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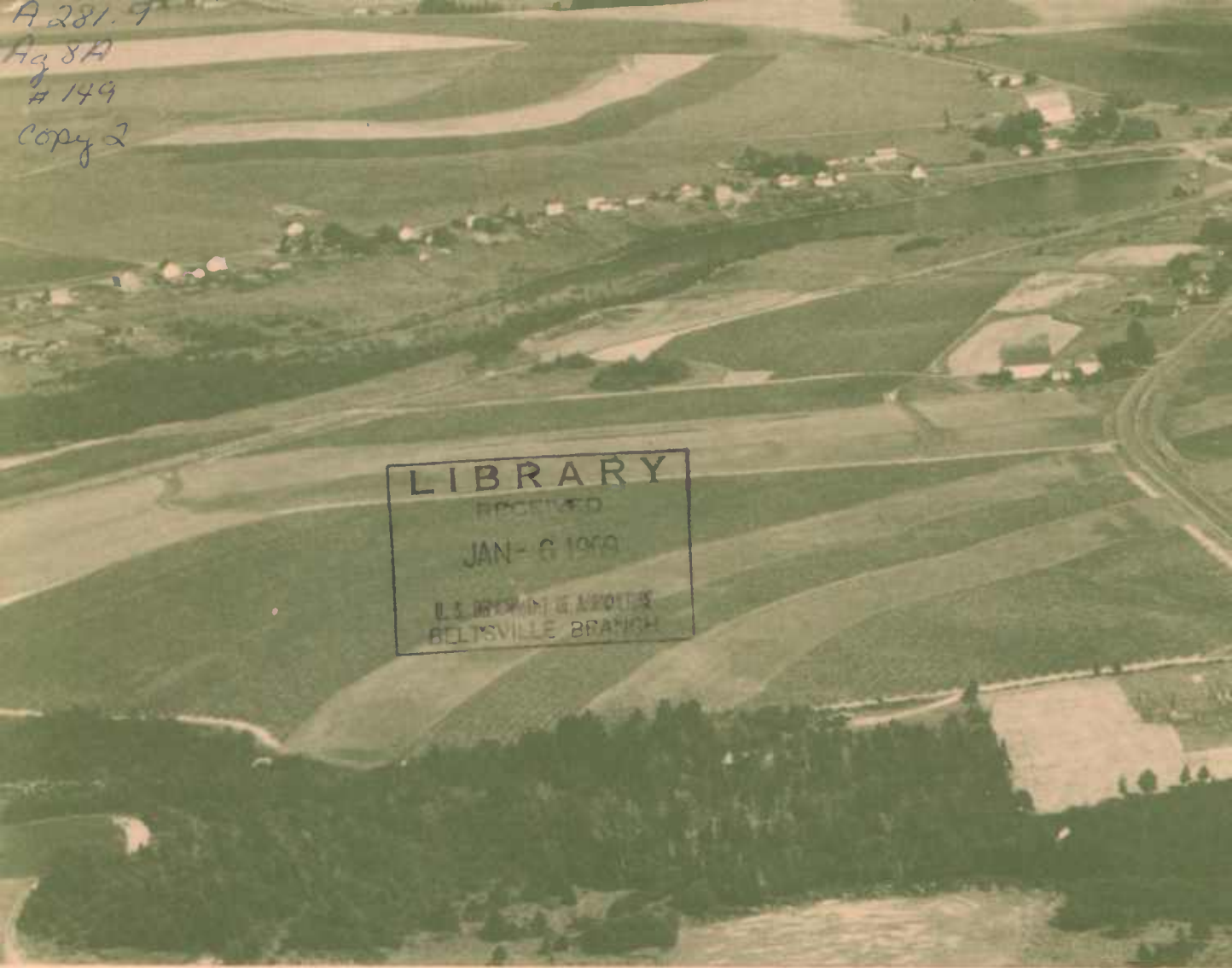
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Major Uses of Land and Water in the United States With Special Reference to Agriculture Summary for 1964

PREFACE

This report continues the series on the major uses of land and water in the United States published at 5-year intervals by the Economic Research Service and its predecessor agencies. As in earlier publications in the series, this one brings together data from many sources to form a summary account of the extent and distribution of land used for crops, pasture and range, forest, and other purposes. Acreages irrigated and dry-farmed, acreages drained, and other information on water-use practices are also included, since land and water uses are closely related in agriculture.

Among the chief sources of data used are reports and records of the following: The Bureau of the Census, U. S. Department of Commerce; The Economic Research Service, Forest Service, Statistical Reporting Service, and Agricultural Stabilization and Conservation Service, all of USDA; and the Bureau of Land Management and the Geological Survey, U. S. Department of the Interior. Numerous other Federal and State agencies also contributed data needed to complete the land- and water-use profile of the country. The summary is based chiefly on the 1964 Census of Agriculture, but more recent information on cropland was available and was incorporated in the section on cropland.

Although data from the various sources were classified with the objective of maintaining comparability with estimates presented in previous reports of the series, this objective was not always attained. Comparability of estimates is affected by the sources, purposes, and consequently, the characteristics of the available data, which vary significantly over time. For example, data on major land uses from the Conservation Needs Inventory were used in 1959, but data required to maintain strict comparability were not available from this source in 1964. It is believed, however, that estimates in this report and those of earlier reports are reasonably comparable at the national level and generally comparable at the regional level. In some instances, the State-by-State estimates are less reliable. The reader should also keep in mind that the available data on major land uses do not fully convey the highly dispersed pattern of uses, the innumerable relationships between uses, or the wide variation in land quality and intensity of use, particularly in relatively small areas.

Concerning water use, the Water Resources Council's National Assessment of Water and Related Land Resources also describes current and projected agricultural water uses. In addition, it presents a much more detailed account of water uses in areas outside of agriculture than does this publication, which has special reference to agriculture. Information provided in the National Assessment includes an inventory of both withdrawal and nonwithdrawal uses in the 17 major water resources of the contiguous States, as well as Alaska, Hawaii, and Puerto Rico. Problems concerning water supply, water quality control, drainage, irrigation and flood protection are covered at the national level. The base year for the National Assessment is 1965 and the projections apply to 1980, 2000, and 2020.

It is not possible here to give adequate recognition to all State and Federal workers who aided significantly in this study. The agencies and references cited indicate to a limited extent the sources consulted. The authors would be remiss, however, if they did not acknowledge the contribution of Hugh H. Wooten, formerly Leader of Land Use Investigations in the Economic Research Service and predecessor agencies and senior author of several reports in this series. He had already performed such difficult tasks as identifying sources of information, developing methods, and solving fundamental problems associated with reconciling conflicting data. Although retired, his guidance and counsel were frequently sought as the study progressed, and his response was always gracious and helpful.

Statistics were not always kept for all 50 States. In this report, "United States" means all 50 States; where applicable, "48 States" means the 48 contiguous States.

Cover photo, courtesy of Soil Conservation Service, USDA.

Washington, D. C. 20250

November 1968

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SUMMARY

Nearly three-fifths of the land area of the United States is used to produce crops and livestock. More than one-fifth is ungrazed forest land; less than 3 percent is in urban and related intensive uses. Areas designated primarily for parks, recreational or wildlife refuges, and various public installations and facilities account for about 5 percent. The rest--12 percent--is mainly desert, swamp, tundra, and other land of limited surface use.

One-fifth of the land area is classified as cropland, but not all is used for crops each year. In 1964, the acreage used for crop production totaled 335 million acres, or 75 percent of the cropland base. The total includes 292 million acres from which crops were harvested, 6 million acres on which crops failed, and 37 million acres of cultivated summer fallow. Of the acreage harvested, 31 million were irrigated. The acreage used for crops was 23 million fewer than in 1949 and 45 million fewer than a decade earlier.

Livestock grazed on 922 million acres in 1964, or 41 percent of the land; some of this land is also used for other purposes. About 640 million acres of grassland and other nonforested areas are used primarily for grazing. The remainder consisted of 57 million acres (in 1964) of cropland used only for pasture and 225 million acres of forest land grazed. The total acreage grazed was 22 million acres less in 1964 than in 1959, due mainly to a decrease in the acreage of forest land grazed. About one-third of the feed for livestock comes from pasture and grazing land.

Including acreage used for multiple purposes, one-third of the area of the United States is forested. The size of the area has not greatly changed in recent years, but important changes in the relative proportions of forest and other major uses have occurred at regional and local levels. Reversion of cropland and pasture to forest continues in many commercial forest areas of the East and South, offset only partially by the expansion of urban and other special uses on forest land in these regions. In contrast, land clearing for pasture improvement has made substantial inroads on the noncommercial forest acreage of the West.

Special uses of land, exclusive of those classified as agricultural, occupy 164 million acres and continue to increase in importance as the Nation's population grows. One-third of the special use acreage is in urban and transportation uses. The rest is in parks and wildlife refuges, national defense and military reservation areas, flood control, and other generally extensive public uses. An additional 9 million acres, classified as agricultural, are in farmsteads and farm roads and lanes.

Each year about 1 million additional acres are occupied by urban places, transportation areas, artificial reservoirs, and miscellaneous other intensive uses.

Much of the land shifting to intensive special uses is cropland, but the total includes grassland, forest land, and wasteland as well.

During 1959-64, the area in extensive public facilities, such as parks, wildlife refuges, national defense holdings, and Federal flood-control lands, increased almost 15 million acres--an average of 3 million acres annually. However, more than 10 million of the increase is attributable to the establishment of wildlife refuges on public domain land in Alaska. Apart from this unusual increase, land shifted to extensive special uses at an average annual rate approaching 1 million acres.

Three-fifths of the land area of the United States is in private ownership and two-fifths is owned by Federal, State, and local governments. More than 99 percent of the cropland, 70 percent of the grassland pasture, and 56 percent of the forest land are in private ownership. Large acreages of grassland and forest land and a large proportion of the area in special and miscellaneous uses are publicly owned.

Concerning water resources, the 48-State annual renewable supply of 30 inches of average precipitation is equivalent to about 4.50 billion acre-feet, or 402 billion gallons per day over an average year. About 70 percent (3.15 billion acre-feet) of the precipitation is consumed in place to support forest, range, and other vegetation, including nonirrigated farmland. The balance of 30 percent (1.35 billion acre-feet) is runoff or streamflow, supporting such nonwithdrawal uses as power generation, waste dilution, navigation, and recreation. It can be withdrawn along the way for various municipal, industrial, or agricultural purposes and then returned, to the extent it is not consumed in these processes.

Water consumption is then a measure of net depletion of streamflow and ground water. About 304 million acre-feet of streamflow and ground water were withdrawn for all purposes in 1965. Roughly 30 percent (87 million acre-feet) was consumed in the sense of not being available for withdrawal again. Agricultural irrigation accounted for 41.4 percent of all withdrawals but, because of a high rate of consumptive use (60 percent), represented 82.7 percent of the total consumption or net depletion. This consumption occurred on about 37.8 million acres of irrigated farmland in 1965, of which 34.9 million acres were concentrated in the western mainland regions or States. There were about 2.7 million acres of irrigated farmland in the eastern regions in 1965 and around 150,000 acres in Hawaii. Irrigated farmland has been increasing annually 8.51 percent in the East, 1.78 percent in the West, and 1.18 percent in Hawaii. The national rate of increase in irrigated farmland is 1.85 percent.

MAJOR USES OF LAND AND WATER IN THE UNITED STATES
With Special Reference to Agriculture

SUMMARY FOR 1964

By

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THE COUNTRY AS A WHOLE

In this publication, the available statistics on the major uses of land and water have been summarized for one point in time. By comparison with similar studies for previous periods, significant changes and trends in use also have been documented. The findings are presented briefly at the national level of aggregation and then treated in more detail at the regional level. State-by-State acreages for each major use are shown in the appendix tables.

The dynamic processes of land and water utilization continually change the landscape of America. When European explorers and colonists first arrived in what is now the United States, the natural cover of vegetation, undisturbed by use in the economic sense, consisted of approximately one-half forest, one-third grass, and the rest desert shrub and tundra. During the centuries that followed, settlers progressively occupied, in varying degree, all but the most inhospitable areas. In establishing homes and means of livelihood, they cleared forests for crops, pastures, building sites, and timber products; converted grassland to cultivated fields; created cities, roads, and railroads; and developed and altered the distribution of water resources. As the population increased, the intensity of land and water use also increased. Changes in demand for particular products were accompanied by changes in the use of land and water resources. Now, after three centuries of settlement and development, one-fifth of the land area is used for crops and one-twelfth is in various special uses such as cities, roads, and parks. These uses have grown primarily at the expense of forested and natural grassland areas, although irrigated crops and most special uses, such as parks and urban areas, have made inroads on the acreages of arid and other normally low-value land. Despite these decreases, acreages of grassland, forest, and miscellaneous other land remain large.

MAJOR USES OF LAND, UNITED STATES, 1964

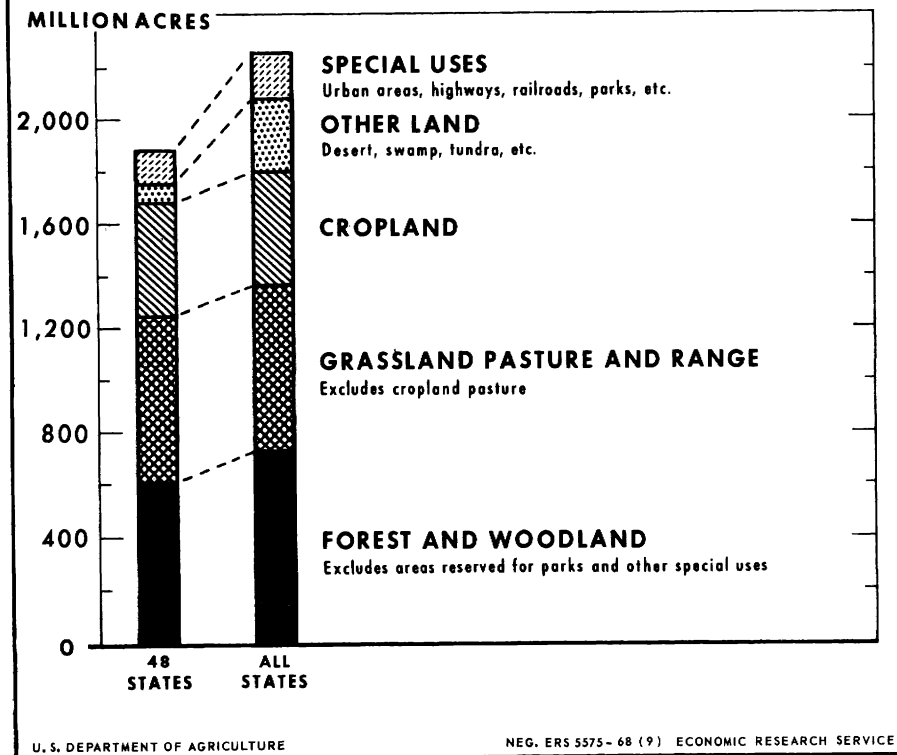


Figure 1

Table 1.--Major uses of land, United States, 1964

Land use	: Acreage : Percentage of total	
	Million acres	Percent
Cropland, including land in rotation.	444	19.6
Grassland pasture and range <u>1/</u>	640	28.3
Forest land <u>2/</u>	732	32.3
Special uses <u>3/</u>	173	7.6
Miscellaneous other land <u>4/</u>	277	12.2
Total land area <u>5/</u>	2,266	100.0

1/ Excludes cropland used only for pasture.

2/ Excludes 30 million acres in special uses.

3/ Urban and transportation areas, areas used for recreation and wildlife purposes, public installations and facilities, farmsteads, and farm roads.

4/ Marshes, open swamps, bare rock areas, desert, tundra, and other land generally having low value for agricultural purposes.

5/ Includes streams and canals less than 1/8 mile wide; and ponds, lakes, and reservoirs less than 40 acres in area.

The U.S. land area totals approximately 2,266 million acres. ^{1/} The distribution among uses of this acreage is shown in table 1 and figure 1.

Agricultural Land Uses

Land used for agricultural purposes totals 1,318 million acres, or 58 percent of the land area (table 2). This total includes cropland, grassland pasture and range, forested pasture and range, and areas occupied by farmsteads and farm roads and lanes. It does not include ungrazed forest land or areas with no reported use, even though these types of area often occur near or are otherwise associated with land used for crop and livestock production. If forest land not grazed is included, the total used for agricultural purposes is 81 percent.

Approximately 78 percent of the land in agricultural use is in farms, although only 49 percent of the total land area of the country is in farms (table 3). All of the cropland and the most productive pasture are in farms. Substantial acreages of forest land, both grazed and ungrazed, are counted as being in farms, but much of the forest land, including some large tracts owned or managed by farm operators but associated only loosely with agricultural operations, is not enumerated as land in farms. Similarly, a large proportion of land in the special and miscellaneous use category is outside farm boundaries.

Agricultural land not in farms totals 293 million acres and consists entirely of grazing land including grassland, brush-browse, and forested grazing land. A large proportion is federally owned, mainly in grazing districts and National Forest system range allotments. Privately owned grazing land not in farms is predominantly forest land, frequently in large tracts. Grazing land not in farms is usually located near farm areas and associated with them in terms of operation and management.

Nonagricultural Land Uses

Forest land exclusive of the acreage grazed or reserved for parks and other special uses totals 507 million acres. However, one-third of the total land area--762 million acres--is forest land. About two-thirds of this larger acreage is classified as commercial forest by the U. S. Forest Service. The remainder is classified as noncommercial because of low productivity or, in the case of some public lands, because of legal reservation for recreation and other nontimber uses. Both commercial and noncommercial forest land characteristically provide watershed and wildlife protection and as noted above, many areas provide recreational opportunities and forage for livestock as well.

^{1/} Includes all dry land temporarily or partially covered with water, such as marshland, swamps, and river flood plains; streams, sloughs, estuaries, and canals less than 1/8 mile wide; and lakes, reservoirs, and ponds less than 40 acres in area. Data supplied by the U. S. Bureau of the Census.

Table 2.--Agricultural and nonagricultural uses of land, United States, 1964

Major land use	Acreage	Percentage of total
	Million acres	Percent
Agricultural:		
Cropland:-----	444	19.6
Cropland used for crops <u>1/</u> -----	(335)	(14.8)
Soil improvement crops and idle cropland:-----	(52)	(2.3)
Cropland used only for pasture-----	(57)	(2.5)
Grassland pasture and range <u>2/</u> -----	640	28.3
Forest land grazed-----	225	9.9
Farmsteads, farm roads-----	9	.4
Total agricultural land-----	1,318	58.2
Nonagricultural:		
Forest land not grazed <u>3/</u> -----	507	22.4
Special uses:	164	7.2
Urban and other built-up areas <u>4/</u> -----	(55)	(2.4)
Primarily for recreation parks and wildlife <u>5/</u> -----	(76)	(3.4)
Public installations and facilities <u>6/</u> ---	(33)	(1.5)
Miscellaneous land <u>7/</u> -----	277	12.2
Total nonagricultural land-----	948	41.8
Total land area-----	2,266	100.0

1/ Cropland harvested, crop failure, and cultivated summer fallow.

2/ Excludes cropland used only for pasture.

3/ Excludes 28 million acres of reserved forest land and 2 million acres of unreserved forest land duplicated mainly in parks and other special use areas. It was not feasible to eliminate some overlap that exists because of multiple use.

4/ Urban and town areas; highway, road, and railroad rights-of-way; and airports.

5/ National and State parks and related recreational areas, National and State wildlife refuges, and National Forest wilderness and primitive areas.

6/ National defense (including military reservations and other land administered by Department of Defense), Federal flood control, Federal industrial (AEC land, etc.), and State institutional areas.

7/ Marshes, open swamps, bare rock areas, deserts, tundra, and other land generally having low value for agricultural purposes.

Table 3.--Major uses of land in farms and not in farms, United States, 1964

Major Use	Land in farms		Land not in farms		Total
	Acreage	Percent- age of total	Acreage	Percent- age of total	Acreage
	Million acres	Percent	Million acres	Percent	Million acres
Agricultural uses of land:					
Cropland-----	444	100	---	---	444
Grassland pasture and range:	490	77	150	23	640
Woodland grazed-----	82	36	143	64	225
Farmsteads, farm roads-----	9	100	---	---	9
Total agricultural land--:	1,025	78	293	22	1,318
Nonagricultural land:					
Forest land not grazed-----	64	13	443	87	507
Special uses-----	---	---	164	100	164
Other land-----	21	8	256	92	277
Total nonagricultural land:	85	9	863	91	948
Total land area	1,110	49	1,156	51	2,266

Special uses, exclusive of those classified as agricultural, now occupy 164 million acres of land and continue to increase in importance as the Nation's population increases. Some of the special uses are intensive while others are extensive. One-third of the acreage is in urban and transportation areas which generally compete more directly with cropland than do other special uses. The rest is in parks, wildlife areas, national defense areas, and other generally extensive uses.

Approximately 12 percent of the Nation's land area consists of marshes, bare rocks, deserts, and tundra. Although now virtually worthless for agricultural purposes, these areas may have value for minerals, wildlife, and other purposes. About 213 million acres in this miscellaneous category is Alaskan tundra.

Trends in Major Land Uses

Recent changes in the use of land, for the most part, have followed trends established in the 1950's or earlier (table 4). Between 1959 and 1964, the total cropland acreage decreased from 458 to 444 million acres, some 3 percent. Cropland used for crops, mainly as a result of acreage diversion programs, declined even more rapidly--from 358 to 335 million acres. The acreage of permanent grassland pasture and range increased 7 million acres. This increase is associated with a continuing movement of land from crop to pasture use and to land clearing and reclassification activities. Among the nonagricultural uses, the total acreage of forest land decreased 15 million acres, due largely

to reclassification in Alaska but land in special uses increased sharply. Trends in major land uses are summarized in figures 2 and 3.

Table 4.--Trends in major uses of land, United States, 1950-64

Land use	1950	1954	1959	1964
: - - - - - Million acres - - - - -				
Cropland <u>1</u> /-----	478	466	458	444
Grassland pasture and range <u>2</u> /-----	632	634	633	640
Forest land <u>3</u> /----- (grazed)-----	740 (319)	745 (301)	747 (245)	732 (225)
Special areas <u>4</u> /-----	138	143	157	173
Miscellaneous other land <u>5</u> /	285	285	276	277
Total <u>6</u>/-----	2,273	2,273	2,271	2,266

1/ Cropland harvested, crop failure, cropland idle or fallow, and cropland used only for pasture. Cropland and pasture acreages for 1950 relate to the previous year.

2/ Grassland and other nonforested pasture and range.

3/ Exclusive of forest land in parks, wildlife refuges, and other special use areas.

4/ Includes such uses as urban areas, highways and roads, parks, wildlife areas, military reservations, and farmsteads.

5/ Includes deserts, swamps, bare rock, tundra, and similar areas generally having low value for agricultural purposes.

6/ Decreases in the land area mainly represent increases in the water area of artificial reservoirs. Changes in methods of area measurement used by the Bureau of the Census together with revisions for Alaska also account for much of the decrease after 1959.

WATER SUPPLY AND USE

Precipitation in the 48 States averages 30 inches annually--the equivalent of 4,700 million acre-feet per year. In the 48 States, approximately 70 percent of precipitation reaching the ground is returned to the atmosphere through evaporation and transpiration. Part of the moisture returned by transpiration is first used productively by commercial crops. The remaining 30 percent of precipitation constitutes the natural runoff, amounting to an average of about 1,350 million acre-feet per year. A substantial fraction of this runoff is available for irrigation and other uses. In addition, large reservoirs of ground water can be tapped and used. In 1965, 347 million acre-feet of water were withdrawn from surface and ground sources for all uses, including 130 million acre-feet for crop irrigation.

