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# Land Use Change and Competition in the South

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## ABSTRACT

The amount of land in urban and other special uses increased more than 50 percent since the 1960s in the South. Rural land converted to urban uses is directly related to increases in population in the South. Urban land-use coefficients were estimated to provide a measure of the amount of land converted to urban uses per person added to the population base. These coefficients indicate that from 1974 to 1987 two-thirds to three fourths of an acre of land was converted to urban uses for each person added to the population base. At this rate, about 12.6 million acres are expected to be converted to urban use in the South during the next two decades.

**Key Words:** *land use change, rural land use, rural-urban conflict, urban land conversion.*

The rural landscape and agriculture in the South have changed dramatically in the past several decades. Production of much of the food and fiber in the South has shifted to modern high-tech production systems. As a result of changes in agricultural production systems and the accompanying technical efficiencies, rural land use in the South has changed. For example, the amount of land used in producing food and fiber has declined; the number of farms has decreased; and there have been changes in the mix of cropland, pasture, range and woodland. (For this analysis, the South refers to the four southern USDA farm production regions, which include the following: *Appalachian* consists of Virginia, West Virginia, North Carolina, Kentucky and Tennessee; *Southeast* consists of Florida, Georgia, South Carolina and Alabama; *Delta States* consists of Mississippi, Arkansas and Louisi-

ana; and *Southern Plains* consists of Oklahoma and Texas.)

The South has experienced rapid population growth during the past several decades. As population increased, more land was needed for home sites, roads, airports, schools, commercial and industrial sites, parks, open space, and other uses to satisfy the demands of urbanizing areas. Population growth and increase in per-capita disposable income have been important components of the economic demand for urban land uses. As urban areas expand into rural areas, competition for land in rural areas increases and the value of rural land rises. A USDA study indicates that urban influence constitutes 66 percent of the market value of farmland in urban-influenced areas (Barnard).

The expansion of urban areas into rural areas has dramatically changed the rural land base. Urban areas have expanded into rural areas to accommodate the demand for urban land uses and some urban residents have migrated farther into rural areas to escape the increased congestion of urban areas. An im-

**Table 1.** Land in Farms and Number of Farms, 1964–1997

	Appalachian	Southeast	Delta States	Southern Plains	The South	United States
<b>Number of Farms (1,000)</b>						
1964	597.0	300.0	271.0	326.0	1,494.0	3451.2
1997	292.0	150.0	112.0	278.0	832.0	2052.8
<b>Change</b>						
(#)	-305.0	-150.0	-159.0	-48.0	-662	-1,398.4
(%)	-51.1	-50.0	-58.7	-14.7	-44.3	-40.5
<b>Land in Farms (Million Acres)</b>						
1964	68.8	60.8	47.7	185.3	362.6	1141.7
1997	46.9	36.8	35.8	163.0	282.5	965.8
<b>Change</b>						
(#)	-21.9	-24.0	-11.9	-22.3	-80.1	-175.9
(%)	-46.7	-39.5	-24.9	-12.0	-22.1	-15.4

portant impact on the natural resource base has been the conversion of land which was formerly extensively used for agriculture, forestry, and open spaces for these urban uses. Along with the urbanization of rural areas have come changes that often alter the environmental amenities that many urban residents were seeking by moving to rural areas. The quantity and quality of natural resources in rural areas have been important factors in population growth in some rural areas. Changes in these resources have often resulted in a reduction of aesthetic and ecological values. Given our market economy, with its emphasis on private property rights and generally flexible land use controls, the amount of land converted from extensive rural uses to urban uses has increased directly with population growth (Reynolds and Dillman). Studies of urban expansion indicate that population growth in the South has caused rapid expansion in urban land use (Frey; Healy; Vesterby and Heimlich).

In some areas urban expansion into rural areas has created strong competition between urban expansion and agriculture, forestry, and other rural land use (Reynolds, 2000). This article examines the rural land base and how it has changed over the past several decades, competition between urban and rural uses, estimates of the amount of land converted to urban uses in relation to population growth, and

how future population growth in the southern states may affect the future use of rural land.

