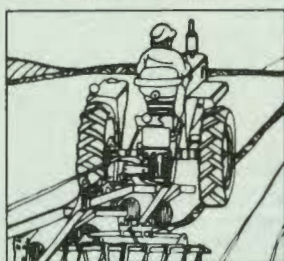
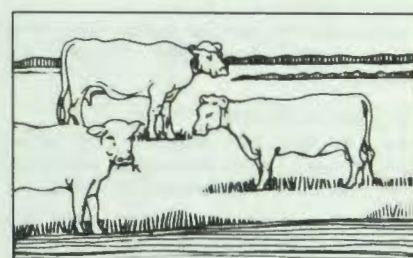
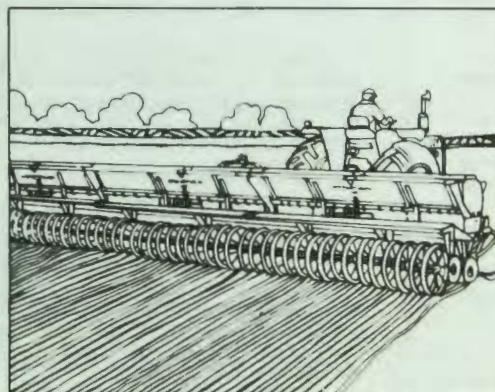
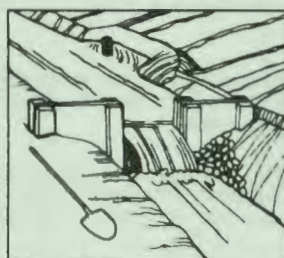


part 15
GRAPHIC SUMMARY

**VOLUME V
SPECIAL REPORTS**



**1969
CENSUS OF
AGRICULTURE**



Issued December 1973



U. S. DEPARTMENT OF COMMERCE
Frederick B. Dent, Secretary
Sidney L. Jones, Assistant Secretary for Economic Affairs
Social and Economic Statistics Administration
Edward D. Failor, Administrator
BUREAU OF THE CENSUS
Vincent P. Barabba, Director



BUREAU OF THE CENSUS

Vincent P. Barabba, Director
Robert L. Hagan, Deputy Director
James W. Turbitt, Associate Director

AGRICULTURE DIVISION

J. Thomas Breen, Chief

GEOGRAPHY DIVISION

Morton A. Meyer, Chief

REPORTS OF THE 1969 CENSUS OF AGRICULTURE

Individual County Reports

Eight-page reports have been issued for each county and State.

Volume I. Area Reports

A separate report has been published for each State, American Samoa, Guam, Puerto Rico, Trust Territory, and the Virgin Islands. The report consists of two sections. Section 1 contains State summary data, county summary of selected data, and miscellaneous items by counties; Section 2 contains the detailed county reports.

Volume II. General Report

Statistics by subject are presented in separate chapters with totals for the United States, regions, geographic divisions, and States. The nine chapters are being issued as individual reports as follows:

- Chapter 1 General Information; Procedures for Collection, Processing, Classification*
- Chapter 2 Farms: Number, Use of Land, Size of Farm*
- Chapter 3 Farm Management, Farm Operators*
- Chapter 4 Equipment, Labor, Expenditures, Chemicals*
- Chapter 5 Livestock, Poultry, Livestock and Poultry Products*
- Chapter 6 Crops, Nursery and Greenhouse Products, Forest Products*
- Chapter 7 Value of Products, Economic Class, Contracts*
- Chapter 8 Type of Farm*
- Chapter 9 Irrigation and Drainage on Farms*

Volume III. Agricultural Services

This new report contains data relating to agricultural services for the United States by State and county.

Volume IV. Irrigation

Data will be included on drainage basins, land irrigated, crop production on irrigated land, water conveyed, users, and types of organizations.

Volume V. Special Reports

Reports may contain data obtained from supplemental surveys, such as type of farm, horticulture, and farm finance; in addition to information obtained in the census.

- Parts 1 to 9. Type-of-Farm Operations.*—One for each of nine major type-of-farm classifications.
- Part 10. Horticultural Specialties.*
- Part 11. Farm Finance.*
- Part 12. Ranking Agricultural Counties.*
- Part 13. Forms and Procedures.*
- Part 14. Procedural History.*
- Part 15. Graphic Summary.*
- Part 16. Coverage Evaluation.*

Volume VI. Drainage of Agricultural Lands

This report will include agricultural drainage statistics collected from individual farms and from publicly organized drainage projects.

ACKNOWLEDGMENTS—The data used in the preparation of this report were furnished by the nation's farm operators, members of their families, or employees. The Graphic Summary is the result of a cooperative effort under the joint direction of J. Thomas Breen, Chief, Agriculture Division, and Morton A. Meyer, Chief, Geography Division.

Orvin L. Wilhite, Assistant Chief, Agriculture Division, participated in the overall planning and supervised the preparation of this report. Development of the subject matter content, review of the data displayed on the maps, and preparation of the text were accomplished by Joseph A. Horak, Agriculture Division. Richard I. Buhrman, then of the Agriculture Division, wrote the computer programs used to convert the county statistics to formats permitting direct computer preparation of the dot and pattern maps and assisted in the development of the pattern map programs.

The maps were prepared under the supervision of Richard H. Schweitzer, Jr., Geography Division. The dot maps were prepared for the Census Bureau through a contract with the Cartographic Laboratory, University of Wisconsin - Madison, under the immediate direction of Dr. Joel L. Morrison. The dot maps were drawn on a computer-driven drum plotter utilizing a computer program written by Wendell K. Beckwith. The program automatically clusters the dot patterns within counties with respect to the specific land use patterns found in the counties.

The computer mapping system used to create the pattern maps was developed by Frederick R. Broome, Geography Division, who also wrote the computer programs required to produce the plot tapes. The color separation negatives used to create the pattern maps were automatically drawn on a FR-80, Computer Output on Microfilm unit operated by the National Oceanic and Atmospheric Administration.

The photographic processing and final preparation of the publication negatives were accomplished by the Geographic Operations Branch, Data Preparation Division, under the supervision of Kurt L. G. Legait.

Helen D. Turner, assisted by Janet W. Hall, coordinated the various phases of the publication program for the Agriculture Division. Publication planning, editing, and printing were accomplished through the Publication Services Division, Raymond J. Koski, Chief.

SUGGESTED CITATION

U.S. Bureau of the Census, Census of Agriculture, 1969
Volume V. Special Reports
Part 15. Graphic Summary

U.S. Government Printing Office, Washington, D.C. 1973

LIBRARY OF CONGRESS CARD NO. 72-601370

For sale by the Superintendent of Documents, U.S. Government Printing Office,
Washington, D.C. 20402. Price \$3.30 Stock Number 0324-00252

CONTENTS

	<i>page</i>
Introduction	
Authority	1
Source of Information	1
Presentation of Data—U.S. Totals	1
U.S. Summary of Mapped Data, With 1964 Comparative Data	1
Definition of Farm	9
Census Forms Used	9
Maps for "All Farms" and "Class 1-5 Farms" (Those With Sales of \$2,500 or More) ..	9
Number of Farms	9
Value of Land Buildings	9
Size of Farm	9
Type of Farm	9
Class of Farm	11
Tenure and Characteristics of Farm Operators	11
Type of Farm Organization	11
Land in Farms and Land Uses	12
Conservation Practices	12
Market Value of Agricultural Products Sold	12
Farm-Related Income	12
Farm Production Expenses	13
Hired Farm Labor	13
Machinery and Equipment	13
Agricultural Chemicals Used	13
Livestock and Poultry	13
Crops	14
How the Maps Were Made	14