LAND UTILIZATION, UNITED STATES, 1950-64

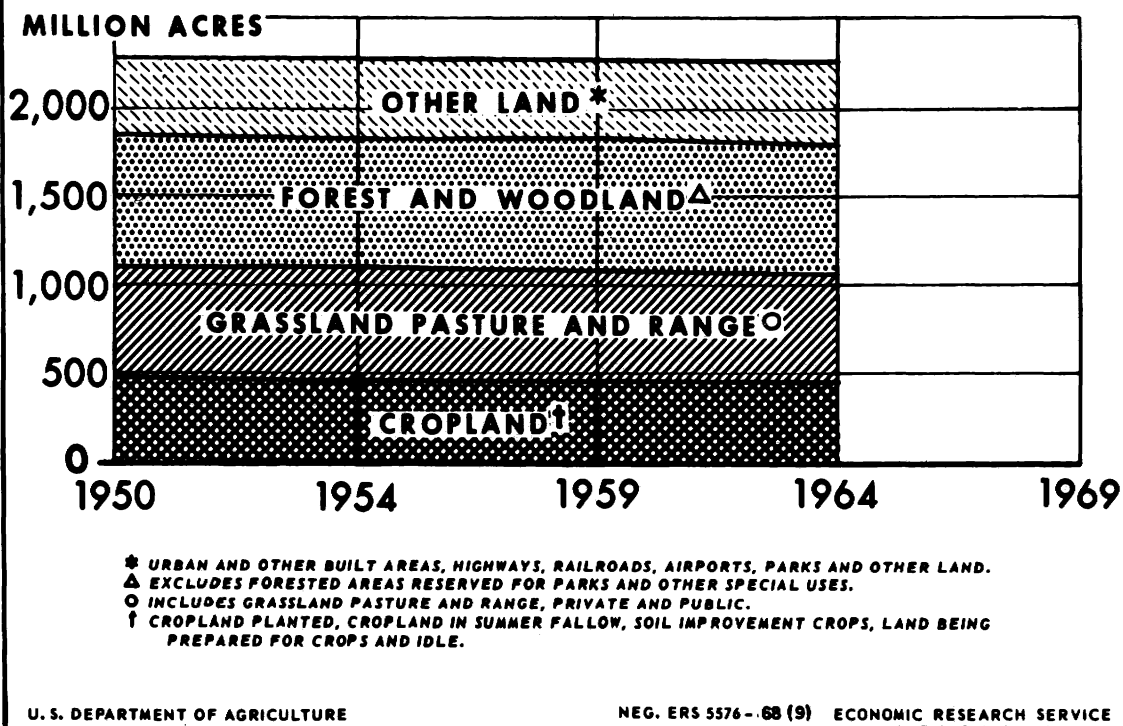


Figure 2

The geographic distribution of runoff in the 48 States is uneven--some areas have much precipitation and runoff, while others have little. Yearly precipitation and runoff also vary widely in some regions. The greatest variability is found in the North Central and the Southwestern portions of the Nation. The adverse effects of droughts are particularly felt in areas using a high proportion of the available water supply each year.

CHARACTERISTICS AND DISTRIBUTION OF MAJOR LAND USES

Land used primarily for agricultural production (cropland and nonforested grazing land) accounts for nearly half of the Nation's land area. Forest land accounts for about one-third and other land one-fifth, but the proportions vary greatly across the country. Variations in physical conditions account for many of the differences, particularly among agricultural and forestry uses. Large portions of some regions are suitable only for grazing and other extensive uses. Physical conditions on a high proportion of the area in other regions permit a choice between crops, pasture, and forestry, with the most profitable usually predominating (table 5, fig. 4). Throughout all regions, of course, physical conditions affect such characteristics as specific vegetative composition and yields, as well as the relative proportions of area in most uses. The influence of such variables as ownership characteristics, management practices, and location relative to other economic activities is also discernible in the use pattern.

Table 5.--Major uses of land by regions, United States, 1964.

Regions	Cropland <u>1/</u>		Pasture and range <u>2/</u>		Forest land <u>3/</u>		Other land <u>4/</u>		Approximate land area <u>5/</u>	
	Acreage	Percent of total	Acreage	Percent of total	Acreage	Percent of total	Acreage	Percent of total	Acreage	Percent of total
	1,000 acres	Percent	1,000 acres	Percent	1,000 acres	Percent	1,000 acres	Percent	1,000 acres	Percent
Northeast-----	19,173	17	7,110	6	66,637	60	19,303	17	112,223	100
Lake States-----	44,970	37	8,485	7	53,417	44	15,094	12	121,966	100
Corn Belt-----	94,750	57	20,335	12	30,407	19	19,737	12	165,229	100
Northern Plains--	98,843	51	80,675	41	4,244	2	10,679	6	194,441	100
Appalachian-----	28,883	23	10,778	9	73,021	59	11,493	9	124,175	100
Southeast-----	18,880	15	12,564	10	78,992	64	13,381	11	123,817	100
Delta States-----	20,238	22	9,433	10	54,624	59	8,305	9	92,600	100
Southern Plains--	49,446	23	118,378	56	33,071	16	11,556	5	212,451	100
Mountain-----	43,167	8	314,399	57	127,591	23	63,088	12	548,245	100
Pacific-----	25,451	12	54,307	27	89,819	44	34,845	17	204,422	100
48 States-----	443,801	23	636,464	34	611,823	32	207,481	11	1,899,569	100
Alaska-----	24	6/	2,772	1	118,156	32	241,565	67	362,517	100
Hawaii-----	371	9	1,203	29	1,796	43	817	19	4,187	100
U. S. Total--	444,196	20	640,439	28	731,775	32	449,863	20	2,266,273	100

1/ Includes cropland harvested, idle, and used only for pasture; crop failure, cultivated summer fallow, and soil-improvement crops.

2/ Includes open permanent pasture in farms and grassland range not in farms.

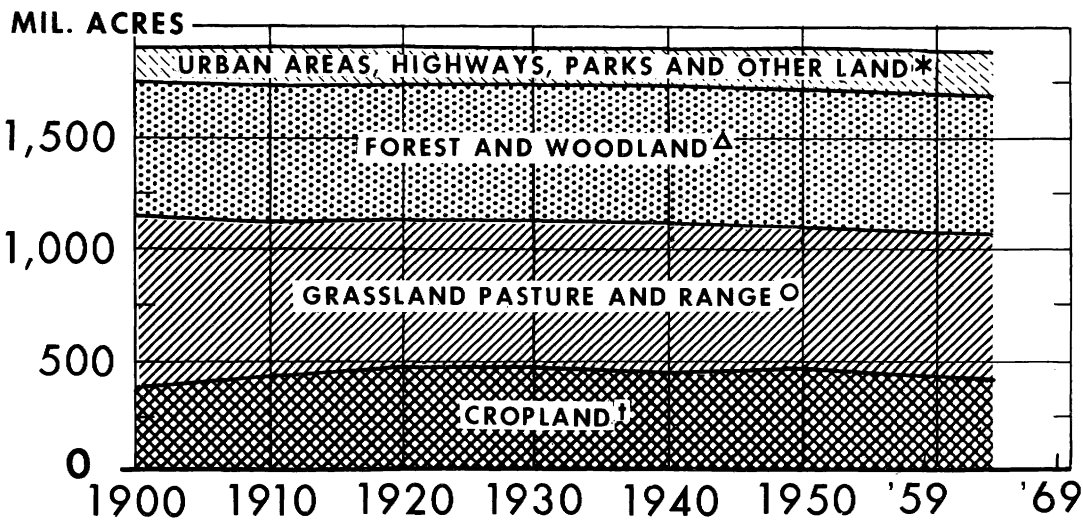
3/ Total forest land area as reported by the U. S. Forest Service, preliminary table, September 1967, excluding reserved woodland and forest areas in National and State parks and other special use areas. Because of multiple use, some overlaps occur in acreages between forest land, special use, and other areas that were not feasible to eliminate.

4/ Includes cities and towns of 1,000 or more population, highway and railroad rights-of-way, airports, National and State parks, wildlife refuges, wilderness areas, national defense lands, Federal flood-control areas, farmsteads, feedlots, ditches, farm roads and lanes, swamps, bare rock, deserts, and tundra.

5/ Remeasurement after the 1960 census showed land area of 1,900 million acres for the 48 contiguous States, and 2,266 million acres for the Nation.

6/ Less than 0.5 percent.

LAND UTILIZATION, 48 STATES, 1900-64



- * URBAN AND OTHER BUILT AREAS, HIGHWAYS, RAILROADS, AIRPORTS, PARKS AND OTHER LAND.
 - △ EXCLUDES FORESTED AREAS RESERVED FOR PARKS AND OTHER SPECIAL USES.
 - INCLUDES GRASSLAND PASTURE AND RANGE, PRIVATE AND PUBLIC.
 - † CROPLAND PLANTED, CROPLAND IN SUMMER FALLOW, SOIL IMPROVEMENT CROPS, AND LAND BEING PREPARED FOR CROPS AND IDLE.
- CROPLAND ACREAGES PRIOR TO 1954 ARE FOR THE YEAR PRECEDING THE DATE OF THE INVENTORY.

U. S. DEPARTMENT OF AGRICULTURE

NEG. ERS 946-68 (9) ECONOMIC RESEARCH SERVICE

Figure 3

CROPLAND

Major Uses of Cropland

In 1964, the 48 States had 444 million acres in cropland, of which only 292 million acres (66 percent) were harvested for crop production (table 6, fig. 5). The 152 million acres of nonharvested cropland reflect climatic conditions, management practices, crop characteristics, or Federal farm programs.

Cropland on which crops failed is largely associated with hazards of weather, although insects and diseases may also cause failure. Generally, crop failure is only about 2 or 3 percent of the acreage of crops harvested, although this varies across the country, and has been considerably higher in years of widespread drought. In the Great Plains, droughts are the chief cause of crop failure, although hail and grasshoppers are also significant. East of the Mississippi River, crop failure is largely associated with excessive moisture--floods or local waterlogged low spots, although local droughts are not uncommon.

Cultivated summer fallow is widespread in the semiarid regions of the country where small grains are produced, largely without irrigation. In these areas, rainfall is usually insufficient for a crop each year. Increases in yields

MAJOR USES OF ALL LAND, BY REGIONS, 48 STATES, 1964

(Millions of Acres)

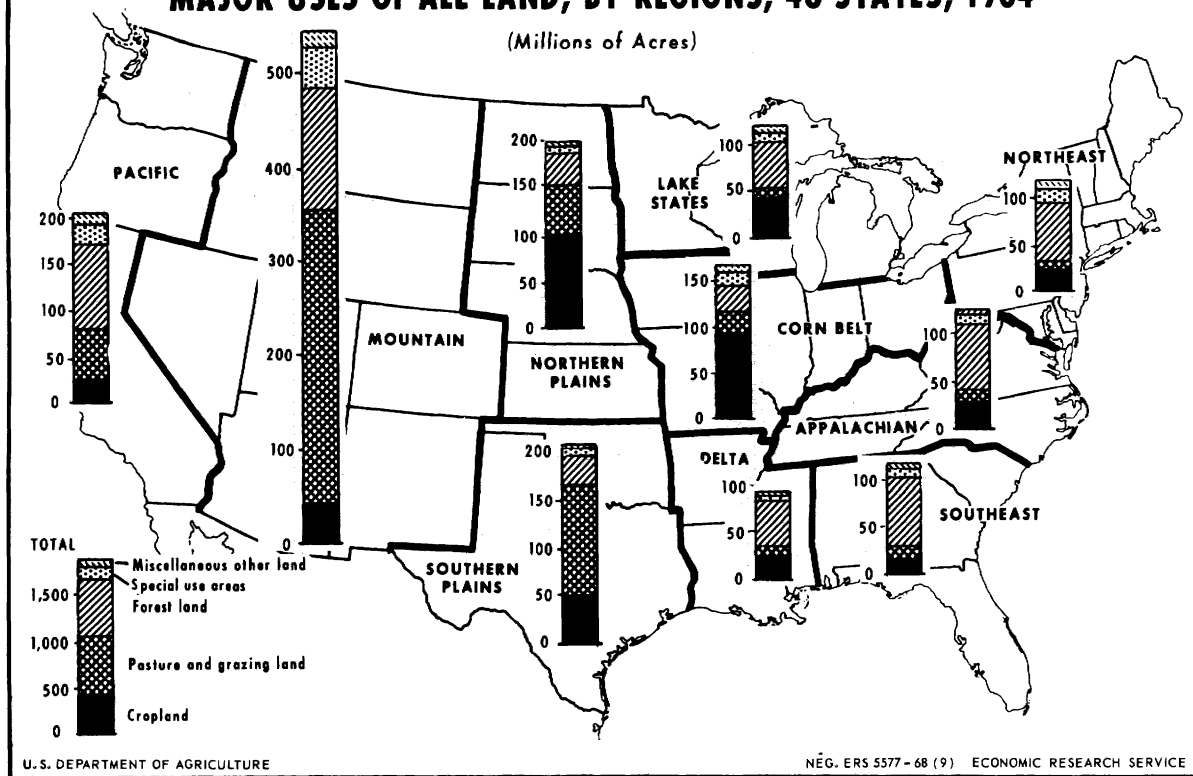


Figure 4

Table 6.--Major uses of cropland, 48 States, selected years

Cropland use	1954	1959	1964	1965	1966	1967
	----- Million acres -----					
Harvested-----	339	317	292	291	288	302
Crop failure-----	13	10	6	8	6	8
Cultivated summer fallow-----	28	31	37	37	37	32
Total used for crops-----	380	358	335	336	331	342
Soil improvement and idle cropland---	19	33	52	48	51	35
Cropland used for pasture-----	66	66	57	58	57	59
Total cropland-----	465	457	444	442	439	436

MAJOR USES OF CROPLAND, SELECTED YEARS 48 STATES

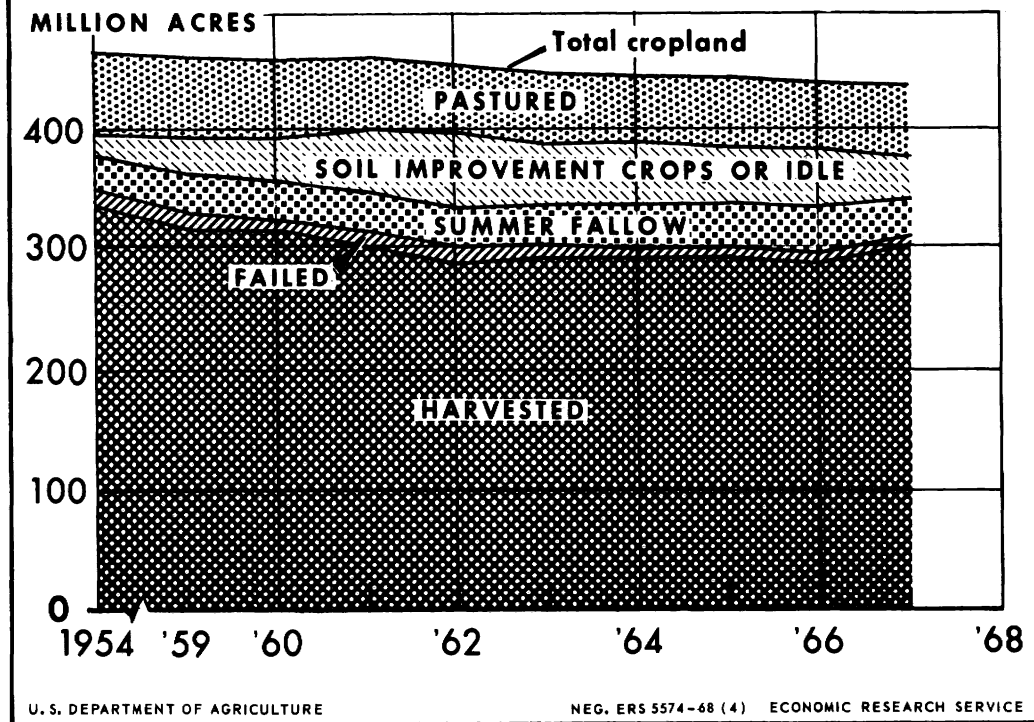


Figure 5

result from fallowing land for a year before small grains are planted. The fallow land is cultivated to control weeds and help conserve soil moisture. For purposes of the cropland series in table 6, "cultivated summer fallow" refers to cropland in 17 western States that was plowed and left unseeded for harvest in the current year, although it may be seeded in the fall for harvest the following year. In this area, this is done to accumulate enough soil moisture to produce a crop. Some acreage diverted from crop production under Federal farm programs is in cultivated summer fallow. Other types of summer fallow ordinarily found east of the Mississippi, such as crops planted only for soil improvement or cropland left idle all year, are not included in cultivated summer fallow.

These three uses (cropland harvested, failed, and summer fallow) are aggregated to form the "cropland used for crops" data series which was developed as an estimate of the number of acres of cropland directly allocated to crop production each year (table 6). It is an annual indication of cropland acreage as an input in the agricultural production process. To compute cropland used for crops, the acreage on which crops failed and in cultivated summer fallow is added to the acreage harvested, on the assumption that this is the actual total number of acres required to achieve the smaller harvested acreage.

In 1964, cropland "used only for soil improvement crops" not harvested or pastured, plus "idle cropland" amounted to 52 million acres, or about 12 percent

of the total. Much of the Federal farm program diverted acreage is found in these categories. Some cropland is put in soil improvement crops for a year or two before it is replanted to crops for harvest. This use of cropland in humid areas is similar to cultivated summer fallow in subhumid areas, but it is to improve productivity by controlling weeds, conserving moisture, and increasing organic matter in the soil. A small amount (around 5 percent) of total cropland in the country is idle each year for various reasons. Some land is unharvested in a given year because it is planted to a crop such as sugarcane, which takes longer than a year to develop to harvest stage. In other cases, a crop is planted during the year for harvest the following year, but no crop is harvested from the land during the year of planting. Some land is sporadically idled in local areas due to excessive moisture, drought, or inclement weather at planting time. Other cropland is left idle when operators choose to work off the farm. Near growing cities much land is idle, subject to actual or potential demand for urban development.

Much of the nonharvested cropland (summer fallow, soil improvement, and idle) was shifted out of production in compliance with Federal farm programs. Starting in 1956, there have been various programs to divert crop acreages from production to idle but soil-conserving uses. These include the annual programs (acreage reserve, wheat, cotton, and feed grains) and the longer range programs (Conservation Reserve, Cropland Adjustment, and Cropland Conversion) which contracted to divert crop acreages to conserving uses for periods up to 10 years. The "use" distribution of diverted cropland is not known, as the acreage is not identical to the total acreage of unharvested cropland. In 1964, for example, cropland acreage diverted under annual and long-term programs was about 55 million acres, while the combined acreage of summer fallow, soil improvement, and idle was 89 million acres. Moreover, over time, some unknown acreage of land diverted from production under long-term programs is no longer classed as cropland.

And finally, "cropland used only for pasture" amounted to 57 million acres (13 percent of total cropland) in 1964. Most of this land is in the regular rotation and regularly returns to the harvested category. Some of this acreage, however, has become uneconomic for production and may remain in pasture indefinitely.

Cropland Uses by Regions

Of the Nation's total cropland of 444 million acres in 1964, three-fourths was used for crops, about an eighth for soil improvement only or left idle, and an eighth was used as pasture (table 7). These proportions, however, varied in some of the regions and even more so among the States. Half of the regions (the Northeast, Lake States, and Corn Belt in the East, and the Mountain and Pacific in the West) had about the same proportions of cropland in each use as for the Nation as a whole, except the Pacific Region where cropland pasture acreage was double that for the soil improvement and idle categories.

In the Appalachian Region, however, only 52 percent of the cropland was used for crops, while 33 percent was used for pasture and 15 percent was in the soil improvement only or idle category. In the Southeast Region, less than two-thirds was used for crops while the remaining cropland was about equally divided

Table 7.--Cropland uses by regions, United States, 1964 ^{1/}

Region	Cropland used for crops ^{2/}	Cropland in soil improvement crops or idle	Cropland pasture	Total cropland
-----1,000 acres-----				
Northeast-----	14,016	2,598	2,559	19,173
Lake States-----	34,301	6,450	4,219	44,970
Corn Belt-----	72,003	11,519	11,228	94,750
Northern Plains---	86,236	8,448	4,159	98,843
Appalachian-----	14,994	4,432	9,457	28,883
Southeast-----	11,845	3,442	3,593	18,880
Delta States-----	13,491	1,874	4,873	20,238
Southern States---	34,126	6,383	8,937	49,446
Mountain-----	33,886	4,707	4,574	43,167
Pacific-----	19,925	1,762	3,764	25,451
48 States-----	334,823	51,615	57,363	443,801
Alaska-----	17	3	4	24
Hawaii-----	305	14	52	371
U. S. total---	335,145	51,632	57,419	444,196

^{1/} See appendix table 21 for data by States.

^{2/} Includes cultivated summer fallow.

between the noncropped categories of cropland. Cropland used for crops in the South Central part of the country (Delta States and Southern Plains) amounted to two-thirds or more of the total cropland. In the Delta States, however, 24 percent of the cropland was used for pasture, compared with 18 percent in the Southern Plains and only 13 percent for the Nation.

Trends in Major Uses of Cropland

Total cropland acreage has been trending downward since 1950. It rose to 480 million acres by 1920 and then held near that level until 1950, except for a brief drop in the late 30's and early 40's associated with drought and wartime manpower shortages. In recent years, total acreage decreased from 478 million acres in 1950 to 436 million acres in 1967, or a total decrease of 9 percent in 17 years. The average annual decrease was almost 2.5 million acres a year, or only 0.5 percent.

Significant changes in land use, however, have been obscured by the slight total downtrend. Foremost has been the improvement of land for crops and grassland pastures with drainage, flood control, irrigation, and brush clearing. Substantial shifts have been made among uses in some regions, in line with the trend toward concentrating cropland on fertile and nearly level areas, and shifting hilly and eroded land to grass and trees.

Also, while total cropland acreage has declined only moderately, significant shifts have occurred among its various categories, namely, (1) cropland harvested, (2) crop failure, (3) summer fallow, (4) soil improvement crops only, and idle cropland, and (5) cropland used only for pasture. These shifts have been associated largely with the impact of Federal programs designed to divert crop acreage to idle but soil-conserving uses. Total diversion ranged from 14 million acres in 1956, the first year, up to 65 million acres in 1962, the highest point. Some 41 million acres were diverted in 1967.

Although acreage harvested in 1967 rose appreciably above the previous year, the trend in recent years has generally been downward. From 1954 to 1966, the acreage harvested decreased from 339 million acres to 288 million acres or a decline of 15 percent (table 6). This decrease of 51 million acres was partly offset by increases in the nonharvested categories so that total cropland decreased only 26 million acres. The land uses to which diverted acreage can be put (summer fallow, soil improvement, and idle) increased from 47 million acres in 1954 to 88 million acres in 1966, or an increase of 41 million acres in these nonharvested categories. Most of the increase occurred in soil improvement and idle acreage, but some was accounted for by a 9-million-acre increase in summer fallow. Some diverted acreage, such as that planted to trees, is no longer classed as cropland. As a result of these land-use shifts, only two-thirds of the total cropland was harvested in 1966, compared with three-fourths in 1954.

These trends, however, were reversed, at least temporarily, in 1967 when cropland harvested rose to 302 million acres, or 5 percent above 1966. To build up depleted feed grain and wheat stocks, the diverted acreage goals of the farm programs were lowered to draw on the reservoir of cropland in nonharvested uses. Harvested acreage in 1967 was up 14 million acres from 1966, while the acreage of summer fallow, soil improvement, and idle cropland showed significant decreases. The harvest in 1967 rose to 69 percent of the total cropland acreage, but was still well below the 1954 ratio of 73 percent.

Trends in Cropland Used for Crops by Region

Cropland used for crops consists of the sum of cropland harvested, cropland failed, and cultivated summer fallow acreages in the 48 States (table 6 and fig. 6). This total acreage is considered to be the cropland required to be allocated each year to achieve the acreage of cropland harvested.

Cropland used for crops comprised 330 million acres in 1910 and trended steadily upward to 384 million acres in the predrought year of 1931. Acreage then continued below that level until the end of World War II, with an increase in 1949 to an all-time record high of 387 million acres. Wheat acreage in that year, in response to favorable prices, reached an all-time high of 84 million seeded acres, or an increase of 12 million acres in 3 years' time. With the establishment of wheat acreage allotments in 1950, acreage decreased somewhat, but stayed around the 380 million-acre level until the cropland diversion program was initiated in 1956. From this point, the acreage trended downward to 331 million acres in 1966, a decrease from 1954 of 49 million acres, or 13 percent.