### **The Changing Rural Land Base**

More than 85 percent of the land area in the South is in cropland, pasture, and forest land (ERS, USDA). The remainder of the land in the South is in special (including urban) and other uses. Cropland and pasture each account for about one-fourth of the land base and forest land accounts for 39 percent of the land area in the South. About two-thirds of the forest land is in the Appalachian and Southeast regions. Over four-fifths of the pasture land is in the Southern plains. Cropland in the South ranges from 14 percent of land use in the Southeast to 44 percent in the Southern Plains.

Substantial land use change has occurred as people have migrated to the South and urban areas have expanded into rural areas. Southern agriculture changed during this period as the amount of land in farms declined by 80 million acres from 1964 to 1997, or a decrease of about 2.4 million acres per year (Table 1). As people migrated from small inefficient farms to the cities and the average size of the remaining farms increased, the number of farms in the South declined by 44 percent. However, not all regions of the South were affected in the same manner. The percentage change in the number of farms and

**Table 2.** Major Use of Land in the South, 1964–1992

Type of Use	Appalachian	Southeast	Delta States	Southern Plains	The South	United States
(Million Acres)						
<b>Cropland</b>						
1964	28.9	18.9	20.2	49.4	117.4	443.8
1992	29.1	18.1	23.7	55.1	126.0	459.7
Change	0.2	-0.8	3.5	5.7	8.6	15.9
<b>Pasture</b>						
1964	10.8	12.6	9.4	118.4	151.1	636.5
1992	5.9	9.8	6.4	118.7	140.8	589.0
Change	-4.9	-2.8	-3.0	0.3	-10.3	-47.5
<b>Forest Land</b>						
1964	73.0	79.0	54.6	33.1	239.7	611.8
1992	71.6	73.4	48.3	21.7	215.0	558.7
Change	-1.4	-5.6	-6.3	-11.4	-24.7	-53.1
<b>Special/Other Uses</b>						
1964	11.5	13.4	8.3	11.6	44.8	207.5
1992	17.0	22.1	12.9	16.2	68.2	286.7
Change	5.5	8.7	4.6	4.6	23.4	79.2

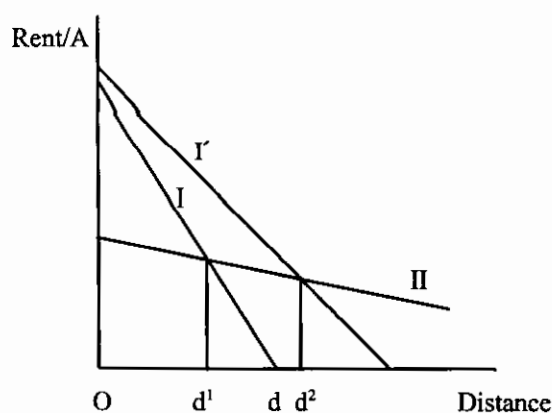
land in farms was much smaller in the Southern Plains (a decline of 14.7 and 12 percent, respectively) than in the other regions. Land in farms declined by 40 percent or more in the Appalachian and Southeast regions, and the decline in the number of farms was more than 50 percent in the Appalachian, Southeast, and Delta States regions.

As population in the South increased, the demand for land for urban uses, parks, recreation areas, and other uses increased while the demand for rural land uses decreased. As land was converted to urban and other uses, land-use shifts occurred and the more intensive uses outbid the extensive uses for control and use of the land. Land in special and other uses increased by 23.4 million acres in the South, 52 percent from 1964 to 1992 (Table 2). Land in special and other uses includes urban areas, transportation, rural parks and wildlife areas, defense and industrial areas, other special uses, swamps, marshes, and other uses of land. Special and other uses of land increased 8.7 million acres in the Southeast, or 7 percent of the total land in the Southeast region. Cropland increased by 8.6 million acres in the South during the same period. However, land in pasture and forest land (extensive uses of land) decreased by 35.1 million acres to offset

the increases in land used for cropland, special and other uses.

