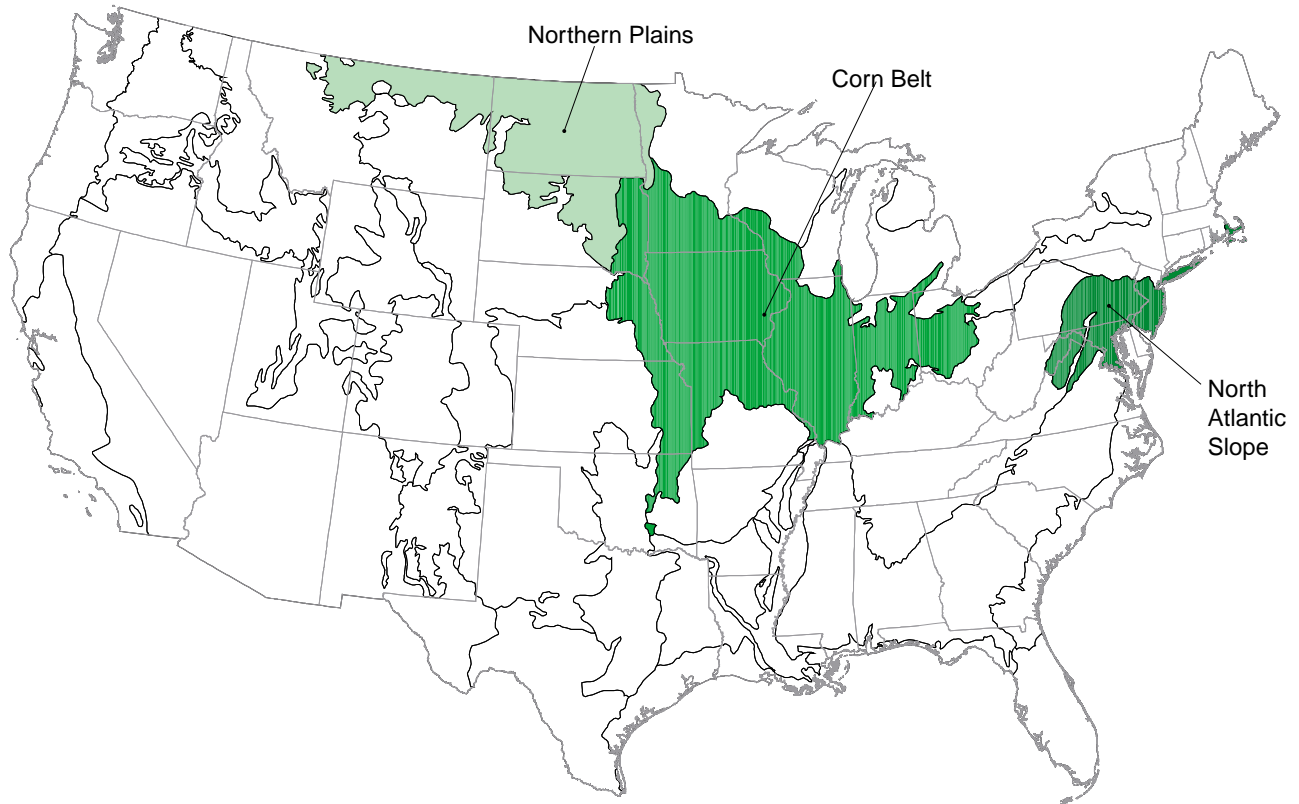


Source: Calculated by ERS from USDA's National Agricultural Statistics Service, June Agricultural Survey data.

Figure 4

Selected land resource regions

Three regions represent a wide range of urban influence



Source: USDA.