CROPLAND USED FOR CROPS, 48 STATES, 1910-64

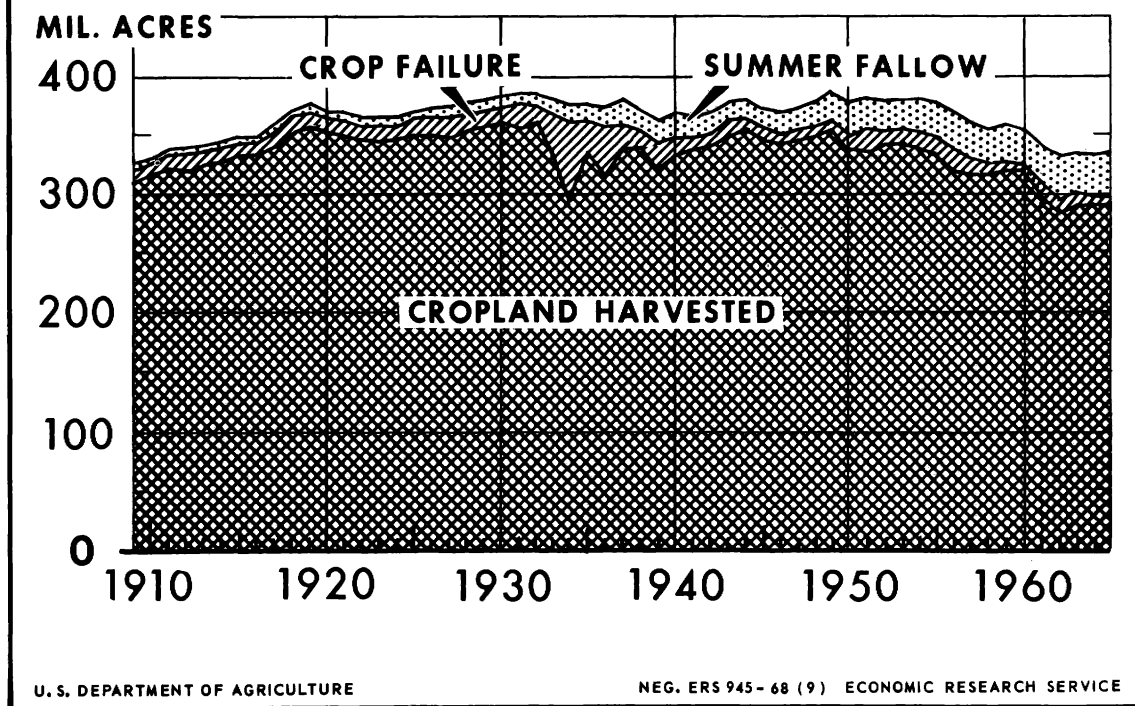


Figure 6

During these same years, however (1954-66), productivity per acre increased about 3 percent a year due to increased inputs (fertilizers, pesticides, etc.), improved technology, and shifts out of lower-grade land. By 1966, productivity per acre for the 48 States was 36 percent greater than in 1954, so that total production increased 20 percent in spite of a 13-percent decrease in acreage during that period.

Compared with the national downtrend, however, there was considerable variation among the regions (table 8 and fig. 7). There was relatively little decline in the Mountain and Pacific Regions where irrigated projects have not only improved old cropland, but have also developed some new cropland. Cropland used for crops in 1966 was down from 1954 only 6 and 4 percent, respectively, in these regions. In contrast, the decrease in the Eastern regions was greater than the national average. The Northeast was down 17 percent, the Appalachian down 26 percent and the Southeast down 40 percent from 1954. These decreases were associated with the reversion of cropland to other uses in many areas because of isolation, small size, adverse topography, and relatively low productivity. A long-time downtrend continued in the Southern Plains where cropland used for crops in 1966 was down 22 percent from 1954. In some parts of the region, soil moisture is inadequate even for dryland farming which is widely used in the Northern Plains, so cropland has been gradually reverting to other uses. Cropland used for crops in the Corn Belt and Northern Plains, accounting for about half of the Nation's acreage, decreased only about 10 percent from 1954 to 1966.

Table 8.--Cropland used for crops, by regions, 1950-66 1/

Year	North- east	Lake States	Corn Belt	Northern Plains	Appa- lachian	South- east	Delta States	Southern Plains	Mountain	Pacific	48 States
-----Million acres-----											
1950----	17.1	37.5	77.2	93.3	21.1	18.7	15.3	41.7	35.2	20.2	377.3
1951----	17.0	37.7	77.4	93.8	21.2	18.7	15.4	43.4	35.9	20.6	381.1
1952----	16.9	37.4	77.8	93.8	20.8	19.0	15.1	41.8	36.6	20.8	380.0
1953----	16.8	37.6	78.8	94.0	20.6	18.9	14.9	41.3	35.8	20.8	379.5
1954----	16.6	37.6	79.4	95.5	20.0	17.6	14.8	41.5	36.2	20.7	379.9
1955----	16.4	37.6	79.5	94.6	19.9	17.3	14.3	41.4	36.2	20.5	377.7
1956----	15.9	37.4	78.5	92.8	18.9	16.1	13.7	38.9	35.7	20.8	368.7
1957----	15.7	36.4	77.2	90.1	17.5	15.1	13.2	37.3	35.2	20.5	358.2
1958----	15.5	36.0	76.9	90.4	17.2	13.7	12.5	36.8	35.3	20.5	354.8
1959----	15.2	36.7	78.8	90.2	17.4	14.6	13.1	37.6	34.4	20.5	358.5
1960----	14.9	35.8	78.4	91.5	17.1	13.3	12.8	37.2	34.1	20.2	355.3
1961----	14.5	35.3	71.6	86.9	16.1	12.7	12.8	35.8	33.8	20.1	339.6
1962----	14.2	33.3	70.7	85.3	15.4	11.9	12.7	34.4	33.9	19.4	331.2
1963----	14.2	34.5	72.5	87.1	15.2	12.1	13.1	34.8	34.0	19.8	337.3
1964----	14.0	34.3	72.0	86.2	15.0	11.9	13.5	34.1	33.9	19.9	334.8
1965----	13.8	34.1	72.7	86.8	14.8	11.3	13.6	34.8	34.5	20.0	336.4
1966 <u>2/</u> -	13.8	33.5	72.6	86.0	14.7	10.5	13.5	32.5	33.9	19.9	330.9

1/ Cropland used is the sum of the acreage of land from which one or more crops were harvested plus acreages of crop failure and summer fallow.

2/ Preliminary.

CROPLAND USED FOR CROPS, 48 STATES AND REGIONS, 1940-65*

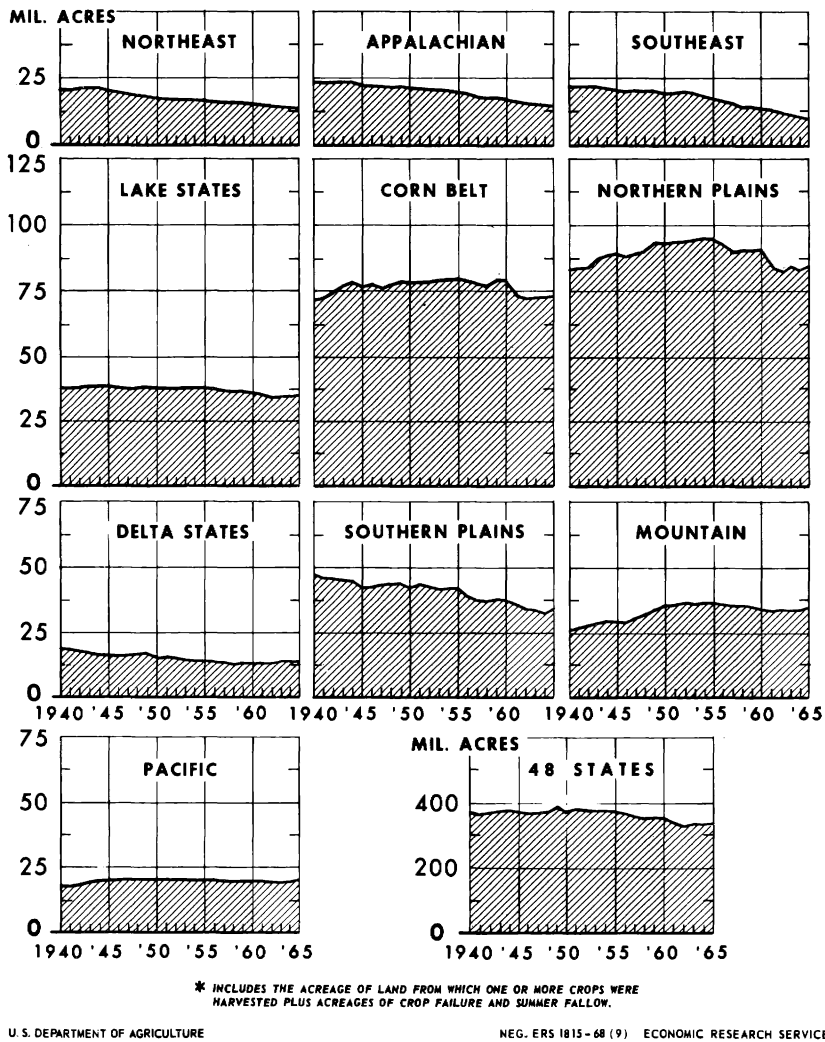


Figure 7

Despite decreased acreages, all regions except the Northeast and Appalachian had a total 1966 production well above 1954 because of marked increases in productivity per acre.

Types of Crops Harvested Annually

Annual estimates of the total acreage of crops harvested are compiled from several sources. The principal acreages harvested are as reported in Crop Production and other reports issued by the Statistical Reporting Service. Acreages of fruits and planted nuts, vegetables for home use, and some minor crops are based mainly on Census of Agriculture reports.

It will be noted that the total acreage of crops harvested somewhat exceeds the acreage of cropland harvested as shown in table 2. For instance in 1967,

the total acreage of crops harvested amounted to 309 million acres, including the acreage of fruits and nuts and of farm gardens. However, because some land yields more than one crop a year, the actual acreage of cropland harvested in 1967 amounted to only 302 million acres. The 7 million acres of land that was double-cropped included such cases as the planting of soybeans for harvest following the winter wheat or oats harvest, or the production of more than one crop a year on land in the southernmost vegetable production areas with very long growing seasons.

Associated with the impact of the several acreage diversion programs, besides other technical and economic factors, the pattern of land use by major crops shifted significantly in recent years. From 1959 to 1964, the total acreage harvested decreased from 324 million acres to 298 million acres, a decline of 26 million acres or 8 percent (table 9 and appendix table 29 showing the trend by crop).

Contrary to the trend in the total, however, the "food crops" group gained 7 million acres, or 7 percent during this period. The increase was accounted for by a continuation of the uptrend in soybeans. The remainder of the "food crops" group showed only small and offsetting changes.

The "feed crops" group showed a sharp decrease of 31 million acres, or 15 percent from 1959 to 1964. The decline was all accounted for by the decrease in feed grains--hay acreage actually showed a slight increase. During this period, corn acreage dropped 20 percent, oats 29 percent, barley 31 percent, and sorghums 17 percent. By 1964, total feed grain acreage was only 34 percent of total crops harvested, compared with 44 percent in 1959.

A small decrease in the "other crops" group during this period (1.7 million acres) was mainly accounted for by a 1-million-acre decrease in cotton acreage.

Since 1964, some trends have changed in response to changes in farm programs designed to increase wheat and feed grain production in order to build up depleted stocks. In 1967, total crops harvested increased to 308 million acres, or 3 percent greater than in 1964. The "food crops" group increased more than 17 million acres from 1964 to 1967, with the increase about evenly divided between wheat and soybeans. The "feed crops" group acreage, however, remained practically unchanged, as the 7-million-acre increase in corn and sorghum acreage was offset by decreases in oats, barley, and hay acreages. In contrast, the "other crops" group showed a sharp decrease from 1964 to 1967, mainly accounted for by a drop in cotton acreage from 14.1 million acres to only 8.1 million acres in 1967. The decline in cotton acreage was mainly due to acreage allotments which were decreased to lower surpluses, but greater than usual abandonment in 1967 also contributed to the downtrend.

PASTURE AND RANGE RESOURCES

Livestock grazing occurs on 922 million acres, or 41 percent of the land area (table 10). Approximately 640 million acres of permanent grassland and other nonforested areas are used more or less exclusively for grazing. The rest

Table 9.--Types of crops harvested annually, 48 States, 1954-67 ^{1/}

Type	1954	1959	1964	1966	1967
	----- Million acres -----				
Food crops					
Food grains-----	58.8	54.8	53.3	53.0	62.1
Other food crops-----	33.4	38.2	46.5	52.3	55.2
Total-----	92.2	93.0	99.8	105.3	117.3
Feed crops					
Feed grains-----	152.3	143.5	111.2	109.8	113.3
Hay-----	72.5	66.3	67.3	65.1	64.7
Total-----	224.8	209.8	178.5	174.9	178.0
Other crops-----	29.8	21.8	20.1	15.0	13.1
Total crops harvested----	346.8	324.6	298.4	295.2	308.4

^{1/} See appendix table 29 for individual crop acreages and sources of data.

consists of 57 million acres of cropland used only for pasture and 225 million acres classified as forest pasture and range. ^{2/} Most pasture and other grazing land is used for some period each year, but the acreage varies depending on weather and available forage.

Of the total pasture and range, 630 million acres were enumerated as land in farms. Pasture and range in farms includes all of the cropland pasture, 490 million acres or 77 percent of the permanent grassland pasture, and 82 million acres or 36 percent of the forest land grazed. Most grazing land in farms is in private, State, and Indian ownership. About 10 percent of the Federal range, consisting mainly of scattered areas grazed under lease and portions of the National Grasslands, is also included in farms.

^{2/} These totals do not include the acreage of planted crops on which grazing occurs for brief periods before or after crops are harvested. Examples of this type of grazing are fall and winter pasturage of small grains, and after-harvest pasturage of hay.

Also excluded are areas totaling 58 million acres in Federal grazing districts and National Forest system range allotments characterized by little or no use for grazing. However, these areas are intermingled and managed with areas classified as usable or suitable for grazing. Since livestock range over or have access to these areas in the course of utilizing the more productive areas, they form an important part of the total range environment.

Table 10.--Pasture and range by type and region, United States, 1964

Region	Cropland	Grassland	Forest land	Total ^{4/}	
	pasture <u>1/</u>	pasture and range <u>2/</u>	pasture and range <u>3/</u>	Acreage	Percentage of land area
	-----1,000 acres-----			-----Percent-----	
Northeast-----:	2,559	7,110	3,573	13,242	12
Lake States-----:	4,219	8,485	6,937	19,641	16
Corn Belt-----:	11,228	20,335	12,179	43,742	26
Northern Plains--:	4,159	80,675	2,300	87,134	45
Appalachian-----:	9,457	10,778	8,356	28,591	23
Southeast-----:	3,593	12,564	18,773	34,930	28
Delta States-----:	4,873	9,433	27,428	41,734	45
Southern Plains--:	8,937	118,378	26,381	153,696	72
Mountain-----:	4,574	314,399	85,327	404,300	74
Pacific-----:	3,764	54,307	32,568	90,639	44
48 States-----:	57,363	636,464	223,822	917,649	48
Alaska-----:	4	2,772	367	3,143	1
Hawaii-----:	52	1,203	331	1,586	38
U. S. total--:	57,419	640,439	224,520	922,378	41

^{1/} Mainly cropland in rotation which is used some years for cultivated crops and other years for pasture.

^{2/} Excludes cropland used for pasture.

^{3/} Used or usable for grazing.

^{4/} Excludes 58 million acres in Federal grazing districts and National Forest system range allotments characterized by little or no use for grazing.

The 293 million acres of grazing land not in farms includes 150 million acres of grassland and other nonforested areas, and 143 million acres of forest land. More than 200 million acres of the grazing land not in farms is federally owned, mainly in Federal grazing districts and National Forest system range allotments. These areas are grazed under a permit rather than lease arrangement and, as such are not enumerated as land in farms. Much of the non-Federal grazing land not in farms consists of forest industry and other large holdings in the South.

Grassland Pasture and Range

Grassland pasture and range consists mainly of tame and native grasses and legumes but also includes shrub and brushland not classified as forest. Of the 490 million acres in farms, 397 million are improved and unimproved grassland, including 36 million improved between 1960 and 1964, and 93 million are predominantly brush and browse. The latter statistic applies only to the 17 Western States where, overall, a little more than one-fifth of the nonforested

pasture in farms is classified as brush and browse. The proportion is much higher in several individual States, however. In general, the proportion of brush and browse on the nonforested pasture and range not in farms equals or exceeds that on adjacent acreages in farms.

Grazing of grassland pasture and range is the predominant primary use of land in the Mountain Region and Southern Plains and the predominant agricultural use in the Pacific Region, Alaska, and Hawaii as well. Among the major pasture types, grassland pasture predominates in all regions except the Southeast and Delta States. Grazing of this varied cover type accounts for more than half the area in the Mountain Region and Southern Plains; 41 percent in the Northern Plains where a larger proportion of the area is used for crops; and 27 percent in the Pacific Region where forestry predominates. These four regions have 566 million acres, or 88 percent, of the permanent grassland pasture and range acreage. In other regions (excluding Hawaii) the proportion of area in grassland pasture ranges from 12 percent in the Corn Belt to less than 1 percent in Alaska. Three-tenths of the land in Hawaii is grazed, but due to the State's small size it contributes little to the total grassland pasture acreage.

Cropland Used Only for Pasture

Cropland used only for pasture, the smallest component of the grazing acreage, occupies between 2 and 3 percent of the land nationally and comprises 6 percent of the total pasture and range acreage. Cropland used only for pasture can be cultivated without further improvement and is considered to be in the crop rotation. Much of it is of high quality. In some instances, however, it is difficult to differentiate--in terms of either quality or use characteristics--between cropland used only for pasture and permanent grassland pasture. About half of the 57 million acres of cropland pasture is concentrated in the Corn Belt, Southern Plains, and Appalachian Regions. As a percentage of total pasture and range, cropland pasture is particularly high in the Appalachian Region and relatively high in the Corn Belt, Lake States, and Northeast. Substantial acreages of cropland are pastured in other regions, but their relative importance is diminished by large acreages of permanent grassland and forest land grazed.

Forest Pasture and Range

The 225 million acres of forest pasture and range is an approximation of the amount of open forest, cutover areas, land reverting to forest, and similar areas which have grass or other forage growth pastured to some extent. Forest pasture is the predominant type of grazing in the Southeast and Delta Regions and exceeds cropland pasture acreages in all regions except the Northern Plains and Appalachian Region. The larger aggregate acreages are located in the 11 Western States and in the South and Southwest.

Pasture and Range Productivity

Forage production per acre varies widely among the different types of pasture and range. Cropland pasture is by far the most productive type. An acre of cropland pasture on the average produces five to six times as much forage as an acre of farm grassland pasture and roughly 25 times the feed from an average

acre of nonfarm pasture and range. ^{3/} However, compared with most crops, even the more productive grazing types represent extensive use of land. Thus, although the total acreage of pasture and range occupies triple the acreage in crops, it normally contributes only a third of the total feed consumed by all livestock (1). ^{4/}

The inherent productivity of private and other non-Federal grassland pasture or, since the two are roughly coextensive, permanent grassland pasture in farms is indicated by its potential for crop use. According to the Conservation Needs Inventory (CNI) conducted in 1957-59 (12), about one-fourth of the permanent grassland in non-Federal ownership (or in farms) is suitable for regular cultivation or would be after application of feasible corrective measures. Another tenth has marginal cropland potential. The remaining two-thirds is characterized by topographic, soil, or climatic conditions which preclude its use for crops. Regionally, the CNI revealed that more than 70 percent of the non-Federal grassland pasture in the humid eastern portion of the country is suitable or marginal for cultivation while more than 70 percent in the West is unsuitable for cultivation. In general, the same physical conditions which limit its use for crops also limit the natural forage producing capability of the land and act as a deterrent to pasture and range improvement.

Most of the grassland range in Federal ownership is distributed in semiarid portions of the 11 Western States and, as are counterpart acreages of non-Federal range in these areas, is characterized by low productivity. Not uncommonly, the physical limitations to grazing on federally-owned land are even more severe than those on adjacent non-Federal range. This characteristic difference developed over time as the better land was transferred gradually from the public domain to private ownership.

From the standpoint of total livestock feed production the contribution of the Federal range, including both grassland and forest land, is small. In the Mountain and Pacific Regions, however, the Federal range provides about one-eighth of the livestock feed utilized and higher proportions locally (7). Here, many ranchers depend on the public range as a source of feed or as a seasonal source of feed that supplements or complements other feed supplies.

The natural forage producing capacity of forest pasture and range is strongly influenced by characteristics of the forest such as species composition and density of stand, as well as by underlying physical factors. Forage values are relatively high on open stands of longleaf slash pine in such areas as the Delta Region where climatic conditions permit grazing throughout the year. In contrast, the upland hardwoods of the region do not produce much forage, especially when protected from fire, although large acreages are grazed as a consequence of their location in or near farms. Similarly, a high proportion

^{3/} Rogers, R. O., and Barton, G. T., 1960. Our Farm Production Potential, 1975. U. S. Dept. Agr. Inform. Bull. 233, 14 pp., illus. p. 6.

^{4/} Underscored numbers in parentheses refer to items in the Literature Cited, p. 48.

of the ponderosa pine, aspen, pinion-juniper, and other relatively open forest types of the West has value for seasonal grazing but thick-growing types such as fir, spruce, and lodgepole pine have little utility for grazing. Type conversion from nonforage species to grasses in many portions of the semiarid Southwest has resulted in some increased livestock grazing capacity. An example of this is the juniper control and conversion projects in the Salt and Verde River drainages. This type of treatment results not only in improved range forage production, but also increased efficiency in use of available water and better control of erosion.

Changes in Pasture and Range Acreages

The combined acreage of the three major types of pasture and range decreased 22 million acres (2 percent) from 1959 to 1964, thus continuing a well-established trend (table 11). Acreages of cropland pasture and forest grazing land decreased 9 and 20 million acres respectively, but a partially offsetting increase of 7 million acres occurred in the acreage of grassland pasture and range.

Grassland pasture, the largest component of the grazing acreage, generally declined or changed little in regions east of the Plains States, but increased throughout the West, Alaska, and Hawaii. In the better farming areas of the East, maintenance of the cropland base, some shifts of pasture to forest, and expansion of urban and other special uses precluded increases in the grassland pasture acreage. In the poorer farming areas, additions to the grassland pasture acreage were usually more than offset by reversion to forest and increases in special uses.

The total area in the 17 Western States, Alaska, and Hawaii classified as grassland pasture and range increased 13 million acres between 1959 and 1964. Approximately 9 million acres (more than two-thirds of the increase) were added in the Southern Plains and the increase is attributed to a shift of cropland to pasture, land clearing, and some reclassification of forest land. The acreage was enlarged in the Northern Plains by smaller shifts of cropland to pasture, and in several other areas of the West by land clearing. In Alaska, grassland pasture expanded mainly on previously unused land.

The acreage of grassland pasture in farms was 24 million acres higher in 1964 than in 1959, but the acreage not in farms decreased 17 million acres. Regional

Table 11.--Changes in pasture and range, United States, 1950-64

Type	1950	1954	1959	1964
	-----Million acres-----			
Cropland used only for pasture-----	69	66	66	57
Grassland pasture and range-----	632	634	633	640
Woodland grazed-----	319	301	245	225
Total pasture and range-----	1,020	1,001	944	922

increases in the acreage of grassland pasture in farms were especially large in the 17 Western States, due partly to land clearing and shifts of cropland to pasture. Another major factor was the inclusion of certain federally owned grazing areas not previously enumerated as land in farms. Census coverage of State and Indian land also may have been more complete.

Smaller increases in the acreage of grassland pasture in farms occurred in the South and Southeast. In some areas, increases in this class are associated with declining cropland acreages. In the Lower Mississippi Valley and Florida, land improvement activities and expanded census coverage were important factors. No overall gain in grassland pasture occurred in the South, however, as the nonfarm acreage available and suitable for grazing declined.

Cropland used only for pasture decreased sharply between 1959 and 1964, after remaining stable for nearly a decade. All regions showed decreases except the Mountain Region. These regional decreases are associated with the decrease of cropland and the increase of grassland pasture in farms in most regions.

Forest pasture and range continued a long-term decline during 1959-64. In the Mountain and Pacific Regions, reclassification activities by administering agencies substantially reduced the acreage of usable Federal range, although the total acreage under management for grazing did not change greatly. This reduction is reflected mainly in the estimates of forest land grazed. Clearing and reclassification of woody vegetation reduced the forested grazing acreage still further in the Mountain and Pacific Regions and were primary causes of a large decrease in the Southern Plains. In the eastern United States, total acreages of forest land grazed remained fairly stable, but generally declined as a percentage of total forest land. Throughout much of the East, the potential for forest land grazing inherent in increasing forest land acreages was offset by increasing stand density and changes in feeding practices. The acreage of forest land grazed in farms declined 10 million acres nationally with decreases occurring in all regions. As a percentage of total forest land in farms, however, there was little change regionally or nationally.

A trend of gradual improvement of grassland pasture by brush clearing, reseeding, fertilization, and shifting of cropland to pasture continued during 1959-64. These yield-increasing activities were accompanied by the removal of some areas of low productivity from grazing use. Thus, although the total acreage of pasture and range decreased, the overall quality of the remaining acreage increased.

FOREST LAND

Using a total for 1963 of 759 million acres of forest land (rather than the total of 762 million used in this report), the Forest Service classified 509 million acres, or two-thirds, as commercial, i.e., suitable and available for the growing of continual crops of industrial timber products (14). The remaining 250 million acres were classified as noncommercial because of inherent low timber-producing capacity or, as in the case of some public lands, because of legal reservation for recreation and other nontimber uses. Large acreages of forest land in the Alaskan interior for which survey statistics are not yet available, are also included in the noncommercial acreage.

The total forest land acreage is about equally divided between the 31 Eastern States and the 17 Western States, Alaska, and Hawaii. In contrast, the proportions classified as commercial and noncommercial forest in the two regional groupings are strikingly dissimilar. In the 31 Eastern States, 97 percent of the forest land is classified as commercial, while in the remaining 19 States only 40 percent is of commercial quality. Exclusive of Alaska, however, the average for the Western States is 54 percent. In addition to having disproportionately large shares of the commercial forest land, individual eastern regions also have the largest proportions of their total land area classed as forest (table 5).

