

Land Use

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The three major uses of land in the 48 contiguous States are grassland pasture and range, forest-use land, and cropland, in that order. Total cropland (used for crops, used for pasture, and idled) declined 6 percent over 1969-2002. Farm policy changes have reduced the acreage idled under Federal programs since 1996.

Introduction

Land-use changes can affect the environment and the sustainability of production. Because impacts on the environment—including erosion, water quality, and wildlife habitat—are typically not reflected in private profit calculations, land-use choices that are optimal for an individual may not be optimal for society. This difference suggests the possibility of public policies that more closely align land-use decisions with social objectives.

The allocation of a fixed land base among competing uses is determined by the relative returns to the different uses, which vary according to land quality and location. A landowner seeking to maximize profits will allocate a land parcel to the use that yields the highest expected economic return, after the costs of conversion. As relative returns change along with market conditions, technological advancements, or government policies, land-use patterns tend to adjust accordingly (see the “Land Use, Value and Management” Briefing Room on the ERS website).

Land-use change is dynamic. With the exception of urban land, changes occur to and from major land uses. For example, 44 million acres left the cropland and pasture category from 1992 to 1997 while 21 million acres shifted into the category, resulting in a net loss of 23 million acres (USDA/NRCS, 2000).

Major Land Uses in the United States

Major Land Uses is a land-use inventory conducted periodically by ERS. This series contains acreage estimates of major uses by region and State, coinciding with each census of agriculture from 1945 through 2002. (See the glossary for detailed definitions of the major land uses.)

Because Alaska and Hawaii have very little crop area, we focus on the contiguous 48 States. The total land area of the 48 contiguous States is approximately 1.9 billion acres, with an additional 365 million acres in Alaska and a little over 4 million acres in Hawaii (table 1.1.1).

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Table 1.1.1

Major uses of land, United States, 2002¹

Land use	48 States	United States	48 States	United States
	<i>Million acres</i>		<i>Percent of total</i>	
Cropland ²	441	442	23.3	19.5
Grassland pasture and range	584	587	30.8	25.9
Forest-use land ³	559	651	29.5	28.8
Special uses ⁴	153	297	8.1	13.1
Urban	59	60	3.1	2.6
Miscellaneous other land	97	228	5.1	10.1
Total land area ⁵	1,894	2,264	100.0	100.0

¹ See the "Major Land Uses" data product on the ERS website for estimates of major uses by region and State, coinciding with each census of agriculture, from 1945 through 2002.

² All land in the crop rotation (used for crops, used for pasture, idle cropland). Includes about 34 million acres idled under the Conservation Reserve Program.

³ Total forest land as classified by the U.S. Forest Service minus an estimated 98 million acres of forested land used for parks, wildlife areas, and other special uses.

⁴ Rural transportation areas, land used primarily for recreation and wildlife purposes, various public installations and facilities, farmsteads, and farm roads/lanes. Excludes urban land in contrast to Major Land Uses, Aggregate Data.

⁵ Distributions by major use may not add to totals due to rounding.

Sources: USDA/ERS based primarily on reports and records of the Census Bureau and Federal, State, and local land management and conservation agencies. See the *Major Land Report* (Lubowski et al., 2006) for information about the 2002 land-use estimates.

Grassland pasture and range, the largest use of land, accounted for 584 million acres (31 percent) of the 48 States in 2002 (table 1.1.1). This compares with 636 million acres in the mid-1960s. Due to improvements in the forage quality and productivity of grazing lands, less pasture and range is needed to sustain grazing herds. The inventory of domestic animals, particularly sheep, has also been declining in recent years, further reducing pasture/range demand (USDA/NASS, 2004).

Forest-use land, the second largest major use, declined from about 32 percent of total land in 1945 to about 30 percent in 2002. A broader category, all land with forest cover, comprised 33 percent of the land base in 2002 (Smith et al., 2004). While forest-use land increased 1 percent between 1997 and 2002, it declined from 612 million acres in 1964 to 559 million acres in 2002. Much forest-covered land is in "special uses" (parks, wilderness areas, and wildlife areas) that prohibit forestry uses such as timber production. Forested land in these special uses increased from 23 million acres in 1945 to about 98 million acres in 2002.