### Land Use Transition

As the demand for high value urban uses increases, land is bid away from more extensive rural uses such as pasture, forest land, and other undeveloped uses. Those who want to develop land for urban uses are usually able to bid land away from extensive rural uses because of the higher capitalized net returns in the more intensive uses. Urban conversion of rural land is illustrated in Figure 1. The vertical axis represents the level of net returns to land (rent) and the horizontal axis represents the distance from the center of the urban area. The lines labeled I and II are called *bid rent surfaces*. Each line represents the maximum rent per acre for a particular use as distance from the center of the urban area increases. There could be a number of different bid rent surfaces, each representing a different land use and having a different slope. The bid rent surface slopes downward and to the right, representing a higher rent near the center of the urban area and declining as the land is located farther from the urban center, eventually reaching zero rent at some distance from the



**Figure 1.** Bid rent surfaces with population increases

urban center. For simplicity, let I represent the urban use of land, which produces a high rent at the urban center (or market) and decreases as distance from the urban center increases. Rent for urban use (I) would decrease to zero rent at distance  $d$ .

Assume bid rent surface II represents agricultural land use. Bid rent surface II has less slope because there is little or no advantage to being located near the urban center. Although agricultural land rents generally are much lower, at some distance from the urban center a margin of transference will be reached. The margin of transference represents the point at which it is more profitable to shift from one use to another rather than continue the former use. At this point, rational use will change from urban to agricultural (point  $d_1$ ).

As population increases and the demand for urban land increases (the combined demands for commercial, industrial and residential uses), the urban bid rent surface increases to  $I'$ , and the margin of transference shifts outward to  $d_2$ . The distance  $d_1$  to  $d_2$  represents the amount of urban expansion into the rural area and, as a result, urban development accompanying population increases. Rotating the figure around the vertical axis produces the classic von Thunen concentric rings, which represent encroachment of urban development into the rural areas. Realistically, natural physical features, transportation corridors, institutional impediments, and other barriers create irregular boundaries.

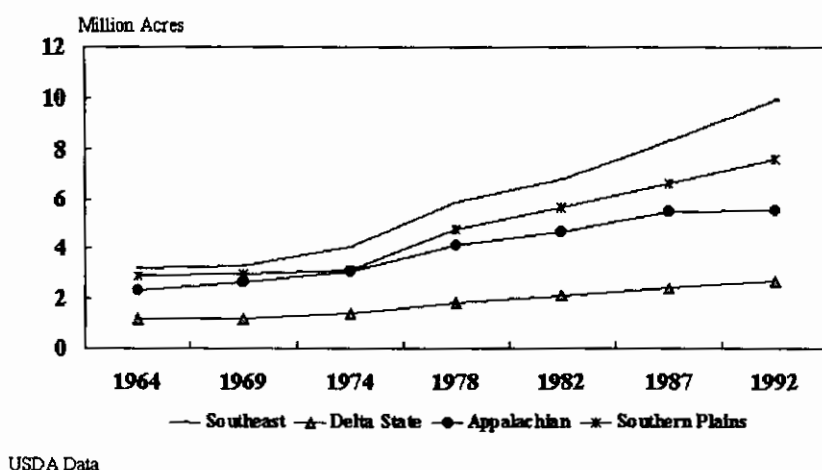
**Table 3.** Population Change in the South, 1960–2000

Region	1960	2000	Annual	
			Change Number	Rate
	(Millions)			
<b>Appalachian</b>	16.99	26.67	9.68	1.13
<b>Southeast</b>	14.54	32.63	18.09	2.04
<b>Delta States</b>	7.22	9.99	2.77	0.82
<b>Southern Plains</b>	11.91	24.30	12.39	1.80
<b>The South</b>	50.66	93.58	42.92	1.55
<b>United States</b>	179.32	281.42	102.10	1.13

Population in the South increased by 42.9 million people from 1960 to 2000, 42 percent of the total increase in U.S. population (Table 3). The rate of population increase in the South was 33 percent higher than the average for the United States. Population in the United States grew at a compound rate of 1.13 percent per year from 1960 to 2000. Population increased 1.55 percent, compounded annually, from 1960 to 2000 for the 14 states representing the South. Population in the Delta States grew at a rate below the national average (0.82 percent per year), while the Southeast and Southern Plains experienced population growth of 2.04 and 1.80 percent per year, respectively. Some southern states experienced much larger increases in population than other southern states. Population changes ranged from a slight decline in West Virginia to an increase of 2.97 percent per year in Florida. During the 1900s, Florida's population approximately doubled every 20 years. In 1900, there were about 500,000 people living in Florida. In 1980, Florida's population exceeded eight million people (Bureau of Economic and Business Research, 1997) and by 2000 had reached 15.98 million (U. S. Census Bureau). Other states with population increases during this period that were larger than the average for the rest of the country include Texas (1.96 percent per year), Georgia (1.84 percent per year), Virginia (1.46 percent per year), North Carolina (1.43 percent per year) and South Carolina (1.31 percent per year).