Except for acreage changes resulting from reclassification, the total acreage of forest land has not changed greatly in recent years. Substantial acreages of noncommercial forest in the Southern Plains, parts of the West and Alaska, have been cleared or reclassified to other use classes. In contrast, the commercial forest acreage is increasing rapidly in many areas of the South and East. Some of the changes in forest land are also referred to in other sections on agricultural and special uses of land.

Although most of the forested area is generally considered to be used primarily for forestry, it typically serves multiple purposes. For example, forest land provides watershed protection and wildlife habitat. Many areas are used for grazing, recreation, or other purposes as well. Forest land exclusive of the acreage grazed and areas used primarily for other purposes totals approximately 507 million acres.

SPECIAL AND MISCELLANEOUS USES

Agricultural and forestry activities are largely absent on 450 million acres, or one-fifth of the land area. Special uses, including urban and other built-up areas, parks, wildlife, defense, institutional, and some other uses occupy 38 percent (173 million acres) of this acreage. A still larger portion, 62 percent, is characterized by little or no economic surface use. The former often competes with agricultural uses for land, while the latter in some instances represents a potential source of additional agricultural land.

Special Use Areas in 1964

The special uses of land specified in table 12 occupy 173 million acres, or nearly 8 percent of the total land area of the country. Urban and transportation areas, the most intensive uses, account for 55 million acres or one-third of the total in this category. Federal and State parks take 32 million acres scattered across the country. National Forest wilderness and primitive areas occupy 15 million acres. Relatively large acreages have been set aside for wildlife refuges and national defense purposes. Various other extensive-type public facilities plus an estimated 9 million acres in farmsteads, farm roads, and farm lanes contribute to the special use acreage.

Land in special-purpose uses, like that used for agriculture and forestry, is distributed unevenly between regions and States as shown in appendix table 27. Some of the reasons are more obvious than others. Acreages in urban places

Table 12.--Special-use areas, United States, estimates for 1964

Special use area	Acreage	Percentage of total
	<u>1,000 acres</u>	<u>Percent</u>
Nonagricultural:		
Intensive uses:		
Urban areas-----	29,268	16.9
Highways and roads-----	21,169	12.2
Railroads-----	3,298	1.9
Airports-----	1,520	.9
Total-----	55,255	31.9
Extensive uses:		
National parks-----	25,975	15.0
State parks-----	5,918	3.4
Wilderness and primitive areas-----	14,617	8.5
Federal wildlife refuges-----	22,398	12.9
State wildlife refuges-----	6,602	3.8
National defense areas-----	23,599	13.6
Flood control land-----	6,171	3.6
Federal industrial lands-----	2,110	1.2
State institutional and other uses-----	1,338	.8
Total-----	108,728	62.8
Total nonagricultural lands-----	163,983	94.7
Agricultural:		
Farmsteads-----	7,334	4.2
Farm roads and lanes-----	1,840	1.1
Total agricultural special use lands-----	9,174	5.3
Total special use areas-----	173,157	100.0

Note: Definitions and procedures are given in footnotes to appendix table 27 showing special use areas by States.

are closely related to population densities and are largest in the most populous States. Federally owned areas held for flood-control purposes are distributed mainly along the Mississippi, Missouri, and Ohio Rivers and their tributaries. The sizes of various flood-control projects are in proportion to the flood problems in these areas. Similarly, acreages in farmsteads and farm roads are related to the number of farms and area in farms.

The bases for the distributional patterns of most other special uses are more complex, but several generalizations can be made. The varying quantities of land used for rural transportation purposes in different areas reflect the influences of both population densities and historical land settlement patterns. The latter is usually the predominant factor. For example, regardless of population densities, most larger acreages are in States with rectangular land divisions, particularly those in the better agricultural areas of the country.

The acreages in parks, wildlife areas, and, to a lesser extent, national defense areas, are concentrated in the Western States and Alaska because large public domain holdings are available for these uses, and in the less productive areas of the East. Many areas used for these purposes were selected because of special-site characteristics. Others, particularly some State parks and wildlife areas, entered State ownership more or less by chance and then were designated to the special use deemed appropriate. National defense areas differ mainly in that locational aspects were more likely stressed in the selection process and a larger proportion is characterized by high value and intensive use.

The relative proportions of cropland, pasture, range, forest, and other land absorbed by individual special uses are not well established but are known to vary substantially. As urban and transportation areas expand into rural areas, they may progressively occupy or isolate land in other uses in existing proportions; but, where a choice is possible, preference is normally shown for level and fertile land. The distribution of urban and transportation acreages in relation to other uses also indicates that a proportionately larger share of land moving to intensive uses is from cropland than from other major uses. In contrast, only a small proportion of land in parks, wildlife areas, and other extensive special uses was formerly used for crops. These uses are usually established on pasture and forest land or, frequently, on areas not previously used for any purpose.

Rate of Growth of Special Uses

According to available statistics, the area in special uses grouped in table 13 increased almost 17 million acres, or an average of 3.4 million acres annually during 1959-64. Most individual uses specified in table 12 also increased. ^{5/} Among intensive uses, the urban area increased from an estimated 27.2 to 29.3 million acres--an annual growth rate of about 420,000 acres. The growth rate

^{5/} See Wooten, et al. (18, table 20) and Wooten and Anderson (17, table 30) for comparative data on special uses of land in 1950-59.

cannot be compared directly with the rate of 550,000 acres estimated for the 1950's (18, p. 9) as data adequate for comparison are available only for years of the Censuses of Population. However, the evidence generally indicates that, in terms of acreage occupied, urban areas expanded at a somewhat slower rate after 1959.

Rural transportation areas increased from 25.2 to 26.0 million acres, or about 160,000 acres annually during the same period. Construction of new highways such as the National System of Interstate and Defense Highways, which occurred at a somewhat accelerated rate relative to 1959 and earlier, accounts for 141,000 acres of the total. The remainder is attributable to a small increase in the acreage in airports. In contrast, estimates of the area in railroad rights-of-way continue to show a slight but persistent decline.

Separate estimates were not made for rural areas used for such purposes as industrial, commercial, and nonfarm residential sites; mining areas; clay, sand, and stone quarries; cemeteries; and golf courses. Areas of artificial reservoirs are also omitted from the special use acreage tabulations as they have been deducted from the land area figure already. However, an average of 420,000 acres per year are taken for reservoirs annually. By combining an allowance for noninventoried uses and reservoirs with the nearly 600,000 acres absorbed by urban and transportation uses, it is estimated that about 1.0 million acres of all kinds of land are now shifting to intensive special uses each year. This rate is largely unchanged from 1950-60.

Table 13.--Changes in special use areas, United States, 1959-64

Special use area	1959 ^{1/}	1964	Change
	Million acres		
Urban areas ^{2/} -----	27.2	29.3	+2.1
Transportation areas ^{3/} -----	25.2	26.0	+ .8
Recreation and wildlife areas ^{4/} -----	61.5	75.5	+14.1
Public installations & facilities ^{5/} ---	32.4	33.2	+ .8
Farmsteads and farm roads-----	10.1	9.2	- .9
Total-----	156.4	173.2	+16.8

^{1/} From Wooten, et al. (18, table 5).

^{2/} Places of 1,000 or more population.

^{3/} Highway, road, and railroad rights-of-way, and rural nonmilitary airports.

^{4/} Includes Federal and State parks, related recreational areas, and wildlife areas, and National Forest wilderness and primitive areas.

^{5/} National defense, Federal flood control, Federal industrial areas, and State institutional and miscellaneous other uses, as defined in footnote 5, appendix table 27.

A net increase of almost 15 million acres occurred in the acreage of extensive-type public acreages (recreation and wildlife and public installations and facilities), an average of 3 million acres yearly. However, more than 10 million acres of the increase resulted from the establishment of wildlife refuges on public domain land in Alaska. Apart from this unusual increase and considering certain classification changes, land shifted to extensive special uses at an average annual rate approaching 1 million acres, or 5 million in the period, the same as in the 1950's. Acreages in park, wildlife, Federal flood control, Federal industrial, and State institutional holdings all increased during 1959-64, but the total was partially offset by the disposal of 0.8 million acres held for national defense purposes. The estimated acreage in farmsteads and farm roads, the only special uses classified as agricultural, also declined as a consequence of the decrease in the number of farms and land in farms.

Miscellaneous Other Land

Except for minor acreages in special uses that were not inventoried, the remaining 277 million acres of the Nation's land resources consist largely of swamps, marshes, bare rock areas, desert, tundra, and similar areas. Acreages of miscellaneous land are relatively large in arid portions of the West and several Atlantic and Gulf Coastal areas but particularly large in Alaska, which has 213 million acres, or three-fourths of the total. Although characterized by little or no economic surface use, these areas generally have utility for wildlife purposes and some have value for minerals. From the standpoint of potential use, inroads will continue to be made for special purposes, while limited areas will be irrigated or otherwise reclaimed for agriculture. Johnson and Jorgenson (5) have estimated that 50 to 60 million acres of unclassified land in Alaska has some potential for grazing, although most of this acreage is adapted to reindeer rather than domestic livestock.

MAJOR USES OF LAND BY CLASS OF OWNERSHIP

The land resources of the United States are classified by major ownership and use classes in table 14. About three-fifths of the land area is privately owned and two-fifths publicly owned.

The Federal acreage comprises mainly the residual of the original public domain, but it also includes 53 million acres acquired by purchase and other means. Almost half (47 percent) of the Federal land is distributed in the 11 Western States and an equal amount is located in Alaska. Grazing is the primary use of 159 million acres of grassland and a secondary use on 63 million acres of forest land. Livestock range over an additional 59 million acres, mainly forest, which have little or no economic use for grazing but which are intermingled and managed with the usable Federal range. Other major uses of Federal land are forest land (including forest land grazed), 37 percent; special uses, 12 percent; and miscellaneous land including desert, tundra, etc., 30 percent.

State and local governments have accumulated landholdings of varying size through such means as grants of land from the Federal Government, tax-reversion, purchase, gift, and escheat. These publicly administered areas are

Table 14.--Major classes of land by use and ownership, United States, 1964

Ownership	Cropland	Grassland pasture and range	Forest land ^{1/}	Special use and other land	Total land area
-----Million acres-----					
Federal-----	0.4	157.7	282.0	325.6	765.7
State and other-----					
public ^{2/} -----	2.4	39.4	37.4	43.1	122.3
Indian ^{3/} -----	2.6	32.5	12.9	2.4	50.4
Private ^{4/} -----	438.8	410.8	429.6	48.7	1,327.9
Total ^{4/}-----	444.2	640.4	761.9	419.8	2,266.3

^{1/} Includes reserved forest in parks and other special uses.

^{2/} Excludes State-grant land in process of transfer from the Federal public domain to the State of Alaska.

^{3/} Trust land held by tribes and individual Indians. About 4.7 million acres of federally-owned land, located mainly in Alaska, are also used by Indians.

^{4/} Federal, State, local government, and Indian land acreages were obtained from public records and reports. Private land is the rest of the land area in each major use.

distributed somewhat more evenly than Federal land, but are still characterized by a high degree of concentration. The larger acreages are located mainly, but not exclusively in the Western States. State and local governments hold land for forests, parks, wildlife areas, watershed protection, highway and road rights-of-way, institutional uses, and other specific purposes. Most Western States also own relatively large acreages without specific use designations. About 41 million acres in the category, including 39 million acres of grassland, are used for grazing.

Nearly 70 percent of the Indian land, or 35 million acres, is used by Indian farmers and livestock operators for farming and grassland pasture and range. In addition, there are about 13 million acres of Indian forest land, most of which is also used for grazing. Indian land, like publicly owned land, is concentrated in the Western States. Private land exclusive of that in Indian ownership totals 1,328 million acres, or 58 percent of the land area. Included in this privately owned land are 99 percent of the Nation's total cropland, 64 percent of the grassland pasture, 56 percent of the forest land, and 12 percent of the miscellaneous land. As these percentages indicate, a large proportion of the land with relatively favorable attributes is in private ownership.

Excluding cropland used for pasture, private and other non-Federal grassland pasture and range total about 482 million acres for the 50 States. An additional 161 million acres of private and other non-Federal woodland and forest

are used for grazing. Federal range classified as usable or suitable for grazing totals 222 million acres, of which about seven-tenths is grassland and the rest forest and woodland. Thus, 865 million acres, including both private and public land, are classed as pasture and range. Of the total acreage, 640 million acres are grassland or nonforest, and 225 million acres woodland and forest.

WATER AND AGRICULTURE

The Role of Water in Agriculture

The interaction of land and water use greatly affects agriculture, and over time, man has become increasingly able to alter the balance of that interaction.

Most water used by crops in fields comes from direct replenishment of soil moisture by rain or snow. Some precipitation enters rivers and streams as runoff. The proportion of precipitation absorbed by the soil is generally increased by land treatment.

Land treatment is defined by the U.S. Soil Conservation Service as "Use of land within its capabilities and the application of soil and water conservation measures and practices, singly or in combination." Included under this definition are contour-farming, terracing, reforestation, and other practices recommended in farm and ranch planning. In 1964, land treatment was practiced on approximately 475 million acres, or 28 percent of the total cropland, pasture and grazing land, and forest and woodland of the 48 contiguous United States. 6/

From 109 to 125 million acres, or about 6 to 7 percent, of the U.S. land area lies in the flood plains of rivers and streams. Surveys by the U.S. Department of the Army Corps of Engineers indicated that in 1959, 50 million acres received some flood protection. Some 49 million acres of rural land, almost half of which lies in the Mississippi Valley, received varying degrees of protection. Of this acreage, 54 percent was protected against the maximum flood of record; 20 percent was protected against floods of about 10-year frequency; and the rest, or 26 percent, was protected to a limited degree against floods.

Irrigation was used on 37 million acres in 1964 to take the place of, or to supplement, precipitation. Water for irrigation is taken from, or diverted into, many natural and manmade bodies of water. The competitive relation between land and water for space can be critical in some areas. According to a report by Martin and Hanson (6), reservoirs and natural lakes with 5,000-acre-feet storage capacity or more for agricultural and other uses occupied 14.8 million acres in 1963. These data are for surface areas at a maximum controllable water level. From 1954 to 1963, the average yearly increase in the surface area of all large reservoirs combined was about 420,000 acres.

In 1964, agricultural uses of water were facilitated through more than 2.2 million small structures occupying some 2,900,000 acres when filled to capacity.

6/ All subsequent figures are for the 48 contiguous States, unless noted otherwise.

ity. ^{7/} These smaller structures included 2,156,000 farm ponds, small reservoirs, and pit tanks on private land, and 66,000 of the same on Federal property. ^{8/} Although the net effect of such reservoirs is helpful to the agricultural process, land area taken over by reservoirs is frequently land area previously devoted to agriculture. Thus, land use and water use are seen to be mutually interacting in still another way.

Water Use in Agriculture and Basic Relationship to Other Uses and Supply

Rainfall in the 48 States averages 30 inches a year. Some 70 percent is evaporated or transpired by plants. Out of this comes the largest agricultural water use--nonirrigated crop, pasture, and forest production. The rest, or roughly 1,350 million acre-feet, is the longrun available water supply for diversion from streams and replenishing water pumped from wells.

The proportion of rainfall that becomes available water supply in streams and ground-water reservoirs is influenced by land treatment and drainage. The best estimates are that, on an overall national basis, recently installed and prospective future land treatment measures do not diminish water supplies by more than 1 or 2 percent.

Data are not available for an appraisal of the effects of drainage on water supply. As in land treatment, recently installed prospective drainage may result in only small changes in overall national water supply. This is because of the recent emphasis in draining existing farmlands and improving drainage systems, rather than reclaiming extensive wetland areas through large drainage projects as in earlier years.

Recent unpublished preliminary estimates of the U.S. Geological Survey for the 50 States place the proportion of water withdrawn for irrigation in 1965 at nearly 37.2 percent of a total of 347 million acre-feet withdrawn from ground and surface sources for all purposes (fig. 8). Based on the acreage irrigated in 1964 as reported by the Census of Agriculture, and the quantity of water applied per irrigated acre from the 1965 U.S. Geological Survey estimate, approximately 109 million acre-feet of water were used for irrigation in 1964. Use of water in rural homes, including farm homes, stock water, and other farm uses, accounted for only some 4 million acre-feet.

Water can be reused if adequate quality is maintained or restored. Therefore, a comparison between water supply and use should be in terms of consumptive use, defined as withdrawn water not returning to any supply source. The U.S. Geological Survey's recent preliminary estimate of consumptive use for 1965 is nearly 87 million acre-feet. Irrigation is much more significant on a consumptive-use basis, accounting for almost 85 percent of the total. These estimates exclude evaporation from water surfaces. Even if this were included, annual depletion of the overall water supply of 1.35 billion acre-feet would probably be less than 10 percent.

Not all of the water supply is available for withdrawal or consumptive uses. Some must be left in streams for navigation, recreation, and waste dilution.

^{7/} Source: U. S. Bureau of the Census.

^{8/} Source: U. S. Forest Service and U. S. Bureau of Land Management.

PROPORTIONAL USES OF WATER WITHDRAWN AND CONSUMED, 48 STATES, 1965

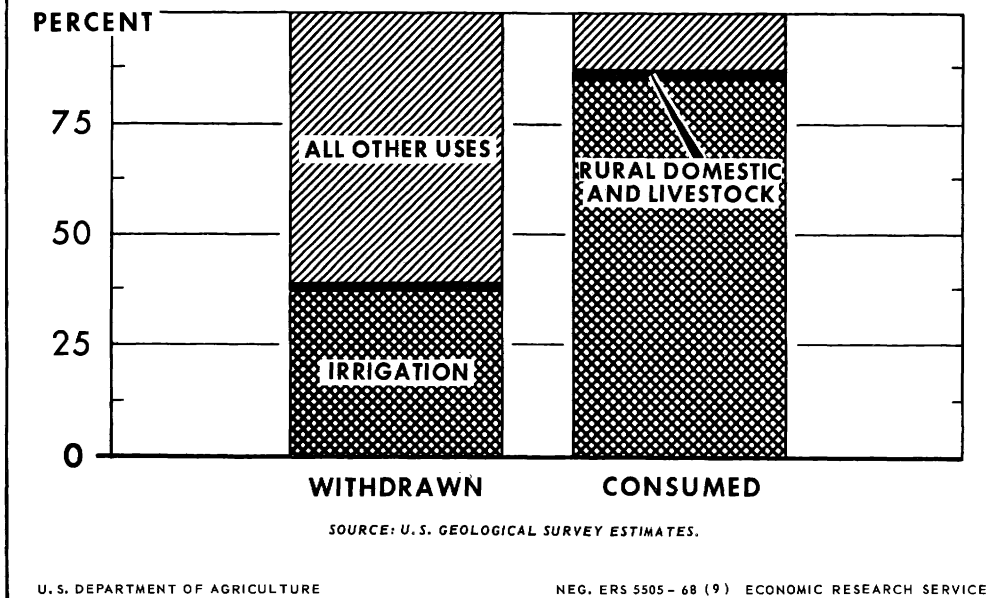


Figure 8

Further, as variations in streamflow do not fully conform to the needs of man, increasing uses of water require additional capacity of storage reservoirs with rising storage costs and more surface evaporation losses per acre-foot of additional water.

Finally, both supplies and patterns of use vary in different parts of the country. Thus, it is necessary to appraise water use in agriculture on a regional and local basis.

The Water Situation in the Western States

The area corresponding approximately to the 17 Western States has a long-term annual water supply of roughly 375 million acre-feet, less than 30 percent of the total supply. Yet this same area supports almost 90 percent of all irrigation and accounts for over 84 percent of all water consumption. Further, nearly two-thirds of the water supply in this region is in the Pacific Northwest and northern California. Even in these areas much of the supply is in the form of seasonal peak flows requiring extensive storage works for fuller use.

Considerable ground-water supplies are available for additional irrigation development in parts of the Northern Great Plains, notably in Nebraska, Kansas, and Oklahoma. The greatest pressure on water resources is in the Southwestern States, a region extending from western Texas through southern California and northward through Colorado, Utah, and Nevada. Considerable depletion of ground water has taken place within this area.

Pressures on water supplies in the southern California area may be eased by long-distance conveyance from more water-plentiful regions. In a more limited way, developing remaining surface supplies may relieve some pressure on ground water in other parts of the Southwest; but further irrigation development from surface water sources will generally involve higher costs. At any rate, these developments are unlikely to alter radically the water situation in the West in the foreseeable future.

The Water Situation in the Humid-Area States

The 31 Eastern States have roughly 1 billion acre-feet of the national annual water supply of 1.35 billion acre-feet. In the East, gross water use for irrigation and withdrawals for other rural uses are relatively minor. Yet they account for a considerable part of total consumptive use. Taking the East as a whole, water use for current irrigation and potential increases seems relatively minor, compared with the available supplies. Nevertheless, sharp conflicts over water between agriculture and other interests may arise on a local basis, particularly with recreational interests on small headwater streams and in draining areas that support wildlife. The quality standards for irrigation water, developed for Western conditions, will need to be modified in the East, where impurities resulting from urban uses are more important.

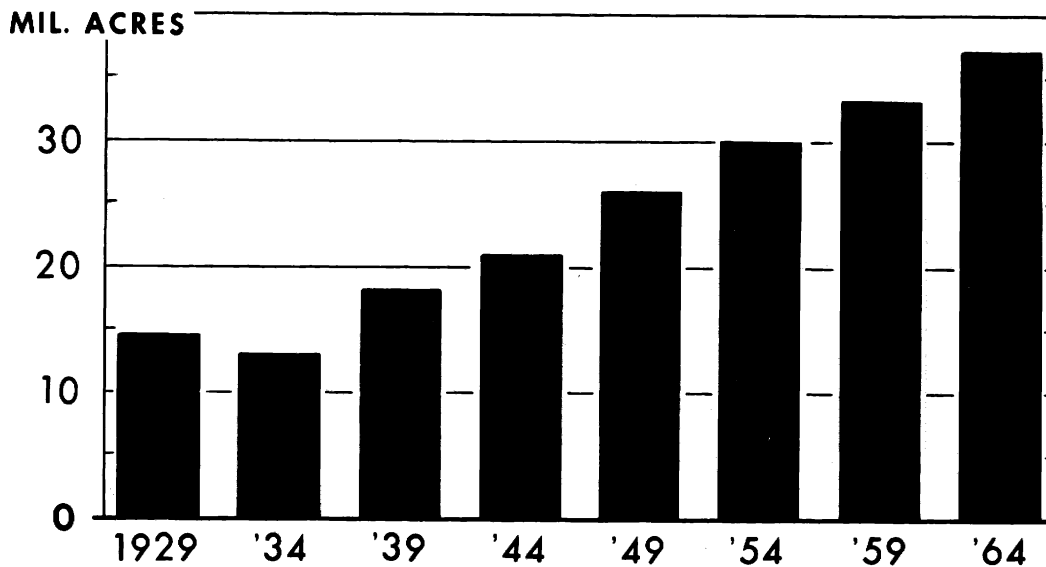
IRRIGATION

Factors Influencing the Growth of Irrigation

Irrigated acreage in the 50 States has grown from less than 8 million acres at the turn of the century to more than 37 million in 1964 (fig. 9). Despite the pinch on water supplies in some areas, irrigated acreage appears certain to expand both in the East and West in the coming decades. Perhaps the most basic determinants of the rate of expansion will be future population levels, per capita demand for agricultural products, and relative costs and returns of meeting the Nation's agricultural needs by irrigation compared to alternative means. The latter will be influenced by technology of water use in agriculture. Where such major export crops as cotton, wheat, and rice are grown under irrigation, export levels will influence irrigation. In the subhumid Great Plains, and to some degree in all humid States, interest in irrigation is likely to continue to fluctuate with the weather. Public policy in water law and water development will also be an important determinant, particularly in the West. For guidance of both the individual irrigator and public policy, a prime need is a better basic knowledge of crop response to soil moisture.

The trend of development in irrigation is affected by other factors, also. Among these are development costs, prices and marketing outlets for irrigated crops, agricultural programs, public irrigation development policy, availability of land, and the current level of rainfall. The last of these factors has opposite effects upon different regions, depending upon the dryness of climate. In the relatively humid areas, a temporary decline from normal annual rainfalls tends to speed irrigation development; but in the perennially water-scarce areas a decline from normal annual precipitation tends to force a decline in acreage irrigated.

IRRIGATED LAND IN FARMS UNITED STATES, 1929-64



SOURCE: U. S. CENSUS OF AGRICULTURE.

U. S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5507-68 (3) ECONOMIC RESEARCH SERVICE

Figure 9

Use of Irrigated Land in the West

Uses of irrigated land in the 17 Western States in 1964 are shown in figure 10. In terms of acreage, hay and pasture are the most important uses. Land from which hay was cut, some 8.2 million acres, made up about 29.8 percent of 27.4 million acres of irrigated cropland harvested in the West. In addition, the major part of 5.8 million acres of irrigated land not harvested was used for pasture.