Map number		MAPS	page
All farms	Class 1-5 farms	Number of Farms	
69-M1		Number of Farms, 1969	16
M2		Farms—Increase and Decrease in Number, 1964 to 1969	17
	69-M3	Number of Farms With Sales of \$2,500 and Over, 1969	18
	MP5	Farms With Sales of \$2,500 and Over as a Percent of All Farms, 1969	18
M4		Number of Farms With Sales Less Than \$2,500, 1969	19
MP6		Farms With Less Than \$2,500 Sales as a Percent of All Farms, 1969	19
Value of Land and Buildings			
MP1		Average Value of Land and Buildings Per Farm, 1969	20
MP2		Average Value of Land and Buildings Per Acre of Land in Farms, 1969	20
Size of Farms			
MP3		Average Size of Farms, 1969	21
	MP4	Average Size of Farms With Sales of \$2,500 and Over, 1969	21
M5		Farms of Less Than 50 Acres, 1969	22
M6		Farms of 50 to 179 Acres, 1969	22
M7		Farms of 180 to 259 Acres, 1969	23
M8		Farms of 260 to 499 Acres, 1969	23
M9		Farms of 500 to 999 Acres, 1969	24
M10		Farms of 1,000 Acres or More, 1969	24
Type of Farm			
	M12	Cash-Grain Farms, 1969	25
	M13	Tobacco Farms, 1969	26
	M14	Cotton Farms, 1969	26
	M15	Other Field-Crop Farms, 1969	27
	M16	Vegetable Farms, 1969	27
	M17	Fruit and Nut Farms, 1969	28
	M18	Poultry Farms, 1969	28
	M19	Dairy Farms, 1969	29
	M24	Livestock Farms, Other Than Poultry and Dairy Farms, and Livestock Ranches, 1969 ...	30
	M22	General Farms, 1969	31
	M23	Miscellaneous Farms, 1969	31
Economic Class of Farms			
	M25	Class 1 Farms, 1969	32
	M26	Class 2 Farms, 1969	32
	M27	Class 3 Farms, 1969	33
	M28	Class 4 Farms, 1969	33
	M29	Class 5 Farms, 1969	34
M30		Class 6 Farms, 1969	34
M31		Part-Time Farms, 1969	35
M32		Part-Retirement Farms, 1969	35
	MP61	Farms With Sales of \$10,000 and Over as a Percent of All Farms, 1969	36

MAPS—Continued

Map number			page
	Class		
All farms	1-5 farms		
Tenure and Characteristics of Farm Operators			
69-M34		Farms Operated by Full Owner, 1969	37
MP7		Percent of Farms Operated by Full Owners, 1969	37
M35		Farms Operated by Part Owners, 1969	38
MP8		Percent of Farms Operated by Part Owners, 1969	38
M36		Farms Operated by Tenants, 1969	39
MP9		Percent of Farms Operated by Tenants, 1969	39
MP28		Percent of Farm Operators Under 25 Years of Age, 1969	40
MP27		Percent of Farm Operators 65 Years Old and Over, 1969	40
M42		Farm Operators Reporting Any Off-Farm Work, 1969	41
M43		Farm Operators Working Off Their Farms 100 Days or More, 1969	41
MP29		Percent of Farm Operators Working Off Farms 100 Days or More, 1969	42
MP62		Percent of Farm Operators Not Residing on Farm Operated, 1969	42
Type of Farm Organization			
69-MP10		Percent of Land in Farms Operated by Individuals or Families, 1969	43
MP11		Percent of Land in Farms Operated by Partnerships, 1969	44
MP12		Percent of Land in Farms Operated by Corporations, 1969	44
Land in Farms and Land Uses			
M49		Land in Farms, 1969	45
M50		Land in Farms—Increase and Decrease in Acreage, 1964 to 1969	46
MP31		Land in Farms as a Percent of Land Area, 1969	47
M51		Cropland, 1969	48
M52		Cropland—Increase and Decrease in Acreage, 1964 to 1969	48
MP32		Cropland as a Percent of Land Area, 1969	49
MP33		Cropland as a Percent of Land in Farms, 1969	49
M53		Harvested Cropland, 1969	50
MP34		Harvested Cropland as a Percent of Land Area, 1969	51
MP35		Harvested Cropland as a Percent of Land in Farms, 1969	51
	MP36	Pastureland as a Percent of Land in Farms, 1969	52
M58		Irrigated Land, 1969	53
M59		Irrigated Land—Increase and Decrease in Acreage, 1964 to 1969	53
MP37		Irrigated Land as a Percent of Land in Farms, 1969	54
	MP38	Irrigated Harvested Cropland as a Percent of Harvested Cropland, 1969	54
	M61	Drained Land, 1969	55
	MP39	Drained Land as a Percent of Land in Farms, 1969	55
Conservation Practices			
	M62	Grain or Row Crops Farmed on the Contour, 1969	56
	M63	Stripcropping Systems to Control Erosion, 1969	57
	M64	Cropland and Pastureland Having Terraces, 1969	57

MAPS—Continued

Map number			page
All farms	Class 1-5 farms		
Market Value of Farm Products Sold			
69-M65		Value of Farm Products Sold, 1969	58
MP13		Pattern of Value of Farm Products Sold, 1969	59
MP14		Average Value Per Farm of Farm Products Sold, 1969	60
MP15		Average Value of Farm Products Sold Per Acre of Land in Farms, 1969	60
MP16		Average Net Value (Value of Farm Products Sold Minus Farm Production Expenses) of Farm Products Sold Per Farm, 1969	61
MP17		Net Value of Farm Products Sold as a Percent of Total Farm Sales, 1969	61
MP18		Net Value of Farm Products Sold as a Percent of Value of Land and Buildings, 1969	62
M66		Value of Crops Sold, 1969	63
MP19		Value of Crops Sold as a Percent of Farm Products Sold, 1969	64
MP20		Average Value of Crops Sold Per Acre of Harvested Cropland, 1969	64
M72		Value of Livestock, Poultry, and Their Products Sold, 1969	65
	69-MP21	Value of Poultry and Poultry Products Sold as a Percent of Farm Products Sold, 1969	66
	MP22	Value of Dairy Products Sold as a Percent of Farm Products Sold, 1969	66
	MP23	Value of Cattle and Calves Sold as a Percent of Farm Products Sold, 1969	67
	MP24	Value of Hogs, Sheep, and Goats Sold as a Percent of Farms Products Sold, 1969	67
Farm-Related Income			
M77		Income From Customwork and Other Agricultural Services, 1969	68
M78		Income From Recreational Services, 1969	68
MP25		Income From Government Farm Programs as a Percent of Sales of Farm Products, 1969 .	69
MP26		Income From Government Farm Programs as a Percent of Net Sales of Farm Products, 1969	69
Farm Production Expenses			
M80		Farm Production Expenses, 1969	70
MP41		Pattern of Farm Production Expenses, 1969	71
MP40		Farm Production Expenses as a Percent of Value of Farm Products Sold, 1969	72
M81		Expenditures for Purchase of Livestock and Poultry, 1969	73
MP42		Pattern of Expenditures for Purchase of Livestock and Poultry, 1969	73
M82		Expenditures for Feed for Livestock and Poultry, 1969	74
MP43		Pattern of Expenditures for Feed for Livestock and Poultry, 1969	74
MP63		Expenditures for Commercially Mixed Formula Feeds as a Percent of All Feed Purchased for Livestock and Poultry, 1969	75
M83		Expenditures for Seeds, Bulbs, Plants, and Trees, 1969	76
MP44		Pattern of Expenditures for Seeds, Bulbs, Plants, and Trees, 1969	76
M84		Expenditures for Commercial Fertilizer, 1969	77
MP45		Pattern of Expenditures for Commercial Fertilizer, 1969	77
M85		Expenditures for Lime, 1969	78
M86		Expenditures for Agricultural Chemicals Excluding Lime and Fertilizer, 1969	79
MP46		Pattern of Expenditures for Agricultural Chemicals Excluding Lime and Fertilizer, 1969 .	79
MP64		Average Expenditures for Agricultural Chemicals Excluding Lime and Fertilizer Per Farm Reporting, 1969	80
M87		Expenditures for Gasoline and Other Petroleum Fuel and Oil for the Farm Business, 1969	81
MP47		Pattern of Expenditures for Gasoline and Other Petroleum Fuel and Oil for the Farm Business, 1969	81

