

Irrigation of Agricultural Lands

GENERAL EXPLANATION

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defines a farm, for statistical purposes, as any place from which \$1,000 or more of agricultural products were sold or normally would have been sold during the census year. The previous definition (used for the 1959, 1964, and 1969 censuses, and for the 1974 preliminary county reports) counted as a farm any place with less than 10 acres from which \$250 or more of agricultural products were sold or normally would have been sold during the census year, or any place of 10 acres or more from which \$50 or more of agricultural products were sold or normally would have been sold during the census year.

GENERAL INFORMATION

This chapter presents statistics on irrigation by farms and ranches included in the 1978 Census of Agriculture. In the 50 States, 303,000 farms reported land irrigated. Although this number is relatively small in relation to the 2.5 million farms in the United States, irrigation is significantly important in the Nation's agricultural production. While accounting for only 12.2 percent of all farms in the Nation, irrigated farms accounted for 28.9 percent of the total value of agricultural products sold.

HISTORY

The census of agriculture provides a periodic statistical picture of the Nation's farming, ranching, and related activities. The 1978 Census of Agriculture is the 21st taken by the U.S. Department of Commerce, Bureau of the Census.

The first agriculture census was taken in 1840 as part of the sixth decennial census. From 1840 to 1950, an agriculture census was taken as part of the decennial census of population. A mid-decade census of agriculture was conducted in 1925, 1935, and 1945. From 1954 to 1974, a census of agriculture was taken for the years ending in 4 and 9. In 1976, Congress authorized the census of agriculture to be taken for 1978 and 1982 to adjust the data reference year to coincide with the 1982 Economic Censuses covering manufacturing, mining, construction, retail trade, wholesale trade, service industries, and selected transportation activities. Thereafter, the agriculture census will revert to a 5-year cycle.

Questions relating to the irrigation of agricultural lands have been included in each census since 1890.

FARM DEFINITION

Since 1850, when the minimum criteria defining a farm for census purposes was first established, the farm definition has been changed nine times. The current definition was announced on August 12, 1975, in accordance with a joint agreement between the U.S. Department of Agriculture, the Office of Management and Budget, and the Bureau of the Census. It

METHOD OF ENUMERATION

The 1969, 1974, and 1978 Censuses of Agriculture were conducted primarily by mail for maximum economy. It was supplemented by a personal canvass of a statistical area segment sample for maximum completeness of coverage. The area segment sample, which consists of selected geographic areas completely canvassed by enumerators, provides reliable estimates for States of the number of characteristics of farms not represented in the mail portion of the census. Estimates for these farms are an integral part of the State totals published for the 1978 census. The sample estimates derived from direct enumeration are statistically reliable only for State totals.

COMPARABILITY OF DATA

The U.S., region, division, and State totals for 1978 are not directly comparable with totals for 1974 or earlier censuses as they include data for farm operations on the mail list, plus estimates from the direct enumeration of sample farms not on the mail list. Coverage evaluation studies for the 1974 census indicated that 10.7 percent of all farms were not included in the census. Estimates of the net proportion of farms missed varied widely by State, from a low of 0.7 percent in Nebraska to a high of 33.0 percent in West Virginia. Farms missed in the 1974 census were usually small and accounted for less than 3 percent of the total value of agricultural products sold and less than 6 percent of the land in farms. Because missed farms are typically small, the percent missed was generally higher in States having a relatively large proportion of small farms and urbanized areas with a sizeable number of part-time farmers. The proportion of all farms in each State represented by direct enumeration sample in 1978 follows a pattern similar to that of missed farms in 1974. Farm counts and land in farms for 1974, adjusted for net undercount, are shown in the volume 1 reports, appendix A. Improvements in the mail list coverage for the 1978 census, especially of small farms, also should be taken into consideration when comparing farm counts. While about 9 percent of the farms were not on the mail list in 1978, these farms accounted for less than 1 percent of the land irrigated. Acres irrigated by farms not on the mail list for the 1978 Census of Agriculture are presented for each State.

