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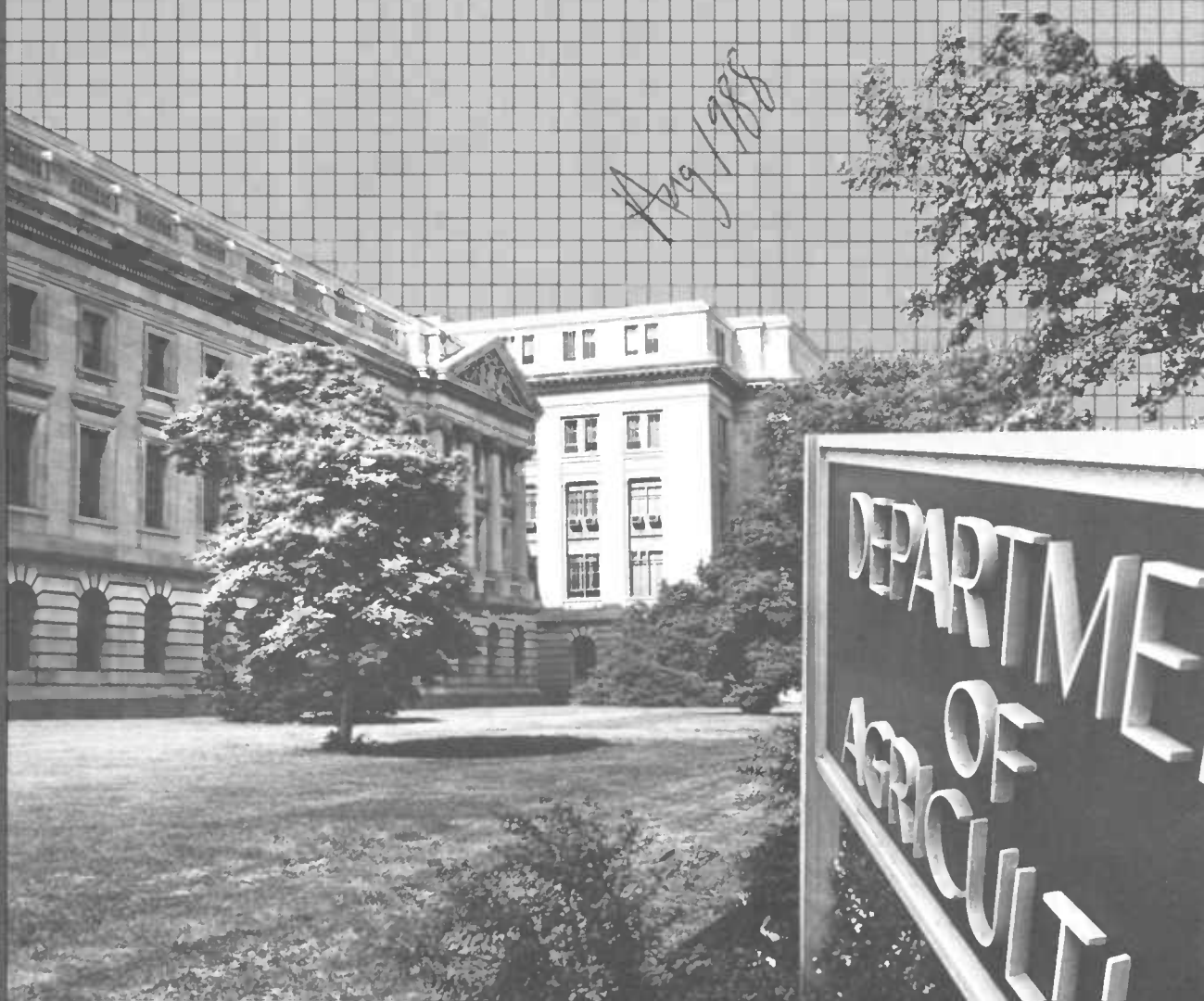
Economic Research Service

Agriculture Handbook No. 671

Volume 6

Major Statistical Series of the U.S. Department of Agriculture

Land Values and Land Use



Major Statistical Series of the U.S. Department of Agriculture, Volume 6: Land Values and Land Use. By Charles H. Barnard and Roger Hexem, Resources and Technology Division, Economic Research Service, U.S. Department of Agriculture. Agriculture Handbook No. 671.

Abstract

This volume describes how the statistical series on agricultural land values and on acreages of cropland and other land in the United States are constructed and used. It identifies sources of current and historical data and information used in constructing the series.

Keywords

Agricultural land values, land price index, land rent, cropland, major land uses.

Sales Information

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Foreword

This set of 12 volumes on the *Major Statistical Series of the U.S. Department of Agriculture* (Agriculture Handbook No. 671) is the second revision that supersedes the original volumes published during 1957-60. The first revision was completed in 1972.

Our goal for this handbook remains essentially unchanged. We hope to help government, university, private sector, and other users become better acquainted with the concepts and data underlying the Department's statistical series. We believe this handbook will benefit new users as well as those already familiar with the Department's statistics. If you find it valuable in improving your knowledge of what the various data series measure and how appropriate they may be for specific uses, we will have largely succeeded.

The challenge for our statistics is to reflect events in the agricultural sector and rural areas as they are, insofar as possible, and in this way contribute to public understanding. Because much has changed in the economics of rural areas and the food and fiber system since the last revision, we have adopted some new procedures. Thus, although the revised handbook describes several established series essentially as they were in the two earlier handbooks, it also notes changes in ongoing series, describes new series, and identifies some series that are no longer published.

Your interest in the Department of Agriculture's statistical series is important. We welcome comments on either these handbook volumes or the series they describe.

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Volumes in Handbook

Agriculture Handbook No. 671, *Major Statistical Series of the U.S. Department of Agriculture*, will consist of 12 volumes.

1. Agricultural Prices
2. Agricultural Production and Efficiency
3. Farm Income
4. Agricultural Marketing Costs and Charges
5. Consumption and Utilization of Agricultural Products
6. Land Values and Land Use
7. Crop and Livestock Estimates
8. Farmer Cooperatives
9. Market News
10. International Agricultural Statistics
11. The Balance Sheet and Farm Finance
12. Costs of Production

Glossary

The following organizational abbreviations appear in this publication:

ASCS	Agricultural Stabilization and Conservation Service, USDA
ERS	Economic Research Service, USDA
FmHA	Farmers Home Administration, USDA
NASS	National Agricultural Statistics Service, USDA
SSO	State Statistical Office, NASS, USDA
USDA	U.S. Department of Agriculture

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- Richard Dunford, Research Triangle Institute, Raleigh, North Carolina; and

- David Chicoine, Department of Agricultural Economics, University of Illinois.

An earlier version of the section on "Agricultural Land Values and Rents" was presented to a meeting of the North Central Regional Research Committee on Land Values (NCR-123) and was published in *Ongoing Farmland Market Research: A Handbook*, North Central Regional Research Publication No. 306, Agricultural Experiment Station, University of Nebraska, Lincoln, Sept. 1985.

Edward Reinsel, Office of the Administrator, ERS, USDA, coordinated preparation of manuscripts for this and other volumes of the handbook. Judith Latham edited the manuscript. Carolyn Riley designed the cover and art work. Denice Bess and Wanda Cooper typed the manuscript, and Patty Beavers prepared the camera copy.

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Major Statistical Series of the U.S. Department of Agriculture

Volume 6: Land Values and Land Use

Charles H. Barnard and Roger Hexem

Introduction

This volume of the *Major Statistical Series of the U.S. Department of Agriculture* describes how the series on agricultural land values and on acreage and major uses of land in the United States are constructed and used.

The level of, and change in, farm real estate values have broad and important implications for agriculture. The value of farmland and buildings currently accounts for 75 percent of the value of all farm assets. Changes in farmland values can substantially affect the relative wealth of the farm sector compared with other economic sectors as demonstrated by the dramatic increases in farmland values during the seventies and the subsequent decreases since 1981. The value of farmland plays a crucial role in production agriculture, serving as the principal collateral for the purchase of farm assets. It serves as collateral for financing operating loans as well.

The Economic Research Service (ERS) and the agricultural research community use the farm real estate series described here to analyze farm sector well-being. ERS applies the farm real estate series in constructing the balance sheet of the farming sector. Balance sheet items affected include the value of farm assets, farm debt, and net worth. The series are also used to estimate the magnitude of unrealized capital gains.

Barnard is an agricultural economist with the Agriculture and Rural Economy Division, Economic Research Service (ERS), U.S. Department of Agriculture (USDA), and Hexem is an agricultural economist with the Resources and Technology Division, ERS, USDA.