MAPS—Continued

Map number		page
	Class	
All farms	1-5 farms	
Farm Production Expenses—Continued		
69-M88	Expenditures for Hired Farm Labor Excluding Contract Labor, 1969	82
MP48	Pattern of Expenditures for Hired Farm Labor Excluding Contract Labor, 1969	82
M89	Expenditures for Contract Labor, Machine Hire, and Customwork, 1969	83
MP49	Pattern of Expenditures for Contract Labor, Machine Hire, and Customwork, 1969	83
Hired Farm Labor		
69-M93	Number of Regular Hired Farm Workers (Working 150 Days or More), 1969	84
M94	Number of Hired Workers Working Less Than 150 Days, 1969	84
MP30	Ratio of Regular Hired Farm Workers (Working 150 Days or More), to Farm Operators, 1969	85
Machinery and Equipment on Place		
M95	Estimated Market Value of All Machinery and Equipment on Place, 1969	86
MP50	Pattern of Estimated Market Value of All Machinery and Equipment on Place, 1969	87
MP51	Average Estimated Market Value of All Machinery and Equipment on Place Per Farm Reporting, 1969	87
M98	Motortrucks Including Pickups, 1969	88
M100	Tractors Other Than Garden Tractors and Motor Tillers, 1969	88
M101	Tractors Other Than Garden Tractors and Motor Tillers—Increase and Decrease in Number, 1964 to 1969	89
M102	Grain and Bean Combines, Self-Propelled, 1969	89
M104	Pickup Balers, 1969	90
M106	Cornpickers, Cornheads, and Picker-Shellers, 1969	90
Agricultural Chemicals Used		
M108	Acreage on Which Commercial Fertilizer Was Used, 1969	91
MP52	Acres of Crops Harvested on Which Commercial Fertilizer Was Used as a Percent of All Harvested Cropland, 1969	92
M112	Acreage of Hay Crops Treated for Insect Control, 1969	93
M114	Acreage of Other Crops (Corn, Cotton, Tobacco, Trees, Vines, etc.) Treated for Insect Control, 1969	93
MP53	Acres of Crops Treated for Insect Control as a Percent of Harvested Cropland, 1969	94
M116	Acreage of Crops and Orchards Treated for Disease Control, 1969	94
M118	Acreage of Crops Treated for Weed or Grass Control, 1969	95
MP54	Acres of Crops Treated for Weed or Grass Control as a Percent of Harvested Cropland, 1969	95
M120	Acreage of Pasture Treated for Weed or Brush Control, 1969	96
M122	Acreage Treated With Chemicals for Defoliation or for Growth Control of Crops or Thinning of Fruit, 1969	96
Livestock and Poultry		
M125	Cattle and Calves, 1969	97
M126	Cattle and Calves—Increase and Decrease in Number, 1964 to 1969	98

MAPS—Continued

Map number			page
	Class		
All farms	1-5 farms		
Livestock and Poultry—Continued			
69-M128		Cows and Heifers That Had Calved on Hand, 1969	99
MP67		Cows and Heifers That Had Calved as a Percent of All Cattle and Calves, 1969	99
M130		Milk Cows, 1969	100
M131		Milk Cows—Increase and Decrease in Number, 1964 to 1969	100
MP69		Milk Cows as a Percent of All Cows and Heifers That Had Calved, 1969	101
M132		Cows Other Than Milk Cows, 1969	101
M133		Cows Other Than Milk Cows—Increase and Decrease in Number, 1964 to 1969	102
	69-MP68	Heifers and Heifer Calves; Bulls and Steers, Including Calves as a Percent of All Cattle and Calves, 1969	102
M127		Cattle and Calves Sold, 1969	103
	MP65	Cattle and Calves Sold After Being Fattened on Grain and Concentrates as a Percent of All Cattle and Calves Sold, 1969	104
	M134	Cattle, Excluding Calves, Fattened on Grain Concentrates and Sold for Slaughter, 1969 ..	104
M139		Hogs and Pigs, 1969	105
M140		Hogs and Pigs—Increase and Decrease in Numbers, 1964 to 1969	106
	M142	Hogs and Pigs for Breeding, 1969	106
M141		Hogs and Pigs Sold, 1969	107
MP66		Feeder Pigs Sold as a Percent of All Hogs and Pigs Sold, 1969	107
M147		Sheep and Lambs, 1969	108
M149		Sheep and Lambs Sold, 1969	108
M151		Horses and Ponies, 1969	109
M152		Chickens 3 Months Old or Older, 1969	110
M155		Broilers and Other Meat-Type Chickens Less than 3 Months Old Sold, 1969	111
	M158	Turkeys Sold, 1969	111
Crops Harvested			
M162		Corn Harvested for All Purposes, 1969	112
MP55		Acres of Corn Harvested for All Purposes as a Percent of Harvested Cropland, 1969	113
M164		Corn Harvested for Grain, 1969	114
	M165	Corn Cut for Silage, 1969	114
M166		Sorghums Harvested for All Purposes Except Sirup, 1969	115
MP56		Acres of Sorghums Harvested for All Purposes Except Sirup, as a Percent of Harvested Cropland, 1969	116
M168		Sorghums Harvested for Grain, 1969	116
M170		Wheat Harvested, 1969	117
M171		Wheat Harvested—Increase and Decrease in Acreage, 1964 to 1969	118
MP57		Acres of Wheat Harvested as a Percent of Harvested Cropland, 1969	118
	M172	Oats Harvested, 1969	119
	M174	Barley Harvested, 1969	119
	M176	Rye Harvested, 1969	120
	M177	Flaxseed Harvested, 1969	120
	M178	Rice Harvested, 1969	121
M179		Soybeans Harvested for Beans, 1969	122
M180		Soybeans Harvested for Beans—Increase and Decrease in Acreage, 1964 to 1969	123
MP58		Acres of Soybeans Harvested as a Percent of Harvested Cropland, 1969	123
M181		Peanuts Harvested for Nuts, 1969	124
M183		Cotton Harvested, 1969	125
M184		Cotton Harvested—Increase and Decrease in Acreage, 1964 to 1969	126
MP60		Acres of Cotton Harvested as a Percent of Harvested Cropland, 1969	126

MAPS—Continued

page

<u>Map number</u>			
<u>All</u>	<u>Class</u>		
<u>farms</u>	<u>1-5</u>		
	<u>farms</u>	Crops Harvested—Continued	
	69-M185	Sugar Beets Harvested for Sugar, 1969	127
	M186	Sugarcane Harvested for Sugar, 1969	127
	M187	Irish Potatoes Harvested, 1969	128
69-M189		Tobacco Harvested, 1969	128
M191		Land From Which Hay Was Cut, Excluding Sorghum Hay, 1969	129
MP59		Land From Which Hay Was Cut, Excluding Sorghum Hay, as a Percent of Harvested Cropland, 1969	129
	M193	Alfalfa and Alfalfa Mixtures for Hay or Dehydrating, 1969	130
	M195	Clover, Timothy, and Mixtures of Clover and Grasses for Hay, 1969	130
	M197	Small Grain Hay, 1969	131
	M200	Wild Hay, 1969	131
	M201	Grass Silage, 1969	132
	M204	Alfalfa Seed, 1969	132
		Vegetables	
M206		Vegetables Harvested for Sale, 1969	133
	M208	Tomatoes Harvested for Sale, 1969	134
	M209	Sweet Corn Harvested for Sale, 1969	134
	M210	Cucumbers and Pickles Harvested for Sale, 1969	135
	M211	Watermelons Harvested for Sale, 1969	135
	M212	Snap Beans, Bush and Pole, Harvested for Sale, 1969	136
	M213	Lettuce and Romaine Harvested for Sale, 1969	136
	M214	Asparagus Harvested for Sale, 1969	137
	M215	Cantaloups, Persians and Muskmelons Harvested for Sale, 1969	137
	M216	Green Peas Harvested for Sale, 1969	138
		Berries, Fruits, and Nuts	
M217		Berries Harvested for Sale, 1969	139
	M218	Strawberries Harvested for Sale, 1969	139
M219		Land in Orchards, 1969	140
	M221	Apples—Acres in Trees, 1969	141
	M222	Peaches—Acres in Trees, 1969	141
	M223	Pears—Acres in Trees, 1969	142
	M224	Cherries—Acres in Trees, 1969	142
	M225	Plums and Prunes—Acres in Trees, 1969	143
	M226	Grapes—Acres in Vines, 1969	143
	M227	Oranges—Acres in Trees, 1969	144
	M228	Grapefruit—Acres in Trees, 1969	144
	M229	Lemons—Acres in Trees, 1969	145
	M232	Pecans—Acres in Trees, 1969	145

Introduction

The 1969 Census of Agriculture, the 19th nationwide census of agriculture of the United States, was the first to be conducted primarily by mail. This report summarizes graphically many of the significant facts collected by the census regarding agricultural operations in the United States.

Authority

The census of agriculture is authorized under the provisions of Title 13, United States Code. Section 142(a) provides that the Secretary of Commerce shall take a census of agriculture in 1959 and each fifth year thereafter.

Source of Information

The data used in preparing the charts shown in this graphic summary were obtained from the 1969 Census of Agriculture; detailed statistics may be found in volumes I and II of the 1969 census reports.

Presentation of Data—U.S. Totals

Except for 12 increase-decrease maps, the maps in this report show data only for 1969. The 1969 total for each map is shown below, along with the comparable 1964 total, the numerical increase or decrease and the percent change from 1964 to 1969.