Irrigated Farms Not on Mail List

	Farms	Acres		Farms	Acres
United States.....	21,895	488,034	Missouri.....	245	23,285
Alabama.....	97	343	Montana.....	298	16,228
Alaska.....	-	-	Nebraska.....	192	14,848
Arizona.....	667	14,841	Nevada.....	287	18,053
Arkansas.....	145	2,982	New Hampshire...	29	55
California.....	4,734	97,895	New Jersey.....	165	539
Colorado.....	1,057	27,171	New Mexico.....	1,097	13,625
Connecticut.....	10	(D)	New York.....	147	345
Delaware.....	-	-	North Carolina...	463	3,526
Florida.....	1,299	11,254	North Dakota....	-	-
Georgia.....	76	684	Ohio.....	252	1,344
Hawaii.....	-	-	Oklahoma.....	80	480
Idaho.....	1,435	32,862	Oregon.....	1,978	39,485
Illinois.....	94	188	Pennsylvania....	125	309
Indiana.....	138	179	Rhode Island....	22	184
Iowa.....	85	85	South Carolina...	191	608
Kansas.....	1	(D)	South Dakota....	41	6,355
Kentucky.....	447	767	Tennessee.....	530	954
Louisiana.....	332	904	Texas.....	1,350	71,332
Maine.....	42	84	Utah.....	833	16,694
Maryland.....	135	258	Vermont.....	15	198
Massachusetts...	61	188	Virginia.....	476	1,841
Michigan.....	35	280	Washington.....	1,799	42,079
Minnesota.....	97	194	West Virginia...	-	-
Mississippi.....	99	825	Wisconsin.....	-	-
			Wyoming.....	194	23,657

USE OF SAMPLING

Two types of sampling were used for data collection in the 1978 Census of Agriculture. In addition to the U.S., region, and State estimates from the direct enumeration sample discussed previously, data for the value of land and buildings, commercial fertilizer and lime, chemicals, machinery and equipment, expenses for energy and petroleum products, and selected farm production expenses were collected from a sample of approximately 20 percent of the farms. These data are presented in table 5 of this chapter.

Data based on a sample of farms are subject to sampling error. A detailed discussion of the use of sampling, estimates of sampling error, and the census report forms are presented in appendix A of any volume 1 report for the 1978 Census of Agriculture.

TABULAR PRESENTATION

Tables 1, 2, 3, and 5 contain State-level irrigation data as well as historical data for one or more censuses. These tables include data on the number of farms irrigated and acres irrigated, trends in irrigated farms, and the number of irrigated farms.

Tables 3, 4, 5, and 8 through 15 have been extracted, for maximum economy, directly from the 1978 Census of Agriculture, Volume 1, **State and County Data**, parts 1 to 50, and **Summary and State Data**, part 51. Tables 3 through 7 present data on land use and acres irrigated by standard industrial classification (SIC) as well as by value of agricultural products sold. Table 5 also presents selected characteristics of irrigated and nonirrigated farms. Tables 8 through 14 present data on specified crops irrigated such as corn, sorghums, wheat, cotton, tobacco, soybeans, field seeds, vegetables, berries, and other crops. Table 15 presents data on the average yield of selected irrigated and nonirrigated crops.

Data for the regions, divisions, and the 17 Western States are presented in tables 1, 2, 6, and 7. Table 8 contains data for only

the regions. Tables 2, 5, and 8 contain data for farms with sales of \$2,500 or more.

DEFINITIONS AND EXPLANATIONS

The following definitions and explanations provide a more detailed description of the terms used in this publication than is available in the tables or on the report form.

Land in farms—The acreage designated in the tables as "land in farms" consists primarily of agricultural land used for crops, pasture, or grazing. It also includes woodland and wasteland not actually under cultivation or used for pasture or grazing, provided it was part of the farm operator's total operation. Large acreages of woodland or wasteland held for nonagricultural purposes were deleted from individual reports during the processing operations.