Data series related to value per acre, extent and methods of financing farmland purchases, and other aspects of the farmland market are also used by lending institutions, tax officials, and other government agencies. Individuals, such as brokers or lenders, associated with farm real estate businesses use the indexes and dollar value series to adjust cash rental agreements and to appraise farmland.

Farmland values reflect expectations about the stream of future net returns generated by agricultural production. Farmland values are affected by a host of factors, including agricultural productivity, credit policies, Government farm programs, and technological change. Macroeconomic variables such as interest rates, inflation, international currency rates, export policies, and urbanization have a less direct, but equally important, effect. Thus, farm real estate values often indicate general economic conditions within the farm sector.

For more than 50 years, ERS and its predecessor agencies have estimated acreages and maintained an inventory of the major uses of land in the United States. Although numerous public agencies develop land use data, no one agency attempts to account for all land uses. The ERS synthesis of available data provides both a current accounting and a historical record of major uses for the entire land base.

The United States has a land area of approximately 2,265 million acres. Agriculture is a major user of this land. In 1982, about 21 percent of the land surface was used for

crops, and 26 percent was used primarily for livestock grazing. Another 32 percent was forested (including forest land in parks and similar uses), and 21 percent was used for a variety of nonagricultural and miscellaneous purposes.

Cropland is a major component of the land use series and a major input to agricultural production. ERS prepares annual estimates of "cropland used for crops." Cropland used for crops fluctuates from year to year in response to weather, crop demand and supply levels, and other economic conditions. It can also fluctuate widely as a consequence of farm programs. Thus, annual data on cropland use provide not only a measure of input use in agriculture but also a measure of the effect of farm programs on agricultural resource use.

The land use series are widely distributed. ERS staff use them to prepare situation and outlook reports, research reports, and staff analyses. The data are also used by other researchers, policymakers, legislators, and the news media.

Agricultural Land Values and Rents

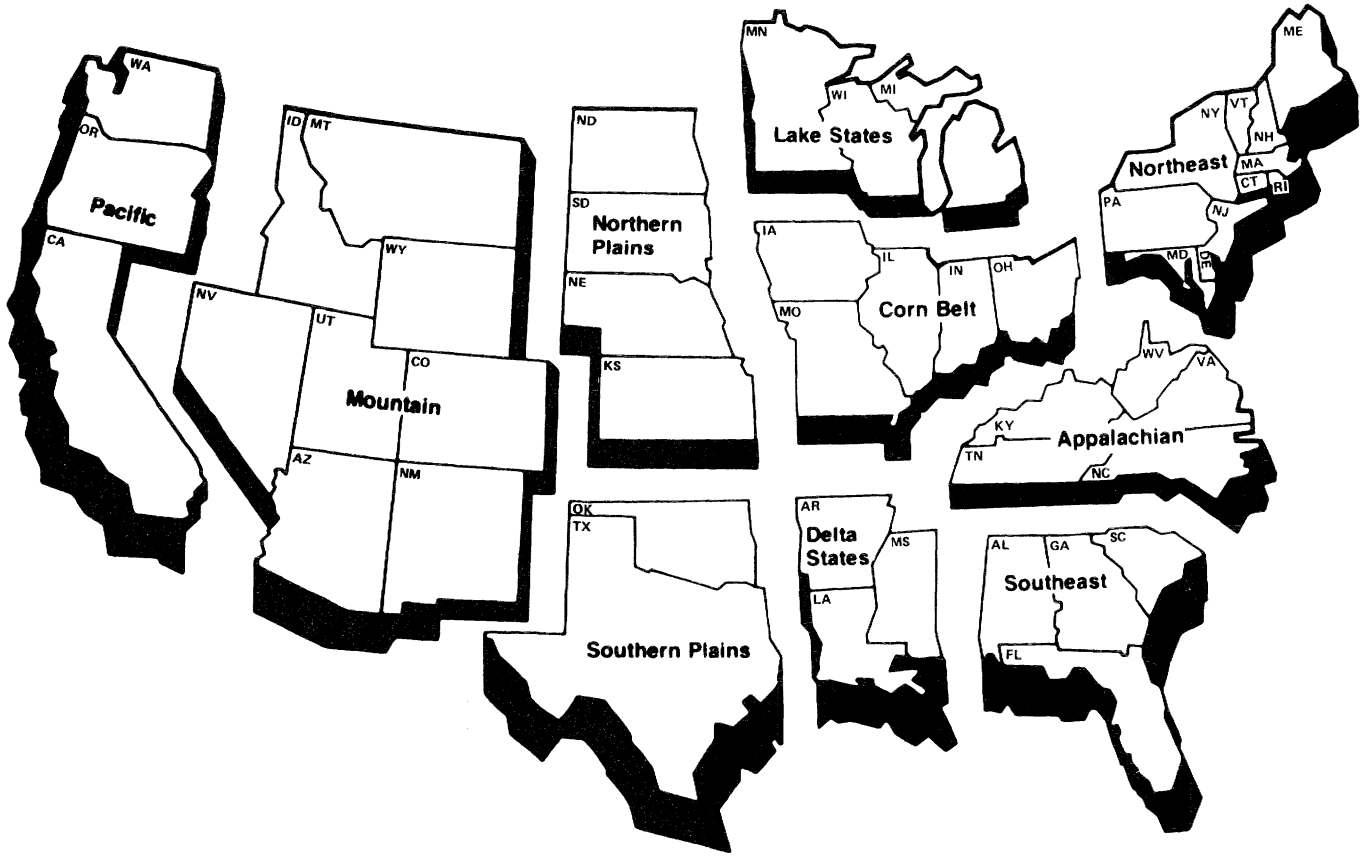
This section examines how statistical series related to farm real estate are constructed and used. It updates and extends information on farm real estate previously published in *Land Values and Farm Finance* (*13*).[1]

ERS has historically published statistical series related to farm real estate values, agricultural rents, and selected characteristics of farmland buyers, sellers, and transactions. The farm real estate value statistics consist of two series: an index series and a dollar value series. The farm real estate dollar values and indexes are published as per-acre averages for 48 States and the United States. National figures are acre-weighted averages for the 48 contiguous States; statistics for Alaska and Hawaii are not published. The agricultural rent statistics, which include series on farmland cash rents and grazing rates, are published for selected States. Characteristics of farmland buyers, sellers, and transactions are published for the 10 farm production regions (see map).

The farm real estate value indexes, dollar-per-acre estimates, and cash rent estimates are now released each year in early April in an eight-page folio called *Agricultural Resources: Situation and Outlook Summary* (*8*). These same data are also published, along with additional farmland value data from the Agricultural Land Values Survey and farmland market data from the Farm Land Market Survey in June or July in the ERS Situation and Outlook publication, *Agricultural Resources: Agricultural Land Values and Markets* (*7*). Prior to August 1985, the series was titled *Farm Real Estate Market Developments* (*17*). Grazing rates are published in *Agricultural Prices* (*26*) by the National Agricultural Statistics Service (NASS).

Figure 1

Farm Production Regions



[1] Italicized numbers in parentheses refer to items in the references at the end of this volume.

In the following sections, we describe in detail the content of USDA series on farm real estate values, cash rents, and farmland sales characteristics and examine the procedures used to produce each series. We also describe the surveys from which the data are now collected. Sample tables of some statistics are included, but readers may find it useful to have a recent issue of *Agricultural Resources: Agricultural Land Values and Markets* (*7*) available for easy reference.

Farmland Values

USDA publishes two separate statistical series on farm real estate values: an index series and a dollar value series (tables 1 and 2). The indexes express the percentage change in the average market value from a base year, currently 1977.[2] The dollar value series consist of four parts including estimates of average value per acre of land and buildings, total value of land and buildings, value of farm buildings, and average value of land and buildings per farm. The dollar value series are based on periodic benchmarks obtained from the *Census of Agriculture* and are updated annually by the ERS farmland value indexes.

Index Construction

The USDA index is constructed from data obtained from the Agricultural Land Values Survey. Unweighted averages of the values of each type of farmland are calculated for each stratum, the smallest geographic unit for which the data are summarized. Analysts weight the stratum average for each type of farmland to calculate a State average for each type of farmland. Weights are taken directly from, or are derived from, data related to land in farms in each county in the latest *Census of Agriculture* (*29*). Strata weights are defined separately for each type of farmland. Analysts calculate a stratum weight by summing the county acreages (for the specified type of farmland) for each county in the stratum and by dividing the sum by the State acreage for that type of land. State average values for each type of farmland are weighted together to calculate the State-weighted average for "all" farmland. The weights used in this calculation are the State acreages for each of the four farmland types, each of which is divided by the State total acreage of "all" farmland.