The Major Land Uses data (ERS, USDA) indicate that increases in urban land in the

## URBAN LAND USE Southern Regions



**Figure 2.** Urban land use in the south

South for the period 1964 to 1992 were greatest in the Southeast and Southern Plains regions (Figure 2). Increases in urban land in these regions were due to the large population increases in Florida and Georgia (Southeast) and in Texas (Southern Plains) during this period. Conversion of land from rural to urban use is more pronounced in some states than in other states. About 4.5 percent of the land area in the United States was classified as developed land in the 1992 National Resources Inventory (NRCS, USDA). Developed land is defined as "a combination of land cover/use categories: urban and built-up areas, and rural transportation" (NRCS, USDA). Using this definition of urbanized areas, urban land accounted for 6.3 percent of the land area in the South in 1992. In the Southeast and Appalachian regions more of the land area was in urban areas (nine and eight percent, respectively) than in the other two regions of the South. In the Delta States and Southern Plains, 4.4 percent of the area was urbanized. The percentage of land in urban areas in the South in 1992 ranged from 3.7 percent in Arkansas to 12.7 percent in Florida.

### Urban Land Conversion

Studies by agricultural economists of the process of converting land from rural to urban

uses date back many years (Schmid; Clawson, 1971). Several of the studies have examined the rate of urban conversion of land (Vesterby and Heimlich; Vesterby and Krupa; Zeimet, et al.; Frey). Depending on the type of data available, some studies have estimated the amount of land converted from agriculture to urban uses on a per-capita or per-household basis while others have estimated the total amount of land urbanized each year. For example, the National Agricultural Lands Study indicated that as much as three million acres per year were being urbanized. Vesterby and Krupa indicated that about three quarters of a million acres annually were being converted to urban uses, and the preliminary report and press releases of the 1997 National Resources Inventory indicated that the rate of urbanization had doubled during the 1990s (NRCS, USDA). [Although a computer programming error was discovered by the NRCS in its procedure to estimate developed (urban) land, it is doubtful that when the revised data for the 1997 National Resources Inventory are released the revised data will indicate that there has been no increase in the rate of conversion.] In terms of examining future land use changes and the competition for rural land in the South, it is important to know whether the rates of urban land conversion in the South are similar to the rest of the country.

One of the objectives of this article was to estimate the amount of land converted to urban uses in relation to population growth in the South. Urban land-use coefficients were estimated to represent the amount of additional land converted to urban use for each person added to the population base. Urban land-use coefficients ( $U$ ) are defined as the change in urban land divided by the change in population during a given period:

$$(1) \quad U = \frac{(UL_2 - UL_1)}{(P_2 - P_1)}$$

where

$UL_2$  = acres of urban land in period 2,

$UL_1$  = acres of urban land in period 1,

$P_2$  = population in period 2, and

$P_1$  = population in period 1.

Urban land-use coefficients, therefore, provide a measure of the amount of land converted to urban uses per person added to the population base. In this sense they are marginal urban land-use coefficients. Some of the studies (Frey; Vesterby and Krupa) calculate average urban land-use coefficients (urban area divided by urban population). Average urban land-use coefficients are smaller and do not directly reflect the effect of changes as urban areas expand into rural areas. In this paper, marginal urban land-use coefficients are estimated for regions of the South.

To estimate urban land-use coefficients, data on the amount of land used for urban purposes are needed. The two primary sources of data available to examine urban land conversion in the South are the Major Land Uses data published by the Economic Research Service of the U.S. Department of Agriculture (ERS/USDA) and the National Resources Inventory (NRI) data collected by the Natural Resources and Conservation Service of the U.S. Department of Agriculture (NRCS/USDA). The Major Land Uses data series are reported for each Census of Agriculture year from 1945 through 1992. The report with data for the 1997 census

year has not been released. The agricultural land use data are based on the Census of Agriculture, and other categories of land use data are obtained from information in other census and federal reports.