Cropland comprises the third largest use of land, covering 23 percent of the contiguous States in 2002 (table 1.1.1). Since 1945, cropland ranged from a high of 478 million acres in 1949 to a low of 441 million acres in 2002. Total cropland has trended downward since the late 1960s, and decreased by 13 million acres (3 percent) from 1997 to 2002.

The total cropland base includes cropland used for crops, cropland used for pasture, and cropland idled. These components vary more than total crop-

land. Since 1945, the amount of cropland used for crops has ranged from as much as 383 million acres in 1949 and 1982 to a minimum of 331 million acres in 1987. Total acreage used for crops exhibited two major cycles between 1945 and 1987, with cropland moving from idle to crop use and back again. Cropland used for crops increased from 331 to 349 million acres over 1987-97, and then declined to 340 million acres in 2002, about 5 percent below the average acreage for 1910-97. Since 1945, cropland used for pasture varied from 47 million acres in 1945 to 88 million acres in 1969.

Special uses include rural transportation; rural parks and wildlife; defense and industrial uses; and farmstead, farm roads/lanes, and other onfarm uses. These special uses increased from 85 million acres (4 percent of the land area of the contiguous 48 States) in 1945 to 153 million acres (8 percent) in 2002.

Land in transportation uses (highways and roads, railroads, and airports in rural areas) increased by 4 million acres (17 percent) between 1945 and 1982. Transportation uses declined by about 0.5 million acres from 1982 to 1992 due to the abandonment of railroad facilities and rural roads, and the classification of some transportation uses as urban areas.

Land used for recreation and wildlife areas (Federal and State parks, wilderness areas, and wildlife refuges) expanded 344 percent from 1945 to 2002 (an increase of 78 million acres). The increase came mostly from conversion of Federal lands, previously in forest and grassland pasture and range. Land in defense and industrial uses declined by 10 million acres (40 percent) from 1945 to 2002. Farmsteads, farm roads, and other farm uses declined by 4 million acres (29 percent) between 1945 and 1997. This decline reflects trends toward fewer farms and larger, more consolidated farms, as well as an increasing tendency for farm households to live off the farm.

In response to expanding U.S. population, land in urban uses—including homes, schools, office buildings, shopping sites, and other commercial/industrial uses—increased from 15 million acres in 1945 to 25 million acres in 1960, 47 million acres in 1980, and 59 million acres in 2002. While the U.S. population nearly doubled, the amount of land urbanized quadrupled. However, urban uses still comprise only 3 percent of the total land area of the contiguous States.

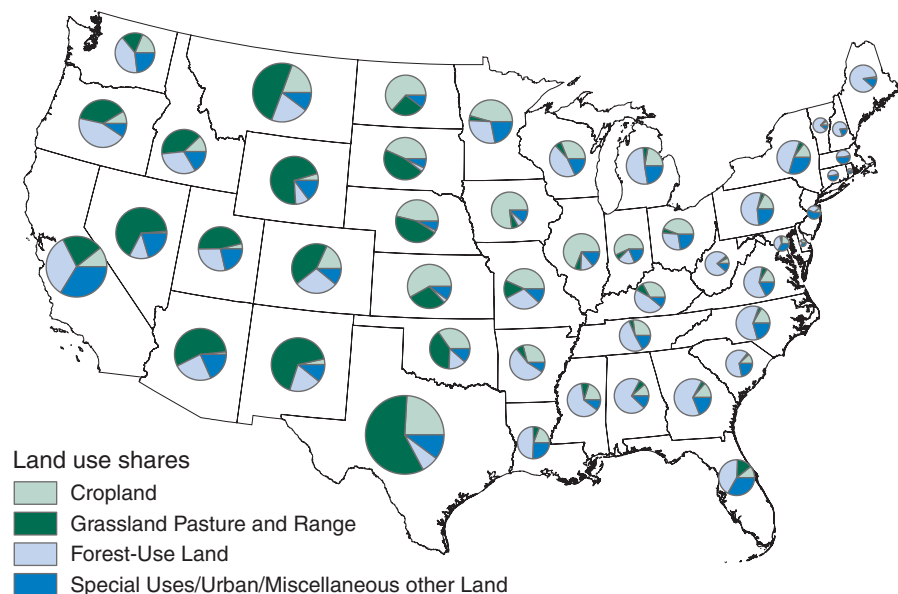
Miscellaneous other land uses decreased from 1945 to 1964, and have since trended upward, showing a 54-percent increase from 1964 to 2002 reflecting improved data and reclassification of grazing and forest lands. These uses include marshes and open swamps not included in other major land uses, bare rock areas, deserts, some rural residential areas, and other uses not inventoried. Wetlands are defined by soil and hydrological characteristics and may occur on land in many different uses (see Chapter 2.3, “Wetland Status and Trends”).