1969 Census of Agriculture—U.S. Summary of Mapped Data, With 1964 Comparative Data

Map number		Title	Unit	1969	1964	1964 to 1969		Percent change
All farms	Class 1-5 farms					Increase	Decrease	
NUMBER OF FARMS								
69-M1		Number of farms	number	2,730,250	3,157,857		427,607	-13.5
69-M2		Farms increase and decrease in number ..	number	2,730,250	3,157,857		427,607	-13.5
	69-M3	Number of farms with sales of \$2,500 and over (class 1-5 farms)	number	1,733,683	1,817,440		83,757	-4.6
	69-MP5	Farms with sales of \$2,500 and over as a percent of all farms	percent	63.5	57.6	5.9		+10.3
69-M4		Number of farms with sales less than \$2,500	number	994,456	1,338,239		343,783	-25.7
69-MP6		Farms with less than \$2,500 sales as a percent of all farms	percent	36.4	42.4		6.0	-14.1
VALUE OF LAND AND BUILDINGS								
69-MP1		Average value of land and buildings per farm	dollars	75,725	50,646	25,079		+49.5
69-MP2		Average value of land and buildings per acre of land in farms	dollars	194.43	143.81	50.62		+35.2
SIZE OF FARM								
69-MP3		Average size of farms	acres	389.5	351.6	37.9		+10.8
	69-MP4	Average size of farms with sales of \$2,500 and over (class 1-5 farms)	acres	529.7	507.8	21.9		+4.3
69-M5		Farms of less than 50 acres	number	635,576	820,015		184,439	-22.5
69-M6		Farms of 50 to 179 acres	number	1,001,706	1,175,370		173,664	-14.8
69-M7		Farms of 180 to 259 acres	number	306,942	355,442		48,500	-13.6
69-M8		Farms of 260 to 499 acres	number	419,421	451,301		31,880	-7.1
69-M9		Farms of 500 to 999 acres	number	215,659	210,437	5,222		+2.5
69-M10		Farms of 1,000 acres or more	number	150,946	145,292	5,654		+3.9

1969 Census of Agriculture—U.S. Summary of Mapped Data, With 1964 Comparative Data—Continued

Map number		Title	Unit	1969	1964	1964 to 1969		Percent change
All farms	Class 1-5 farms					Increase	Decrease	
TYPE OF FARM								
69-M12		Cash-grain farms (class 1-5 farms)	number	369,312	368,518	794		+0.2
69-M13		Tobacco farms (class 1-5 farms)	number	89,903	125,593		35,690	-28.4
69-M14		Cotton farms (class 1-5 farms)	number	40,534	117,241		76,707	-65.4
69-M15		Other field crop farms (class 1-5 farms)	number	31,190	31,299		109	-0.3
69-M16		Vegetable farms (class 1-5 farms)	number	19,660	17,345	2,315		+13.3
69-M17		Fruit and nut farms (class 1-5 farms)	number	53,754	50,108	3,646		+7.3
69-M18		Poultry farms (class 1-5 farms)	number	57,545	76,322		18,777	-24.6
69-M19		Dairy farms (class 1-5 farms)	number	260,956	349,244		88,288	-25.3
69-M24		Livestock farms, other than poultry and dairy, and livestock ranches (class 1-5 farms)	number	647,884	470,715	177,169		+37.6
69-M22		General farms (class 1-5 farms)	number	126,527	175,103		48,576	-27.7
69-M23		Miscellaneous farms (class 1-5 farms)	number	36,418	35,952	466		+1.3
ECONOMIC CLASS OF FARMS								
69-M25		Class 1 farms (sales of \$40,000 and over)	number	221,690	141,914	79,776		+56.2
69-M26		Class 2 farms (sales of \$20,000 to \$39,999)	number	330,992	259,898	71,094		+27.4
69-M27		Class 3 farms (sales of \$10,000 to \$19,999)	number	395,472	467,096		71,624	-15.3
69-M28		Class 4 farms (sales of \$5,000 to \$9,999)	number	390,425	504,614		114,189	-22.6
69-M29		Class 5 farms (sales of \$2,500 to \$4,999)	number	395,104	443,918		48,814	-11.0
69-M30		Class 6 farms (sales of \$50 to \$2,499)	number	192,564	348,272		155,708	-44.7
69-M31		Part-time farms	number	574,546	639,409		64,863	-10.1
69-M32		Part-retirement farms	number	227,346	350,558		123,212	-35.1
69-MP61		Farms with sales of \$10,000 and over as a percent of all farms	percent	34.7	27.5	7.2		+26.2
TENURE AND CHARACTERISTICS OF FARM OPERATORS								
69-M34		Farms operated by full owners	number	1,705,720	1,818,254		112,534	-6.2
69-MP7		Percent of farms operated by full owners	percent	62.5	57.6	4.9		+8.5
69-M35		Farms operated by part owners	number	671,607	781,884		110,277	-14.1
69-MP8		Percent of farms operated by part owners	percent	24.6	24.8		0.2	-0.7
69-M36		Farms operated by tenants	number	352,923	539,921		186,998	-34.6
69-MP9		Percent of farms operated by tenants	percent	12.9	17.1		4.2	-24.4
69-MP28		Percent of farm operators under 25 years of age	percent	1.9	1.7	0.3		+15.0
69-MP27		Percent of farm operators 65 years old and over	percent	16.6	17.4		0.8	-4.4
69-M42		Farm operators reporting any off-farm work	number	1,482,292	1,462,183	20,109		+1.4
69-M43		Farm operators working off their farms 100 days or more	number	1,090,502	1,013,200	77,302		+7.6
69-MP29		Percent of farm operators working off farms 100 days or more	percent	39.9	32.1	7.9		+24.5
69-MP62		Percent of farm operators not residing on farm operated	percent	16.8	9.2	7.5		+81.9

1969 Census of Agriculture—U.S. Summary of Mapped Data, With 1964 Comparative Data—Continued

Map number		Title	Unit	1969	1964	1964 to 1969		Percent change
All farms	Class 1-5 farms					Increase	Decrease	
TYPE OF FARM ORGANIZATION								
	69-MP10	Percent of land in farms operated by individuals or families (class 1-5 farms)	percent	72.5	NA	—	—	—
	69-MP11	Percent of land in farms operated by partnerships (class 1-5 farms)	percent	17.8	NA	—	—	—
	69-MP12	Percent of land in farms operated by corporations (class 1-5 farms)	percent	8.8	NA	—	—	—
LAND IN FARMS AND LAND USE								
69-M49		Land in farms	acres	1,063,346,489	1,110,184,615		46,838,126	—4.2
69-M50		Land in farms—increase and decrease in acreage	acres	1,063,346,489	1,110,184,615		46,838,126	—4.2
69-MP31		Land in farms as a percent of land area	percent	47.0	49.0		2.0	—4.0
69-M51		Cropland	acres	459,047,505	434,235,833	24,811,672		+5.7
69-M52		Cropland-increase and decrease in acreage	acres	459,047,505	434,235,833	24,811,672		+5.7
69-MP32		Cropland as a percent of land area	percent	20.3	19.1	1.1		+5.9
69-MP33		Cropland as a percent of land in farms	percent	43.2	39.1	4.1		+10.4
69-M53		Harvested cropland	acres	273,016,000	286,892,202		13,876,202	—4.8
69-MP34		Harvested cropland as a percent of land area	percent	12.1	12.6		0.6	—4.7
69-MP35		Harvested cropland as a percent of land in farms	percent	25.7	25.8		0.2	—0.6
	69-MP36	Pastureland as a percent of land in farms (class 1-5 farms)	percent	54.5	54.8		0.4	—0.7
69-M58		Irrigated land	acres	39,121,693	37,055,449	2,066,244		+5.6
69-M59		Irrigated land—increase and decrease in acreage	acres	39,121,693	37,055,449	2,066,244		+5.6
69-MP37		Irrigated land as a percent of land in farms	percent	3.7	3.3	0.3		+10.2
	69-MP38	Irrigated harvested cropland as a percent of harvested cropland (class 1-5 farms)	percent	12.5	NA	—	—	—
	69-M61	Drained land (class 1-5 farms)	acres	59,550,697	NA	—	—	—
	69-MP39	Drained land as a percent of land in farms (class 1-5 farms)	percent	6.5	NA	—	—	—
CONSERVATION PRACTICES								
	69-M62	Grain or row crops farmed on the contour (class 1-5 farms)	acres	14,572,224	20,254,349		5,682,125	—28.1
	69-M63	Stripcropping systems to control erosion (class 1-5 farms)	acres	12,447,013	16,029,231		3,582,218	—22.3
	69-M64	Cropland and pastureland having terraces (class 1-5 farms)	acres	16,435,486	NA	—	—	—
MARKET VALUE OF FARM PRODUCTS SOLD								
69-M65		Value of farm products sold	dollars	45,609,090,417	35,292,343,942	10,316,746,475		+29.2
69-MP13		Pattern of value of farm products sold	dollars	45,609,090,417	35,292,343,942	10,316,746,475		+29.2
69-MP14		Average value per farm of farm products sold	dollars	16,705	11,176	5,529		+49.5
69-MP15		Average value of farm products sold per acre of land in farms	dollars	42.89	31.79	11.10		+34.9
69-MP16		Average net value (value of farm products sold minus farm production expenses) of farm products sold per farm	dollars	2,940	NA	—	—	—