USDA does not publish the weighted estimates of the State average values of farmland from the Agricultural Land Values Survey, but analysts use them (in conjunction with data for the base year) in constructing the ERS farmland value indexes. Each year, the estimates of State-average value are compared with estimates from the base year, and percentage changes are calculated. These percentage changes are reflected in the "Indexes of average value per acre of land and buildings" shown in table 1. An implicit assumption underlying the construction of these indexes is that the value of land and buildings changes by the same percentages.

Dollar Value Series

Once computed, the indexes are used to produce annual estimates of average dollar values per acre. The annual dollar-per-acre estimates published by ERS are produced by a benchmark and mover system. The *Census of Agriculture* provides benchmark estimates of State average values every fifth year. ERS uses the percentage changes indicated by its annual indexes to move the benchmarks, providing annual estimates of State average values of land and buildings. Because the dollar values are benchmarked on Census estimates, the annual *average value per acre* estimates published by ERS reflect the value of "land and buildings."

The questionnaires used by the *Census of Agriculture* to prepare its estimates of farmland value are mailed around January of the year following the reference year of the Census. Questionnaires are then returned over several months. For example, the 1978 Census was conducted from January to June in 1979. Thus, farmland value data from the *1978 Census of Agriculture* (*31*) correspond most closely to the farmland value data collected by USDA for February 1979. Consequently, the State-average dollar values published by USDA for the year following the Census reference year are the same as the Census estimates. For example, the final dollar-per-acre estimates USDA published for 1970, 1975, 1979, and 1983 are the estimates published by the Bureau of the Census in the *Censuses of Agriculture* for 1969, 1974, 1978, and 1982.

Until data from each new census become available, the percentage change in dollar values published by ERS equals that shown by the ERS indexes. However, ERS changes the base for its dollar estimates of farmland value every 5 years when new census data become available. At this time, ERS also revises the estimates for each year following the previous census to realign them with the new benchmark. To make these revisions, analysts use the relative year-to-year change provided by the ERS indexes to interpolate between the two census figures. The indexes themselves are not revised. After the revision, therefore, the percentage change in dollar value estimates does not necessarily equal that shown by the ERS indexes.

[2]The base period does not affect the information content of the index, which is a measure of change between dates. One can shift to any desired year without altering the year-to-year change expressed by the index.

Table 1—Farm real estate values, by State, April 1, 1982-85, and February 1, 1986

State	Indexes of average value per acre of land and buildings						Average value per acre of land and buildings				
	1982	1983	1984	1985	1986	Change	1982	1983	1984	1985	1986
	1977=100					Percent	Dollars				
Alabama	174	165	162	154	152	-1	885	826	809	769	761
Arizona	186	177	181	163	142	-13	302	289	295	265	231
Arkansas	196	174	167	152	126	-17	1,096	972	933	849	705
California	221	223	223	201	183	-9	1,900	1,918	1,918	1,726	1,571
Colorado	164	161	166	154	126	-18	451	454	468	435	357
Connecticut	149	152	162	185	215	16	2,610	2,655	2,814	3,208	3,721
Delaware	143	143	146	128	137	7	1,787	1,829	1,866	1,642	1,757
Florida	149	152	155	147	138	-6	1,518	1,576	1,608	1,527	1,435
Georgia	128	124	122	116	110	-5	926	929	910	865	822
Idaho	151	140	140	129	111	-14	839	814	814	749	644
Illinois	131	117	115	84	73	-13	2,023	1,837	1,800	1,314	1,143
Indiana	140	122	121	96	81	-16	1,804	1,610	1,594	1,259	1,058
Iowa	139	121	108	77	61	-21	1,889	1,684	1,499	1,064	841
Kansas	136	126	122	98	81	-17	628	601	583	466	387
Kentucky	154	149	143	129	124	-4	1,058	1,049	1,007	906	870
Louisiana	199	195	195	181	145	-20	1,414	1,351	1,351	1,256	1,005
Maine	149	152	162	185	215	16	680	708	750	856	993
Maryland	178	160	165	158	142	-10	2,376	2,121	2,185	2,097	1,887
Massachusetts	149	152	162	185	216	17	1,874	1,963	2,081	2,372	2,752
Michigan	152	141	141	121	108	-11	1,278	1,223	1,223	1,052	936
Minnesota	174	155	144	109	81	-26	1,272	1,165	1,083	823	609
Mississippi	189	174	183	163	147	-10	981	894	939	835	752
Missouri	153	133	133	102	94	-8	945	856	856	659	606
Montana	157	146	149	125	115	-8	271	259	264	222	204
Nebraska	143	129	114	82	67	-18	730	701	617	444	364
Nevada	198	188	192	173	151	-13	268	249	254	229	199
New Hampshire	149	152	162	185	215	16	1,136	1,174	1,244	1,419	1,646
New Jersey	128	125	129	141	157	11	3,181	3,140	3,234	3,525	3,913
New Mexico	185	176	180	162	133	-18	195	178	182	163	134
New York	132	129	133	128	131	2	821	817	842	808	824
North Carolina	149	150	158	142	129	-9	1,297	1,314	1,380	1,242	1,130
North Dakota	149	142	142	116	102	-12	455	439	439	360	317
Ohio	137	121	116	90	81	-10	1,629	1,504	1,444	1,126	1,013
Oklahoma	164	156	156	126	107	-15	725	699	699	566	481
Oregon	145	138	137	114	103	-10	705	705	698	579	521
Pennsylvania	133	128	138	127	122	-4	1,513	1,520	1,642	1,510	1,450
Rhode Island	149	152	162	185	215	16	2,729	2,760	2,926	3,335	3,869
South Carolina	136	128	125	121	117	-3	980	946	927	899	872
South Dakota	150	140	136	101	87	-14	349	348	338	250	215
Tennessee	138	131	135	127	128	1	1,040	1,014	1,044	982	992
Texas	185	191	208	229	190	-17	539	544	593	652	541
Utah	188	179	183	165	153	-7	589	560	571	514	478
Vermont	149	152	162	185	215	16	815	842	893	1,017	1,180
Virginia	143	144	143	140	147	5	1,096	1,125	1,114	1,091	1,146
Washington	152	152	157	151	133	-12	922	933	961	923	812
West Virginia	177	177	172	143	139	-3	723	688	667	554	537
Wisconsin	174	165	155	126	106	-16	1,144	1,113	1,046	847	711
Wyoming	140	133	136	122	106	-13	193	193	197	177	154
48-State average	157	148	146	128	112	-13	823	788	782	679	595

Table 2—Farm real estate values, by State, 1985-86

State	Total value of land and buildings		Total value of farm buildings		Average value of land and buildings per farm	
	Apr. 1, 1985	Feb. 1, 1986	Apr. 1, 1985	Feb. 1, 1986	Apr. 1, 1985	Feb. 1, 1986
	Million dollars				Dollars	
Alabama	8,844	8,755	1,682	1,649	163,700	162,100
Arizona	9,937	8,646	766	659	1,169,100	1,017,132
Arkansas	13,584	11,275	1,497	1,497	256,300	212,700
California	56,613	51,518	5,922	5,335	716,600	652,100
Colorado	14,964	12,270	1,622	1,317	560,400	459,500
Connecticut	1,444	1,675	434	498	379,800	440,600
Delaware	1,067	1,142	188	199	304,900	326,200
Florida	19,851	18,660	1,756	1,634	509,000	478,400
Georgia	11,678	11,094	1,788	1,682	233,500	221,800
Idaho	11,010	9,469	1,413	1,203	447,500	384,900
Illinois	37,712	32,809	2,941	2,533	419,000	364,500
Indiana	20,648	17,344	2,670	2,221	254,900	214,100
Iowa	35,750	28,243	3,706	2,898	322,000	254,400
Kansas	22,368	18,565	2,148	1,765	310,600	257,800
Kentucky	13,137	12,612	2,686	2,553	131,300	126,100
Louisiana	12,686	10,148	1,411	1,118	357,300	285,800
Maine	1,301	1,509	444	510	166,800	193,500
Maryland	5,557	5,001	1,089	970	308,700	277,800
Massachusetts	1,613	1,871	597	685	268,800	311,800
Michigan	11,993	10,674	2,578	2,271	190,300	169,400
Minnesota	25,019	18,514	3,640	2,667	260,600	192,800
Mississippi	11,857	10,671	1,658	1,477	247,000	222,300
Missouri	20,297	18,673	2,837	2,584	176,400	162,300
Montana	13,520	12,438	1,093	995	572,800	527,000
Nebraska	20,957	17,185	1,674	1,359	355,200	291,200
Nevada	2,015	1,753	236	203	806,000	701,200
New Hampshire	766	889	230	264	225,300	261,400
New Jersey	3,349	3,717	742	815	384,900	427,200
New Mexico	7,335	6,015	698	566	531,500	435,800
New York	7,434	7,582	2,290	2,313	165,100	168,400
North Carolina	13,414	12,206	2,717	2,448	176,400	160,600
North Dakota	14,724	12,957	1,442	1,256	433,000	381,000
Ohio	17,791	16,012	2,724	2,427	199,800	179,900
Oklahoma	18,678	15,876	2,096	1,764	263,000	223,600
Oregon	10,422	9,380	1,774	1,581	285,500	256,900
Pennsylvania	13,137	12,612	3,473	3,301	226,500	217,400
Rhode Island	243	282	55	63	324,600	376,500
South Carolina	4,945	4,796	851	817	179,800	174,400
South Dakota	11,125	9,568	1,174	1,000	300,600	258,500
Tennessee	13,159	13,290	2,878	2,878	134,200	135,600
Texas	88,868	73,760	7,606	6,250	482,900	400,800
Utah	5,962	5,545	799	736	428,900	398,900
Vermont	1,627	1,888	492	565	232,400	269,600
Virginia	10,474	10,997	2,171	2,257	190,400	199,900
Washington	15,045	13,240	2,389	2,082	395,900	348,400
West Virginia	1,939	1,881	457	439	95,500	92,600
Wisconsin	14,992	12,593	4,120	3,426	180,600	151,700
Wyoming	6,160	5,359	556	479	684,400	595,400
48 States	687,008	602,959	90,538	80,212	301,400	264,500