Land in farms is an operating unit concept and includes land owned and operated as well as land rented from others. Land used rent free was to be reported as land rented from others. Except for open range and grazing land used under government permits, all grazing land was included as "land in farms" provided it was part of a farm or ranch. Grazing land operated by grazing associations was to be reported by the person chiefly responsible for conducting the business of the association. All land in Indian reservations used for growing crops or grazing livestock was to be included as land in farms. Land in Indian reservations not reported by individual Indians or non-Indians was to be reported in the name of the cooperative group that used the land. In some instances, an entire Indian reservation was reported as one farm.

Irrigated farms—Farms with any agricultural land irrigated in the census year are shown as irrigated farms. The acreage irrigated may vary from a very small portion of the total acreage in the farm to irrigation of all agricultural land in the farm.

Nonirrigated farms—Farms with no agricultural land irrigated in the census year are shown as nonirrigated farms. Farms that had irrigated in years prior to the census year or could have been irrigated in the census year, but did not, are included in this classification.

All harvested cropland irrigated—Those farms reporting all land irrigated from which crops were harvested during the census year are shown as all harvested cropland irrigated. These data include hay, orchards, citrus groves, and nursery and greenhouse products.

Entire crop irrigated—If all of the harvested acreage of a crop was irrigated, the crop was classified as entire crop irrigated.

Part of crop irrigated—If the acreage irrigated of a specific crop was less than the total acreage harvested of that crop, the crop acreage was counted as partly irrigated.

Value of land and buildings—Farm operators receiving the sample form were asked to report their estimates of the current

market value of land and buildings owned, rented or leased from others, and rented or leased to others. Market value refers to the respondent's estimate of what the land and buildings would sell for under current market conditions. If the value of land and buildings was not reported, it was estimated during processing by using the average value of land and buildings from a similar farm in the same geographic area.

Selected production expenses—Data on selected production expenses incurred in 1978 were requested from farm operators reporting on the sample form. Only selected production expenses were requested; thus, the expense data cannot be used in combination with gross sales to calculate net farm income. The **1979 Farm Finance Survey** provides estimates on net farm income.

For 1978, as with earlier censuses, expense data in some cases were not fully reported especially by operations producing crops, livestock, or poultry on a contract basis. Many such operators were unable or unwilling to estimate the value of production inputs furnished by the contractor. Estimates were made for individual expense items based on reported crop and livestock information, or on averages or ratios of expense items reported by similar farms in the same geographic area.

Commercial fertilizer—The expense for commercial fertilizer is the amount spent on fertilizer during 1978, excluding the cost of application. Some fertilizer purchased in 1978 may not have been applied during the year. If the fertilizer was applied by someone other than the operator, the cost of application is included as an expense for customwork, machine hire, and rental of machinery and equipment. Some operators may have included the cost of application with the amount spent on fertilizer.

Other agricultural chemicals, including lime—Expenses include the cost of all insecticides, herbicides, fungicides, other pesticides, lime, etc., excluding costs of application. Data exclude commercial fertilizer purchased.

Energy and petroleum products—More extensive data on energy usage for the farm business were collected in the 1978 census than in prior censuses. Data were collected on expenses for gasoline; diesel fuel; LP gas, butane, propane; and fuel oil. In addition, data were collected on expenses for natural gas, kerosene, motor oil, and grease, electricity, and all other energy sources. The 1978 energy data were collected from a sample of farms. Additional data on energy usage and storage capacity are available from the **1979 Farm Energy Survey**.

Value of agricultural products sold—This item represents the gross market value before taxes and production expenses of all agricultural products sold or removed from the place in 1978 regardless of who received the payment. It includes sales by the operator as well as the value of any shares received by partners, landlords, contractors, and others associated with the operation.

The value of agricultural products sold represents the sum of all crops including nursery products sold, and livestock and poultry and their products sold. It does not include income

from farm-related sources such as customwork or agricultural services, or income from nonfarm sources.

The value of crops sold in 1978 does not necessarily represent the sales from crops harvested in 1978. Data include sales from crops produced in earlier years and exclude some crops produced in 1978, but held in storage and not sold in 1978. For crops sold through a co-op which made payments in several installments, only the total value received in 1978 was to be reported.

The value of agricultural products sold was collected from all operators. Where the operator failed to report a value of sales, estimates were made based on the amount of crops harvested or the number of livestock or poultry sold. Extensive estimation was required for operators growing crops or livestock under contract.