Regional Changes in Land Use

While land in every use occurs in all 10 regions of the contiguous States, some uses are more concentrated in some regions than in others (fig.1.1.1). Regions with the largest cropland acreage are the Northern Plains, Corn Belt, and Southern Plains. Grassland pasture and range is concentrated in the Mountain and Southern Plains regions. Acreage in forest use, special and miscellaneous other uses is highest in the Mountain region.

Figure 1.1.1

Shares of land in major uses, 48 contiguous States, 2002



Source: USDA/ERS, Major Land Uses Data Product.

The Northeast, Appalachian, Southeast, Delta States, and Lake States regions lost cropland between 1945 and 2002. The largest increases occurred in the Northern Plains and Mountain regions, with smaller increases in the Corn Belt, Southern Plains, and Pacific regions. Western increases may have resulted in part from federally subsidized irrigation water (see Chapter 2.1, “Irrigation Resources and Water Costs”).

Nine of the 10 regions lost grassland pasture and range between 1945 and 2002. While grassland pasture and range increased 11 million acres (10 percent) in the Southern Plains, the Northeast region lost about 70 percent of its grassland pasture and range, and the Appalachian and Lake States regions lost more than 50 percent. The Northeast and Appalachian regions saw the reforestation of grassland, loss of some grassland to urbanization, and concentration of the dairy industry. Decreases in the Corn Belt, Northern Plains, and Mountain regions were likely associated with the conversion of some grassland pasture and range to cropland.

Cropland Use and Federal Programs

While total cropland acreage has varied up and down and generally declined since 1969, greater shifts have occurred between cropland used for crops and cropland idled, mostly because of Federal programs. Cropland used for pasture has exhibited less variation in acreage than cropland idled.

Most cropland used for crops is harvested, but typically 2-3 percent experiences crop failure and 5-10 percent is cultivated summer fallow (table 1.1.2). In 2002, farmers harvested one or more crops on an estimated 307 million acres of cropland, down 4 percent from 1997. About 8 million acres of the total harvested were double-cropped. When double-cropped land is counted twice, total acres harvested rise to 315 million acres.

Table 1.1.2

Major uses of cropland, 48 contiguous States, 1992-2004

Cropland	1992	1997	2002	2004 ¹
	<i>Million acres</i>			
Cropland used for crops ²	337	349	340	336
Cropland harvested ³	305	321	307	312
Crop failure	8	7	17	9
Cultivated summer fallow	24	21	16	15
Cropland idled by all Federal programs ²	55	33	34	35
Annual programs	19	0	0	0
Conservation Reserve Program	35	33	34	35
Total, specified uses ^{2,4}	392	382	374	372

¹ Preliminary, subject to revision.

² Breakdown may not add to totals due to rounding.

³ A double-cropped acre is counted as 1 acre.

⁴ Does not include cropland pasture or idle land not in Federal programs that is normally included in the total cropland base.

Sources: USDA/ERS, based on USDA/ERS, 1997a; USDA/NASS, 1998, 1999a, 2000a; 2004a; 2005; and unpublished data from USDA/FSA and USDA/NASS.