Index and Dollar Values for the United States

Analysts construct the U.S. farmland value index for the 48 contiguous States by weighting average values for each State from the Agricultural Land Values Survey by the latest estimates of land in farms from the Census Bureau. The average "dollar-per-acre" value for the 48 States is calculated in a slightly different manner, which makes it possible for the annual percentage change indicated by the U.S. dollar value series to differ from the percentage change indicated by the U.S. 48-State index. Analysts construct the average dollar value for the 48 States by weighting each State average dollar value by the most recent annual NASS estimate of land in farms. This different weighting procedure is used partly to make the sum of the total farm real estate values published for each of the 48 States sum to the value published as the total value of U.S. (48-State) farm real estate.

Total Farm Real Estate Value

Total value of all farm "land and buildings" is estimated for each of the 48 contiguous States and for a 48-State U.S. total. For each State, the average dollar-per-acre estimates are multiplied by total acres of land in farms to obtain the total value of land and buildings. The acres (weights) used in the multiplication are NASS annual estimates of land in farms. NASS estimates are used because Census Bureau estimates are not available annually.

Average Value Per Farm

Analysts derive the average-value-per-farm series by dividing the total value of farm real estate by estimates of the number of farms. Farm numbers are estimated annually by NASS and are published in the August issue of the monthly USDA publication, *Crop Production* (*24*).

Farm Building Values

ERS prepares annual estimates of the total value of farm buildings for each State and the 48 contiguous States. The total value of farm buildings is currently estimated as a proportion of the total value of farm real estate. For each State, the total value is multiplied by a ratio representing the proportion that farm buildings constitute of the total value of farm real estate (land and buildings). These building ratios are based on the *1979 Farm Finance Survey* (*32*) and related earlier surveys. The most recent estimate of this ratio is from the *1979 Farm Finance Survey*. In that survey, a sample of farm operators was asked to estimate the total value of their farm real estate and the total value of their farm buildings separately. Intercensal ratios are straight-line interpolations of the ratios of building values to total value of land and buildings shown by each successive follow-on survey.

Agricultural Rents

USDA publishes a series of statistics on cash rents for farmland (tables 3 and 4) and a series of statistics on grazing rates. The farmland cash rents are estimated from data from the Agricultural Land Values Survey, the grazing rates from the June Enumerative Survey.

Cash Rents

For selected eastern States, ERS publishes three series on cash rents: "whole farms rented entirely for cash," "cropland rented for cash," and "pasture land rented for cash." These series are currently published for 23-29 States in the eastern half of the country, depending on the specific series. Tables 3 and 4 are samples from a recent issue of *Agricultural Resources: Agricultural Land Values and Markets* and show the States for which each cash rent series is currently published. For Nebraska, Kansas, Oklahoma, and Texas, separate cash rent series are published for irrigated and nonirrigated cropland, as well as for pasture. For these four States, cash rents are not collected for "whole farms."

Arithmetic averages of cash rents reported on the Agricultural Land Values Survey are calculated for each stratum. To obtain State average rents for farms, cropland, and pasture in eastern States, analysts weight the stratum averages by Census Bureau estimates of land in farms, cropland acres, and pasture acres, respectively. Analysts obtain State average rents for irrigated and nonirrigated cropland and pasture land in Nebraska, Kansas, Oklahoma, and Texas by weighting stratum averages by corresponding Census Bureau estimates of cropland acres, irrigated and nonirrigated, and acres pastured. The State average cash rents calculated from the survey data are published directly, rather than in a benchmark and mover system like those for values. No estimate of average U.S. cash rents is prepared.

In conjunction with the cash rents, ERS also publishes a corresponding set of rent-to-value ratios. Analysts calculate the rent-to-value ratios by dividing the average cash rents for each type of cash-rented land by the estimated value of that cash-rented land. The value of *cash-rented* farmland is estimated from data obtained from questions on the survey asking specifically about the value of cash-rented land rather than from the general farmland value questions that are used to calculate the index.

Table 3--Gross rent per acre and ratio of rent to value, by State, 1985-86

State	Farms rented for cash				Pasture rented for cash			
	Rent per acre		Ratio of rent to value		Rent per acre		Ratio of rent to value	
	1985	1986	1985	1986	1985	1986	1985	1986
	-----Dollars-----		----Percent-----		-----Dollars-----		----Percent----	
Alabama	27.06	24.65	4.3	3.7	16.61	17.12	3.7	3.3
Arizona								
Arkansas		39.68		4.8		17.64		3.4
California								
Colorado								
Connecticut								
Delaware	63.26	64.02	3.6	3.6				
Florida								
Georgia	28.32	25.43	4.5	3.9	21.03	19.38	3.2	3.2
Idaho								
Illinois	103.78	100.07	7.1	7.8	34.26	31.91	5.8	6.2
Indiana	92.70	83.06	7.1	7.7	36.52	35.60	5.5	5.8
Iowa	98.40	82.98	8.5	9.0	35.95	29.19	7.6	7.7
Kansas					13.08	13.22	4.5	5.9
Kentucky	42.04	45.96	4.7	5.5	27.75	24.83	3.8	4.2
Louisiana								
Maine								
Maryland	57.51	52.46	2.4	3.2				
Massachusetts								
Michigan	46.05	43.87	5.1	5.5				
Minnesota	60.04	52.85	7.6	9.0	19.13	15.99	5.4	6.4
Mississippi	37.23	28.48	4.9	4.5	19.12	14.02	3.2	2.7
Missouri	46.62	42.08	8.0	8.2	18.89	22.05	4.9	6.2
Montana								
Nebraska					12.38	8.87	8.5	7.6
Nevada								
New Hampshire								
New Jersey	41.68	44.63	1.3	1.1				
New Mexico								
New York								
North Carolina	45.82	35.63	3.7	3.4	21.40	20.64	2.0	1.9
North Dakota	25.68	26.89	7.4	8.1	9.00	7.78	5.6	5.8
Ohio	72.18	65.88	6.1	6.5	25.87	24.87	4.2	4.9
Oklahoma					13.23	12.93	2.9	3.4
Oregon								
Pennsylvania	35.83	34.75	2.3	2.4	19.67	17.96	2.2	2.2
Rhode Island								
South Carolina	24.74	22.10	3.2	2.8	16.96	16.11	2.7	2.4
South Dakota	20.35	20.90	8.4	8.4	8.11	7.34	7.3	7.5
Tennessee	35.41	41.15	4.1	5.4	23.25	23.65	3.9	4.2
Texas					8.26	7.78	.9	1.0
Utah								
Vermont					16.96		3.3	3.3
Virginia	29.42	30.23	2.8	3.1	22.28	20.02	2.5	2.7
Washington								
West Virginia								
Wisconsin	53.24	43.69	6.5	6.7	23.20	21.98	5.9	6.7
Wyoming								

Blanks indicate insufficient data for specified year.