1969 Census of Agriculture—U.S. Summary of Mapped Data, With 1964 Comparative Data—Continued

Map number		Title	Unit	1969	1964	1964 to 1969		Percent change
All farms	Class 1-5 farms					Increase	Decrease	
MARKET VALUE OF FARM PRODUCTS SOLD—Continued								
69-MP17		Net value of farm products sold as a percent of total farm sales	percent	17.6	NA	—	—	—
69-MP18		Net value of farm products sold as a percent of value of land and buildings	percent	3.9	NA	—	—	—
69-M66		Value of crops sold	dollars	16,922,023,191	16,236,247,722	685,775,469		+4.2
69-MP19		Value of crops sold as a percent of farm products sold	percent	37.1	46.0		8.9	—19.4
69-MP20		Average value of crops sold per acre of harvested cropland	dollars	61.98	56.59	5.39		+9.5
69-M72		Value of livestock, poultry and their products sold	dollars	28,526,119,823	18,841,026,664	9,685,093,159		+51.4
	69-MP21	Value of poultry and poultry products sold as a percent of farm products sold (class 1-5 farms)	percent	8.8	NA	—	—	—
	69-MP22	Value of dairy products sold as a percent of farm products sold (class 1-5 farms)	percent	12.2	NA	—	—	—
	69-MP23	Value of cattle and calves sold as a percent of farm products sold (class 1-5 farms)	percent	31.5	NA	—	—	—
	69-MP24	Value of hogs, sheep, and goats sold as a percent of farm products sold (class 1-5 farms)	percent	9.8	NA	—	—	—
FARM-RELATED INCOME								
69-M77		Income from customwork and other agricultural services	dollars	509,612,885	NA	—	—	—
69-M78		Income from recreational services	dollars	49,622,915	40,731,541	8,891,374		+21.8
69-MP25		Income from government farm programs as a percent of sales of farm products	percent	5.6	NA	—	—	—
69-MP26		Income from government farm programs as a percent of net sales of farm products	percent	31.6	NA	—	—	—
FARM PRODUCTION EXPENSES								
69-M80		Farm production expenses	dollars	37,581,596,653	NA	—	—	—
69-MP41		Pattern of farm production expenses	dollars	37,581,596,653	NA	—	—	—
69-MP40		Farm production expenses as a percent of value of farm products sold	percent	82.4	NA	—	—	—
69-M81		Expenditures for purchase of livestock and poultry	dollars	8,081,638,922	4,177,778,075	3,903,860,847		+93.4
69-MP42		Pattern of expenditures for purchase of livestock and poultry	dollars	8,081,638,922	4,177,778,075	3,903,860,847		+93.4
69-M82		Expenditures for feed for livestock and poultry	dollars	7,100,395,745	5,511,833,966	1,588,561,779		+28.8
69-MP43		Pattern of expenditures for feed for livestock and poultry	dollars	7,100,395,745	5,511,833,966	1,588,561,779		+28.8
69-MP63		Expenditures for commercially mixed formula feeds as a percent of all feed purchased for livestock and poultry	percent	63.1	67.7		4.6	—6.8
69-M83		Expenditures for seeds, bulbs, plants, and trees	dollars	871,471,287	660,671,595	210,799,692		+31.9
69-MP44		Pattern of expenditures for seeds, bulbs, plants, and trees	dollars	871,471,287	660,671,595	210,799,692		+31.9
69-M84		Expenditures for commercial fertilizer	dollars	2,209,185,456	1,771,617,015	437,568,441		+24.7

1969 Census of Agriculture—U.S. Summary of Mapped Data, With 1964 Comparative Data—Continued

Map number		Title	Unit	1969	1964	1964 to 1969		Percent change
All farms	Class 1-5 farms					Increase	Decrease	
FARM PRODUCTION EXPENSES—Con.								
69-MP45		Pattern of expenditures for commercial fertilizer	dollars	2,209,185,456	1,771,617,015	437,568,441		+24.7
69-M85		Expenditures for lime	dollars	102,097,156	NA	—	—	—
69-M86		Expenditures for agricultural chemicals excluding lime and fertilizer	dollars	805,939,016	NA	—	—	—
69-MP46		Pattern of expenditures for agricultural chemicals excluding lime and fertilizer .	dollars	805,939,016	NA	—	—	—
69-MP64		Average expenditure for agricultural chemicals excluding lime and fertilizer per farm reporting	dollars	613	NA	—	—	—
69-M87		Expenditures for gasoline and other petroleum fuel and oil for the farm business	dollars	1,906,578,901	1,786,789,060	119,789,841		+6.7
69-MP47		Pattern of expenditures for gasoline and other petroleum fuel and oil for the farm business	dollars	1,906,578,901	1,786,789,060	119,789,841		+6.7
69-M88		Expenditures for hired farm labor, excluding contract labor	dollars	3,375,203,049	2,798,568,115	576,634,934		+20.6
69-MP48		Pattern of expenditures for hired farm labor, excluding contract labor	dollars	3,375,203,049	2,798,568,115	576,634,934		+20.6
69-M89		Expenditures for contract labor, machine hire, and customwork	dollars	1,405,258,858	869,784,030	535,474,828		+61.6
69-MP49		Pattern of expenditures for contract labor, machine hire, and customwork ..	dollars	1,405,258,858	869,784,030	535,474,828		+61.6
HIRED FARM LABOR								
69-M93		Number of regular hired farm workers (working 150 days or more) (class 1-5 farms)	number	654,370	866,022		211,652	−24.4
69-M94		Number of hired workers working less than 150 days (class 1-5 farms)	number	5,125,604	NA	—	—	—
69-MP30		Ratio of regular hired farm workers (working 150 days or more) to farm operators (class 1-5 farms)	number	0.38	0.48		0.10	−20.8
MACHINERY AND EQUIPMENT ON PLACE								
69-M95		Estimated market value of all machinery and equipment on place	dollars	25,343,076,671	NA	—	—	—
69-MP50		Pattern of estimated market value of all machinery and equipment on place ...	dollars	25,343,076,671	NA	—	—	—
69-MP51		Average estimated market value of all machinery and equipment on place per farm reporting	dollars	9,770	NA	—	—	—
69-M98		Motortrucks, including pickups	number	2,985,014	3,030,143		45,129	−1.5
69-M100		Tractors other than garden tractors and motor tillers	number	4,618,672	4,786,835		168,163	−3.5
69-M101		Tractors other than garden tractors and motor tillers—increase and decrease in number	number	4,618,672	4,786,835		168,163	−3.5
69-M102		Grain and bean combines, self-propelled	number	467,226	340,845	126,381		+37.1
69-M104		Pick-up balers	number	708,044	751,153		43,109	−5.7
69-M106		Cornpickers, corn heads, and picker-shellers	number	634,592	689,801		55,209	−8.0