Irrigated cropland used primarily for production of harvested livestock feed (hay, sorghum, corn, oats, and other grains, excluding wheat, barley, and rice) accounted for about 50.7 percent of all irrigated cropland harvested. Irrigated farmland used primarily for pasture or harvested livestock feed accounted for about 59.2 percent of all irrigated farmland in the West. Small grains grown primarily for human consumption (wheat and rice), or partly for human consumption (barley), made up over 19 percent of the irrigated land harvested. The remaining 30.2 percent harvested contained the most valuable irrigated land, in terms of annual value per acre of crop production. Most significant in this group, because of the crops' high value, was the acreage in tree fruits and vineyards, in vegetables, and in Irish potatoes. These three crop groups constituted 12.0 percent of the irrigated Western cropland harvested. Production of these perishables in California alone occupied 7.6 percent of the West's irrigated cropland harvested. Arizona and New Mexico's production of them occupied 0.6 percent.

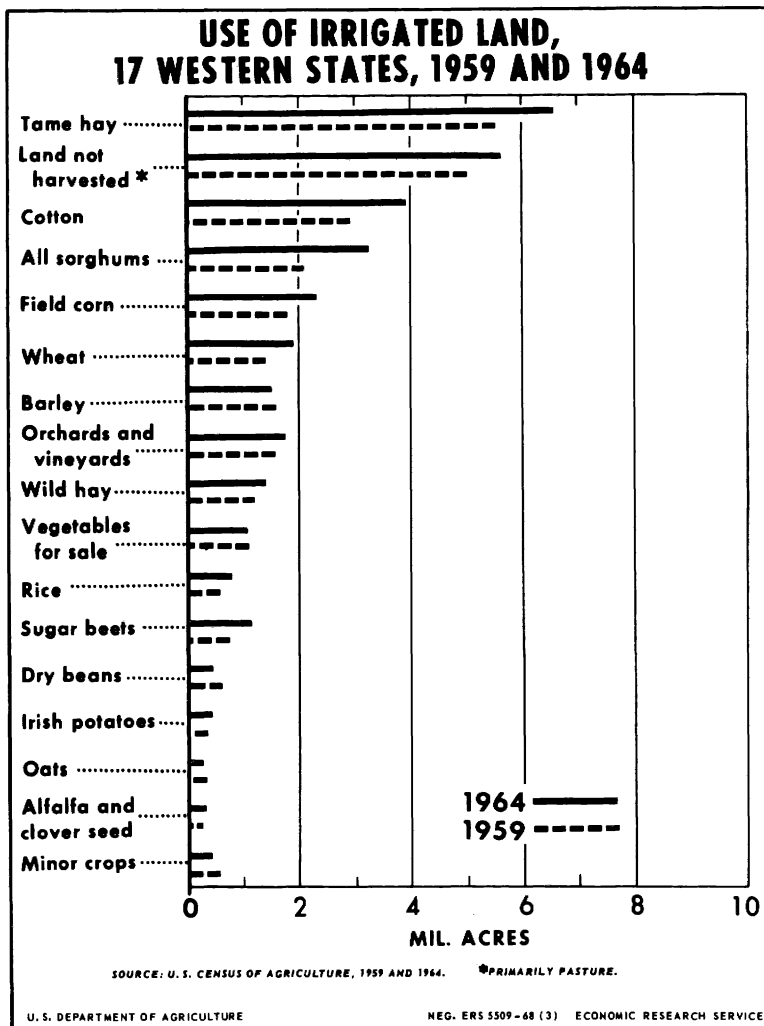


Figure 10

Cotton, important both in total acreage irrigated and in value per acre, made up 12.8 percent of the West's irrigated cropland harvested. Most of the 5.4 percent remaining was in sugarbeets, dry field and seed beans, and clover and alfalfa seed.

In 1959-64, substantial increases occurred in acreages of irrigated hay, cotton, sorghums, wheat, corn, and sugarbeets. Rice acreage increased by 12 percent. Irrigated acreage decreased for barley, oats, rye, vegetables for sale, and dry field and seed beans.

Most of the increases in irrigated cotton acreage and to a significant degree, the gains in sorghum, corn, and wheat, appear to be associated with the expansion of irrigation in the Great Plains Region. There, 79.2 percent of the West's irrigated sorghum and 66.1 percent of the irrigated corn acreages were found. Over 62.4 percent of the West's irrigated cotton and about 54.8 percent of the irrigated wheat acreages were in that region, also.

Significance of Western Irrigation --Irrigated cropland harvested amounted to slightly more than 21 percent of cropland harvested in the Western States in 1964. Still, nearly all cropland harvested was irrigated in Arizona and Nevada, over 81 percent in California, 74 percent in Utah, about 65 percent in Wyoming, about 57 percent in Idaho, and 76 percent in New Mexico.

The importance of western irrigation is much greater than would be suggested by the above comparisons. First, yields per irrigated acre are often several times those obtained for the same crop grown without irrigation. In 1954, for example, yields of irrigated cotton in the West averaged about two and one-half times the average U.S. yield of all nonirrigated cotton. USDA estimated for 1954 that irrigated pasture in the West yielded about 10 times as many pounds of forage per acre as nonirrigated pasture throughout the United States.

High-value crops, combined with higher yields per acre, are concentrated on irrigated land. Irrigated cropland harvested made up less than 11 percent of the total cropland harvested in the United States in 1964. Yet, 40.9 percent of the total U.S. acreage in orchards and vineyards and over 34.6 percent of the acreage of vegetables harvested for sale was on irrigated land in the 17 Western States.

Finally, irrigated feed crops and pasture play a significant part in stabilizing the western livestock industry by providing a dependable feed base that permits more effective use of the extensive pasture areas. Irrigation also aids the growth of large-scale livestock finishing operations near western population centers.

Use of Irrigated Land in the Humid-Area States and Hawaii

Approximately 1.7 million of the 3.7 million acres of irrigated land in the 31 humid-area States in 1964 were in the Delta States. Use of irrigated land in these States--Mississippi, Arkansas, and Louisiana--differs sharply from that in the other humid-area States. Three crops dominate--rice, cotton, and soybeans--but are minor irrigated crops in the other States (figures 11 and 12).

The leading irrigated crops for the remaining 28 humid-area States are high-value specialty crops, such as vegetables, citrus, potatoes, tobacco, berries, and nursery crops. Pasture, which generally falls sharply in grazing capacity in midsummer, is an important irrigated crop in the eastern States. Irrigation of corn, hay, other feed crops, and cotton is not yet widespread. In 1964, there were 3.3 million acres of irrigated cropland harvested in the humid-area States.

Most of the eastern irrigated land and leading irrigated crops are concentrated in a few States. In 1964, Florida accounted for 60.1 percent of all irrigated land in the 28 eastern States outside of the Delta States. This included practically all of the citrus crops irrigated, 93.5 percent of all irrigated tree fruits, and 38.9 percent of the irrigated vegetables. New Jersey accounted for another 13.2 percent of the vegetables irrigated in the 28 States.

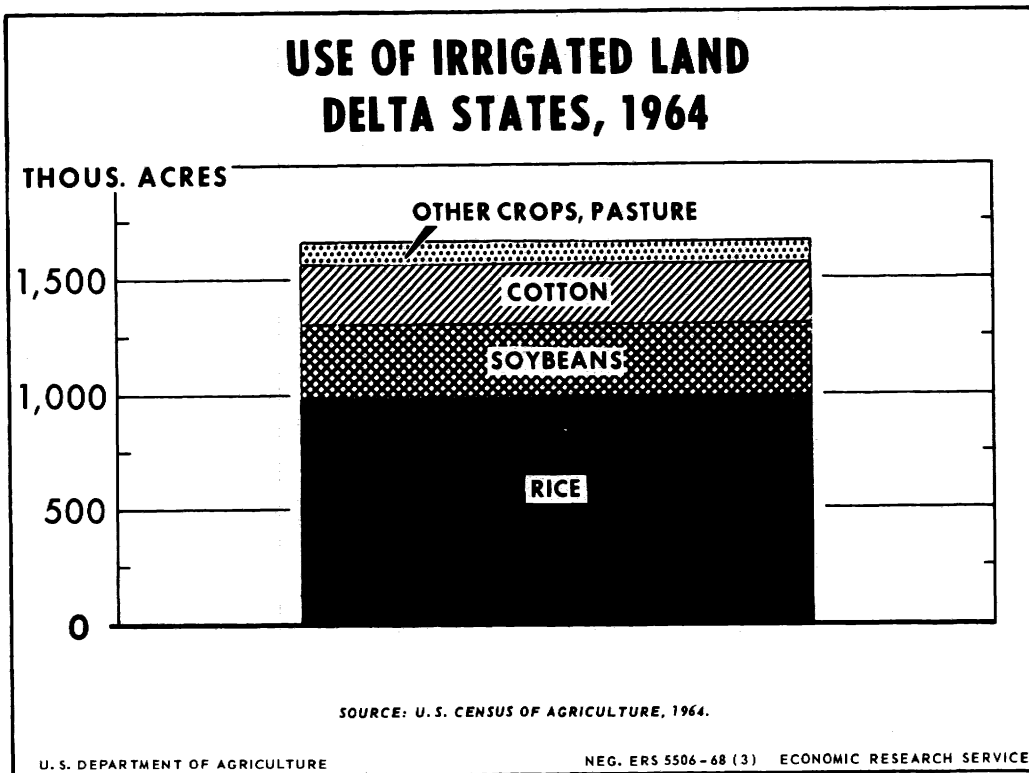


Figure 11

Sugarcane dominates on irrigated land in Hawaii, accounting for about 89 percent of approximately 70,000 acres of irrigated land harvested in 1964 and about 95 percent of all irrigated cropland in the State. Pineapples accounted for 4.1 percent of irrigated cropland harvested. Vegetables made up 4.0 and alfalfa 0.3 percent--the latter is a decrease from 2 percent in 1959.

Trends in Irrigated Acreages in the West

Irrigated acreages in the West expanded by 6.2 million acres from 1954-64, compared with 7.5 million in the preceding 10 years. These totals for the West are the sums of divergent regional trends. Of the 6.2-million-acre expansion in Western irrigation that occurred from 1954 to 1964, some 3.9 million, or 63 percent, took place in four States--Texas, Nebraska, California, and Kansas (table 15). In the eight Western Mountain States, total expansion in irrigation was only 1.6 million acres in the same period. One of these States--Arizona--reported a decline in irrigated land of 5 percent in 1954.

The divergent regional trends in Western irrigation are due to many factors, such as rainfall variations, climate, and public irrigation development policy. A full analysis of the dynamic interaction of these factors is beyond the scope of this report, but some highlights are noted.

Trends in irrigation differed for the four major western regions for the 25-year period, 1939-64 (table 16). The rapid rise of irrigation in the Southern Great Plains resulted largely from the availability of ground water at reasonable cost. From 1949 to 1959, this upward trend was reinforced by a severe

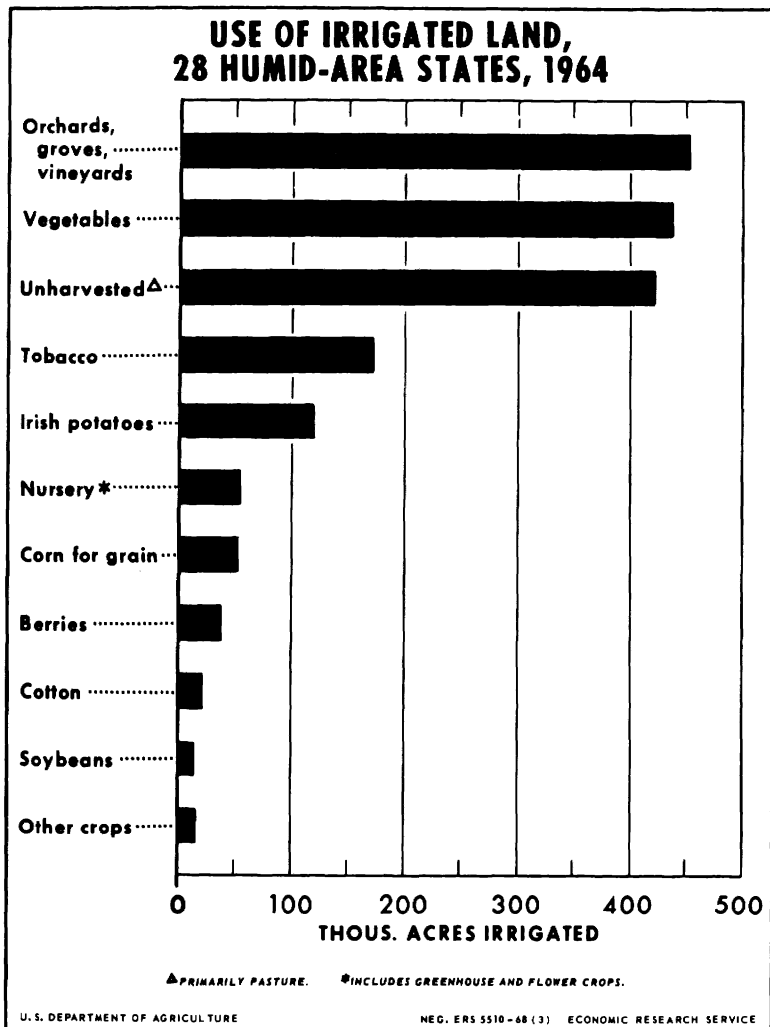


Figure 12

drought that gripped the region from the early part of the 1950's with no substantial relief until 1957. More favorable rainfall since 1957 was partly responsible for the slower rate of expansion of irrigation in the Southern Plains from 1954 to 1959. Nearly full development of some of the areas with moderate pumping lifts, lower prices for wheat and grain sorghum, and acreage restrictions were other important contributing factors.

The increases in irrigation in the Northern Great Plains and in the Southern Plains show some similarities. Both are subhumid to semiarid regions with large ground water reserves. In both regions, irrigation is relatively new and was stimulated by large-scale public development programs of surface water resources.

Compared with the Great Plains, the Mountain States are less favored with ground water; and, in general, surface sources are more fully developed. Lack of rainfall appears largely responsible for the net decline of irrigated acreage in the Mountain States from 1949 to 1954. Future irrigation expansion

Table 15.--Irrigated land in farms, 17 Western States and United States, selected years

State and region	Irrigated land in farms ^{1/}					
	1939	1944	1949	1954	1959	1964
	----- Million acres -----					
North Dakota -----	20	23	35	38	48	51
South Dakota -----	54	53	78	90	116	130
Nebraska -----	474	632	876	1,171	2,078	2,169
Kansas -----	83	96	139	332	762	1,004
Northern Plains -----	631	804	1,128	1,631	3,003	3,354
Oklahoma -----	4	2	34	108	198	302
Texas -----	895	1,320	3,132	4,707	5,656	6,385
Southern Plains -----	899	1,322	3,166	4,815	5,854	6,687
Montana -----	1,588	1,555	1,717	1,891	1,875	1,893
Idaho -----	1,895	2,026	2,137	2,325	2,577	2,802
Wyoming -----	1,284	1,354	1,432	1,263	1,470	1,571
Colorado -----	2,468	2,699	2,872	2,263	2,685	2,690
New Mexico -----	436	535	655	650	732	813
Arizona -----	575	736	964	1,177	1,152	1,125
Utah -----	911	1,124	1,138	1,073	1,062	1,092
Nevada -----	756	674	727	567	543	824
Mountain -----	9,913	10,703	11,642	11,208	12,095	12,811
Washington -----	494	520	589	778	1,007	1,150
Oregon -----	1,030	1,129	1,307	1,490	1,384	1,608
California -----	4,276	4,952	6,438	7,048	7,396	7,599
Pacific -----	5,800	6,601	8,334	9,317	9,787	10,356
17 Western States -----	17,243	19,430	24,271	26,971	30,739	33,208
Humid-area States -----	740	1,109	1,517	2,581	2,284	3,704
Hawaii -----	2/	2/	117	2/	141	144
U.S. total ^{3/--}	17,983	20,539	25,905	29,552 ^{4/}	33,164	37,056

^{1/} Totals do not add because of rounding.

^{2/} Not available.

^{3/} Excludes Alaska. Irrigated acreage in Alaska in 1964 was 158 acres.

^{4/} Excludes Hawaii in 1954.

Source: U. S. Census of Agriculture, 1940, 1950, 1959, and 1964.

Table 16.--Increase in irrigation, 4 Western regions, specified periods

Region	1939-1944	1944-1949	1949-1954	1954-1959	1959-1964
	-----1,000 acres-----				
Southern Plains--:	423	1,843	1,650	1,038	833
Northern Plains--:	173	325	503	1,372	351
Mountain-----:	790	939	-434	887	720
Pacific-----:	801	1,732	982	470	569
Total <u>1/</u> -----:	2,188	4,839	2,700	3,767	2,473

1/ Because of rounding, figures do not add to totals shown.

Source: Census of Agriculture, 1950, 1954, 1959, 1964.

Table 17.--Irrigated land in farms by regions, 31 humid-area States, selected years 1/

Region	Irrigated land in farms			Increase, 1964 over 1954
	1954	1959	1964	
-----Acres-----				
Northeast-----:	188,178	205,751	279,824	91,646
Lake States-----:	50,879	87,031	128,803	77,924
Corn Belt-----:	69,300	87,474	129,658	60,358
Appalachian-----:	84,591	117,543	175,404	90,813
Southeast-----:	490,347	489,535	1,311,596	821,249
Delta States-----:	1,698,171	1,296,348	1,678,364	-19,807
Total <u>1/</u> -----:	2,581,466	2,283,682	3,703,649	1,122,183

1/ Because of rounding, figures do not add to totals shown.

Source: Census of Agriculture, 1954, 1959, and 1964.

will be limited by water supplies, particularly in New Mexico, Arizona, Utah, and Nevada.

In the Pacific States, availability of substantial ground and surface water and large public projects favored growth of irrigation. The trend, however, is slowing with near full development of the less costly surface sources and fuller use of ground water. Further growth of irrigation in the Pacific States will be determined mostly by public policy concerning large-scale State and Federal water projects.

Trends in Irrigated Acreage in Humid-Area States and Hawaii

While still small in comparison with the West, irrigation in the 31 humid States expanded from about 2.6 to 3.7 million acres from 1954 to 1964 (table 17). In Hawaii, the rate of expansion was more moderate.

An increase of 821,000 acres occurred in the Southeastern States between 1954 and 1964, mainly due to an increase in citrus irrigation in Florida.

In other parts of the Eastern States, irrigation generally continued to expand from 1954 to 1964. The slow rate of expansion from 1954-59 seems to have resulted largely from more rainfall then, contrasted with the scanty rainfall in the early 1950's.

Sources of Irrigation Water in the West

Land irrigated with water from farm sources and irrigation organizations--Water supply for Western irrigation comes either from farm sources or from projects operated by supply organizations, such as irrigation districts and mutual and commercial companies. In 1949-59, farm sources increased in importance over organization sources. In 1959, farm sources supplied water for over 58 percent of irrigation land in the West, compared with a maximum of 49 percent in 1950. Much of this trend is due to the rapid expansion of well irrigation in the Great Plains, notably in Texas, Nebraska, and Kansas.

Of 33.2 million acres irrigated in the 17 Western States in 1964, more than 7.5 million acres were served entirely or in part with water supplies developed by the U.S. Bureau of Reclamation.

Land irrigation by ground and surface sources--The proportion of land irrigated by ground water has increased steadily since 1900 and was estimated in 1959 at 45 percent of all land irrigated in the West.^{9/} The percentage of water supplies coming from ground-water sources is considerably smaller, as much of the ground-water irrigation is in subhumid regions where water applications per acre are less than in arid regions. Further, water lost in conveyance is generally much less with ground-water irrigation than with irrigation from surface sources.

^{9/} The rest of this section is based on (9), 1959. The 1964 Census of Agriculture did not include information on these subjects.

In 1959, about 95 percent of the land served by ground water received that water from farm sources. Water furnished by supply organizations was mostly surface water. Yet ground water made up 40 percent of water supplied by organizations in Arizona, 6 percent of the same in Oregon, and 10 percent in California.

Seven western States irrigated more than half of their irrigated agricultural land with ground water in 1959. In three of these--Nebraska, Kansas, and Oklahoma--ground-water supplies permit considerable additional irrigation development. In the remaining four--California, Texas, New Mexico, and Arizona--supplies permit little new net development of ground water as a long-term, dependable irrigation source. Serious problems of lowered ground-water levels and contamination by saline water have already been encountered in these four States.

Sources of Water in the Humid-Area States and Hawaii

Outside the 17 Western States, Louisiana, and Hawaii, little water for irrigation is sold. The Census Survey of Irrigation in Humid Areas (9, 1959, Vol. 5) in the 30 remaining contiguous States reported less than 2 percent of some 1.87 million acres served by irrigation or drainage organizations or municipal water systems. Some 66 percent of the irrigated area was served by ground-water sources and 32 percent by surface sources, generally developed on individual farms.

The proportion of acreage irrigated by ground-water sources varied considerably--ranging from 81 percent in the Delta States (excluding Louisiana) to 26 percent in the Appalachian States. Nearly two-thirds of the irrigated land in the Corn Belt and from one-half to three-fifths of the irrigated acreages in Northeast, Southeast, and Lake States were served with ground water.

In Louisiana, irrigation organizations are an important source of water. They accounted for over 22 percent of the nearly 485,000 acres irrigated in 1959. Farm ground sources served 51 percent, and surface sources served 27 percent of the irrigated lands. An estimated 84 percent of land irrigated by organizations was served from surface sources and the rest from ground water.

In Hawaii, 62 percent of some 142,000 acres irrigated in 1959 were supplied by irrigation organizations. Farm surface sources provided for slightly over half of the remaining land irrigated. Farm ground water was used on 18 percent of the total irrigated area.

DRAINAGE

The limited space devoted here to drainage in comparison with irrigation reflects the amount of data reported for the two practices, not their relative significance. The acreage of farmland drained for the 48 States is not known with certainty, but was estimated at 155 million in 1959 (16). This was almost five times the acreage irrigated, and it included some of the Nation's most valuable farmlands.

Factors Affecting the Future of Drainage

Much the same factors influencing the future of irrigation will also influence the future of drainage. An example is the demand for agricultural products, and the relative costs of meeting the Nation's food production needs by drainage or other alternative means. Costs of drainage per acre compare favorably with costs per acre of Western irrigation from surface sources of water and are competitive with well-irrigation costs per acre and with most humid-area irrigation cost. Crop yields on drained lands versus irrigated lands are also relevant, of course. As described below, there is a considerable supply of land on which agricultural production could be made feasible or increased by drainage.

Public policy, particularly with respect to watershed protection and conservation incentive payments, will influence the extent of future drainage. Flood protection and irrigation development will also influence the future of drainage, because much flood plain land has drainage problems, and because removing excess water is often an essential complement to irrigation.

Uses of Drained Agricultural Land

Although a census was never made of crops grown on lands improved by drainage, some generalizations are possible. At least 80 percent of the drained agricultural land is used for harvested crops. From location maps of land in drainage projects, the following appraisal is made of principal crops grown under drainage.

In the Corn Belt probably the most widespread use of drained land is growing livestock feed, principally corn and soybeans. These crops are also grown in areas with considerable drained land that lies outside the Corn Belt. North of the Corn Belt, in the extensive drained areas of southern Michigan and Minnesota, forage crops are more frequently grown.

Truck and fruit crops are important on drained lands. These are found on the Atlantic Coast from New York through Delaware, in parts of North Carolina, in much of southern Florida, along much of the Gulf Coast of Louisiana and Texas and in the Rio Grande Valley. Truck and fruit crops are also grown on drained land in central and southern California.

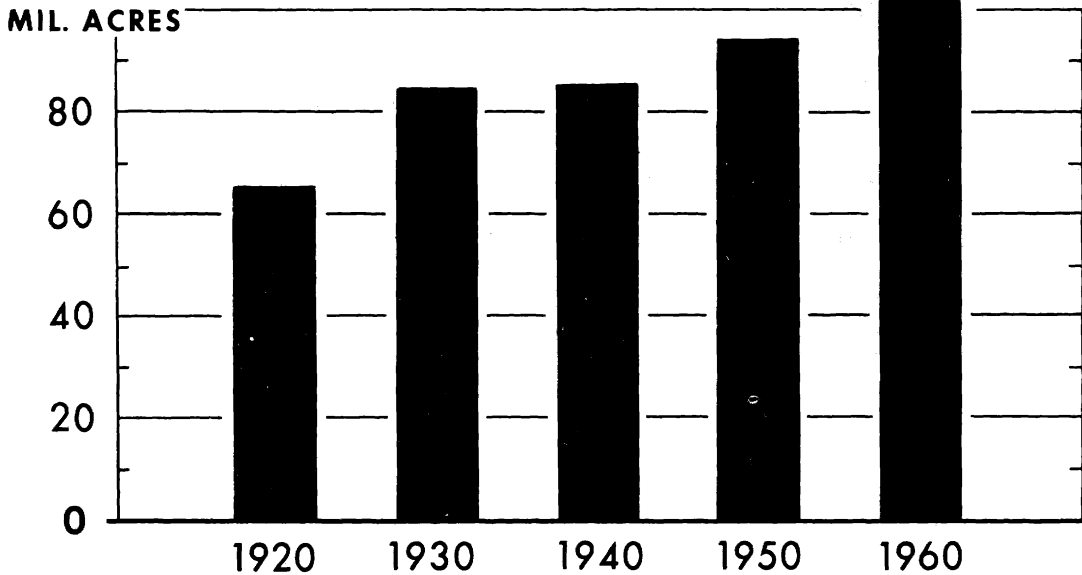
Cotton is grown extensively on drained land mainly in the Mississippi Valley and in California where drainage and irrigation are combined. This is similar to rice, a crop grown entirely under irrigation primarily in Arkansas, Louisiana, Texas, and California, where drainage is used in conjunction with irrigation.