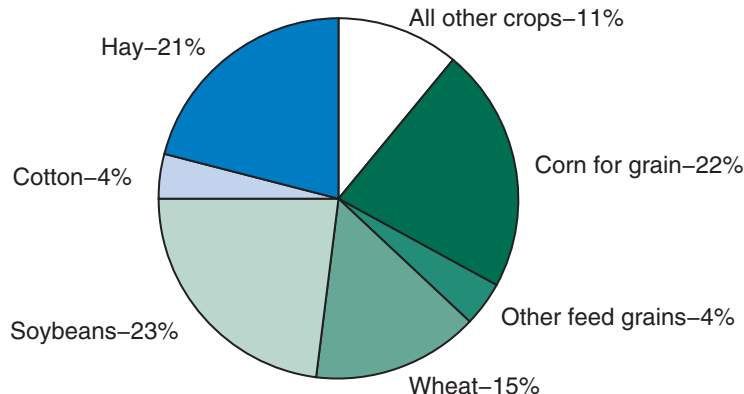
Cropland used for crops was at a record high of 387 million acres in 1949, when no acres were idled by Federal programs. In 1972, cropland used for crops was near a record low of 334 million acres as Federal programs idled 61 million acres. Cropland used for crops climbed to 387 million acres in 1981, when Federal programs idled no cropland, and dropped to 333 million in 1983, when Federal program set-asides reached a historic peak of 78 million acres under the Payment-in-Kind (PIK) program. The Federal Agricultural Improvement Act (FAIR) of 1996 eliminated all Federal acreage reduction programs other than the Conservation Reserve Program (CRP) (see Chapter 5.2, “Land Retirement Programs”). Between 1983 and 2002, cropland used for crops increased overall, while total acreage idled by Federal programs decreased to 34 million acres. From 1997 to 2002, cropland used for crops declined from 349 to 340 million acres, while acreage idled under CRP increased by about 1 million acres. Between 2002 and 2004, acreage in CRP increased by an additional 1 million acres, while cropland used for crops declined by about 4 million acres (table 1.1.2).

The 14-million-acre drop in harvested cropland between 1997 and 2002 was coincident with a decrease in cultivated summer fallow and an increase in failed acres due to widespread drought. Crop failure occurred on 17 million acres, over 5 percent of the acreage planted, in 2002. This failed acreage was the largest since 1956. The use of summer fallow has been decreasing since the late 1960s, and stood at 15 million acres in 2002, down from 42 million acres in 1969.

Four crops—corn for grain, soybeans, wheat, and hay—accounted for 80 percent of all crop acres harvested in 2002 (fig. 1.1.2). The additional 17 “principal” crops accounted for another 15 percent of harvested area. Vegetables, fruits, nuts, melons, and all other crops accounted for 4.5 percent of crop area harvested in 2002.

Figure 1.1.2

Harvested crops in the 48 contiguous States, 2002



Source: USDA/ERS, based on USDA/NASS, 1999a, 1999b, 1999c, 1998, 2004.

Urbanization of Agricultural and Other Rural Land

Cropland conversion to urban uses is largely irreversible, so it is important to know the rate of conversion and how much of the loss is replaced from other land uses (see briefing room “Land Use, Value and Management” on the ERS website). Excessive loss of cropland to urban uses could lessen the production of food and fiber and the supply of rural amenities, such as open space, watershed protection, and rural lifestyles. A variety of Federal, State, local, and private programs address such concerns (see Chapter 5.6, “Farm-land Protection Programs”).

Although urban land constituted less than 3 percent of the U.S. land area in 2000, 79 percent of the population lived there (table 1.1.3). Even large percentage increases in urban area would amount to small decreases in rural area since it is so vast. The rate of expansion (by decade) of urban area has declined from 39 percent during the 1950s, to about 36 percent during the 1960s and the 1970s, and to 18 percent in the 1980s. According to the Census Bureau, urban area was 59 million acres in 2000, just 7 percent above the previous estimate for 1990 (DOC/BOC, 2002). However, the Census Bureau adopted a new definition of urban area for the 2000 Census, improving the precision of urban area measurement but making it more difficult to compare urban area before and after this year. If urban area for 1990 is recalculated using the 2000 definition, the Census Bureau’s estimate falls to 51 million acres, implying a 15-percent increase in urban area from 1990 to 2000.