1969 Census of Agriculture—U.S. Summary of Mapped Data, With 1964 Comparative Data—Continued

Map number		Title	Unit	1969	1964	1964 to 1969		Percent change
All farms	Class 1-5 farms					Increase	Decrease	
AGRICULTURAL CHEMICALS USED								
69-M108		Acreage on which commercial fertilizer was used (class 1-5 farms)	acres	155,549,815	NA	—	—	—
69-MP52		Acres of crops harvested on which commercial fertilizer was used as a percent of all harvested cropland (class 1-5 farms)	percent	59.6	NA	—	—	—
69-M112		Acreage of hay crops treated for insect control (class 1-5 farms)	acres	2,180,223	NA	—	—	—
69-M114		Acreage of other crops (corn, cotton, tobacco, trees, vines, etc.) treated for insect control (class 1-5 farms)	acres	39,881,566	NA	—	—	—
69-MP53		Acres of crops treated for insect control as a percent of harvested cropland (class 1-5 farms)	percent	16.1	NA	—	—	—
69-M116		Acreage of crops and orchards treated for disease control (class 1-5 farms) . . .	acres	4,088,038	NA	—	—	—
69-M118		Acreage of crops treated for weed or grass control (class 1-5 farms)	acres	84,913,547	59,629,354	25,284,193		+42.4
69-MP54		Acres of crops treated for weed or grass control as a percent of harvested cropland (class 1-5 farms)	percent	32.5	NA	—	—	—
69-M120		Acreage of pasture treated for weed or brush control (class 1-5 farms)	acres	4,967,459	3,166,802	1,800,657		+56.9
69-M122		Acreage treated with chemicals for defoliation or for growth control of crops or thinning of fruit (class 1-5 farms)	acres	5,780,991	NA	—	—	—
LIVESTOCK AND POULTRY								
69-M125		Cattle and calves	number	106,380,541	105,557,830	822,711		+0.8
69-M126		Cattle and calves—increase and decrease in number	number	106,380,541	105,557,830	822,711		+0.8
69-M128		Cows and heifers that had calved, on hand	number	45,511,356	47,341,851		1,830,495	—3.9
69-MP67		Cows and heifers that had calved as a percent of all cattle and calves	percent	42.8	44.8		2.1	—4.6
69-M130		Milk cows	number	11,174,521	14,622,630		3,448,109	—23.6
69-M131		Milk cows—increase and decrease in number	number	11,174,521	14,622,630		3,448,109	—23.6
69-MP69		Milk cows as a percent of all cows and heifers that had calved	percent	24.6	30.9		6.3	—20.5
69-M132		Cows other than milk cows	number	34,336,835	32,719,221	1,617,614		+4.9
69-M133		Cows other than milk cows—increase and decrease in number	number	34,336,835	32,719,221	1,617,614		+4.9
69-MP68		Heifers and heifer calves, bulls and steers, including calves, as a percent of all cattle and calves (class 1-5 farms) . .	percent	57.3	NA	—	—	—
69-M127		Cattle and calves sold	number	74,616,155	62,952,900	11,663,255		+18.5
69-MP65		Cattle and calves sold after being fattened on grain and concentrates as a percent of all cattle and calves sold (class 1-5 farms)	percent	36.4	37.7		1.2	—3.2
69-M134		Cattle, excluding calves, fattened on grain concentrates and sold for slaughter (class 1-5 farms)	number	22,988,615	18,652,778	4,335,837		+23.2
69-M139		Hogs and pigs	number	55,454,828	54,080,194	1,374,634		+2.5

1969 Census of Agriculture—U.S. Summary of Mapped Data, With 1964 Comparative Data—Continued

Map number		Title	Unit	1969	1964	1964 to 1969		Percent change
All farms	Class 1-5 farms					Increase	Decrease	
LIVESTOCK AND POULTRY—Con.								
69-M140		Hogs and pigs—increase and decrease in number	number	55,454,828	54,080,194	1,374,634		+2.5
	69-M142	Hogs and pigs for breeding (class 1-5 farms)	number	8,153,267	7,056,758	1,096,509		+15.5
69-M141		Hogs and pigs sold	number	89,313,449	83,537,060	5,776,389		+6.9
69-MP66		Feeder pigs sold as a percent of all hogs and pigs sold	percent	16.9	NA	—	—	—
69-M147		Sheep and lambs	number	21,611,074	25,471,538		3,860,464	—15.2
69-M149		Sheep and lambs sold	number	18,308,083	22,081,419		3,773,336	—17.1
69-M151		Horses and ponies	number	2,237,981	NA	—	—	—
69-M152		Chickens 3 months old or older	number	371,008,459	343,161,043	27,847,416		+8.1
69-M155		Broilers and other meat-type chickens less than 3 months old sold	number	2,429,773,426	1,915,373,928	514,399,498		+26.9
	69-M158	Turkeys sold (class 1-5 farms)	number	103,454,667	103,966,019		511,352	—0.5
CROPS HARVESTED								
69-M162		Corn harvested for all purposes	acres	60,402,153	63,514,906		3,112,753	—4.9
69-MP55		Acres of corn harvested for all purposes as a percent of harvested cropland	percent	22.1	22.1		0.014	—0.063
69-M164		Corn harvested for grain	acres	52,540,249	53,751,155		1,210,906	—2.3
	69-M165	Corn cut for silage (class 1-5 farms)	acres	7,262,348	8,141,448		879,100	—10.8
69-M166		Sorghums harvested for all purposes except sirup	acres	15,487,665	14,951,719	535,946		+3.6
69-MP56		Acres of sorghums harvested for all purposes except sirup as a percent of harvested cropland	percent	5.7	5.2	0.5		+8.8
69-M168		Sorghums harvested for grain	acres	12,953,930	11,168,607	1,785,323		+16.0
69-M170		Wheat harvested	acres	45,372,878	47,958,396		2,585,528	—5.4
69-M171		Wheat harvested—increase and decrease in acreage	acres	45,372,878	47,958,396		2,585,528	—5.4
69-MP57		Acres of wheat harvested as a percent of harvested cropland	percent	16.6	16.7		0.1	—0.6
	69-M172	Oats harvested (class 1-5 farms)	acres	16,354,035	17,879,668		1,525,633	—8.5
	69-M174	Barley harvested (class 1-5 farms)	acres	8,924,758	9,567,832		643,074	—6.7
	69-M176	Rye harvested (class 1-5 farms)	acres	1,115,260	1,552,426		437,166	—28.2
	69-M177	Flaxseed harvested (class 1-5 farms)	acres	2,489,806	NA	—	—	—
	69-M178	Rice harvested (class 1-5 farms)	acres	2,130,770	NA	—	—	—
69-M179		Soybeans harvested for beans	acres	38,549,663	29,843,593	8,706,070		+29.2
69-M180		Soybeans harvested for beans—increase and decrease in acreage	acres	38,549,663	29,843,593	8,706,070		+29.2
69-MP58		Acres of soybeans harvested as a percent of harvested cropland	percent	14.1	10.4	3.7		+35.7
69-M181		Peanuts harvested for nuts	acres	1,426,726	1,347,253	79,473		+5.9
69-M183		Cotton harvested	acres	11,496,320	13,916,653		2,420,333	—17.4
69-M184		Cotton harvested—increase and decrease in acreage	acres	11,496,320	13,916,653		2,420,333	—17.4
69-MP60		Acres of cotton harvested as a percent of harvested cropland	percent	4.2	4.8		0.6	—13.2
	69-M185	Sugar beets harvested for sugar (class 1-5 farms)	acres	1,464,384	NA	—	—	—
	69-M186	Sugarcane harvested for sugar (class 1-5 farms)	acres	519,180	NA	—	—	—
	69-M187	Irish potatoes harvested (class 1-5 farms)	acres	1,260,898	1,151,505	109,393		+9.5