Table 1

Indicators of urban-influence for three selected regions

The geographic extent of urban influence and its degree of influence on farmland values varies considerably across regions

	Acres influenced	Urban-influence component of market value		Market value of farmland		
		All farmland	Urban-influenced	Not-urban-influenced	Urban-influenced	All
		Percent		Dollars per acre		
	Percent of agricultural land base	Percent		Dollars per acre		
Northern Plains	9	6	40	290	480	310
Corn Belt	22	14	42	1,090	1,860	1,260
North Atlantic Slope	55	48	63	1,970	5,300	3,790

Source: Estimated by ERS from USDA's National Agricultural Statistics Service, June Agricultural Survey data.

However, for the 9 percent of farmland classified as urban-influenced, the urban-influence accounts for nearly 40 percent of its market value.

The Corn Belt has large amounts of rural farmland, but is subject to considerably higher levels of urban-influence than the Northern Plains. In the Corn Belt, the urban influence component is about 14 percent of the market value of all farmland, about twice that of the Northern Plains (table 1). For the 22 percent of farmland acres that are subject to urban influence, that influence accounts for nearly 42 percent of market value, a percentage that is similar to the corresponding effect in the Northern Plains.

The North Atlantic Slope is one of the most urban-influenced regions in the United States. For this region, urban-influence accounts for about 48 percent of market value of the region's farmland (table 1). About 55 percent of the region's farmland is classified as urban-influenced. For urban-influenced parcels, about 63 percent of farmland's market value is attributable to the urbanization effect.

Agricultural Land Provides Multiple Benefits

In addition to producing the Nation's food and fiber, farms have always provided many auxiliary products that are socially beneficial, including wildlife habitat (with various species generating value through viewing, hunting, preservation, etc.), surface water control (including storage in lakes, streams, and reservoirs and flood control), groundwater recharge, wetlands, aesthetic experiences from viewing pastoral scenes, and open space. Until recent decades, there was little concern over loss of such benefits due to conversion of agricultural land to urban-related uses because these products were supplied in abundance. But as the land base becomes more urbanized, the nonpecuniary benefits associated with agricultural production become more valuable and important relative to food and fiber production, and losses of those amenities become a source of concern.

Evolving Importance of Governmental Policy in Preservation of Rural Amenities

With the loss of farms and interspersed urban-related activities, consumers may perceive a loss of "rural amenities," "landscape amenities," or "visual amenities." But, there is no market mechanism through which consumers can express their desires to retain these aesthetic products. As a consequence, some form of social action may serve as a substitute for the land market's allocative functions.

Due partially to legal and cultural tradition, State and local land use policies have been the primary means of preserving rural amenities. Voters and taxpayers across the United

States have consistently supported State and local initiatives to encourage retention of private land as undeveloped or “open space” land. Even though these State and local programs can take many forms, including retention of undeveloped land in the form of publicly accessible parks and recreation areas, many open space programs focus on retention of agricultural uses of land, in part reflecting the predominant presence of agriculture in many rural areas. All 50 States have right-to-farm laws. All 50 States have some form of use-value assessment or preferential taxation favoring farmland. Conservation easements can be purchased in 20 States, at least 20 counties have transferable development rights programs, 16 States have agricultural district laws, and 24 States allow agricultural protection zoning (American Farmland Trust, *Saving American Farmland: What Works*, Washington, DC, pp. xiii).

The Federal role in farmland protection, while limited, appears to be expanding. The Farmland Protection Policy Act of 1981 required Federal agencies to conduct reviews for the purpose of “minimiz[ing] the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses.” The necessary administrative rules to implement the law were adopted in 1994. The Farms for the Future program, created by the 1990 farm bill, authorized a pilot program under which federally subsidized loans to State and local governments were used for purchase of agricultural conservation easements on farmland. The Federal Agricultural Improvement and Reform Act of 1996 (FAIR) superseded the latter program and directed USDA to carry out a program to purchase agricultural conservation easements on prime and unique farmland for the purpose of protecting it from nonagricultural uses. It authorized up to \$35 million (from CCC funds administered by NRCS) in matching funds for State and local farmland protection programs. More recently, Vice President Gore announced a \$9.5-billion bond proposal to curb urban sprawl and proposed \$1 billion in tax credits and grants to help communities preserve farmland, limit sprawl, and invest in cities.