Trends in Drainage

Land in drainage projects grew from less than 7 million acres at the turn of the century to 102 million acres in 1960. Available statistics are not quite comparable for these two dates and intervening dates, however. The totals presented in figure 13 include drained acreage in swamps, wasteland, and drained irrigated land through 1940, but exclude these categories in 1950 and

LAND IN DRAINAGE PROJECTS, 1920-60

48 States



SOURCE: U. S. CENSUS OF AGRICULTURE.

U. S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5508-68 (9) ECONOMIC RESEARCH SERVICE

Figure 13

1960. Growth was most rapid in the first quarter of the century, with another spurt of growth in the 1940-50 decade. In 1960, 92.3 million acres in drainage projects were drained and used for agricultural production.

Lands included in the census reports are limited to drainage projects of 500 or more acres and consist primarily of group undertakings. ^{10/} In addition to these group drainage projects, perhaps another 55 to 60 million acres had been drained by individual farmers up to 1960, excluding about 5 million acres of drained land in irrigation projects.

The drained agricultural area within projects increased by approximately 5.3 million acres during 1950-59, but considerably more drainage was accomplished outside of projects. Farmers, with the assistance of USDA's Agricultural Conservation Program, did work on 16.9 million acres in the same period. This total, consisting of open and enclosed drainage and shaping of land for drainage, was more than twice the increase in irrigated land during the same period.

^{10/} See Census of Agriculture (9, 1959, Vol. 4, p. XVI). The equivalent designation used in the 1950 Census Report was "Drainage Enterprise."

Assistance on drainage was given on 21,000 additional acres in Alaska, Hawaii, Puerto Rico, and offshore possessions. More recent data show an additional 7.2 million acres drained under this program from 1959 to 1965 (8).

Assistance under the Agricultural Conservation Program is confined to existing cropland and improved pasture, and is not permitted for the purpose of bringing new land into production. Therefore, no new large-scale drainage has resulted from this program. Much of the program has been for on-farm drainage and improving drainage works, with little area expansion under drainage projects.

Location of Existing and Potential Drained Land

Land in drainage projects drained and used for agriculture in 1960 was distributed as follows:

<u>Region</u>	<u>1,000 acres</u>
Northeast - - - - -	752
Lake States - - - - -	21,022
Corn Belt - - - - -	35,395
Northern Plains - - - - -	3,412
Appalachian - - - - -	2,893
Southeast - - - - -	5,353
Delta States - - - - -	14,832
Southern Plains - - - - -	5,825
Mountain - - - - -	390
Pacific - - - - -	<u>2,423</u>
48 States - - - - -	92,297

Source: U. S. Census of Agriculture (9, 1959, Vol. 4). For State data, see appendix table 25.

The greatest concentration of land in drainage projects was in the Corn Belt, followed by the Lake States and Delta States. These three regions accounted for 77 percent; Texas, 6 percent; and Florida, 5 percent of all land in drainage projects.

Five States--Indiana, Minnesota, Michigan, Ohio, and Iowa--contained about half the 1960 total of drained land within drainage projects.

Although it does not include all drainage development, location of lands drained under the Agricultural Conservation Program indicates the location of

drainage activities in recent years. The regional distribution of all types of drainage under the Agricultural Conservation Program from 1950 through 1964 was as follows:

<u>Region</u>	<u>1,000 acres (10-year total)</u>
Northeast - - - - -	747
Lake States - - - - -	4,103
Corn Belt - - - - -	5,663
Northern Plains - - - - -	1,683
Appalachian - - - - -	1,543
Southeast - - - - -	2,059
Delta States - - - - -	5,177
Southern Plains - - - - -	558
Mountain - - - - -	725
Pacific - - - - -	<u>1,848</u>
48 States - - - - -	24,106

Source: U. S. Department of Agriculture, Agricultural Stabilization and Conservation Service. For 1950-58, unpublished summaries. For 1964, see Statistical Summary, 1964 (9). Includes enclosed and open drainage, and shaping and grading of land for surface drainage. For State data, see appendix table 25.

For land in organized drainage projects, the Corn Belt leads in recent drainage installed under the Agricultural Conservation Program. The Delta States are second and the Lake States third. Of all land drained under the program from 1950 to 1964, 74 percent was in the Corn Belt, Delta, and Lake States; and another 13 percent in California, South Carolina, North Carolina, and North Dakota.

Estimates from the nationwide USDA sample survey of conservation needs indicated that in 1958 there were some 60 million acres of cropland on which excess water was still a dominant problem. The three leading regions that contained 70 percent of the estimated total cropland area with drainage problems were the Corn Belt, Lake States, and Delta States.

Outside these three regions, six States had an estimated 1 to 2 million acres (14 percent) of the Nation's cropland with drainage problems: Texas, North Carolina, California, Tennessee, North Dakota, and New York.

In addition to land presently used for agriculture, there is a considerable fertile but undeveloped land area in the United States that could be farmed if adequately drained. Much of this undeveloped land area would require clearing. An article by Wooten and Jones on the history of drainage enterprises (19) estimated that some 20 million acres could be developed through drainage. Of this total, about 7 million acres are in the Delta States and another 7 to 8 million in the Coastal Plain of the Southeast.

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DEFINITIONS AND EXPLANATIONS OF LAND USE CLASSES

Cropland.--Total cropland includes cropland used for crops, cropland used only for pasture, cropland in soil-improvement crops, and idle cropland. The acreage used only for pasture may also be included with the acreage of other pasture and grain types if the acreage of all land used for pasture is desired.

Cropland used for crops is made up of three components--acreage of cropland harvested (land from which one or more crops were harvested), crop failure, and cultivated summer fallow. Data on soil-improvement crops not harvested or pastured and idle cropland is not included, as the cropland-used-for-crops series shows land area in crops or in preparation for crops the following year.

Idle and fallow cropland and cropland used only for pasture are usually considered in the crop-rotation system as land that is used for crops, though not necessarily in each year. Fallow land often is cultivated to conserve moisture and kill weeds in preparation for crops. Much of the idle land is left unplanted for a year or two only, although some of it is the poorer cropland that represents abandonment for crop purposes.

The series on cropland used for crops is based on the series of principal crops harvested and crop losses of the Statistical Reporting Service (SRS) and its predecessors, and on the data from the censuses of agriculture. The acreages of cropland harvested were used for the censuses taken at 5-year intervals from 1925 to 1964. Interpolations were made for the intervening years, based on the SRS and former Bureau of Agricultural Economics (BAE) series on principal crops harvested. For earlier years, the former BAE series on principal crops harvested and acreages of specified crops harvested reported by the 10-year censuses were used, and adjustments made for crops not reported. Additions were made to the acreage of cropland harvested reported by the 1950, 1954, 1959, and 1964 censuses to cover some of the underenumeration of cropland harvested that was indicated by postenumeration surveys.

Acreages of crop failure as given in census reports were used for census years from 1925 to 1945 and interpolations for intervening years were based on the crop losses or differences between planted and harvested acreages of principal crops as estimated by the former BAE. Acreages of crop failure for recent years are based chiefly on crop losses as reported by the Agricultural Marketing Service (AMS, now Consumer and Marketing Service) and SRS, except for 1964, when these data were included in the Census of Agriculture. Reported acreages of crop losses are adjusted for the replanting of part of the acreage on which winter wheat is abandoned. Hayland that produced nothing but pasture in some dry seasons is not included in crop failure in recent years.

Estimates of acreage of cultivated summer fallow were made only for the geographic divisions lying west of the Mississippi River. From 1945 to 1948, estimates of fallow were based chiefly on acreages seeded to wheat on summer fallow land, as estimated by the former BAE and according to data issued by the Great Plains Council. For 1949 and subsequent years, estimates of fallow were based partly on the 1950, 1954, 1959, and 1964 Censuses of Agriculture, estimates of wheat seeded on summer fallow made by AMS and SRS, and information obtained from the Great Plains Council. For 1967, estimates of cultivated summer fallow, as well as idle cropland, cropland in soil-improvement crops only, and cropland pasture were based on data collected on the SRS June enumerative survey. Estimates for years before 1945 were built up from fragmentary data available in BAE and the Production Economics Research Branch, Agricultural Research Service.

Pasture and range.--Estimates of the acreage of all pasture and grazing land include open permanent pasture in farms, cropland used only for pasture, farm woodland, or forest land pastured, and all land grazed not in farms. Grazing land not in farms is part grassland, part shrubs and other nonforest growth, and part forest land.

In the study reported here, pasture and range is classified in two different ways. One breakdown includes grassland pasture and grazing land and forest

pastured or grazed. The second breakdown separates pasture in farms from grazing land not in farms.

Grassland pasture and range.--Grassland pasture and grazing land includes all land used primarily for pasture and grazing, exclusive of the forest pastured or grazed. It includes the shrub and brushland types of pasture and grazing land such as sagebrush, scattered mesquite, and some other shrub types in the West, and some scattered brushland pasture in the East, and all tame and wild or native grasses and legumes and other forage used for pasture or grazing.

Forest range.--Only rough approximations can be made of the total acreage of forest not in farms which contains some areas that have forage subject to grazing or that have value for grazing at some time during the year. Forest land actually grazed, or useful for grazing, consists principally of open forest, cutover areas, abandoned fields, brush-grown pasture, and other land within forested areas that has grass or other forage growth.

In the Northern States, the forest areas grazed, or subject to grazing, usually include forest land adjacent to farms in the Corn Belt, the Lake States, and the Northeastern States. Much of the forest land in the Missouri Ozark area is subject to grazing. The acreage of forest land grazed in New England and other sections of the Northeast includes abandoned fields and brush-grown pastures.

In the Southern States, the forest lands estimated to be subject to grazing, or useful for grazing, contain areas covered by switch cane, abandoned fields (not reforested), cutover land, and grass and other forage areas within forests, such as the open longleaf-slash pine belt of the Coastal Plain, the Arkansas Ozark area, and some semiprairie, open grassland, savanna, and marshland areas in Florida, Georgia, Louisiana, and Texas.

The chief forest areas in the Western States that are subject to or useful for grazing include arid woodlands, brush and shrub lands, woodland-grasslands, open forests like ponderosa pine forests, and some cutover areas that have grass or other forage growth.

Land use and cover classes of land grazed and in open grassland, shrubs, and forest are not always mutually exclusive. Grassland includes some brushland, while forest land includes many areas of open grass and other forage.

Pasture and range in farms.--Farm pasture consists of grassland and other non-forested pasture (not cropland and not woodland), and pastured forest. (Cropland used only for pasture is included as a part of the cropland area in arriving at the total acreage of cropland available for crops).

Improved pasture ordinarily is in tame grasses and legumes, either seeded or natural growth, but may include native forage. All classes usually have had improvement or conservation practices applied, such as weed and brush control, seeding or reseeding, either artificial or natural, fertilization, drainage, and irrigation.

Range not in farms.--Grazing land not in farms comprises the open grassland and shrub grazing lands and the forest area grazed. Most of the grazing land not

in farms is public land in the Western States, and privately owned forest land in the South.

Forest land.--Forest land as defined by the U. S. Forest Service includes (1) lands that are at least 10-percent stocked by trees of any size and capable of producing timber or other wood products, or of influencing the climate or the water regime; (2) land from which the trees described in (1) have been removed to less than 10 percent stocking and which have not been developed for other use; (3) forested areas; and (4) chaparral areas.

Land that is grazed and that bears sparse forest growth--only 10 to 30 percent covered by trees--or from which the forest has been removed to less than 10-percent stocking but which has not been developed for uses other than timber production, or for pasture, may in some areas overlap the acreages reported by farmers as open pasture and grazing land in farms (grassland pasture, or pasture other than cropland and forest land).

Most of the available forest land in the East, North, and South is commercial, whereas about two-thirds of such forest land in the Great Plains and half of that in the West is classed as noncommercial. Noncommercial forest includes inaccessible alpine ranges, chaparral, mesquite, pinion-juniper, and semiarid shrub and brush growth.

Special-use areas.--The special uses in this report include areas for highway, road, and railroad rights-of-way, airports, farmsteads, farm roads and lanes, urban and town areas; parks, wilderness, and primitive areas; wildlife refuges, national defense areas, flood-control areas; and State-owned land held for institutional sites and miscellaneous other uses, such as National Guard camps and rifle ranges, fairgrounds, airports, radio stations, flood-control areas, and watershed-protection areas.

Special uses of rural land for which estimates are not available include those for industrial and commercial sites in rural areas, mining areas, clay, sand, and stone quarry sites, powerline rights-of-way, cemeteries, and golf courses. Areas in rural villages and small towns with populations of 100 to 1,000 are not included in urban and town areas. At present, the acreage in these villages and towns is included in other major uses of land such as forest, grazing, farm, and other land. Separation would call for revision of accepted major land use areas of many counties and States.

Water area in large reservoirs is not included among the special uses of land as the approximate land area of the United States excludes all natural or artificial water bodies of 40 acres or more.

Miscellaneous other areas.--Miscellaneous unaccounted-for areas not found among other major uses include marshes, sand dunes, bare rock areas, deserts, and tundra.

APPENDIX

Tables

Table 18.--Major uses of land, United States, 1964

State and region	Cropland <u>1/</u>	Grassland pasture and range <u>2/</u>	Forest land <u>3/</u>	Special uses <u>4/</u>	Miscellaneous other land <u>5/</u>	Approximate land area <u>6/</u>
----- 1,000 acres -----						
Maine.....	1,002	283	17,244	707	561	19,797
New Hampshire.....	256	47	4,933	302	243	5,781
Vermont.....	883	406	4,280	312	54	5,935
Massachusetts.....	369	135	3,270	1,141	98	5,013
Rhode Island.....	46	7	430	181	7	671
Connecticut.....	299	192	1,979	620	27	3,117
New York.....	6,626	3,447	12,073	5,256	3,234	30,636
New Jersey.....	858	148	2,162	1,483	169	4,820
Pennsylvania.....	6,314	1,868	16,975	3,435	224	28,816
Delaware.....	533	18	391	159	167	1,268
Maryland.....	1,987	559	2,900	761	123	6,330
District of Columbia.....	--	--	--	39	--	39
Northeast.....	19,173	7,110	66,637	14,396	4,907	112,223
Michigan.....	9,867	2,045	19,356	3,566	1,530	36,364
Wisconsin.....	12,367	3,086	15,539	2,896	969	34,857
Minnesota.....	22,736	3,354	18,522	4,296	1,837	50,745
Lake States.....	44,970	8,485	53,417	10,758	4,336	121,966
Ohio.....	12,035	3,708	5,121	2,854	2,531	26,249
Indiana.....	13,755	2,286	3,960	1,824	1,336	23,161
Illinois.....	24,165	3,375	3,826	3,073	1,322	35,761
Iowa.....	26,623	3,248	2,295	2,281	1,421	35,868
Missouri.....	18,172	7,718	15,205	2,286	809	44,190
Corn Belt.....	94,750	20,335	30,407	12,318	7,419	165,229
North Dakota.....	27,914	12,988	436	2,231	770	44,339
South Dakota.....	18,965	25,432	1,496	2,415	304	48,612
Nebraska.....	22,275	23,731	848	1,850	270	48,974
Kansas.....	29,689	18,524	1,464	2,277	562	52,516
Northern Plains.....	98,843	80,675	4,244	8,773	1,906	194,441
Virginia.....	4,080	3,211	16,059	1,878	270	25,498
West Virginia.....	1,238	1,706	11,423	685	362	15,414
North Carolina.....	6,154	1,715	20,092	2,439	883	31,283
Kentucky.....	9,437	2,032	11,804	1,716	516	25,505
Tennessee.....	7,974	2,114	13,643	2,109	635	26,475
Appalachian.....	28,883	10,778	73,021	8,827	2,666	124,175
South Carolina.....	3,706	1,202	11,566	1,548	1,357	19,379
Georgia.....	6,381	1,802	26,052	2,860	151	37,246
Florida.....	3,582	6,731	19,625	3,909	800	34,647
Alabama.....	5,211	2,829	21,749	2,214	542	32,545
Southeast.....	18,880	12,564	78,992	10,531	2,850	123,817
Mississippi.....	6,655	3,717	17,976	1,408	553	30,309
Arkansas.....	8,571	2,373	20,630	1,789	29	33,392
Louisiana.....	5,012	3,343	16,018	1,871	2,655	28,899
Delta States.....	20,238	9,433	54,624	5,068	3,237	92,600

See footnotes at end of table.

Table 18.--Major uses of land, United States, 1964--Continued

State and region	Cropland ^{1/}	Grassland : pasture and range ^{2/}	Forest : land ^{3/}	Special : uses ^{4/}	Miscellaneous : other land ^{5/}	Approximate : land area ^{6/}
	----- 1,000 acres -----					
Oklahoma.....	13,540	18,449	9,179	2,841	141	44,150
Texas.....	35,906	99,929	23,892	7,166	1,408	168,301
Southern Plains.....	49,446	118,378	33,071	10,007	1,549	212,451
Montana.....	15,661	50,558	19,235	4,855	2,877	93,186
Idaho.....	5,982	22,352	17,808	4,058	2,713	52,913
Wyoming.....	2,836	45,826	6,362	5,634	1,602	62,260
Colorado.....	11,341	29,017	21,351	2,902	1,817	66,428
New Mexico.....	2,554	51,471	17,341	5,184	1,175	77,725
Arizona.....	1,669	41,169	19,798	7,995	2,049	72,680
Utah.....	2,288	25,775	14,187	4,786	5,688	52,724
Nevada.....	836	48,231	11,509	5,747	4,006	70,329
Mountain.....	43,167	314,399	127,591	41,161	21,927	548,245
Washington.....	8,185	8,318	20,725	4,995	441	42,664
Oregon.....	5,425	22,709	29,688	2,534	1,218	61,574
California.....	11,841	23,280	39,406	15,100	10,557	100,184
Pacific.....	25,451	54,307	89,819	22,629	12,216	204,422
48 States.....	443,801	636,464	611,823	144,468	63,013	1,899,569
Alaska.....	24	2,772	118,156	28,230	213,335	362,517
Hawaii.....	371	1,203	1,796	459	358	4,187
Total.....	444,196	640,439	731,775	173,157	276,706	2,266,273

^{1/} Land used for crops or in the rotation in 1964. Includes a 2-percent upward adjustment in census reported acreage of cropland to compensate for normal underenumeration.

^{2/} Grassland and other nonforested pasture in farms, excluding cropland used only for pasture, plus estimates of open or nonforested grazing land not in farms.

^{3/} Woodland and forest, excluding reserved woodland and forest areas and some unreserved areas duplicated in parks and other special uses. All duplication could not be eliminated because of multiple use between forestry and other classes. The total woodland and forest acreage as of September 1967, was approximately 762 million acres according to the continuing forest inventory of the U.S. Forest Service.

^{4/} Urban and town areas, highway and railroad rights-of-way, airports, National and State Parks, wild-life refuges, national defense areas, flood control areas, and other special-use areas.

^{5/} Miscellaneous areas with low agriculture use value, such as marshes, open swamps, bare rocks, desert, and tundra.

^{6/} Revised land areas for 1960 supplied by the Bureau of the Census. Includes all dryland and land temporarily or partially covered with water, such as marshland, swamps, and river flood plains; streams, sloughs, estuaries, and canals less than 1/8 mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

Table 19.--Major uses of land in farms, by regions and States, 1964

State and region	Cropland <u>1/</u>	Grassland pasture <u>2/</u>	Forest land	Other land <u>3/</u>	Total acreage <u>4/</u>	Percentage of land area
	1,000 acres				Percent	
Maine.....	1,002	98	1,458	32	2,590	13.1
New Hampshire.....	256	47	578	22	903	15.6
Vermont.....	883	406	1,166	69	2,524	42.5
Massachusetts.....	369	73	405	55	902	18.0
Rhode Island.....	46	7	43	8	104	15.5
Connecticut.....	299	98	278	46	721	23.1
New York.....	6,626	2,302	2,727	620	12,275	40.1
New Jersey.....	858	84	190	24	1,156	24.0
Pennsylvania.....	6,314	1,519	2,568	403	10,804	37.5
Delaware.....	533	12	161	11	717	56.5
Maryland.....	1,987	341	812	41	3,181	50.3
Northeast.....	19,173	4,987	10,386	1,331	35,877	32.0
Michigan.....	9,867	577	2,479	676	13,599	37.4
Wisconsin.....	12,367	1,845	5,134	1,032	20,378	58.5
Minnesota.....	22,736	2,118	3,864	2,087	30,805	60.7
Lake States.....	44,970	4,540	11,477	3,795	64,782	53.1
Ohio.....	12,035	2,177	2,366	1,041	17,619	67.1
Indiana.....	13,755	1,102	2,355	721	17,933	77.4
Illinois.....	24,165	1,746	2,696	1,351	29,958	83.8
Iowa.....	26,623	3,248	1,980	1,907	33,758	94.1
Missouri.....	18,172	5,835	7,335	1,350	32,692	74.0
Corn Belt.....	94,750	14,108	16,732	6,370	131,960	80.0
North Dakota.....	27,914	12,988	388	1,427	42,717	96.3
South Dakota.....	18,965	25,432	271	899	45,567	93.7
Nebraska.....	22,275	23,731	496	1,291	47,793	97.6
Kansas.....	29,689	18,524	773	1,285	50,271	95.7
Northern Plains.....	98,843	80,675	1,928	4,902	186,348	95.8
Virginia.....	4,080	2,568	5,035	319	12,002	47.1
West Virginia.....	1,238	1,605	2,285	151	5,279	34.2
North Carolina.....	6,154	1,165	6,849	214	14,382	46.0
Kentucky.....	9,437	1,824	4,247	757	16,265	63.8
Tennessee.....	7,974	1,808	4,859	625	15,266	57.7
Appalachian.....	28,883	8,970	23,275	2,066	63,194	50.9

See footnotes at end of table.

Table 19.--Major uses of land in farms, by regions and States, 1964--Continued

State and region	Cropland ^{1/}	Grassland pasture ^{2/}	Forest land	Other land ^{3/}	Total acreage ^{4/}	Percentage of land area
----- 1,000 acres -----						Percent
South Carolina.....	3,706	480	3,811	104	8,101	41.8
Georgia.....	6,381	1,802	9,247	457	17,887	48.0
Florida.....	3,582	4,306	6,516	1,007	15,411	44.5
Alabama.....	5,211	2,555	7,123	337	15,226	46.8
Southeast.....	18,880	9,143	26,697	1,905	56,625	45.7
Mississippi.....	6,655	3,717	6,795	585	17,752	58.6
Arkansas.....	8,571	2,373	4,967	654	16,565	49.6
Louisiana.....	5,012	2,004	2,966	429	10,411	36.0
Delta States.....	20,238	8,094	14,728	1,668	44,728	48.3
Oklahoma.....	13,540	18,449	3,780	308	36,077	81.7
Texas.....	35,906	94,581	10,791	428	141,706	84.2
Southern Plains.....	49,446	113,030	14,571	736	177,783	83.1
Montana.....	15,661	47,377	2,125	671	65,834	70.6
Idaho.....	5,982	7,434	1,393	493	15,302	28.9
Wyoming.....	2,836	32,937	830	450	37,053	59.5
Colorado.....	11,341	25,063	1,575	280	38,259	57.6
New Mexico.....	2,554	41,189	3,456	448	47,647	61.3
Arizona.....	1,669	31,935	5,312	1,643	40,559	55.8
Utah.....	2,288	9,661	825	93	12,867	24.4
Nevada.....	836	9,441	51	155	10,483	14.9
Mountain.....	43,167	205,037	15,567	4,233	268,004	48.9
Washington.....	8,185	6,741	3,751	376	19,053	44.7
Oregon.....	5,425	11,577	3,194	313	20,509	33.3
California.....	11,841	20,450	3,403	1,317	37,011	36.9
Pacific.....	25,451	38,768	10,348	2,006	76,573	37.5
48 States.....	443,801	487,352	145,709	29,012	1,105,874	58.2
Alaska.....	24	1,752	48	135	1,959	0.5
Hawaii.....	371	1,203	217	563	2,354	56.2
U.S. Total.....	444,196	490,307	145,974	29,710	1,110,187	49.0

^{1/} Total adjusted upward about 2 percent to compensate for underenumeration. Includes cropland harvested, crop failure, cultivated summer fallow, cropland in soil-improvement and cover crops, idle cropland, and cropland used only for pasture.