Table 4--Gross rent per acre and ratio of rent to value, by State, 1985-86

State	Nonirrigated cropland rent				Irrigated cropland rent			
	Rent per acre		Ratio of rent to value		Rent per acre		Ratio of rent to value	
	1985	1986	1985	1986	1985	1986	1985	1986
	-------Dollars------		------Percent------		------Dollars------		-----Percent-----	
Alabama	29.49	29.66	4.7	4.3				
Arizona								
Arkansas	50.97	48.21	6.4	6.5				
California								
Colorado					75.59	63.44	5.7	6.0
Connecticut								
Delaware	66.77	64.48	3.8	3.7				
Florida								
Georgia	30.32	27.84	4.3	3.2				
Idaho					99.00	85.37	6.3	7.7
Illinois	110.07	99.92	7.2	7.7				
Indiana	95.70	85.55	7.3	7.5				
Iowa	102.65	87.61	8.4	9.3				
Kansas	32.38	30.34	7.2	8.0	61.50	58.40	8.7	9.8
Kentucky	50.67	53.63	5.2	6.0				
Louisiana								
Maine								
Maryland	63.62	54.46	2.7	3.3				
Massachusetts								
Michigan	51.09	47.73	5.5	5.8				
Minnesota	62.19	53.85	7.8	8.7				
Mississippi	40.96	34.95	5.2	6.1				
Missouri	56.54	54.42	8.5	9.0				
Montana					56.10	55.86	5.0	6.6
Nebraska	47.10	46.72	8.6	10.4	92.53	86.29	9.6	10.6
Nevada								
New Hampshire								
New Jersey	43.18	45.96	1.1	.9				
New Mexico								
New York	34.78	30.81	5.0	5.1				
North Carolina	41.44	39.50	2.0	3.5				
North Dakota	31.74	29.69	7.6	8.1				
Ohio	72.64	70.32	5.4	6.5				
Oklahoma	28.52	26.52	4.2	4.7	39.60		5.0	
Oregon					117.11	95.98	6.7	7.6
Pennsylvania	42.98	37.18	2.5	2.7				
Rhode Island								
South Carolina	27.00	25.46	3.5	2.9				
South Dakota	29.35	26.44	8.3	9.2				
Tennessee	45.76	47.35	4.8	5.8				
Texas	21.32	20.22	1.9	2.2	43.61	39.64	4.6	5.1
Utah								
Vermont	28.25	26.01	4.1	3.0				
Virginia	37.63		3.0					
Washington					153.30	118.35	6.2	7.4
West Virginia								
Wisconsin	53.08	48.83	6.3	7.0				
Wyoming					57.27	49.49	7.4	7.2

Blanks indicate insufficient data for specified year.

Grazing Rates

The June Enumerative Survey provides annual data on grazing rates for 17 western States. NASS publishes rental rates per animal-unit-month (aum), per acre, and per cow/calf in the December issue of *Agricultural Prices* (*26*). Annual data for each grazing rate series are available from NASS for each year since 1980.

Transactions

ERS publishes several tables in *Agricultural Resources: Agricultural Land Values and Markets* (ALVM) containing selected summary data related to farm real estate sold primarily for agricultural use. The data related to transactions and buyer/seller characteristics are obtained from information on actual farmland sales provided by respondents to the annual Farm Land Market Survey. The transaction details include: total sale price, total acres, amount of debt incurred, type of credit (if any), credit instrument (contract, mortgage), holders of primary and secondary liens, and interest rates on seller-financed transactions. Characteristic data collected include: tenure status of the buyer and seller, tenure of person(s) farming the land before and after sale, and probable use of the property 5 years hence. Summary tables are published for farm production regions, with a total for the 48 contiguous States. The exact information published has varied over the years, but has consistently been related to the characteristics of the buyers, the sellers, and the transactions themselves. Some readers may find it useful to examine earlier issues of ALVM.

USDA Farmland Value Surveys

USDA farmland value statistics are derived primarily from three USDA surveys and the *Census of Agriculture*. This section describes the USDA surveys used to obtain data on values and cash rents. The Census Bureau's surveys and procedures are not described here, but users of the data who wish to be informed about the procedures for estimating average values per acre for counties, States, and the United States should consult any volume of the latest *Census of Agriculture*.

Agricultural Land Values Survey

The Agricultural Land Values Survey is an opinion survey of farm operators first conducted in 1984.[3] The universe for the Agricultural Land Values Survey is contained in lists of known farmers and ranchers maintained by NASS field offices in each State. Farmers and ranchers who live in urbanized counties that have been deemed nonagricultural counties by the Agricultural Stabilization and Conservation Service are excluded from the universe for this survey. There are 29 such counties throughout the country. A statistical sample of the universe for the Agricultural Land Values Survey is surveyed annually. In 1987, almost 34,000 samples were drawn. Each year 20 percent of the sample is replaced by new samples. Except for that 20 percent, the same farm operators receive questionnaires each successive year. The survey was designed to be summarized by use of data from operators who respond in successive years.

Special sampling strata were established to provide more efficient editing and summarizing of reports potentially influenced by nonagricultural factors. For each State, farm operators located in counties with farmland that is highly influenced by nonagricultural factors such as urbanization and recreational developments were represented in one of two strata: "urban" or "ag-urban." The stratification reduces the variance in the data created by high-valued farmland resulting from extensive urbanization. The remaining farm operators were stratified by geographic location (Crop Reporting District[4]) within each State.

The "urban" and "ag-urban" designations are based on the amount of farmland in the county as a percentage of total farmland in the State and the urban population in the county. Agricultural counties judged to contain large urban populations and considerable farmland are put in the "ag-urban" stratum, whereas urban counties with less farmland are put in the "urban" stratum. The "urban" counties are generally "core" Metropolitan Statistical Area (MSA) counties or fringe counties of large MSA's. "Ag-urban" counties are fringe counties of smaller MSA's, MSA-adjacent counties with significant urban influence, or non-MSA counties with large urban populations. Such strata, of course, did not exist for all States. Of the more than 3,000 U.S. counties, 435 are assigned to one of the two urban-influenced strata.

The Agricultural Land Values Survey data are collected by mail and telephone in January and February with a reference date of February 1. Followup phone calls are made to those who do not respond to the initial mailing. Samples for individual States in 1987 varied from 205 in Alaska to 6,253 in Texas. Over 17,000 individuals provided opinions on values or rents.

The instructions given to the survey recipients and the wording of the questions are important in understanding the farmland value and cash rent data collected on the survey. The survey questionnaire asks recipients to

[3] The survey reference date was April 1 in 1984 and 1985 and February 1 in 1986 and thereafter.

[4] Crop Reporting Districts (CRD's) typically consist of 8-10 counties; a typical State has 8-9 CRD's.

estimate agricultural land values in their "locality." Separate values are asked for irrigated and nonirrigated cropland, grazing land, and woodland. Recipients are specifically instructed to report current market values, including market values created by urban influence. They are also specifically instructed to exclude the value of buildings, mining facilities, and recreational developments. Recipients are informed that the survey is voluntary, that all information collected is confidential, and that individual responses will not be identified.

The survey also asks a set of cash rent questions, requesting recipients to "report *average cash rents* expected in [their] *locality* during the [current] season."

In conjunction with the cash rent questions, recipients are asked to estimate the value of the corresponding type of *cash-rented* farmland. For example, recipients in eastern States are asked to report the value of cropland *rented for cash*. The values estimated from the cash rent section of the questionnaire are used to construct rent-to-value ratios. The reason for the separate question on the *value of cash-rented* farmland is the presumption that the value of cash-rented land may differ from the value of all land.

Returned questionnaires are reviewed by each State Statistical Office (SSO) and are keyed to a computer for an automated data edit designed to minimize keying errors. NASS sends a magnetic tape of the unsummarized data to ERS for summarization and publication of results. ERS analysts edit the data by reviewing the distributions of reported values for each type of farmland within each stratum. Outliers are removed from the data set before summary.

Farm Land Market Survey

The Farm Land Market Survey is mailed to a list of real estate professionals. In 1987, the survey was sent to more than 8,200 farm real estate brokers and agents and major agricultural lenders, including officials of Federal Land Banks, Production Credit Associations, commercial banks, and the Farmers Home Administration (FmHA).

The questionnaire asks for information on actual transactions. It asks recipients to report various characteristics of the "5 most recent voluntary and estate sales of farm, ranch, orchard, and grove property of 10 acres or more that have been completed in [their] county since September 1, 19--."

The survey is a nonprobability survey, and ERS knows neither the percentage of farm real estate professionals participating nor the percentage of total farm real estate sales actually reported. From a mailing of 8,000-9,000 questionnaires, ERS typically receives 4,000 responses nationwide, containing data on 8,000 transactions. The majority of the respondents are FmHA (20 percent), realtors (16 percent), banks (15 percent), appraisers (12 percent), and Federal Land Banks (11 percent). Most of the transactions are reported by Federal Land Banks, FmHA, and realtors. Summaries of the survey data are published annually in ALVM.

Each SSO maintains lists of real estate professionals. The questionnaires are mailed the last week of January, with a second request 2 weeks later. NASS provides an edited data tape the first week of March. ERS summarizes the data using specially designed programs.