The NRI data are based on a survey conducted every five years and are collected at 800,000 scientifically selected sample sites located in all counties and parishes. Data are collected from photo-interpretation and other remote-sensing techniques, as well as some on-site inspection. The same sample sites have been used since 1982 which provide a data set that can be used for trend analyses over time. However, some argue that the NRI data undercount developed land because the data fail to include all of the land in large-lot subdivisions as developed land (Olson and Lyson).

The preliminary 1997 National Resources Inventory was posted on the NRCS website in 1999, and indicated substantial increases in the amount of land in the developed (urban) land use category. Because of errors in the data the final estimates for the 1997 NRI were unavailable for the analysis used in this article.

For this analysis the southern farm production regions include the Appalachian, Southeast, Delta States and Southern Plains. The trends in urban land use for 1964 to 1992 for these farm production regions were derived from the Major Land Uses database and are presented in Figure 2. The Major Land Uses data contain acreage estimates of major land uses by region and states for each Census of Agriculture year from 1945 through 1992. This database defines *urban land* as land in incorporated and unincorporated places of 2500 population or more. Population data were obtained from the Statistical Abstract of the United States (U.S. Department of Commerce). The urban land-use coefficients were estimated for 1974 to 1987. The data on land in urban areas for 1992 indicated a reduction in urban land from 1987 to 1992 for nine of the states in the South and, therefore, were not used. In addition, the footnote for the 1992 data indicates that the 1992 data were estimates based on "trends in urban population and land per capita in urban areas" (ERS, USDA). The changes in urban land use and

**Table 4.** Urban Land-Use Coefficients (U) for Farm Production Regions in the South.

Region	Change in Urban Land Use	Change in Population	U (acres/person)
	1974-1987 (million acres)	1974-1987 (million people)	
<b>Southeast</b>	4.33	6.41	0.675
<b>Delta States</b>	1.01	1.31	0.772
<b>Appalachian</b>	2.34	3.22	0.727
<b>Southern Plains</b>	3.49	5.35	0.652
<b>The South</b>	11.17	16.29	0.686
<b>United States</b>	21.83	31.63	0.690

population for 1974 to 1987 and the estimated urban land-use coefficients for the farm production regions in the South are presented in Table 4.

The urban land-use coefficients ranged from 0.652 acres per person in the Southern Plains to 0.772 acres per person in the Delta States. The urban land-use coefficient for both the South and the United States (48 states) was 0.69 acres per person. Coefficients for the Southern Regions did not vary as much as expected. In an analysis of Florida county data for 1973 to 1984, the coefficients for the more densely settled areas (urbanizing areas) were much lower than those in rural areas (Reynolds, 2000). [Perhaps, when analyzing the data across broad heterogeneous areas, these differences get averaged out.] In states with rapidly urbanizing areas (such as Florida, Texas, and Virginia), the coefficients were smaller, 0.45 persons per acre in Florida and 0.54 persons per acre in Texas and Virginia.

In the study of urban land conversion in Florida, the state was divided into two regions (North and South) and urban land-use coefficients were estimated for Metropolitan Statistical Areas (MSA) counties and non-MSA counties for each region (Reynolds, 2000). The urban land-use coefficient for the MSA counties in the South was 0.363 acres per person. The coefficient for MSA counties in the North was 0.845 acres per person, about 2.3 times larger than the coefficient for the South.

The coefficient for non-MSA counties in the North was 1.904 acres per person, more than three times the coefficient in the South (0.611). The amount of land converted to ur-

ban uses in the non-MSA counties was considerably higher than in MSA counties. Other studies have also found that urban land-use coefficients are consistently higher in non-MSA counties (Heimlich and Anderson; Zeimetz, et al.). Counties in the South are more densely populated, land values are higher, and there is stronger competition for land. Therefore, urban development to accommodate population growth tends to be more compact. As population centers grow and mature as urban areas, development becomes more compact as urban development occurs vertically as well as horizontally and the price of building sites rise. Consequently, urban land conversion rates vary substantially between MSA and non-MSA counties (Reynolds, 1993). Because of the different land settlement patterns within Florida, urban land conversion rates also differ among regions.