Federal policies continue to have profound, indirect impacts on land use and rural landscapes, just as they have in the past. The Conservation Reserve Program (CRP) is a recent example, where Federal policy has the effect of holding land in open space uses for 10 years, even though the primary intent of the program was to remove marginal cropland from production. As originally conceptualized, the CRP’s purpose was soil conservation. Over time, however, policymakers recognized preservation of water quality and enhancement of wildlife habitat as additional environmental benefits of the CRP program. Incorporation of these latter considerations into CRP enrollment criteria highlights growing interest in the “multifunctionality” of farmland. In addition, many other Federal programs and policies, including estate and income tax laws, commodity programs, and highway location affect land use allocations. Furthermore, the U.S. Government has played a role in preserving aesthetic landscapes for at least 125 years by designating large tracts of land as national parks, wilderness areas, and national forests.

The interest in public provision of open space amenities is not limited to the United States, and the involvement of national governments in protecting and enhancing rural amenities has become a contentious issue in international discussions concerned with agricultural trade liberalization. A number of European countries have national programs in place to conserve agricultural landscapes. The densely populated UK is an example where national policies (and budget outlay) are explicitly directed at preserving (and sometimes enhancing) desirable characteristics of the rural landscape. Member countries of the EU and Japan have used Organization for Economic Cooperation and Development (OECD) and World Trade Organization (WTO) venues to argue that preserving landscape amenities is sufficient reason to subsidize certain farmland activities in order to retain these amenities and that these subsidies should not be seen as violations of recent trade agreements—a position the United States and others refute. More information regarding trade issues surrounding rural amenities can be found by visiting the Issues Center (archive on the ERS homepage under the title, “Multifunctionality in the WTO,” or directly at <<http://www.ers.usda.gov/whatsnew/issues/multifunction/index.htm>>). [Charles H. Barnard, 202-694-5602, cbarnard@ers.usda.gov]

Urban Influence: Data and Classification

Farmland values data from the June Agricultural Surveys, pooled for 1994-96, consist of more than 75,000 observations. The data are operator opinions, and the sample segments are geo-referenced, meaning that parcel location information (approximate) is available in the form of latitude and longitude. Each parcel was classified as urban-influenced or not-urban-influenced based on an index of urban proximity derived from Census tract population data using statistical smoothing techniques available in Geographic Information System (GIS) software. In geographer's terminology, the index is derived from a "gravity" model of urban development, which provides measures of accessibility to population concentrations. The index accounts for both population size (within a 50-mile radius) and location of the parcel relative to that population (distance). The index increases as population increases and/or as distance from the parcel to the population decreases—hence, the "gravity" analogy. The urban-influenced and not-urban-influenced categories were determined by examining the distribution of the index across sampled parcels in "totally rural" census tracts. Census tracts were assigned to the "totally rural" category based on 1990 commuting data and Census Bureau geographic definitions (see appendix B, "Definitions" in this issue). In this analysis, "totally rural" means that the tract does not contain any part of a town of 2,500 or more residents and the primary commuting pattern was to sites within the tract. Parcels were classified as urban-influenced if their population accessibility index exceeded the 95th percentile of the index's distribution for the set of "totally rural" tracts in the region (LRR) containing the parcel.

Importance of Farm Real Estate

Farm real estate plays an important role in the farm economy. Farmland values, in most areas determined largely by capacity to produce food and fiber, are an important indicator of the well-being of the farm sector. Farm real estate is the major asset of the farm sector, traditionally accounting for about three-fourths of total U.S. farm assets. Consequently, changes in farmland value directly affect the balance sheets and solvency of farm operators who own land in urbanizing areas. In addition to being the largest single investment item in a typical farmer's portfolio, farm real estate is the principal source of collateral for farm loans, enabling farm operators to finance the purchase of additional farmland and equipment or to finance current operating expenses.