^{2/} Open permanent pasture (not cropland and not woodland).

^{3/} Other land includes farmsteads, farm roads and lanes, ditches, and wasteland. The acreage of other land in farms was reduced to compensate for the upward adjustment in total cropland.

^{4/} Source: U.S. Census of Agriculture, 1964.

Table 20.--Major uses of land not in farms, by regions and States, 1964

State and region	Pasture and range <u>1/</u>	Forest land not grazed <u>2/</u>	Other land <u>3/</u>	Total <u>4/</u>
----- 1,000 acres -----				
Maine.....	215	15,756	1,236	17,207
New Hampshire.....	35	4,320	523	4,878
Vermont.....	45	3,069	297	3,411
Massachusetts.....	104	2,823	1,184	4,111
Rhode Island.....	2	385	180	567
Connecticut.....	100	1,695	601	2,396
New York.....	1,809	8,682	7,870	18,361
New Jersey.....	64	1,972	1,628	3,664
Pennsylvania.....	719	14,037	3,256	18,012
Delaware.....	12	224	315	551
Maryland.....	259	2,047	843	3,149
District of Columbia.....	--	--	39	39
Northeast.....	3,364	55,010	17,972	76,346
Michigan.....	1,671	16,674	4,420	22,765
Wisconsin.....	1,475	10,171	2,833	14,479
Minnesota.....	1,616	14,278	4,046	19,940
Lake States.....	4,762	41,123	11,299	57,184
Ohio.....	1,997	2,289	4,344	8,630
Indiana.....	1,479	1,310	2,439	5,228
Illinois.....	1,946	813	3,044	5,803
Iowa.....	--	315	1,795	2,110
Missouri.....	2,770	6,983	1,745	11,498
Corn Belt.....	8,192	11,710	13,367	33,269
North Dakota.....	--	48	1,574	1,622
South Dakota.....	524	701	1,820	3,045
Nebraska.....	160	192	829	1,181
Kansas.....	345	346	1,554	2,245
Northern Plains.....	1,029	1,287	5,777	8,093
Virginia.....	861	10,806	1,829	13,496
West Virginia.....	930	8,309	896	10,135
North Carolina.....	917	12,876	3,108	16,901
Kentucky.....	839	6,926	1,475	9,240
Tennessee.....	442	8,648	2,119	11,209
Appalachian.....	3,989	47,565	9,427	60,981
South Carolina.....	2,374	6,103	2,801	11,278
Georgia.....	1,425	15,380	2,554	19,359
Florida.....	5,236	10,298	3,702	19,236
Alabama.....	1,885	13,015	2,419	17,319
Southeast.....	10,920	44,796	11,476	67,192

See footnotes at end of table.

Table 20.--Major uses of land not in farms, by regions and States, 1964--Continued

State and region	Pasture and range ^{1/}	Forest land not grazed ^{2/}	Other land ^{3/}	Total ^{4/}
----- 1,000 acres -----				
Mississippi.....	2,915	8,266	1,376	12,557
Arkansas.....	9,605	6,058	1,164	16,827
Louisiana.....	7,763	6,628	4,097	18,488
Delta States.....	20,283	20,952	6,637	47,872
Oklahoma.....	3,680	1,719	2,674	8,073
Texas.....	14,594	3,855	8,146	26,595
Southern Plains.....	18,274	5,574	10,820	34,668
Montana.....	10,802	9,489	7,061	27,352
Idaho.....	21,376	9,957	6,278	37,611
Wyoming.....	15,698	2,723	6,786	25,207
Colorado.....	15,142	8,588	4,439	28,169
New Mexico.....	22,533	1,634	5,911	30,078
Arizona.....	19,072	4,648	8,401	32,121
Utah.....	28,120	1,356	10,381	39,857
Nevada.....	47,597	2,651	9,598	59,846
Mountain.....	180,340	41,046	58,855	280,241
Washington.....	3,153	15,398	5,060	23,611
Oregon.....	20,877	16,749	3,439	41,065
California.....	15,589	23,244	24,340	63,173
Pacific.....	39,619	55,391	32,839	127,849
48 States.....	290,772	324,454	178,469	793,695
Alaska.....	1,370	117,758	241,430	360,558
Hawaii.....	300	1,279	254	1,833
U.S. Total.....	292,442	443,491	420,153	1,156,086

^{1/}Forested and nonforested pasture and grazing land including some acreages classified as usable for grazing but not necessarily grazed each year.

^{2/}Excludes reserved forest land in parks and other special uses.

^{3/}Other land not in farms includes special-use areas such as cities, parks, wildlife refuges, national defense areas, flood-control areas, airports, part of the area in highway and road rights-of-way, and miscellaneous other land.

^{4/}Total land areas shown in appendix table 18 minus land in farms as reported by the U.S. Census of Agriculture, 1964.

Table 21.--Major uses of cropland, by regions and States, 48 States, 1964

State and region	Cropland used for crops <u>1/</u>	Cropland used for soil im- provement crops and idle <u>2/</u>	Cropland used only for pasture <u>3/</u>	Total cropland <u>4/</u>
----- 1,000 acres -----				
Maine.....	603	256	143	1,002
New Hampshire.....	172	22	62	256
Vermont.....	666	34	183	883
Massachusetts.....	240	49	80	369
Rhode Island.....	30	4	12	46
Connecticut.....	210	33	56	299
New York.....	4,883	752	991	6,626
New Jersey.....	587	183	88	858
Pennsylvania.....	4,717	911	686	6,314
Delaware.....	441	60	32	533
Maryland.....	1,467	294	226	1,987
Northeast.....	14,016	2,598	2,559	19,173
Michigan.....	6,946	1,774	1,147	9,867
Wisconsin.....	9,370	1,232	1,765	12,367
Minnesota.....	17,985	3,444	1,307	22,736
Lake States.....	34,301	6,450	4,219	44,970
Ohio.....	9,482	1,389	1,164	12,035
Indiana.....	10,537	1,883	1,335	13,755
Illinois.....	20,357	2,139	1,669	24,165
Iowa.....	20,241	3,750	2,632	26,623
Missouri.....	11,386	2,358	4,428	18,172
Corn Belt.....	72,003	11,519	11,228	94,750
North Dakota.....	25,077	1,989	848	27,914
South Dakota.....	16,520	1,511	934	18,965
Nebraska.....	18,880	2,364	1,031	22,275
Kansas.....	25,759	2,584	1,346	29,689
Northern Plains.....	86,236	8,448	4,159	98,843
Virginia.....	2,662	553	865	4,080
West Virginia.....	754	124	360	1,238
North Carolina.....	4,262	1,291	601	6,154
Kentucky.....	3,591	1,274	4,572	9,437
Tennessee.....	3,725	1,190	3,059	7,974
Appalachian.....	14,994	4,432	9,457	28,883
South Carolina.....	2,353	761	592	3,706
Georgia.....	4,113	1,251	1,017	6,381
Florida.....	2,260	581	741	3,582
Alabama.....	3,119	849	1,243	5,211
Southeast.....	11,845	3,442	3,593	18,880

See footnotes at end of table.

Table 21.--Major uses of cropland, by regions and States, 1964--Continued

State and region	Cropland used for crops <u>1/</u>	Cropland used for soil im- provement crops and idle <u>2/</u>	Cropland used only for pasture <u>3/</u>	Total cropland <u>4/</u>
----- 1,000 acres -----				
Mississippi.....	4,517	844	1,294	6,655
Arkansas.....	6,248	483	1,840	8,571
Louisiana.....	2,726	547	1,739	5,012
Delta States.....	13,491	1,874	4,873	20,238
Oklahoma.....	9,872	1,717	1,951	13,540
Texas.....	24,254	4,666	6,986	35,906
Southern Plains.....	34,126	6,383	8,937	49,446
Montana.....	13,797	833	1,031	15,661
Idaho.....	4,920	366	696	5,982
Wyoming.....	2,077	192	567	2,836
Colorado.....	8,677	1,544	1,120	11,341
New Mexico.....	1,292	877	385	2,554
Arizona.....	1,238	289	142	1,669
Utah.....	1,358	488	442	2,288
Nevada.....	527	118	191	836
Mountain.....	33,886	4,707	4,574	43,167
Washington.....	6,839	562	784	8,185
Oregon.....	4,103	395	927	5,425
California.....	8,983	805	2,053	11,841
Pacific.....	19,925	1,762	3,764	25,451
48 States.....	334,823	51,615	57,363	443,801
Alaska.....	17	3	4	24
Hawaii.....	305	14	52	371
U.S. Total.....	335,145	51,632	57,419	444,196

1/ Includes cropland harvested, crop failure, and cultivated summer fallows. An upward adjustment in the acreage of cropland harvested reported (9, 1964) was made to conform to the estimates of acreages of crops harvested as reported (15, 1965) and other 1965 and 1966 SRS crop reports. Includes cropland harvested--291,538,000 acres; crop failure--6,229,000 acres; and cultivated summer fallow--36,984,000 acres.

2/ Includes cropland not harvested and not pastured. Adjusted upward from Census levels to compensate for underenumeration of Conservation Reserve whole farms.

3/ Cropland in the rotation is used some years for crops and other years for pasture. Acreages are as reported by the Census of Agriculture (9, 1964).

4/ Includes cropland available for crops in rotation and cropland used only for pasture.

Table 22.--Pasture in farms, by type, region and State, United States, 1964

State and region	Cropland used only for pasture	Open perma- nent pasture	Forest land pasture	Total
----- 1,000 acres -----				
Maine.....	143	98	129	370
New Hampshire.....	62	47	110	219
Vermont.....	183	406	407	996
Massachusetts.....	80	73	86	239
Rhode Island.....	12	7	5	24
Connecticut.....	56	98	67	221
New York.....	991	2,302	816	4,109
New Jersey.....	88	84	19	191
Pennsylvania.....	686	1,519	573	2,778
Delaware.....	32	12	9	53
Maryland.....	226	341	111	678
Northeast.....	2,559	4,987	2,332	9,878
Michigan.....	1,147	577	908	2,632
Wisconsin.....	1,765	1,845	2,802	6,412
Minnesota.....	1,307	2,118	2,410	5,835
Lake States.....	4,219	4,540	6,120	14,879
Ohio.....	1,164	2,177	930	4,271
Indiana.....	1,335	1,102	1,018	3,455
Illinois.....	1,669	1,746	1,501	4,916
Iowa.....	2,632	3,248	1,551	7,431
Missouri.....	4,428	5,835	5,214	15,477
Corn Belt.....	11,228	14,108	10,214	35,550
North Dakota.....	848	12,988	237	14,073
South Dakota.....	934	25,432	207	26,573
Nebraska.....	1,031	23,731	357	25,119
Kansas.....	1,346	18,524	470	20,340
Northern Plains.....	4,159	80,675	1,271	86,105
Virginia.....	865	2,568	1,143	4,576
West Virginia.....	360	1,605	910	2,875
North Carolina.....	601	1,165	951	2,717
Kentucky.....	4,572	1,824	1,433	7,829
Tennessee.....	3,059	1,808	1,738	6,605
Appalachian.....	9,457	8,970	6,175	24,602
South Carolina.....	592	480	803	1,875
Georgia.....	1,017	1,802	2,598	5,417
Florida.....	741	4,306	4,976	10,023
Alabama.....	1,243	2,555	2,897	6,695
Southeast.....	3,593	9,143	11,274	24,010

Table 22.--Pasture in farms, by type, region and State, 1964--Continued

State and region	Cropland used only for pasture	Open perma- nent pasture	Forest land pasture	Total
----- 1,000 acres -----				
Mississippi.....	1,294	3,717	3,843	8,854
Arkansas.....	1,840	2,373	2,922	7,135
Louisiana.....	1,739	2,004	1,719	5,462
Delta States.....	4,873	8,094	8,484	21,451
Oklahoma.....	1,951	18,449	3,413	23,813
Texas.....	6,986	94,581	10,042	111,609
Southern Plains.....	8,937	113,030	13,455	135,422
Montana.....	1,031	47,377	1,870	50,278
Idaho.....	696	7,434	1,138	9,268
Wyoming.....	567	32,937	581	34,085
Colorado.....	1,120	25,063	1,436	27,619
New Mexico.....	385	41,189	3,232	44,806
Arizona.....	142	31,935	5,292	37,369
Utah.....	442	9,661	762	10,865
Nevada.....	191	9,441	38	9,670
Mountain.....	4,574	205,037	14,349	223,960
Washington.....	784	6,741	3,052	10,577
Oregon.....	927	11,577	2,632	15,136
California.....	2,053	20,450	2,804	25,307
Pacific.....	3,764	38,768	8,488	51,020
48 States.....	57,363	487,352	82,162	626,877
Alaska.....	4	1,752	17	1,773
Hawaii.....	52	1,203	31	1,286
U.S. Total.....	57,419	490,307	82,210	629,936

Source: U.S. Census of Agriculture, 1964.

Table 23.--Pasture and range by type, region, State, United States, 1964

State and region	Open permanent pasture and range ^{1/}	Forest pasture and range	Federal range ^{2/}	Total pasture and range ^{1/}	State and region	Open permanent pasture and range ^{1/}	Forest pasture and range	Federal range ^{2/}	Total pasture and range ^{1/}
----- 1,000 acres -----					----- 1,000 acres -----				
Maine.....	283	159	--	442	South Carolina.....	1,202	2,453	2	3,657
New Hampshire.....	47	145	--	192	Georgia.....	1,800	4,022	3	5,825
Vermont.....	406	452	--	858	Florida.....	6,695	7,183	640	14,518
Massachusetts.....	135	128	--	263	Alabama.....	2,829	4,450	58	7,337
Rhode Island.....	7	7	--	14	Southeast.....	12,526	18,108	703	31,337
Connecticut.....	192	73	--	265	Mississippi.....	3,717	6,412	346	10,475
New York.....	3,441	1,479	7	4,927	Arkansas.....	2,339	11,071	1,490	14,900
New Jersey.....	148	19	--	167	Louisiana.....	3,343	7,608	535	11,486
Pennsylvania.....	1,868	942	1	2,811	Delta States.....	9,399	25,091	2,371	36,861
Delaware.....	18	15	--	33	Oklahoma.....	18,382	6,923	237	25,542
Maryland.....	559	152	--	711	Texas.....	99,781	18,695	741	119,217
Northeast.....	7,104	3,571	8	10,683	Southern Plains...	118,163	25,618	978	144,759
Michigan.....	2,045	1,111	--	3,156	Montana.....	41,953	5,933	12,163	60,049
Wisconsin.....	3,086	3,035	1	6,122	Idaho.....	8,134	5,002	16,812	29,948
Minnesota.....	3,354	2,785	5	6,144	Wyoming.....	27,634	858	20,724	49,216
Lake States.....	8,485	6,931	6	15,422	Colorado.....	21,284	6,450	13,907	41,641
Ohio.....	3,708	1,396	--	5,104	New Mexico.....	39,108	8,526	19,320	66,954
Indiana.....	2,286	1,313	--	3,599	Arizona.....	25,649	8,828	21,822	56,299
Illinois.....	3,373	1,816	4	5,193	Utah.....	11,460	2,057	25,026	38,543
Iowa.....	3,247	1,550	2	4,799	Nevada.....	7,493	846	48,737	57,076
Missouri.....	7,692	6,100	27	13,819	Mountain.....	182,715	38,500	178,511	399,726
Corn Belt.....	20,306	12,175	33	32,514	Washington.....	7,723	3,411	1,812	12,946
North Dakota.....	12,030	128	1,067	13,225	Oregon.....	9,360	5,756	19,970	35,086
South Dakota.....	24,274	485	1,404	26,163	California.....	15,137	11,606	12,100	38,843
Nebraska.....	23,385	438	425	24,248	Pacific.....	32,220	20,773	33,882	86,875
Kansas.....	18,411	815	113	19,339	48 States.....	479,795	160,964	219,527	860,286
Northern Plains...	78,100	1,866	3,009	82,975	Alaska.....	876	157	2,106	3,139
Virginia.....	3,210	1,361	1	4,572	Hawaii.....	1,203	331	--	1,534
West Virginia.....	1,706	1,739	--	3,445	U.S. Total....	481,874	161,452	221,633	864,959
North Carolina.....	1,715	1,318	--	3,033					
Kentucky.....	2,032	2,064	--	4,096					
Tennessee.....	2,114	1,849	25	3,988					
Appalachian.....	10,777	8,331	26	19,134					

^{1/} Excludes cropland used only for pasture. ^{2/} Includes some 159 million acres of grassland and other nonforested areas and 63 million acres of forest land classified as suitable or usable for grazing.

Table 24.--Federal pasture and range by type, United States, 1964

State and region	Grassland range <u>1/</u>	Forest and Woodland <u>2/</u>	Other range <u>3/</u>	Total Federal range <u>4/</u>
----- 1,000 acres -----				
North Dakota.....	958	109	165	1,232
South Dakota.....	1,158	246	804	2,208
Nebraska.....	346	79	11	436
Kansas.....	113	--	--	113
Northern Plains....	2,575	434	980	3,989
Oklahoma.....	67	170	30	267
Texas.....	148	593	57	798
Southern Plains....	215	763	87	1,065
Montana.....	8,605	3,558	4,521	16,684
Idaho.....	14,218	2,594	7,617	24,429
Wyoming.....	18,192	2,532	3,936	24,660
Colorado.....	7,733	6,174	6,988	20,895
New Mexico.....	12,363	6,957	3,278	22,598
Arizona.....	15,520	6,302	4,060	25,882
Utah.....	14,315	10,711	6,131	31,157
Nevada.....	40,738	7,999	4,833	53,570
Mountain.....	131,684	46,827	41,364	219,875
Washington.....	595	1,217	3,074	4,886
Oregon.....	13,349	6,621	3,999	23,969
California.....	8,143	3,957	8,088	20,188
Pacific.....	22,087	11,795	15,161	49,043
17 Western States....	156,561	59,819	57,592	273,972
31 Eastern States....	108	3,039	1,265	4,412
48 States	156,669	62,858	58,857	278,384
Alaska.....	1,896	210	--	2,106
Hawaii.....	--	--	--	--
U.S. Total....	158,565	63,068	58,857	280,490

1/ An approximation of grassland, shrub, and bushland (not classified as forest) used or usable for livestock grazing.

2/ An approximation of open forest land range used or usable for grazing.

3/ Densely forested and other areas in National Forest system range allotments and Federal grazing districts having little utility for grazing but which form part of the total range environment.

4/ Approximate range assembled from data of the principal Federal land administering agencies.

Table 25.--State land used for farming and grazing, United States, 1962 ^{1/}

State and region	Farming	Grazing ^{2/}	Total
----- 1,000 acres -----			
North Dakota.....	79	834	913
South Dakota.....	1	1,525	1,526
Nebraska.....	306	1,325	1,631
Kansas.....	--	--	--
Northern Plains.....	386	3,684	4,070
Oklahoma.....	555	269	824
Texas ^{3/}	41	574	615
Southern Plains.....	596	843	1,439
Montana.....	476	4,199	4,675
Idaho.....	83	2,149	2,232
Wyoming.....	206	3,441	3,647
Colorado.....	130	2,750	2,880
New Mexico.....	116	10,731	10,847
Arizona.....	212	8,684	8,896
Utah.....	1	2,456	2,457
Nevada.....	--	--	--
Mountain.....	1,224	34,410	35,634
Washington.....	146	1,261	1,407
Oregon.....	6	647	653
California.....	14	85	99
Pacific.....	166	1,993	2,159
17 Western States.....	2,372	40,930	43,302
31 Eastern States.....	188	92	280
48 States.....	2,560	41,022	43,582
Alaska.....	--	--	--
Hawaii.....	67	338	405
U.S. Total.....	2,627	41,360	43,987

^{1/} Includes land leased out and land used by institutions (3, table 4).

^{2/} Includes both grassland and forest land pasture and range.

^{3/} A large proportion of an additional 2.5 million acres of State land in Texas, for which information is incomplete, also may be used for grazing.

Table 26.--Forest land in farms and not in farms, by regions and States, United States, 1964

State and region	In farms ^{1/}	Not in farms	Total ^{2/}	State and region	In farms ^{1/}	Not in farms	Total ^{2/}
----- 1,000 acres -----				----- 1,000 acres -----			
Maine.....	1,458	15,967	17,425	South Carolina.....	3,811	7,829	11,640
New Hampshire.....	578	4,441	5,019	Georgia.....	9,247	17,118	26,365
Vermont.....	1,166	3,156	4,322	Florida.....	6,516	13,388	19,904
Massachusetts.....	405	2,883	3,288	Alabama.....	7,123	14,647	21,770
Rhode Island.....	43	391	434				
Connecticut.....	278	1,712	1,990	Southeast.....	26,697	52,982	79,679
New York.....	2,727	11,723	14,450				
New Jersey.....	190	2,039	2,229	Mississippi.....	6,795	11,213	18,008
Pennsylvania.....	2,568	14,504	17,072	Arkansas.....	4,967	16,624	21,591
Delaware.....	161	231	392	Louisiana.....	2,966	13,109	16,075
Maryland.....	812	2,108	2,920				
				Delta States.....	14,728	40,946	55,674
Northeast.....	10,386	59,155	69,541				
				Oklahoma.....	3,780	5,455	9,235
Michigan.....	2,479	17,220	19,699	Texas.....	10,791	13,163	23,954
Wisconsin.....	5,134	10,454	15,588				
Minnesota.....	3,864	15,183	19,047	Southern Plains...	14,571	18,618	33,189
Lake States.....	11,477	42,857	54,334	Montana.....	2,125	19,923	22,048
				Idaho.....	1,393	20,422	21,815
Ohio.....	2,366	2,805	5,171	Wyoming.....	830	8,947	9,777
Indiana.....	2,355	1,663	4,018	Colorado.....	1,575	21,008	22,583
Illinois.....	2,696	1,175	3,871	New Mexico.....	3,456	14,731	18,187
Iowa.....	1,980	640	2,620	Arizona.....	5,312	15,286	20,598
Missouri.....	7,335	7,961	15,296	Utah.....	825	14,130	14,955
				Nevada.....	51	11,985	12,036
Corn Belt.....	16,732	14,244	30,976				
				Mountain.....	15,567	126,432	141,999
North Dakota.....	388	51	439				
South Dakota.....	271	1,566	1,837	Washington.....	3,751	19,299	23,050
Nebraska.....	496	666	1,162	Oregon.....	3,194	27,545	30,739
Kansas.....	773	895	1,668	California.....	3,403	39,138	42,541
Northern Plains.....	1,928	3,178	5,106	Pacific.....	10,348	85,982	96,330
Virginia.....	5,035	11,304	16,339	48 States.....	145,709	495,137	640,846
West Virginia.....	2,285	9,184	11,469				
North Carolina.....	6,849	13,599	20,448	Alaska.....	48	119,003	119,051
Kentucky.....	4,247	7,608	11,855	Hawaii.....	217	1,765	1,982
Tennessee.....	4,859	9,048	13,907				
				U.S. Total.....	145,974	615,905	761,879
Appalachian.....	23,275	50,743	74,018				

^{1/} All forest land in farms as reported by the U.S. Census of Agriculture, 1964.

^{2/} Total forest land, including reserved areas, as of Sept. 1967, continuing forest inventory of the U.S. Forest Service.