1969 Census of Agriculture—U.S. Summary of Mapped Data, With 1964 Comparative Data—Continued

Map number		Title	Unit	1969	1964	1964 to 1969		Percent change
All farms	Class 1-5 farms					Increase	Decrease	
CROPS HARVESTED—Continued								
69-M189		Tobacco harvested	acres	876,926	1,025,241		148,315	-14.5
69-M191		Land from which hay was cut, excluding sorghum hay	acres	53,203,606	66,159,649		12,956,043	-19.6
69-MP59		Land from which hay was cut, excluding sorghum hay, as a percent of harvested cropland	percent	19.5	23.1		3.6	-15.5
69-M193		Alfalfa and alfalfa mixtures for hay or dehydrating (class 1-5 farms)	acres	22,139,038	26,040,993		3,901,955	-15.0
69-M195		Clover, timothy, and mixtures of clover and grasses for hay (class 1-5 farms) ...	acres	10,525,103	10,752,228		227,125	-2.1
69-M197		Small grain hay (class 1-5 farms)	acres	2,249,185	2,353,212		104,027	-4.4
69-M200		Wild hay (class 1-5 farms)	acres	7,573,887	NA	—	—	—
69-M201		Grass silage (class 1-5 farms)	acres	1,364,316	1,721,876		357,560	-20.8
69-M204		Alfalfa seed (class 1-5 farms)	acres	404,702	654,526		249,824	-38.2
VEGETABLES								
69-M206		Vegetables harvested for sale	acres	3,352,383	3,333,772	18,611		+0.6
69-M208		Tomatoes harvested for sale (class 1-5 farms)	acres	387,838	372,991	14,847		+4.0
69-M209		Sweet corn harvested for sale (class 1-5 farms)	acres	631,067	514,033	117,034		+22.8
69-M210		Cucumbers and pickles harvested for sale (class 1-5 farms)	acres	110,001	98,224	11,777		+12.0
69-M211		Watermelons harvested for sale (class 1-5 farms)	acres	203,165	216,289		13,124	-6.1
69-M212		Snap beans, bush and pole, harvested for sale (class 1-5 farms)	acres	268,667	269,383		716	-0.3
69-M213		Lettuce and romaine harvested for sale (class 1-5 farms)	acres	228,618	NA	—	—	—
69-M214		Asparagus harvested for sale (class 1-5 farms)	acres	116,392	NA	—	—	—
69-M215		Cantaloups, persians, and muskmelons harvested for sale (class 1-5 farms)	acres	119,107	NA	—	—	—
69-M216		Green peas harvested for sale (class 1-5 farms)	acres	392,432	NA	—	—	—
BERRIES, FRUITS, AND NUTS								
69-M217		Berries harvested for sale	acres	138,669	161,137		22,468	-13.9
69-M218		Strawberries harvested for sale (class 1-5 farms)	acres	46,528	57,482		10,954	-19.1
69-M219		Land in orchards	acres	4,233,897	4,251,130		17,233	-0.4
69-M221		Apples—acres in trees (class 1-5 farms) ..	acres	525,849	NA	—	—	—
69-M222		Peaches—acres in trees (class 1-5 farms) .	acres	300,618	NA	—	—	—
69-M223		Pears—acres in trees (class 1-5 farms) ...	acres	111,628	NA	—	—	—
69-M224		Cherries—acres in trees (class 1-5 farms) .	acres	129,216	NA	—	—	—
69-M225		Plums and prunes—acres in trees (class 1-5 farms)	acres	161,023	NA	—	—	—
69-M226		Grapes—acres in vines (class 1-5 farms) ..	acres	542,630	NA	—	—	—
69-M227		Oranges—acres in trees (class 1-5 farms) .	acres	966,963	NA	—	—	—
69-M228		Grapefruit—acres in trees (class 1-5 farms)	acres	183,568	NA	—	—	—
69-M229		Lemons—acres in trees (class 1-5 farms) .	acres	62,376	NA	—	—	—
69-M232		Pecans—acres in trees (class 1-5 farms) ..	acres	382,304	NA	—	—	—

Definition of Farm

The data for the graphic material in this report relate to places qualifying as farms, using the same definition as in 1964 and 1959. These are places on which agricultural operations larger than a specified minimum were conducted at any time during the census year under the control of an individual management. Places of less than 10 acres were counted as farms if the sales of the agricultural products amounted, or normally would amount, to at least \$250. Places of 10 acres or more were counted as farms if the sales of agricultural products for the year amounted, or normally would amount, to at least \$50.

Census Forms Used

Two basic census forms were used. The regular 12-page form (69-A1) was used for farms with an expected value of sales of \$2,500 or more, and a 4-page version (69-A2) was used for farms with an expected value of sales of less than \$2,500. The short form covered only major items and omitted most of the detail found in the regular form.

Maps for "All Farms" and "Class 1-5 Farms" (Those With Sales of \$2,500 or More)

The maps in this report present data for "All Farms" for data items appearing on both the A1 and A2 report forms and for "Class 1-5 Farms" for more detailed data items appearing only on the A1 report form.

Number of Farms

All farms—All places of less than 10 acres with sales of agricultural products amounting, or which normally would amount, to at least \$250 and all places 10 acres or more with sales of agricultural products amounting, or which normally would amount, to at least \$50.

Class 1-5 farms—Farms with sales of agricultural products amounting, or which normally would amount, to at least \$2,500 excluding abnormal farms such as prison farms, hospital farms, church farms, school farms, experimental farms, Indian reservations, and grazing associations.

The total number of farms in the United States has declined steadily from a record high of 6,812,350 in 1935 to 2,730,250 in 1969. While some of the decline has resulted from limited changes toward a more restrictive farm definition which has been used in the more recent censuses of agriculture (c.f., Introduction to Volume II, 1959 Census of Agriculture), most of the decline has resulted from the consolidation of many small farms into other farms.

From 1964 to 1969, the farms counted with sales of farm products less than \$2,500 declined 343,783 in number or 25.7 percent while the number of farms counted with sales of \$2,500 and over declined only 83,757 or 4.6 percent.

Value of Land and Buildings

The value of land and buildings reported for the census was supposed to represent market value—that is, the price for which the land and buildings would sell at the time of the census.

The value of land and buildings for farms for which the value was not completely reported was estimated during office processing by using the average value per acre of land and buildings for farms of approximately the same size having similar characteristics in the same area.

The total value of land and buildings for all farms in the United States is almost \$207 billion. The average value per farm is \$75,725 and the average value per acre is \$194.43.

The maps exhibiting value of land and buildings per farm and per acre show reverse patterns for many groups of counties in the West. Many western counties which appear in the pattern for the highest value-per-farm category, appear in the pattern for the lowest value-per-acre category. The reason for the reverse relationship between the two pattern maps is that while a large proportion of land in farms is comprised of low value-per-acre rangeland, the extremely large average acreage of the farms and ranches offsets the low average-per-acre value, resulting in high average-per-farm values.

Size of Farm

Although the number of farms has dropped drastically in the last 35 years, the acreage of land in farms has changed very little; as a result the average size of farm is 2 1/2 times what it was (an increase from 154.8 acres to 389.5 acres).

The increase of farm size has been one of the significant developments in the recent history of U.S. agriculture. Since 1935, for each of the size-of-farm groups shown in this report, the number of farms under 500 acres has decreased while the number of farms in the size groups over 500 acres has increased. However, large variations in the productivity of land have made size alone an unsatisfactory measure of the scale or size of the farm business and should be considered when using data for various groupings of farms. For example, average value of farm products sold per acre of farmland can vary from such extremes as \$817 per acre in Suffolk County, N.Y., to \$5 per acre in Nye County, Nev.

Type of Farm

Maps by type of farm were made for the 1.7 million class 1-5 farms. In order for a farm to be classified as a particular type, the value of sales in 1969 from a product or group of products had to represent 50 percent or more of the total value of sales of farm products.

Cash-grain farms—Cash-grain farms are farms which receive 50 percent or more of their total sales of farm products from corn, sorghums, small grains, soybeans for beans, cowpeas for peas, dry field and seed beans and peas. Cash-grain farms are the second largest group in number comprising 21 percent of all class 1-5 farms. They average 504 acres in size and \$17,955 in value of farm products sold. Cash-grain farms are usually wheat farms, corn and soybean farms, or rice farms. However, in some scattered areas, grain sorghums, dry field beans and peas, and small grains other than wheat and rice are the principal source of income. The greatest concentration of cash-grain farms is in the Corn Belt where corn and soybeans are the principal cash

crops sold. In the Dakotas, Nebraska, Kansas, Oklahoma, Montana, Washington, and Oregon, wheat is the principal cash-grain crop. Cash-grain farms in Arkansas, Mississippi, Louisiana, California, and on the Gulf Coast of Texas are usually rice farms.

Tobacco farms—Tobacco farms comprised 5 percent of the class 1-5 farms in 1969. On the average, they are the smallest farms of all the type-of-farm groups, both in terms of acres in farm (128) and value of sales of farm products (\$10,470). Nearly all the tobacco farms are in five southern states (North Carolina, South Carolina, Virginia, Kentucky, and Tennessee). Over 72 percent of all tobacco harvested on class 1-5 farms comes from tobacco farms.

Cotton farms—About 2 percent of all class 1-5 farms in 1969 were classified as cotton farms. Cotton farms averaged 466 acres in size and \$20,076 in value of farm products sold. They are located almost entirely in the South and in irrigated areas of the West. About 52 percent of all cotton harvested comes from cotton farms.

Other field-crop farms—Other field-crop farms receive 50 percent or more of their total value of sales of farm products from peanuts, potatoes (Irish and sweet), sugarcane for sugar or sirup, sweet sorghums for sirup, broomcorn, popcorn, sugar beets and sugar beet seed, mint for oil, hops, and pineapples. In 1969, other field-crop farms accounted for less than 2 percent of all class 1-5 farms, averaged 414 acres in size, and \$43,547 in sales. Because of the wide variety of crops in this group, the farms are scattered throughout the entire United States. Usually, within a particular geographic area, the growing of a certain crop provides the income source which classifies the farm type as "other field-crop." For instance, in Maine, New York, New Jersey, North Dakota, Minnesota, Idaho, and California they were principally potato farms; in North Carolina, Virginia, Georgia, Alabama, and Texas they were primarily peanut farms; and in Louisiana and Hawaii, they were primarily sugarcane farms.