Acres and quantity harvested—Crops were reported in whole acres, except for the following crops which were reported in 10ths of acres: Irish potatoes, sweetpotatoes, tobacco, fruit and nut crops including land in orchards, berries, vegetables, and nursery and greenhouse products; in Hawaii, taro, ginger root, and lotus root. Totals for crops reported in 10ths of acres were rounded to whole acres at the aggregate level during the tabulation process.

If two or more crops were harvested from the same land during the year, the acres would be counted for each crop. Therefore, the total acres of all crops harvested generally exceeds the acres of cropland harvested. The exception to this procedure is hay crops. When more than one cutting of hay was taken from the same acres, the acres are counted only once but the quantity harvested includes all cuttings. However, hay cut for both dry hay and green chop or silage would be reported for each applicable crop. For interplanted crops or "skip-row" crops, acres were to be reported according to the portion of the field occupied by each crop.

If a crop was planted but not harvested, the acres were not to be reported as harvested. These acres were to be reported in the "land use" section under the appropriate cropland items—cropland used only for pasture or grazing, cropland used for cover crops, cropland on which all crops failed, cropland in cultivated summer fallow, or cropland idle.

For crops grown purposely for grazing, quantity harvested was not requested. Acres for these crops were to be reported as "cropland harvested" and not as "cropland used only for pasture or grazing." This procedure applies to the following crops:

- Corn cut for dry fodder, hogged or grazed
- Cowpeas hogged or grazed or cut for silage
- Sorghums hogged or grazed
- Soybeans hogged or grazed or cut for silage

Quantity harvested was not obtained for crops such as vegetables, nursery and greenhouse products, and soybeans plowed under.

Acres of land in bearing and nonbearing fruit orchards, citrus or other groves, vineyards, and nut trees were to be reported as harvested cropland regardless of whether the crop was harvested or failed. However, abandoned orchards were to be reported as

cropland idle, not as harvested cropland or for the individual crop acreages.

Data for hay represent all hay crops, including grass silage and hay crops cut and fed green. In production data, dry tons represent dry tonnage for the various hay categories and dry weight equivalents for grass silage and hay cut and fed green. The conversion used was 3 tons of green weight to 1 ton of dry weight.

"See Text" References

Items in the tables which carry the note "See text" are explained or defined in this section. Also, additional definitions and explanations for some items are provided.

Data for 1978 are based on a sample of farms—Inquiries on commercial fertilizer and lime, chemicals, machinery and equipment, expenses for energy and petroleum products, selected production expenses, and value of land and buildings were requested of all certainty (large) farms and approximately 20 percent of all other farms. These data are subject to sampling error.

Market value of agricultural products sold—This item represents the gross market value, before taxes and expenses, of all agricultural products sold in the census year including livestock and poultry and their products, and crops including nursery products and hay. The data include landlords' and contractors' shares.

Hay crops (tons, dry)—Data shown for hay represent all hay crops, including grass silage and hay crops cut and fed green. In production data, dry tons represent dry tonnage for the various hay categories and dry weight equivalents for grass silage and hay cut and fed green. The conversion used was 3 tons of green weight to 1 ton of dry weight.

Other tame dry hay—The 1974 categories clover-timothy hay, lespedeza hay, coastal Bermuda grass hay, and other hay have been combined into "other tame dry hay" in 1978.

All vegetables harvested for sale—In 1978, the acres of vegetables harvested is the summation of the acres of individual vegetables harvested; but not necessarily the total land used for vegetable crops.

Excludes abnormal farms—Abnormal farms include institutional farms, experimental and research farms, and Indian reservations. Institutional farms include those operated by hospitals, penitentiaries, schools, grazing associations, government agencies, etc.

Farms by standard industrial classification—See explanation under Farm Classifications.

FARM CLASSIFICATIONS

Tables 6 and 7 present 1978 irrigation data for all farms classified by value of agricultural products sold and standard industrial classification.