June Enumerative Survey

NASS conducts a probability survey each June to obtain information on crop acreages, livestock inventories, onfarm storage, and other topics. Enumerators collect these data for approximately 53,000 tracts of farmland in 48 States. Farm operators in the 17 western States report grazing fees actually paid on the specified tracts.

Land Use

This section examines the development of two longstanding data series within ERS. It updates information on major land uses previously published in 1970 (*6*).

The major uses of land are inventoried for years in which a *Census of Agriculture* is completed. The inventories have generally been comparable in format and coverage since 1945. Data from the Census Bureau, USDA agencies, public land management and conservation organizations, and other sources are assembled, analyzed, and synthesized to estimate State, regional, and national uses.

The second series encompasses annual estimates of "cropland used for crops," one component of the major land use series. This series of regional and national estimates dates back to 1909.

Descriptions of the ERS data series focus on current procedures. This section notes any substantive changes in the series over time and identifies the principal sources of data.

Definitions

ERS classifies the land base according to cropland, grassland pasture and range, forest land, special uses, and unclassified uses. Each category has specific uses. Land uses are also designated as agricultural and nonagricultural. Some uses are further classified by ownership.

ERS uses the following definitions:

- Total Land Area. All land including areas such as marshlands, swamps, and floodplains temporarily or partly covered by water; linear water areas less than one-eighth mile wide; and other water bodies with less than 40 acres of surface area.

- Cropland. The cropland base comprising cropland harvested, crop failure, cultivated summer fallow, cropland used only for pasture, and idle cropland. Cropland harvested, crop failure, and cultivated summer fallow represent the cropland used for crops.

- Cropland Harvested. Harvested acres of field and vegetable crops, orchards, small fruits, and wild hay. Acres double- or multiple-cropped are subtracted to eliminate double-counting.

- Crop Failure. Acreage on which crops failed principally because of unfavorable weather, insects, or diseases. Some cropland not harvested because of lack of labor, low prices, or other factors is included.

- Cultivated Summer Fallow. Cropland in subhumid regions of the western States cultivated for a season or longer to control weeds and to accumulate moisture before small grains are planted. Fallowed acreage does not include acres planted to soil-improvement crops, but not harvested, or cropland simply idled all year.

- Idle Cropland. Land in cover and soil improvement crops and land idled because of poor growing conditions, low prices, or other reasons. Idle cropland includes most acreage diverted from production under Federal programs.

- Cropland Used Only for Pasture. Cropland in a long-term rotation of field crops and periodic reseedings to pasture. Some acreage may be marginal for crop use and may remain in pasture indefinitely. This category also includes acres that were pastured before crops matured for harvest and were not harvested later, as well as some pastureland suitable for crop production without prior land improvement.

- Grassland Pasture and Range. All open, nonforested land used primarily for pasture and grazing. All tame and native grasses, legumes, and other forage used for grazing are included, as well as shrub and brushland pasture such as sagebrush and scattered mesquite.

- Forest Land. Land with at least 10 percent of the area stocked with trees of any size or that had such tree cover, but that has not yet been developed for some use other than forestry. Chaparral areas in western States and afforested areas are also included. Some forest land has multiple uses when located in parks, wildlife areas, and other special use areas.

- Forest Land Grazed. Mainly forest and brush-grown areas with grass or other forage suitable for grazing, including woodland pasture in farms and ranches.

- Special Uses. Areas in highway, road, and railroad rights-of-way and in airports; Federal and State lands used primarily for parks, wilderness, and wildlife habitat; and Federal land for defense and industrial uses.

- Unclassified Uses. Urban areas; non-Federal industrial and commercial sites in rural areas; cemeteries, golf courses, mining areas, and quarry sites; marshes, open swamps, bare rocks, desert, and tundra; and other unclassified land.

Sources of Data

Data are obtained from several Federal agencies, including USDA (particularly ASCS, ERS, NASS, Forest Service, and Soil Conservation Service) and the Departments of Commerce, Defense, Interior, Transportation, and others. State agencies are also important sources because several States own relatively large acreages of agricultural and forested land. Most States maintain park systems and wildlife refuges, and all administer land in institutional uses and for other purposes. Special studies such as the Public Land Law Review Commission's data on and analyses of Federal and State lands (*12, 14*) complement information from governmental sources.

Major Uses of Land

ERS develops the only accounting of all land uses within States, regions, and the Nation (table 5). Researchers estimate the acreage in each major use and analyze the extent, direction, and causes of change in land use over time. The procedures used and the detail of these estimates are largely determined by the characteristics of available data. ERS staff must evaluate and reconcile data of varying quality collected by numerous agencies for their specific purposes. Available data also represent differing levels of coverage for disparate time periods. ERS analysts attempt to maintain the comparability of the data series over time. More detailed estimates have been made for several categories beginning in 1950. Land uses in Alaska and Hawaii were added in 1959 (*41*).

The sum of land uses for each State and for the Nation rarely corresponds to total land areas, as reported by the Bureau of the Census (*33*). When ERS estimates do not initially sum to total land areas, acres in grassland pasture and range, special uses, and/or unclassified uses are adjusted most frequently. Estimates of cropland are seldom adjusted.

ERS reviews estimates for conformity with available information and with estimates for earlier years. Before publication, estimates are reviewed within and outside ERS by individuals familiar with the series or with specific data sources. The major land use series is published in *Agricultural Statistics* (*15*), *Statistical Abstract of the United States* (*34*), and ERS research reports (*3, 4*).

Table 5—Major uses of land, United States, selected years, 1910-82

Land use	1910	1920	1930	1940	1950	1959	1969	1978	1982
					Million acres				
Cropland 1/	347	402	413	399	409	392	384	395	404
Cropland harvested	317	351	360	331	336	317	286	330	347
Crop failure	9	12	11	16	12	10	6	7	5
Cultivated summer fallow	4	5	11	21	29	31	41	32	31
Idle cropland	17	34	31	32	32	34	51	26	21
Grassland pasture and range 2/	814	750	708	723	700	699	692	663	662
Cropland pasture	--	--	--	--	69	66	88	76	65
Permanent pasture and range	--	--	--	--	631	633	604	587	597
Forest land 3/	562	567	607	602	606	728	723	703	655
Grazed	--	--	--	--	320	245	198	172	158
Not grazed	--	--	--	--	286	483	525	531	497
Other land	181	185	176	180	189	452	465	503	544
Special uses 4/	--	--	--	--	87	123	141	158	270
Unclassified uses 5/	--	--	--	--	102	329	324	345	274
Total land area 6/	1,904	1,904	1,904	1,904	1,904	2,271	2,264	2,264	2,265

-- = Not estimated.

1/Total cropland exclusive of cropland used only for pasture.

2/Grassland and other nonforested pasture and range plus cropland used only for pasture. Idle grassland that probably existed in large acreages only before 1920 is also included.

3/Total forest land exclusive of forest areas in parks, wilderness, wildlife refuges, and other special uses.

4/Rural lands including highway, road, and railroad rights-of-way; airports; Federal and State lands used primarily for parks, wilderness, and wildlife habitat; and Federal land for defense and industrial uses.

5/Urban and other special uses not inventoried and miscellaneous areas such as marshes, open swamps, bare rock areas, deserts, and tundra.

6/Changes in total land area are due to the addition of Alaska and Hawaii as States in 1959 and to changes in methods and materials used in occasional remeasurements.

Sources: Economic Research Service and predecessor agencies. Estimates are based mainly on reports and records of the Bureau of the Census and Federal and State land management and conservation agencies.

Cropland

Estimates of cropland uses are based on the Census of Agriculture and NASS reports (*25, 27, 29*). Census data tend to be underenumerated, and the extent varies both within and between censuses (*30*). Census coverage is restricted to all land in farms and ranches, but the amount of cropland outside these units is minimal (*12, 14*). Changes in definitions of a farm and in census procedures over time have probably reduced the comparability of data among certain censuses.

Although NASS data primarily relate to the principal crops, they represent the most complete and consistent set of acreage data. (In 1982, the principal crops accounted for 97 percent of all harvested acres in the United States.) Analysts add harvested acres of vegetables, orchards, and minor crops reported in the *Census of Agriculture* to the principal crops acreage to estimate harvested acreage of all crops. (Vegetables of "minor" importance are not included in NASS reports, but are in the *Census of Agriculture*.) Because total harvested acres include some double-cropping, analysts subtract the acreage double-cropped to avoid double-counting. The difference represents harvested cropland, which is then compared and reconciled with an adjusted census count of harvested cropland.

ERS adjusts Census Bureau data for underenumeration by applying a factor developed by dividing total harvested acreage of principal crops reported by NASS by the combined harvested acreages of the same crops reported in the *Census of Agriculture*. Adjustments are made at State levels.