Table 27.--Land in special-use areas, by regions and States, United States, 1964

State and region	Urban areas 1/	Rural highways, railroads, and airports 2/	Rural parks 3/	Wildlife refuges 4/	National defense, flood control, and industrial areas 5/	State-owned institutions and miscellaneous other uses 6/	Farmssteads, farm roads, and lanes 7/	Total 8/
----- 1,000 acres -----								
Maine.....	176	172	260	42	23	5	29	707
New Hampshire.....	97	96	55	2	27	16	9	302
Vermont.....	53	67	97	51	19	5	20	312
Massachusetts.....	781	159	79	45	41	18	18	1,141
Rhode Island.....	130	21	7	8	7	6	2	181
Connecticut.....	453	112	23	7	7	5	13	620
New York.....	1,603	535	2,614	145	187	17	155	5,256
New Jersey.....	1,103	130	22	107	74	23	24	1,483
Pennsylvania.....	1,320	681	145	1,001	83	26	179	3,435
Delaware.....	70	27	3	29	18	2	10	159
Maryland.....	361	120	35	68	131	6	40	761
District of Columbia:	39	--	--	--	--	--	--	39
Northeast.....	6,186	2,120	3,340	1,505	617	129	499	14,396
Michigan.....	1,186	934	715	343	29	47	312	3,566
Wisconsin.....	770	869	78	635	141	9	394	2,896
Minnesota.....	804	1,129	1,004	594	265	10	490	4,296
Lake States.....	2,760	2,932	1,797	1,572	435	66	1,196	10,758
Ohio.....	1,584	567	65	84	84	46	424	2,854
Indiana.....	608	524	44	45	239	9	355	1,824
Illinois.....	1,194	1,068	47	103	180	33	448	3,073
Iowa.....	530	912	33	104	127	42	533	2,281
Missouri.....	618	673	66	122	283	41	483	2,286
Corn Belt.....	4,534	3,744	255	458	913	171	2,243	12,318
North Dakota.....	68	1,017	76	270	529	17	254	2,231
South Dakota.....	89	833	339	124	809	2	219	2,415
Nebraska.....	168	938	76	161	143	30	334	1,850
Kansas.....	305	1,129	67	52	333	13	378	2,277
Northern Plains....	630	3,917	558	607	1,814	62	1,185	8,773
Virginia.....	612	312	313	98	374	33	136	1,878
West Virginia.....	194	180	48	135	46	25	57	685
North Carolina.....	631	596	383	274	326	24	205	2,439
Kentucky.....	326	463	110	113	433	30	241	1,716
Tennessee.....	554	418	393	133	334	40	237	2,109
Appalachian.....	2,317	1,969	1,247	753	1,513	152	876	8,827
South Carolina.....	380	422	52	162	400	30	102	1,548
Georgia.....	831	517	49	400	843	51	169	2,860
Florida.....	1,155	651	1,000	226	726	19	132	3,909
Alabama.....	813	572	51	317	227	84	150	2,214
Southeast.....	3,179	2,162	1,152	1,105	2,196	184	553	10,531
Mississippi.....	316	380	36	74	291	75	236	1,408
Arkansas.....	303	416	24	242	527	32	245	1,789
Louisiana.....	575	360	10	493	213	18	202	1,871
Delta States.....	1,194	1,156	70	809	1,031	125	683	5,068

See footnotes at end of table.

Table 27.--Land in special-use areas, by regions and States, United States, 1964--Continued

State and region	Urban areas 1/	Rural highways, rail-roads, and airports 2/	Rural parks 3/	Wildlife refuges 4/	National defense, flood control, and industrial areas 5/	State-owned institutions and miscellaneous other uses 6/	Farms, steads, farm roads, and lanes 7/	Total 8/
----- 1,000 acres -----								
Oklahoma.....	535	615	64	464	826	29	308	2,841
Texas.....	2,732	1,558	911	322	1,090	125	428	7,166
Southern Plains...	3,267	2,173	975	786	1,916	154	736	10,007
Montana.....	77	728	3,046	235	602	39	128	4,855
Idaho.....	98	284	2,743	83	713	18	119	4,058
Wyoming.....	49	647	4,768	83	28	6	53	5,634
Colorado.....	256	672	1,396	147	268	30	133	2,902
New Mexico.....	212	402	1,267	328	2,910	1	64	5,184
Arizona.....	380	296	3,517	113	3,642	11	36	7,995
Utah.....	264	252	1,987	312	1,901	10	60	4,786
Nevada.....	78	450	914	257	4,027	7	14	5,747
Mountain.....	1,414	3,731	19,638	1,558	14,091	122	607	41,161
Washington.....	508	332	2,685	489	820	11	150	4,995
Oregon.....	291	415	964	547	156	29	132	2,534
California.....	2,882	1,189	6,663	174	3,800	102	290	15,100
Pacific.....	3,681	1,936	10,312	1,210	4,776	142	572	22,629
48 States.....	29,162	25,840	39,344	10,363	29,302	1,307	9,150	144,468
Alaska.....	23	113	6,910	18,635	2,546	2	1	28,230
Hawaii.....	83	34	256	2	32	29	23	459
U.S. Total....	29,268	25,987	46,510	29,000	31,880	1,338	9,174	173,157

1/ Areas occupied by incorporated and unincorporated places of 1,000 or more population: 1960 estimates as reported by the Economic Research Service (18) were extended on the basis of population estimates for 1964 and the calculated urban population--area ratio existing in 1960. Several million additional acres that are occupied by villages and towns with populations below 1,000 are included in other major uses of land, such as forest grazing, farm, and other land.

2/ Estimates for highways were derived by applying average right-of-way widths reported by State highway departments to the mileage in different highway systems reported by the Bureau of Public Roads. Estimates for railroad rights-of-way are based on State-by-State changes in mileage reported by the Interstate Commerce Commission. Estimated for rural nonmilitary airports based on information on airports operational in 1960 supplied by the Federal Aviation Agency with allowances for airports subsequently activated and enlarged.

3/ Includes areas in the National Park System, State Parks, and related recreation areas, and National Forest wilderness and primitive areas. Based on reports of the National Park Service and Forest Service, unpublished data supplied by the Bureau of Outdoor Recreation, U.S. Dept. of Interior, and records and reports of numerous State Park administering agencies. Excludes, in most instances, parks in urban places and water areas larger than 40 acres.

4/ As reported by the U.S. Fish and Wildlife Service. Does not include areas under the primary jurisdiction of another agency or land leased for wildlife purposes. Excludes game ranges in Arizona, Montana, and Nevada totaling 4.6 million acres that are reported as grazing land. Estimates of the acreage in State wildlife areas are based on an inventory of the acreage and use of State-owned land (3), unpublished data supplied by the Bureau of Outdoor Recreation, USDI, and data from State agencies.

5/ As reported by the Bureau of Land Management (10). Flood-control lands consisting of 6.2 million acres are administered for flood control and reservoir purposes by the Corps of Engineers. Federal industrial areas of 2.1 million acres are Atomic Energy Commission lands. National defense land administered by the Department of Defense, totals about 23.6 million acres. Includes limited areas classified as urban or built-up that were not feasible to separate for purposes of this publication.

6/ As reported in State-owned Rural Lands, 1962 (3). Includes State-owned rural land held for educational, welfare, correctional, and other institutional purposes, and miscellaneous uses such as National Guard Camps, fairgrounds, State-owned airports, radio stations, and watershed-protection areas.

7/ Estimates are calculated on the basis of State-by-State number of farms and acreage of other land in farms.

8/ The following not included: Reservoirs, non-Federal industrial and commercial sites, mining areas; clay, sand, and stone quarries; powerline rights-of-way; cemeteries; and golf courses.

Table 28.--Cropland used for crops and crop production per acre,
48 States, selected periods and years

Period or year	Cropland used for crops				Index of crop production per acre (1957-59=100)
	Cropland	Crop	Cultivated	Total	
	harvested <u>1/</u>	failure <u>2/</u>	summer fallow <u>3/</u>		
----- Million acres -----					
1910-14.....	322	10	5	337	69
1920-24.....	348	13	6	367	68
1930-34.....	341	27	12	380	64
1940-44.....	341	12	19	372	80
1950.....	336	12	29	377	84
1951.....	336	17	28	381	85
1952.....	341	11	28	380	90
1953.....	341	13	26	380	89
1954.....	339	13	28	380	88
1955.....	333	16	29	378	91
1956.....	317	22	30	369	92
1957.....	316	12	30	358	93
1958.....	316	9	30	355	105
1959.....	317	10	31	358	102
1960.....	317	6	32	355	109
1961.....	296	11	33	340	113
1962.....	287	10	34	331	116
1963.....	291	10	36	337	119
1964.....	292	6	37	335	116
1965.....	291	8	37	336	122
1966.....	288	6	37	331	120
1967 <u>5/</u>	302	8	32	342	121

1/ Includes cropland from which one or more crops were harvested. Acreages are based on data from (9, 1911-67) and the annual estimates of crops harvested by SRS and predecessor agencies. Cropland used for soil-improvement crops that was not harvested or pastured and idle cropland are not included. Acreages in farm gardens, minor crops, and small farm orchards are only partially included in cropland harvested in some years.

2/ Estimates based on acreages reported by (9, 1925-45; 1964), and annual estimates of crop losses by SRS and predecessor agencies. Acreage in hay that produced nothing except pasture in some dry seasons is not included in acreage losses.

3/ Estimates were made only for land west of the Mississippi River. From 1945 to 1948, estimates were based on acreages estimated by the former Bureau of Agricultural Economics and on data issued by the Great Plains Council. For 1949 and subsequent years, estimates were based on (9, 1950, 1954, 1959, 1964); estimates of wheat seeded on summer fallow made by AMS, (now SRS) and data issued annually before 1955 by the Great Plains Council.

4/ Index numbers computed from unrounded data.

5/ Preliminary.

Table 29.--Crops harvested, 48 States, 1954-1967 ^{1/}

Item	1954	1959	1964	1966	1967 ^{2/}	Item	1954	1959	1964	1966	1967 ^{2/}
----- Million acres -----						----- Million acres -----					
Food crops:						Other crops:					
Food grains:						Cotton.....	19.3	15.1	14.1	9.5	8.1
Wheat.....	54.4	51.7	49.8	49.8	59.0	Flaxseed.....	5.7	2.9	2.8	2.5	2.0
Rice.....	2.5	1.6	1.8	1.9	2.0	Tobacco.....	1.7	1.2	1.1	1.0	1.0
Rye.....	1.8	1.4	1.7	1.3	1.1	Broomcorn.....	.3	.2	.2	.1	.1
Buckwheat.....	.1	.1	^{3/}	^{3/}	^{3/}	Sweetclover seed.....	.3	.1	.1	.1	.1
Total food grains.....	58.8	54.8	53.3	53.0	62.0	Timothy seed.....	.3	.3	.2	.2	.2
Irish potatoes.....	1.4	1.3	1.3	1.5	1.5	Minor crops ^{6/}	2.2	2.0	1.6	1.6	1.6
Sweet potatoes.....	.3	.3	.2	.2	.1	Total other crops.....	29.8	21.8	20.1	15.0	13.1
Dry beans.....	1.5	1.4	1.4	1.5	1.2	Total crops harvested ^{7/} :	346.8	324.6	298.4	295.2	308.4
Dry peas.....	.3	.4	.3	.2	.2						
Cowpeas for peas.....	.3	.2	.1	.1	.1						
Sugarcane, all.....	.4	.5	.7	.5	.5						
Sugar beets.....	.9	.9	1.4	1.2	1.1						
Peanuts for nuts.....	1.4	1.4	1.4	1.4	1.4						
Soybeans for beans.....	17.0	22.6	30.8	36.5	39.7						
Fruits and planted nuts ^{4/} :	4.5	4.6	4.6	4.8	4.8						
Commercial vegetables.....	3.8	3.4	3.3	3.4	3.6						
Vegetables for home use ^{5/} :	1.6	1.2	1.0	1.0	1.0						
Total food crops.....	92.2	93.0	99.8	105.3	117.3						
Feed crops:											
Feed grains:											
Corn.....	80.2	81.9	65.4	65.7	69.7						
Oats.....	40.6	27.7	19.7	17.9	15.9						
Barley.....	13.4	14.9	10.3	10.2	9.2						
Sorghums, all.....	18.1	19.0	15.8	16.0	18.5						
Total food crops.....	152.3	143.5	111.2	109.8	113.3						
All hay:											
Tame.....	59.6	55.6	56.8	56.0	55.2						
Wild.....	12.9	10.7	10.5	9.1	9.5						
Total hay.....	72.5	66.3	67.3	65.1	64.7						
Total feed crops.....	224.8	209.8	178.5	174.9	178.0						

^{1/} The principal crop acreages harvested are as reported in Crop Production (15, 1967); and other crop reports issued in 1967 by SRS. Acreages of fruit and planted nuts, vegetables for home use, and some minor crops, are based on (9, 1954, 1959, 1964). Acreages for individual crops are rounded to the nearest tenth of a million.

^{2/} Preliminary.

^{3/} Estimates discontinued.

^{4/} Includes tree fruits, small fruits, and planted nuts, as reported by (9, 1954, 1959, 1964) and ERS estimates for acreage in orchards having less than 20 fruit or nut trees.

^{5/} Estimates based on the number of farms reporting vegetables for home use in the (9, 1959).

^{6/} Consists of small acreages of certain vegetables and field crops not included in the 59 principal crops, various legumes, and other crops harvested by livestock, principal crops in minor producing States, and nursery and greenhouse products.

^{7/} Excludes duplicated acreage in alfalfa, red clover, alsike clover, and lespedeza seeds harvested from hayland, peanut vine hay harvested from land where peanuts were harvested, velvetbeans, and several minor crops.

Table 30.--Irrigated land in farms, 31 humid-area States, 1939-64

State and region	Irrigated land in farms					
	1939	1944	1949	1954	1959	1964
	----- Acres -----					
Maine.....	143	100	2,299	1,097	2,214	4,157
New Hampshire.....	25	63	622	942	1,249	2,648
Vermont.....	0	6	303	689	1,612	1,063
Massachusetts.....	2,049	11,355	18,507	22,683	19,999	24,178
Rhode Island.....	109	133	1,631	1,009	406	1,428
Connecticut.....	520	496	8,088	11,975	5,171	14,452
New York.....	5,948	10,316	19,248	59,024	57,997	79,193
New Jersey.....	7,956	11,712	28,117	58,912	73,873	96,433
Pennsylvania.....	3,356	8,764	7,251	17,950	16,523	22,734
Delaware.....	7	22	404	5,553	15,533	17,542
Maryland.....	67	287	697	8,344	11,174	15,996
Northeast.....	20,180	43,254	87,167	188,178	205,751	279,824
Michigan.....	2,960	2,850	13,901	23,473	40,178	48,991
Wisconsin.....	2,345	4,569	9,781	18,199	31,862	62,302
Minnesota.....	2,968	210	4,235	9,207	14,991	17,510
Lake States.....	8,273	7,629	27,917	50,879	87,031	128,803
Ohio.....	4,536	4,178	5,706	15,379	11,972	17,405
Indiana.....	685	830	5,339	11,738	17,237	16,924
Illinois.....	307	368	1,510	6,789	10,127	14,375
Iowa.....	2,258	1,197	1,386	2,396	18,181	21,528
Missouri.....	960	1,113	2,089	32,998	29,957	59,426
Corn Belt.....	8,746	7,686	16,030	69,300	87,474	129,658
Virginia.....	687	1,419	2,817	21,805	31,101	50,968
West Virginia.....	270	42	40	1,381	1,115	2,420
North Carolina.....	246	229	2,083	25,423	65,743	96,874
Kentucky.....	205	230	485	13,434	8,605	14,405
Tennessee.....	311	393	1,012	22,548	10,979	10,737
Appalachian.....	1,719	2,313	6,437	84,591	117,543	175,404
South Carolina.....	411	62	6,408	22,009	24,952	18,524
Georgia.....	158	423	3,161	23,873	33,700	64,112
Florida.....	126,191	221,917	365,421	427,807	413,526	1,217,192
Alabama.....	281	487	367	16,658	17,357	11,768
Southeast.....	127,041	222,889	375,357	490,347	489,535	1,311,596
Mississippi.....	94	3	5,086	132,490	99,686	123,398
Arkansas.....	159,412	288,665	422,107	857,863	711,812	974,279
Louisiana.....	413,969	535,619	576,775	707,818	484,850	580,687
Delta States.....	573,475	824,287	1,003,968	1,698,171	1,296,348	1,678,364
Total 31 humid-area States.....	739,434	1,108,058	1,516,876	2,581,466	2,283,682	3,703,649

Source: U.S. Census of Agriculture, 1940, 1950, 1959, and 1964.

Table 31.--Comparative estimated rates of change in 1964 and 1967 in irrigated land in farms, United States, based on 1939-64 trends, by water resource regions

Water resource region (See fig. 14)	1964 census year			1967 current estimate			Acreage distri- bution in 1967 ^{2/} (percent)
	Total acres	Annual change ^{1/}		Total acres	Annual change ^{1/}		
		Acres	Percent		Acres	Percent	
New England.....	47	2	3.45	52	2	4.00	1.2
Delaware and Hudson.....	224	23	11.17	308	31	11.17	7.4
Chesapeake Bay.....	59	5	8.47	74	5	7.24	1.8
Southeast.....	1,151	93	8.71	1,478	118	8.71	35.7
Eastern Great Lakes.....	37	2	7.09	45	3	6.50	1.1
Western Great Lakes.....	69	5	7.30	84	5	5.84	2.0
Ohio.....	57	6	11.21	78	8	11.21	1.9
Cumberland.....	2	^{3/}	11.21	2	^{3/}	11.21	0.1
Tennessee.....	11	1	11.21	14	1	11.21	0.3
Upper Mississippi.....	85	7	8.97	106	7	7.07	2.6
Lower Mississippi.....	681	47	7.37	843	58	7.37	20.3
Lower Missouri.....	25	2	8.69	31	2	6.89	0.8
Lower Arkansas-White-Red..	827	58	7.46	1,026	71	7.46	24.8
Eastern mainland.....	3,275	257	8.51	4,141	310	8.51	10.2
Upper Missouri.....	6,391	115	1.83	6,737	115	1.02	18.3
Upper Arkansas-White-Red..	2,976	257	6.99	3,645	238	6.99	10.0
Western Gulf.....	5,621	181	1.03	6,164	181	3.02	16.8
Upper Rio Grande-Pecos...	1,390	24	1.75	1,462	24	1.66	4.0
Colorado.....	2,887	-21	-0.75	2,807	-29	-1.03	7.7
Great Basin.....	2,192	51	2.38	2,366	62	2.77	6.4
Pacific Northwest.....	5,259	105	2.04	5,587	112	2.04	15.3
Central Pacific.....	6,889	121	1.78	7,252	121	1.69	19.8
South Pacific.....	672	-18	-2.66	607	-23	-3.73	1.7
Western mainland.....	34,277	668	1.98	36,627	668	1.86	89.8
48 States.....	37,552	774	2.10	40,768	774	1.95	100.0
Hawaii.....	143	1	1.02	148	2	1.12	0.4
U.S. Total (excluding Alaska).....	37,695 ^{4/}	775	2.05	40,916	775	1.94	100.0

^{1/} All annual regional acreage increases are individually rounded to nearest 1,000 acres and may not add exactly to totals.

^{2/} Percentages of components of Eastern mainland add to 100, as do those of Western mainland. The percentage figures shown for the total Eastern mainland and for Western mainland were calculated as percentages of total mainland area. Hawaii's irrigated acreage was calculated as a percent of the United States, excluding Alaska.

^{3/} Less than 1,000 acres.

^{4/} Add 158 acres for Alaska in 1964.

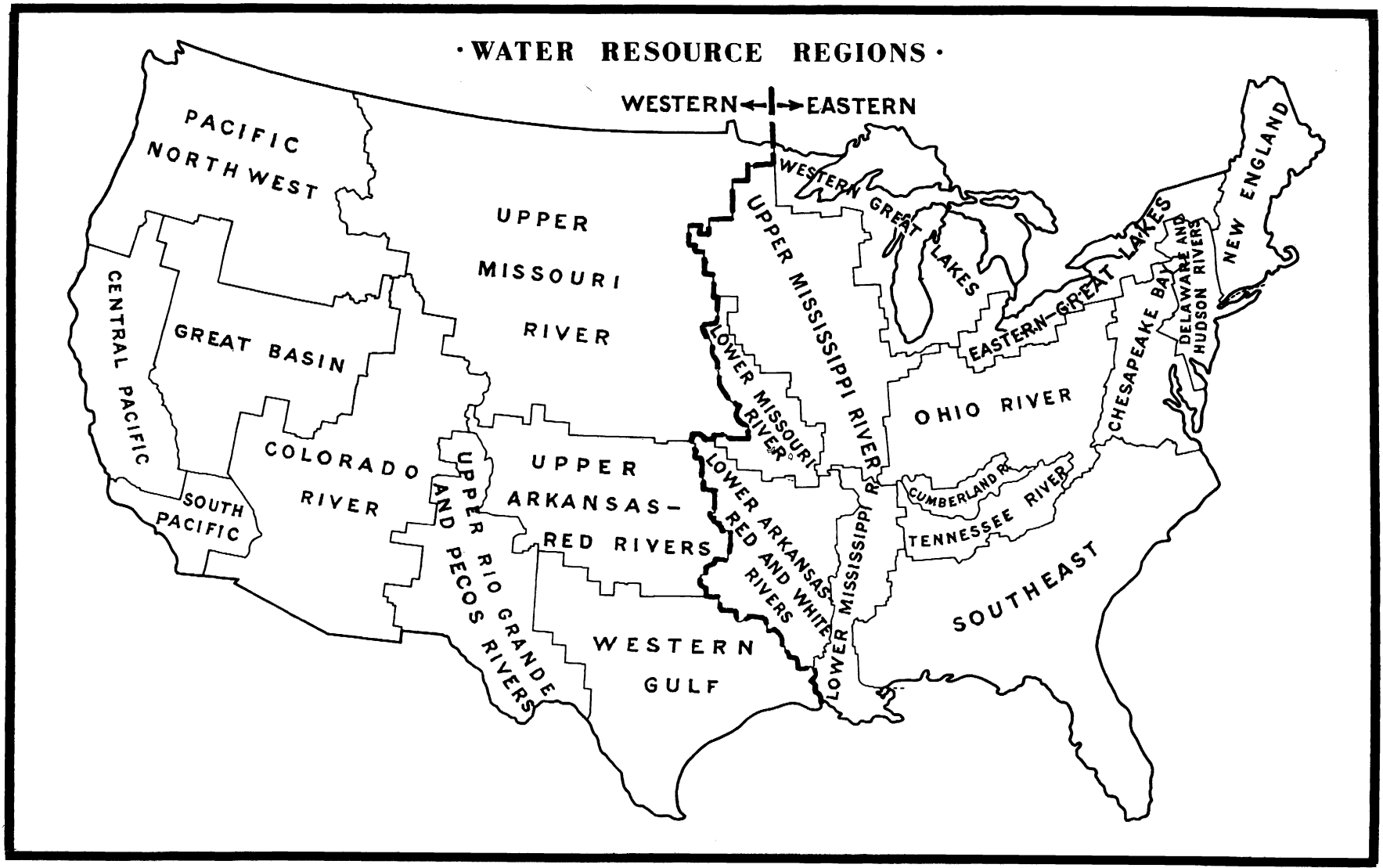


Figure 14

Table 32.--Drained area in drainage projects, 1960, and drainage installed under Agricultural Conservation Program, 1950-64, 48 States

State and region	Net area drained and used for agriculture, drainage projects, 1960	Total area drained under Agricultural Conservation Program, 1950-64 ^{1/}	State and region	Net area drained and used for agriculture, drainage projects, 1960	Total area drained under Agricultural Conservation Program, 1950-64 ^{1/}
----- 1,000 acres -----			----- 1,000 acres -----		
Maine.....	(2)	21	South Carolina.....	338	1,117
New Hampshire.....	(2)	7	Georgia.....	93	143
Vermont.....	(2)	41	Florida.....	4,856	507
Massachusetts.....	(2)	12	Alabama.....	66	292
Rhode Island.....	(2)	1	Southeast.....	5,353	2,059
Connecticut.....	(2)	6	Mississippi.....	3,040	1,725
New York.....	50	225	Arkansas.....	4,681	1,736
New Jersey.....	11	43	Louisiana.....	7,111	1,716
Pennsylvania.....	(2)	198	Delta States.....	14,832	5,177
Delaware.....	341	39	Oklahoma.....	134	89
Maryland.....	350	154	Texas.....	5,691	469
Northeast.....	752	747	Southern Plains.....	5,825	558
Michigan.....	9,877	1,364	Montana.....	60	196
Wisconsin.....	584	550	Idaho.....	111	162
Minnesota.....	10,561	2,189	Wyoming.....	24	84
Lake States.....	21,022	4,103	Colorado.....	55	151
Ohio.....	8,809	1,278	New Mexico.....	32	6
Indiana.....	11,054	1,249	Arizona.....	(2)	20
Illinois.....	5,564	593	Utah.....	67	53
Iowa.....	6,871	1,114	Nevada.....	41	53
Missouri.....	3,097	1,429	Mountain.....	390	725
Corn Belt.....	35,395	5,663	Washington.....	241	351
North Dakota.....	1,641	753	Oregon.....	271	491
South Dakota.....	659	337	California.....	1,911	1,006
Nebraska.....	739	267	Pacific.....	2,423	1,848
Kansas.....	373	326	48 States.....	92,297	24,106
Northern Plains.....	3,412	1,683			
Virginia.....	93	218	^{1/} Total drainage is sum of enclosed and open drainage, and shaping and grading of land for surface drainage. Drainage under the Agricultural Conservation Program is generally carried out outside active drainage projects. Therefore, the overlap is minor.		
West Virginia.....	(2)	27	^{2/} None reported.		
North Carolina.....	1,320	879	Sources: Census of Agriculture (16, 1959, Vol. 4) and Agricultural Stabilization and Conservation Service data.		
Kentucky.....	889	277			
Tennessee.....	591	142			
Appalachian.....	2,893	1,543			