Farms by value of agricultural products sold or value of sale—All farms, except abnormal farms, were tabulated by size based on reported sales. Abnormal farms were not tabulated on the basis of sales. Data for abnormal farms appear in all tables except table 7. These data are included in the totals of the various tables for all farms, but are excluded from totals for farms with sales of \$2,500 or more.

Farms by standard industrial classification—As in the 1974 census, agricultural production establishments (farms, ranches, nurseries, greenhouses, etc.) are classified by the Standard Industrial Classification (SIC) system in the 1978 census. These classifications, found in the 1972 SIC Manual are used to promote uniformity and comparability in the presentation of statistical data collected by various agencies.

An establishment primarily engaged in crop production (major group 01) or livestock production (major group 02) is classified in the 3- or 4-digit industry group which accounts for 50 percent or more of the total value of sales of its agricultural products. If the total value of sales of agricultural products of an establishment was less than 50 percent from a single 4-digit industry, but 50 percent or more from the products of two or more 4-digit industries within the same 3-digit industry group, the establishment is classified in the miscellaneous industry of that industry group; otherwise, it is classified as a general crop farm in industry 0191 or a general livestock farm in industry 0291.

All farms in the 1978 census were classified by SIC. Those agricultural producers having no sales reported were retained as farms and classified as general livestock farms in industry 0291 if livestock or pasture were reported or as general crop farms in industry 0191. Characteristics of irrigated farms by selected SIC groupings are shown in table 7.

HISTORICAL COMPARABILITY

Questions on irrigation of agricultural lands have been included in each census of agriculture since 1890. The kinds of irrigation data collected in each census are summarized briefly.

1890—Total acres irrigated and number of flowing wells.

1900—Acres irrigated from wells (pumped or artesian) and natural streams.

1910—Acres of farm land and pasture irrigated.

1920—Acres of land irrigated and expenditures for irrigation water.

1930—Acres of cropland irrigated, and acres and quantity of crops harvested from irrigated land.

1935—Total acres from which irrigated crops were harvested.

1940—Acres of irrigated land from which crops were harvested, and acres of irrigated land used for pasture.

1945—Total acres of irrigated land.

1950—Total acres of land irrigated and acres irrigated by sprinklers.

1954—Total acres irrigated.

1959—Total acres irrigated, acres irrigated by sprinklers, and acres of irrigated cropland from which selected crops were harvested.

1964—Total acres irrigated, acres of irrigated land used for pasture or grazing, acres of harvested cropland irrigated, acres of irrigated land from which selected crops were harvested, and quantity of selected crops harvested from irrigated land.

1969—Total acres irrigated on all farms. The following data are available for farms with sales of \$2,500 and over: acres of harvested cropland irrigated; acres of cropland irrigated used only for pasture or grazing; other pastureland irrigated; any other land irrigated; acres irrigated by sprinklers; acres irrigated by furrows, ditches, or flooding; acres irrigated by subirrigation; percent of water obtained from wells, springs, or surface supply not controlled by a water supply organization; percent of water obtained from water suppliers; total quantity of water used; farms that irrigated land since January 1965; and acres irrigated of individual harvested crops in 1969.

1974—Total land irrigated on all farms. For farms with sales of \$2,500 and over, the acres irrigated of: harvested cropland, cropland used only for pasture or grazing, cropland used for cover crops, cropland on which all crops failed; idle cropland; acres irrigated by: furrows, ditches, or flooding, subirrigation, self-propelled sprinkler system, other sprinkler system; total quantity of water used; no irrigation in census year but irrigating during 1970 to 1973; most recent year in which acres were irrigated and total acres irrigated that year; and acres irrigated of individual harvested crops.

1978—Total land irrigated, acres irrigated of: land harvested, pastureland and rangeland, any other land, and individual harvested crops. Sections of the 1978 Census of Agriculture report form which relate to irrigation are shown in appendix A.