ERS estimates of crop failure are generally based on adjusted Census Bureau data of cropland on which all crops failed. Cultivated summer fallow is estimated for 17 western States where fallowing is most common. Estimates are developed from Census data and unpublished data from the NASS June Enumerative Survey (*27, 29*). Any acreage summer-fallowed in other States is included in their estimate of idle cropland. Estimates of idle cropland are based on adjusted Census data.

Acreage in cropland pasture is also developed from Census Bureau data. When this acreage is added to all other cropland uses, analysts account for total cropland. If cropland pasture is combined with grassland pasture and range, they develop estimates of all "open" grazing land.

Grassland Pasture and Range

Because no agency accounts for all grassland pasture and range, ERS estimates are synthesized from several sources (*20, 21, 23, 28, 29, 35*). The Census Bureau provides data on pasture and range, cropland pasture, and woodland pasture within farms and ranches. The Census count of 418 million acres of pasture and range in 1982 primarily represents nonfederal land, but includes a small part (about 10 percent) of nonforested Federal rangeland leased by farmers and ranchers.

Federal agencies administered about 270 million acres of grazing land in 1982. Most is in Federal grazing districts administered by the Bureau of Land Management and in range allotments administered by the Forest Service. But, several million acres are located in national wildlife refuges, on military bases, and in other Federal areas.

Analysts cannot simply add Federal grazing land to Census Bureau acreage to estimate total Federal and nonfederal grazing land. First, substantial acreages unsuitable for grazing are intermingled and managed with usable Federal range. Second, a significant portion of Federal grazing land is forested and is included in ERS estimates of forest land. Third, some double-counting would occur because some Federal land is included in the *Census of Agriculture*. So, the area of Federal grazing land that is both nonforested and suitable for grazing is estimated and then combined with the Census Bureau's count of pasture and range adjusted for underenumeration.

Forest Land

The U.S. Forest Service surveys of State forest resources provide the principal data on forest land (*2, 11*). Because the surveys are ongoing and staggered over time, some estimates are always outdated. The Forest Service also periodically analyzes the Nation's forest resources (*18, 19*).

ERS estimates of forest land grazed are developed from several sources including the *Census of Agriculture*, approximations of Federal forest land grazed, and land resource inventories conducted by the Soil Conservation Service (*28*).

To avoid double-counting the forest land in parks, wildlife refuges, military bases, and other special uses, ERS adjusts the estimate of total forest land by subtracting the area in multiple uses. Forest land in multiple uses has totaled 66 million acres in recent years (*18*).

Special Uses

Estimates of special uses such as Federal areas in parks, wilderness, wildlife refuges, defense, and industrial uses are primarily developed from reports by agencies administering such uses (table 6). ERS adopts the acreages as reported (*22, 35, 36, 37*), but adjusts, whenever

Table 6—Special uses of rural land, United States, selected years, 1959-82

Special use area	1959	1969	1978	1982
		Million acres		
Intensive uses:				
Highways and roads 1/	20.4	21.0	21.5	21.5
Railroads 2/	3.4	3.2	3.0	3.0
Airports 3/	1.4	1.8	2.2	2.3
Subtotal	25.2	26.0	26.7	26.8
Extensive uses:				
National parks 4/	24.2	28.3	29.0	77.9
State parks 4/	5.5	6.7	9.5	11.8
Wilderness areas 4/	14.5	14.3	18.1	26.1
Federal wildlife areas 5/	11.5	25.4	31.2	84.9
State wildlife areas 5/	5.7	6.6	10.2	10.3
National defense areas 6/	24.4	23.4	22.8	21.9
Federal industrial areas 7/	1.9	2.1	2.1	2.1
Subtotal	87.7	106.8	122.9	235.0
Agricultural uses:				
Farmsteads, farm roads, and lanes	10.1	8.4	8.4	8.0
Total	123.0	141.2	158.0	269.8

1/Area in rights-of-way of primary and secondary road systems administered by State and local governments.
2/Area in railroad rights-of-way.
3/Area within boundaries of rural airports, exclusive of airports used strictly for personal and military purposes.
4/Area administered primarily for recreational purposes.
5/Area administered primarily for fish and wildlife protection and propagation.
6/Area administered by the Department of Defense for military purposes.
7/Area administered by the Department of Energy.

possible, to exclude urban area, water bodies, and certain multiple-use areas. Acreages in State parks and wildlife areas are also based on reports from administering agencies (*1, 34, 38*) and are generally used as reported.

ERS estimates areas in rural transportation rights-of-way from mileages and widths of various transportation systems, as reported or supplied by the administering or regulatory agencies (*10, 40*). Analysts also estimate areas in rural airports by grouping airports according to length of longest runway and then multiplying the number of airports within each group times an average acreage for each group (*39*). Other descriptive information is used, as available.

Unclassified Uses

The category of "Unclassified Uses" tends to be a residual land use after all other major uses have been estimated. Urban uses developed at 10-year intervals in the Census Bureau's *Census of Population* (*33*) are included. In the past, these data were adjusted to minimize the inclusion of essentially rural land within urban areas. ERS reported urban areas as a separate land use until 1974. Because of the increasing difficulty in making adjustments, data for urban uses are now included in "Unclassified uses" (table 5).

Limitations and Needed Improvements

The land use estimates are most reliable at the national and regional levels. The primary problem in developing State estimates stems from the staggered timetables of inventorying and publishing State forest land data. Because the inventories can vary by several years among States, the usefulness of other land data from the inventories is also impaired.

The most pervasive problem is the completeness of coverage in the *Census of Agriculture*. Underenumeration is most common, but overenumeration seems to occur in a few States. Both are difficult to measure. When overenumeration happens, the area remaining after the Census Bureau's count of all land in farms has been deducted from the total land area may not be sufficient to account for all other land uses within that State. The time lag between data collection by the Census Bureau and publication of final data delays ERS analyses. The Census Bureau has, however, published preliminary estimates of

several land uses that ERS analyzes to develop preliminary estimates of major land uses. For the 1982 study, ERS published preliminary estimates in July 1984 (*5*) and released the final report in June 1985 (*4*).

Land use data are obtained through efforts that typically differ in purpose, methods, definitions, frequency, and reliability. Each data source accounts for only part of the total land area. Conflicts and overlaps resulting from combining the data must be reconciled or removed. Improvements to enhance timeliness, reduce overlaps, and expand completeness of coverage would further the quality and coverage of the data series. Additional data on land quality, more detailed information on land use, and estimates of shifts among land uses would provide additional dimensions to the data series. Data with many of these characteristics might be obtained by a series of sample surveys based on a combination of remote sensing and ground observations.

Cropland Used for Crops

Estimates for cropland used for crops have been made over the past 75 years (table 7). Regional and national estimates are developed annually, and State-level estimates are made for *Census of Agriculture* years. The series is also used to construct regional and national indexes of crop production per acre. The series and indexes are published in *Economic Indicators of the Farm Sector: Production and Efficiency Statistics* (*16*) for use by researchers and analysts preparing research reports, situation and outlook reports, staff analyses, and other publications.

Table 7—Cropland used for crops, United States, selected periods and years, 1910-87

Year	Cropland harvested 1/	Crop failure	Cultivated summer fallow	Total	Index 2/
	Million acres				1977=100
Average:					
1910-20	334	11	5	350	93
1921-30	351	13	8	372	98
1931-40	332	26	17	375	99
1941-50	345	10	20	375	99
1951-60	327	13	29	369	98
1961	296	11	33	340	90
1962	287	10	34	331	88
1963	291	10	36	337	89
1964	292	6	37	335	89
1965	292	6	38	336	89
1966	289	5	38	332	88
1967	301	7	32	340	90
1968	296	6	33	335	89
1969	286	6	41	333	88
1970	289	5	38	332	88
1971	300	6	34	340	90
1972	289	7	38	334	88
1973	316	5	31	352	93
1974	322	8	31	361	96
1975	330	6	31	367	97
1976	330	8	31	369	98
1977	338	9	31	378	100
1978	330	7	32	369	97
1979	340	6	32	378	100
1980	342	10	30	382	101
1981	351	6	30	387	102
1982	347	5	31	383	101
1983	294	5	34	333	88
1984	337	6	30	373	99
1985	333	8	31	372	98
1986	316	9	32	357	94
1987 3/	292	6	32	330	87

1/Land from which one or more crops were harvested.
2/Computed from unrounded data.
3/Preliminary.
Source: Economic Research Service; based on reports of the U.S. Departments of Agriculture and Commerce.