The National Resources Inventory (NRI), conducted by USDA’s Natural Resources Conservation Service (NRCS) in cooperation with Iowa State University, is an alternative source for estimates of urban and rural areas. The NRI uses a consistent definition for built-up areas, though it differs from the definition used by the Census Bureau. According to the NRI, “developed land,” which includes large and small urban and built-up areas

Table 1.1.3

U.S. population and urban area, 1950-2000

Year	U.S. population			Urban area ¹	Urban area increase ²
	Total	Urban	Portion urban		
	— Millions —	Percent	Million acres		
1950	151	97	64	18	
1960	179	125	70	25	39
1970	203	150	74	35	36
1980	227	167	74	47	37
1990	249	187	75	56	18
2000 ³	281	222	79	59	1

¹ Data differ from table 1.1.1 due to different data sources and time periods.

² Percent increase over urban area 10 years earlier.

³ The 2000 urban area estimates are not directly comparable to estimates in prior years due a change in the definition of urban areas in the 2000 Census of Population and Housing. The relatively small change in urban area between 1990 and 2000 should be viewed as a result of this definitional change, rather than as a reflection of a slowing rate of urbanization.

Sources: USDA/ERS, based on DOC/BOC, 2002, 1999; and Frey, 1983.

as well as rural transportation land, totaled 107 million acres in 2002 in the contiguous United States. The NRI indicates that developed land increased by 14 million acres (19 percent) over 1982-92 and 21 million acres (24 percent) over 1992-2002 (USDA/NRCS, 2004).

Land converted to urban uses comes from several different major land uses. The NRI indicates that 20 percent of new developed land came from cropland between 1997 and 2002. Prime cropland—land that has the best combination of physical/chemical characteristics for agricultural production—is converted to developed uses at about the same rate (5 percent per year) as nonprime cropland (USDA/NRCS, 2003). About 21 percent of rural non-Federal land is prime and 26 percent of crop land converted to urban uses over 1997-2001 was prime.

Rural land, defined as all land that is not urban, contains rural residential land, consisting of houses and associated lots. Nonfarm rural residential area was estimated to be about 94 million acres in 2002, up from 56 million acres in 1980. The average rate of increase in rural residential land was 1.7 million acres per year from 1980 to 2002. Combining both rural and urban residential land, the total increase in residential area was about 2 million acres per year during this period.

References

Lubowski, Ruben N., Marlow Vesterby, Shawn Bucholtz, Alba Baez, and Michael J. Roberts (2006). *Major Uses of Land in the United States, 2002*. EIB-14. U.S. Dept. Agr., Econ Res. Serv., May.

Smith, Brad W., Patrick D. Miles, John S. Vissage, and Scott A. Pugh (2004). *Forest Resources of the United States, 2002: A Technical Document Supporting the USDA Forest Service 2005 Update of the RPA Assessment*. General Technical Report NC-241. Forest Service, North Central Research Station, U.S. Department of Agriculture, St. Paul, MN.

U.S. Department of Agriculture, National Agricultural Statistics Service (NASS) (2004). *2002 Census of Agriculture*. Vol. 1: Part 51, Chapter 2, AC-02-A-51, United States Summary and State Data. June.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), and Iowa State University, Center for Survey Statistics and Methodology (2003). *National Resources Inventory: 2001 Annual NRI*. July.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), and Iowa State University, Center for Survey Statistics and Methodology (2000). *Summary Report, 1997 National Resources Inventory (revised December 2000)*, including associated database files. Dec.

U.S. Department of Commerce, Bureau of the Census (BOC) (2002). *2000 Census of Population and Housing, Summary Population and Housing Characteristics, United States*. PHC-1-1. Nov.