CHANGES IN IRRIGATION DATA COLLECTED

The adverse reaction from the public and others to the length and content of the 1974 Census of Agriculture report forms led to an intensive review and rejustification of all inquiries received for the 1978 report form. Data users were requested to provide the Census Bureau with their data requirements, including the level of publication needed—county, State, or national. Each irrigation data item requested was reviewed thoroughly to determine if it was needed at the county level. Based on the results of this review, deletions and changes were made to the 1978 Census of Agriculture report form: acres of irrigated cropland used only for pasture and other pastureland and rangeland were condensed into one item; and of irrigated cropland

used for cover crops, cropland on which all crops failed, cropland in cultivated summer fallow, and cropland idle were condensed into one item. Items on the 1974 report form requesting data on acres irrigated by furrows or ditches, flooding, subirrigation, self-propelled and other sprinkler systems, and total quantity of water used for irrigation were included on the 1979 Farm and Ranch Irrigation Survey report form. This form was only sent to a sample of farm and ranch operators, thereby reducing respondent's burden. Other items needed at the State and water resource area level were also included in the farm and ranch irrigation survey report form.

1979 FARM AND RANCH IRRIGATION SURVEY

Follow-on surveys are an integral part of each census of agriculture. The purpose of these specialized surveys is to collect additional, much needed agriculture-related information from highly specialized farm operations and from only a sample of other farms without burdening all farm operators. This method allowed for the use of a shorter report form in the main census. These surveys are conducted after the main census and are limited to high priority data items essential to current decision-making and future planning.

The **1979 Farm and Ranch Irrigation Survey** provides high priority data on water use by irrigated farms and ranches. Included in the data are: statistics on acreage irrigated, yields of irrigated and nonirrigated crops, quantity of water used, methods of water distribution, types of pumps, number and characteristics of irrigation wells, and expenditures for pumping irrigation water and for water obtained from off-farm water suppliers.

Data from the **1979 Farm and Ranch Irrigation Survey**, which was conducted in 1980 from the calendar year 1979, are published in 1978 Census of Agriculture, Volume 5, **Special Reports**. The data are published for selected water resources areas and aggregated subareas, 17 Western States, Arkansas, Florida, Louisiana, and the conterminous United States. Unpublished data will also be available for the remaining States excluding Alaska and Hawaii. Additional information on the availability and cost of unpublished data may be obtained by writing the Chief, Agriculture Division, Bureau of the Census, Washington, D.C. 20233.

SUMMARY AND CONCLUSIONS

Irrigated Farms

There were 303,000 irrigated farms enumerated in the 1978 Census of Agriculture. This is an increase of 66,000 or 27.8 percent from the 1974 census count of 237,000 irrigated farms. This increase is a reversal of a downward trend in the number of farms irrigated in the 1974, 1969, 1964, and 1959 censuses. This reversal was due to several factors. The use of the direct enumeration sample added 22,000 additional irrigated farms to the mail enumeration or 33.2 percent of the increase. These 22,000 farms accounted for only 7.2 percent of all irrigated farms.

Another factor attributing to the increase in the number of irrigated farms was improvements in methods of obtaining

irrigation water and applying it to crops. These improvements in technology have led to a wider use of irrigation in the Eastern United States and further expansion of irrigation in the Western United States. The largest percentage increase 38.1, was in four divisions: East North Central, South Atlantic, East South Central, and Pacific. Irrigated farms in these States increased from 99,000 in 1974 to 137,000 in 1978.

In the 17 Western States and Louisiana, irrigated farms increased from 197,000 in 1974 to 239,000 in 1978 or a 21.7-percent increase.

Improvements in the completeness of the 1978 mail list also resulted in a more complete coverage of irrigated farms over that of the 1974 census. Reliable estimates of the effects of list improvements are not available because changes have occurred in the use of irrigation and census procedures.

The States with the largest concentration of irrigated farms, in proportion to the total number of farms, are located in the Western United States. The 17 Western States and Louisiana account for 79.0 percent of all irrigated farms. California, Texas, and Nebraska account for 46.1 percent of the irrigated farms in the West.

The 30 Eastern States, Alaska, and Hawaii account for 21.0 percent of the irrigated farms. Florida, North Carolina, Arkansas, Georgia, Michigan, and Virginia account for 55.8 percent of the irrigated farms in the East.