Procedures for developing estimates in census years were described earlier. In intercensus years, analysts develop estimates of total crops harvested by adding harvested acreages of the 19 major crops reported annually by NASS (*24*) to acreages of vegetables, fruits and nuts, and minor crops from the most recent *Census of Agriculture*. Census data must be used for minor crops because annual data from other sources are either incomplete or unavailable. Analysts estimate cropland harvested by adjusting for acres double-cropped. ERS estimates of acreage that is double-cropped are based on census-year indications and on unofficial, annual NASS estimates of the percentage of soybean acreage double-cropped.

Analysts estimate crop failure by adjusting the difference between planted and harvested acres of major crops reported by NASS to account for some replanting of failed crops and for planting small grains for cover crops and other uses not intended for harvest. Adjustments are based on relationships between Census Bureau and NASS data for planted and harvested acreages in years for which a *Census of Agriculture* is conducted.

Estimates of cultivated summer fallow are developed for the Plains, Mountain, and Pacific regions where fallowing is practiced most frequently (table 8). Acreages are based on *Census of Agriculture* data and unpublished data from the NASS annual June Enumerative Survey (*27, 29*).

Beginning in 1986, regional and national estimates of cropland used for crops in the current year are developed following publication of the NASS July *Crop Production* report (*24*). Before 1986, only national estimates were developed for the current year. Estimates are then reviewed as subsequent, monthly issues of *Crop Production* are released. NASS summary statistics for the preceding year are published in January (*25*). At that time, ERS estimates developed in earlier months are reviewed along with estimates for the previous year. Estimates for intercensus years are also revised following publication of each *Census of Agriculture*.

The principal limitation in developing the cropland series is the lack of annual data for all vegetables, fruits and nuts, and minor crops. However, these uses have represented only 4-5 percent of all crops harvested in recent years. Estimates of double-cropping and crop failure are the least reliable. About 3-4 percent of all crops harvested have been double-cropped over the past decade. Crop failure has averaged about 2 percent of all acreage planted for harvest. Finally, State-level estimates are developed only for years coinciding with a *Census of Agriculture*.

Table 8—Cropland used for crops, by region, 1986

Region	Cropland harvested	Crop failure	Summer fallow	Total	Index of total 1/
	Million acres				1977=100
Northeast	12.7	0.1	--	12.8	97
Lake States	36.2	.6	--	36.8	94
Corn Belt	80.7	.6	--	81.3	95
Northern Plains	73.6	1.6	15.9	91.1	99
Appalachia	17.1	.3	--	17.4	94
Southeast	10.8	.8	--	11.6	79
Delta States	15.8	.3	--	16.1	84
Southern Plains	26.5	3.5	2.1	32.1	83
Mountain	26.3	.8	10.6	37.7	103
Pacific	16.6	.2	3.1	19.9	95
48 States	316.3	8.8	31.7	356.8	94

-- = Not estimated.
1/Computed from unrounded estimates.
Source: Economic Research Service; based on reports of the U.S. Department of Agriculture.

References

(1) Council of State Governments. *The Book of the States, 1982-1983*. Vol. 24. Lexington, KY, 1982.

(2) Dennis, Donald D., and Thomas W. Birch. *Forest Statistics for Ohio: 1979*. Forest Service Resources Bulletin NE-68. Broomall, PA, 1979.

(3) Frey, H. Thomas. *Major Uses of Land in the United States: 1978*. AER-487. U.S. Dept. of Agr., Econ. Res. Serv., Aug. 1982 and earlier reports.

(4) _____, and Roger Hexem. *Major Uses of Land in the United States: 1982*. AER-535. U.S. Dept. of Agr., Econ. Res. Serv., June 1985.

(5) _____. *Major Uses of Land in the United States. Preliminary Estimates for 1982*. ERS Staff Report No AGES840712. U.S. Dept. of Agr., Econ. Res. Serv., July 1984.

(6) Frey, H. Thomas, and Orville E. Krause. "Land Use" in *Major Statistical Series of the U.S. Department of Agriculture: How They Are Constructed and Used*. Vol. 2: *Agricultural Production and Efficiency*. AH-365. U.S. Dept. of Agr., Econ. Res. Serv., Apr. 1970.

(7) Heneberry, William (coord.). *Agricultural Resources: Agricultural Land Values and Markets Situation and Outlook Report*. AR-6. U.S. Dept. of Agr., Econ. Res. Serv., July 1987.

(8) _____. *Agricultural Resources: Outlook and Situation Summary*. U.S. Dept. of Agr., Econ. Res. Serv., Apr. 1987.

(9) Hexem, Roger, and Richard Magleby (coords.). *Agricultural Resources: Cropland, Water, and Conservation Situation and Outlook Report*. U.S. Dept. of Agr., Econ. Res. Serv., AR-4. Oct. 1986.

(10) Interstate Commerce Commission. *Yearbook of Railroad Facts, 1979*. 1980.

(11) Powell, Douglas S., and Neal P. Kingsley. *The Forest Resources of Maryland*. Forest Service Resources Bulletin NE-61. Broomall, PA, 1980.

(12) Public Land Law Review Commission. *State Land Resources and Policies*. Washington, DC, 1970.

(13) Reinsel, Robert D. "Farm Real Estate Statistics," in *Major Statistical Series of the U.S. Department of Agriculture: How They Are Constructed and Used*. Vol. 6. *Land Values and Farm Finance*. AH-365. U.S. Dept. of Agr., Econ. Res. Serv. Apr. 1971.

(14) South Dakota State University, Department of Economics. "Federal Public Lands: Their Disposal and Permitted Use, 1934-67." Vol. II: Working Papers. Brookings, SD, 1969.

(15) U.S. Department of Agriculture. *Agricultural Statistics*. 1986.

(16) _____, Economic Research Service. *Economic Indicators of the Farm Sector: Production and Efficiency Statistics, 1985*. ECIFS 5-5. Apr. 1987.

(17) _____. *Farm Real Estate Market Developments*. CD-89. Aug. 1984.

(18) U.S. Department of Agriculture, Forest Service. *An Analysis of the Timber Situation in the United States 1952-2030*. Forest Resources Report No. 23. 1982.

(19) _____. *An Assessment of the Forest and Range Land Situation in the United States*. Forest Resources Report No. 22. 1981.

(20) _____. *An Assessment of the Forest and Range Situation in the United States*. FS 345. 1980.

(21) _____. *The Nation's Range Resources*. Forest Resources Report No. 19. 1972.

(22) _____. Unpublished forest land use data.

(23) U.S. Department of Agriculture, Forest Service and Soil Conservation Service. "Forest and range land area in the United States, by ownership and section, region, and State, 1982." Unpublished tables. July 1984.

(24) U.S. Department of Agriculture, National Agricultural Statistics Service. *Crop Production*. CrPr 2-2. July 1987.

(25) _____. *Crop Production: 1986 Summary*. CrPr 2-1(87). Jan. 1987.

(26) U.S. Department of Agriculture, National Agricultural Statistics Service. *Agricultural Prices*.

(27) _____. "1982 June Enumerative Survey." Unpublished tables. July 1982.

(28) U.S. Department of Agriculture, Soil Conservation Service. "1982 National Resources Inventory." Unpublished tables and data files. July 1984.

(29) U.S. Department of Commerce, Bureau of the Census. *1982 Census of Agriculture*. Vol. 1: *Geographic Area Series*. 1984.

(30) _____. *1982 Census of Agriculture*. Vol. 2: *Subject Series*. AC82-SS-2. Apr. 1985.

(31) _____. *1978 Census of Agriculture*. Vol. 1: *Geographic Area Series*. 1981.

(32) _____. *1978 Census of Agriculture*. Vol. 5: *1979 Farm Finance Survey*. 1981.

(33) _____. *1980 Census of Population: Number of Inhabitants. United States Summary*. PC80-1-A1. 1983.

(34) _____. *Statistical Abstract of the United States 1986*. Dec. 1985.

(35) U.S. Department of the Interior, Bureau of Land Management. *Public Land Statistics*. 1983.

(36) _____, Division of Realty, *Annual Report of Lands Under Control of the U.S. Fish and Wildlife Service as of September 30, 1982*. 1982.

(37) _____, National Park Service. *Index: National Park System and Related Areas as of June 1, 1982*. 1982.

(38) _____, U.S. Fish and Wildlife Service. *Federal Aid in Fish and Wildlife Restoration, 1981*. 1984.

(39) U.S. Department of Transportation, Federal Aviation Administration. *FAA Statistical Handbook of Aviation, Calendar Year 1981*. 1982.

(40) _____, Federal Highway Administration. *Highway Statistics 1982*. 1983.

(41) Wooten, Hugh H., Karl Gertel, and William C. Pendleton. *Major Uses of Land and Water in the United States: Summary for 1959*. AER-13. U.S. Dept. of Agr., Econ. Res. Serv., July 1962.

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