To assess the impact of future urban expansion in the South, urban land-use coefficients were multiplied by population projections for each region to estimate the amount of rural land expected to be converted to urban use for the period 2000 to 2020 (U.S. Bureau of Census, 1997). Population is projected to increase by 18.5 million in the 14 southern states comprising the four farm production regions of the South. By multiplying the regional population projections by the regional urban land-use coefficients, the amount of rural land converted to urban use is estimated for each region. About 12.6 million acres of rural land is expected to be converted to urban use in the South for 2000 to 2020 (Table 5). More than 70 percent of urban land conversion is ex-



**Table 5.** Estimated Urban Land Conversion in the South from 2000 to 2020

State/Region	Population Growth	Urban Expansion
<b>Southeast</b>	7,386,000	4,985,550
<b>Delta States</b>	1,209,000	933,348
<b>Appalachian</b>	3,708,000	2,695,716
<b>Southern Plains</b>	6,167,000	4,020,884
<b>South</b>	20,049,000	12,635,498

pected to occur in the Southeast and Southern Plains regions. Over 60 percent of the estimated urban land conversion is expected to occur in the five southern states with the largest population increases (Texas, Florida, Georgia, North Carolina, and Virginia).

### Implications for Rural Areas

Population projections indicate that the South will continue to grow, and the demand to convert rural land to urban uses will be strong. This means that in many rural areas current land uses will have to compete with potential urban and nonagricultural uses for control and use of the land. As demand for urban-related uses increases, the market value of land in these areas will be expected to rise as higher-value uses, developers, and speculators bid the price of land up. Rural areas around urbanizing centers will experience these shifts in demand and the value of land in these rural areas will increase the most. Texas, Florida, Georgia, North Carolina, and Virginia, where most of the urban land conversion is expected to occur, will be affected more than other states in the South.

The spread of urbanization into rural areas may lead to other impacts on farmland and the production of agricultural products. These impacts may be both direct (conversion of cropland or pasture to urban uses) and indirect (effects of urbanization on nearby agricultural operations). When farmland is directly converted to urban uses the owner may cease operations or relocate. When the owner relocates, other land-use changes may occur farther away from the urbanizing area. Generally, the more intensive agricultural uses relocate by

outbidding extensive uses for the land. Agriculture that remains in the urbanizing areas tends to become more intensive. Heimlich and Brooks reported that farms that remain in urbanizing areas are less than half the size of farms in other areas. Vesterby and Krupa found that in counties that experienced intense urban population pressure between 1950 and 1990 sales of agricultural products had increased \$1.9 billion (adjusted to a 1982 base) even though the amount of farmland had decreased 11.1 percent. They also found that the land that has remained in agricultural production has been used to produce higher-value crops and that a larger share of market sales has come from fruit and nuts, vegetables, and nursery and greenhouse products.

Indirect effects are often more difficult to quantify. Many traditional agricultural practices are objectionable to those who move into the rural fringe areas. These spillover effects often affect existing agricultural operations both economically and politically. These effects may result in restrictions on operations and/or increases in costs of production. However, not all spillover effects are negative because agricultural land often provides open space and attractive visual surroundings. It is important to find ways that these "mixed" agricultural/urban areas can coexist harmoniously.

Healy identified the impact of land-use competition on various "unpriced" values, particularly environmental values, as an important issue for southern policy makers. Markets provide prices for products and services that are bought and sold. However, many of the resources that make the South an attractive location in which to live are not traded in the marketplace and, therefore, are "unpriced." Abundant supplies of land, water, and other environmental amenities that characterize many areas of the South are becoming scarce in some locations. As urban areas expand into rural areas, the external effects of development may affect and change surrounding rural areas. Some of the environmental amenities may be diminished and water supplies in some locations may become restricted.

Another implication of the urban conver-

sion of rural areas is the almost irreversible nature of changes in land uses. While it is true that examples of built-up areas being converted back to agricultural or rural use can be found (farmsteads on small farms that have been demolished as part of farm consolidation), it is unlikely that much, if any, of the conversion of rural land around metropolitan areas will ever be reversed. "Two facts of the concern about rural/urban land shifts are (1) unlike other shifts, this one is essentially irreversible, and (2) urban uses commonly can outbid all other uses for land, so the shift cannot be resisted at the market level" (Brubaker, p. 201).