The number of irrigated farms by seven size classifications are presented in table 5. Farms reporting 1 to 49 acres irrigated account for 52 percent of all farms irrigated but only 4.4 percent of the total acres irrigated. Only about 2.6 percent of the irrigated farms reported irrigating 1,000 acres or more, although they account for 32.8 percent of the total irrigated acres. The greatest concentration, 59.4 percent, of these large irrigated farms is in California, Texas, Kansas, Idaho, and Nebraska.

The number of farms applying water to crops or pasture can vary considerably from year-to-year depending on weather conditions. The availability of water for irrigation depends on the quantity and timing of rainfall, or on the fluctuations in the ground water table. Rain or the lack of it during the growing season determines the need for artificial application of water. The East Atlantic Coastal States and the Midwestern States have the greatest variation in year-to-year irrigation, while the arid States of the Southwest consistently irrigate. Innovations in sprinkler irrigation technology since World War II have made it possible to apply small amounts of water in short periods of time. These improvements have made it economically feasible for farm operators to irrigate in the subhumid cornbelt States of Iowa, Illinois, Indiana, Minnesota, Missouri, Michigan, and Wisconsin.

Irrigated Land

The 1978 census shows 50.8 million acres irrigated in the 50 States. In comparison to previous censuses, this represents an increase of 9.6 million acres irrigated or 23.3 percent since 1974, and an increase of 11.7 million acres irrigated or 29.9 percent since 1969. Of the 50.8 million acres irrigated in 1978, the area sample accounted for 488,000 acres irrigated or 5.0 percent of the increase from 1974 to 1978. Most of the increase

in acres irrigated occurred in the 17 Western States and Louisiana. These States have increased 7.0 million acres since 1974 and 8.8 million acres since 1969.

The acreage irrigated in the 17 Western States and Louisiana nearly doubled between the 1954 and 1978 censuses. In these States, there were 27.7 million acres irrigated in 1954 as compared to 44.3 million acres in 1978.

In the 30 Eastern States, Alaska, and Hawaii there was an increase of 2.6 million acres irrigated or 67.6-percent increase between the 1978 and 1974 censuses. Since the 1954 census there was a threefold increase in the acres irrigated, 1.9 million acres in 1954 as compared to 6.5 million acres in 1978. The difference in the rate and timing of irrigation developments reflects the difference in climate between the East and the West.

Although some of the increase in acres irrigated in the 1978 census can be attributed to improvements in coverage, the data show the upward trend in acres irrigated has accelerated in recent years.

Crops by Acres Irrigated

The most common crops grown on irrigated land are listed in descending order in chart 4 by percent of the crop irrigated in 1978. The importance of irrigation to production of selected crops is shown by the percent of the total of each crop harvested. In general, those crops which produce the greatest monetary returns per acre have a greater percentage of the total acreage irrigated than those crops producing a lower return per acre.

Selected Characteristics of Irrigated and Nonirrigated Farms

Since crop production is one of the leading indicators of the effects of irrigation, data are provided for average yield of selected crops harvested from irrigated and nonirrigated land. Table 15 presents data for farms reporting, acres harvested of selected crops, and the average yield per acre. Data for selected crops were tabulated as entire crop irrigated, part of crop irrigated, and none of crop irrigated. The crop was classified, "entire crop irrigated," if the farm operator reported all acres harvested by the specified crop as being irrigated. Likewise, the crop was classified as, "none of the crop irrigated," if none of the acres harvested for the specified crop was reported irrigated. The "part of crop irrigated," category included the crop acreage from those farms where only part of the acres harvested of the specified crop was irrigated. The average yield per acre was computed for the acres harvested of each specified crop for each category. In most cases, particularly in the Western United States, the differences in average yield on entire crop irrigated and none of the crop irrigated were very significant.

Another affect of irrigation is the value of products produced on irrigated farms versus nonirrigated farms. In 1978, the total market value of products sold from all farms was \$108.1 billion. Of this amount, products from irrigated farms accounted for \$31.2 billion or 28.9 percent of the total. These sales came from only 12.2 percent of the farms, 13.1 percent of the cropland, and 24.6 percent of the land in farms. Table 5 presents other selected characteristics on irrigated and nonirrigated farms.