Urban expansion into rural areas is often referred to as sprawl. *Sprawl* may be defined as the lack of continuity in expansion (Clawson, 1962). The primary concern with sprawl has been cost. Burchell and Shad argue that sprawl leads to higher expenditures by local government to provide public infrastructure such as roads, schools, and water and sewer lines. Although sprawl has been criticized as being inefficient because it leads to higher costs of providing services, there is some evidence that sprawl patterns of urban growth may lead to higher densities in skipped-over areas (Peiser). Nevertheless, a number of options to manage growth, reduce or eliminate sprawl, and minimize other rural/urban fringe problems have been proposed (Garkovich).

Land-use planning has been around for many years and is justified on the basis of correcting deficiencies in the allocative function of the market. People often disagree on how land should be allocated to different uses. Hite points out that "land-use planning is a perilous undertaking, as susceptible to failure and abuse as the market." States have initiated various types of growth-management policies and regulations that require some type of land-use planning. In cases where planning requirements are statewide (e.g., Florida), the planning and reporting requirements may impose relatively high costs on rural counties (many do not have planners on county staff). Most urban planners advocate additional regulations and policies to force development within cities to be more compact. In light of the National

Resources Inventory data which indicates that sprawl may have increased and with so many measures being proposed and implemented to reduce sprawl, one must ask the question: Are these corrective measures working? It appears that structural shifts may have occurred in the way people decide where to live in relation to their work and their free time. Some rural areas are being developed by individuals building on larger tracts of land that is located farther away from the city and thus adding to the "sprawl" problem.

## Conclusion

Although the South's population has been increasing faster than in the rest of the country, over 85 percent of the land in the South is still in rural land uses (cropland, pasture, and forest land). However, increases in the South's population have resulted in changes in land use. Since 1964, the amount of land in rural farms has decreased 80 million acres as land in urban development and other special uses has increased. The amount of land in urban and built-up areas is directly related to increases in population in the South. Urban land-use coefficients have been estimated to provide a measure of the amount of land converted to urban uses per person added to the population base.

The estimated urban land-use coefficients for the South and the United States were the same, 0.69 acres per person. The coefficients for the regions of the South ranged from 0.652 in the Southern Plains to 0.772 acres per person in the Delta States. Coefficients for the regions of the South did not vary as much as expected. In a Florida study where county data were available, urban land-use coefficients ranged from 0.363 acres per person in MSA counties in the South region of the state to 1.904 acres per person in non-MSA counties of the North region of the state. The coefficients were two to three times higher in the North region than in the South region, and the coefficients were also two to three times higher for non-MSA counties than for MSA counties. The Florida analysis supported the hypothesis that when cities increase in size and

mature as an urban area, urban land-use coefficients decline. Therefore, in the larger urbanizing areas, less land is converted to the urban land use for each additional person added to the population base. When using state data and analyzing across broad regions, the coefficients do not vary as widely. Therefore, state or regional estimates may be inadequate when analyzing land use changes for specific areas.

The Florida analysis also indicates that disaggregating the data to the county level and separating MSA and non-MSA counties allow more accurate estimates for specific areas. For example, the use of the state-average coefficient (0.535) for the South region of Florida instead of the coefficient for MSA (0.363) and non-MSA (0.845) counties in the South would have resulted in an estimate of 614,711 additional acres of land to be converted to urban uses in Florida by 2020.

Population growth has been greater in the South in recent years than the average for the country. The National Resource Inventory data indicate that during 1992 to 1997, six of the top 10 states that lost cropland, forests, and other open spaces to urban development were in the South (Texas, Georgia, Florida, North Carolina, South Carolina, and Tennessee). Population projections for the next 20 years indicate that the South will experience continued growth and, consequently, conversion of rural land to urban uses. The strong demand for urban conversion of rural land will increase the competition for the use and control of rural land. The rural landscape and agriculture in the South will continue to change. Decision-makers and policymakers need to be aware of the changes that are likely to occur and the impacts that these changes may have on rural areas. Research and extension programs are needed to provide and disseminate this information to the public.

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