Vegetable farms—Vegetable farms comprise about 1 percent of all class 1-5 farms and are the smallest type-of-farm group in number of farms (19,660). They average 236 acres in size and were next to the highest of all type-of-farm groups in average value of sales at \$59,765. Vegetable farms accounted for 79 percent of the value of all vegetables sold and 61 percent of the acreage of all vegetables harvested for sale from class 1-5 farms in 1969.

Fruit and nut farms—Fruit and nut farms receive 50 percent or more of their total value of sales of farm products from berries, other small fruits, tree fruits, grapes, nuts, and coffee. Fruit and nut farms represented 3.1 percent of all class 1-5 farms in 1969. They are highly specialized in that they accounted for 92.5 percent of the value of sales of fruit, nuts, and berries and over 80 percent of all orchard acreage on class 1-5 farms in 1969. Fruit, nut, and berry farms averaged 144 acres in size and \$31,297 in value of farm products sold in 1969.

Poultry farms—Poultry farms are farms which receive 50 percent or more of their total value of sales of farm products from chickens, chicken eggs, turkeys, and other poultry products. Poultry farms comprise slightly more than 3 percent of all class 1-5 farms in 1969. They are next to the smallest of any type-of-farm groups in acreage, averaging 130 acres. Poultry farms averaged \$68,810 in value of farm products sold which is more than any other type-of-farm group. On class 1-5 farms, poultry farms account for 95 percent of the value of sales from poultry and poultry products, 99 percent of the broilers sold, and 97 percent of the turkeys sold. Although poultry farms are found throughout the country, the greatest concentration of poultry farms is in the broiler producing areas in Georgia, Alabama, Mississippi, Arkansas, Delaware, and Maryland.

Dairy farms (dairy products—milk, cream, etc.)—The criterion of 50 percent of total sales was modified in the case of dairy farms. A farm having value of sales of dairy products amounting to less than 50 percent of the total value of farm products sold was classified as a dairy farm, if—

- a. Dairy products sold accounted for more than 30 percent of the total value of products sold,
- b. Milk cows represented 50 percent or more of total cows, and
- c. The value of dairy products sold plus the value of cattle and calves sold amounted to 50 percent or more of the total value of all farm products sold.

Dairy farms represented the third largest group of farms in 1969. They averaged 249 acres in size and \$25,216 in value of farm products sold. Dairy farms accounted for 93 percent of the value of dairy products sold from class 1-5 farms.

Livestock farms and livestock ranches other than dairy and poultry farms—These are farms that receive 50 percent or more of the total value of agricultural products sold from cattle, calves, hogs, sheep, goats, wool, and mohair. This group includes two subgroups; livestock farms other than poultry and dairy farms, and livestock ranches. It is the largest type-of-farm group, accounting for 37 percent of class 1-5 farms in 1969. The farms in this group contain by far the largest amount of land; accounting for nearly three-fifths of the total land in farms and over 30 percent of cropland harvested on class 1-5 farms. In terms of value of sales from class 1-5 farms, this group accounted for 40 percent of the value of all farm products sold, 86 percent of the value of all cattle and calves sold, and 82 percent of the value of all hogs, sheep, and goats sold. This group averages 828 acres in size and \$27,481 in value of farm products sold.

General farms—General farms are farms on which the sale of one product or related group of products did not provide 50 percent or more of the total value of all farm products sold and farms having 50 percent or more of sales coming from field seeds, hay, forage crops, and silage. They comprise farms usually having a variety of enterprises which are the source of farm sales. Between general farms in various parts of the country, there are wide differences in the products comprising the source of sales. For instance, in the Midwest, cash grains, cattle, and hogs are

often the principal source of sales while in the South, tobacco, peanuts, and cattle may be the principal source of sales. General farms account for 7 percent of all class 1-5 farms, averaged 449 acres in size and \$19,138 in sales of farm products.

Miscellaneous farms—Miscellaneous farms are farms which receive 50 percent or more of the total value of agricultural products sold from nursery and greenhouse products, forest products, mules, horses, colts, ponies, fur-bearing animals, bees, honey, goat milk; farms with no value of farm products sold; all institutional farms and Indian reservations. Miscellaneous farms comprise 2 percent of all class 1-5 farms and average 295 acres in size and \$31,679 in value of farm products sold. They account for 97 percent of nursery and greenhouse products sold and 44 percent of all forest products sold from class 1-5 farms. Over 81 percent of sales of other livestock and livestock products (principally horses, mink, mink pelts, and honey) are from miscellaneous farms.

Class of Farm

The data obtained from the 1969 Census of Agriculture is summarized in statistical tables for "All farms" and for "Farms with sales of \$2,500 and over (classes 1-5)." However, all farms enumerated were divided into nine classes for tabulation purposes. The definitions for the nine classes are as follows:

Class 1—\$40,000 or more of farm product sales

Class 2—\$20,000 to \$39,999 of farm product sales

Class 3—\$10,000 to \$19,999 of farm product sales

Class 4—\$5,000 to \$9,999 of farm product sales

Class 5—\$2,500 to \$4,999 of farm product sales or having a value of products sold of less than \$2,500 provided they had the acreage or livestock operations which normally would have had sales in excess of \$2,500. These would include new farm operations, farms having crop failure, and farms with large inventories and small 1969 sales.

Class 6—\$50 to \$2,499 of farm product sales and a farm operator who is under 65 years of age and did not work off the farm 100 days or more in the census year.

Part time—\$50 to \$2,499 of farm product sales and a farm operator who is under 65 years of age and worked off the farm 100 days or more in the census year.

Part retirement—\$50 to \$2,499 of farm product sales and a farm operator who is 65 years old or over.

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

Farms with sales of \$2,500 and over comprise 63 percent of all farms and account for 86 percent of land in farms, 96 percent

of harvested cropland, and nearly 98 percent of total value of farm sales.

The predominant group in economic importance for all farms is class 1. This group, while comprising only 8 percent of all farms, accounts for 34 percent of the land in farms, 31 percent of the harvested cropland, and 56 percent of the value of farm products sold.

Tenure and Characteristics of Farm Operators

Tenure classifications used in this census are as follows:

Full owners—Operators who operate only land they own.

Part owners—Operators who operate land they own and also land they rent from others.

Tenants—Operators who operate only the land they rent from (or work on shares for) others.

Full owners—Farms operated by full owners comprise over 62 percent of the farms and account for 35 percent of the land in farms, 30 percent of the harvested cropland, and 41 percent of the value of farm products sold. Though they are the largest tenure group in number of farms, they are the smallest in both average size at 220 acres and average value of farm products sold at \$10,869.

Part owners—The predominant group in economic importance are the part-owner-operated farms. These farms, though comprising only one-quarter of all farms, account for 52 percent of both land in farms and harvested cropland, and 44 percent of the value of all farm products sold. They far exceed the other two tenure groups both in average size at 820 acres and average value of farm products sold at \$29,775.

Tenants—Data from the 1969 Census of Agriculture show a continuation of the sharp downward trend occurring in farm tenancy over the past 35 years. The proportion of tenant-operated farms has declined from 17 percent in 1964 to 13 percent in 1969. Tenant-operated farms in 1969 accounted for 13 percent of the land in farms, 18 percent of the harvested cropland, and 15 percent of the value of farm products sold. They averaged 390 acres in size and \$20,024 in value of farm products sold.

Type of Farm Organization

The 1969 census is the first in which information was collected on the type of organization under which the farms operated. This information was collected for class 1-5 farms in response to the demand for data more descriptive of current farm organizational structure than the traditional tenure of farm operator classification.

The four classifications used for type of organization are—

Individual or family farm—excluding partnership and corporation.

Partnership.

Corporation—including family owned—
With 10 or fewer shareholders.
With more than 10 shareholders.

Other—includes estates, trusts, cooperatives. Many of the farms which reported "other" as the type of organization are institutional farms, Indian reservations, or other operations classified as "abnormal" and consequently are not included in the tabulations for class 1-5 farms.

Individual or family farms excluding partnerships and corporations, were by far the predominant type of organization comprising over 85 percent of the number of class 1-5 farms and accounting for over 72 percent of the land in farms. They averaged 450 acres in size.

Partnership farms comprise 13 percent of the class 1-5 farms and accounted for 18 percent of the land. They averaged 738 acres in size.

Corporation farms represent 1.2 percent of all class 1-5 farms but because of their large average size of 3,757 acres account for almost 9 percent of the land in farms.

Farms classified as "other" by type of organization—comprise about one-half percent of class 1-5 farms and account for less than 1 percent of land in farms. They averaged 834 acres in size.

Land in Farms and Land Uses

Land in farms—Each farm operator determined "land in farm" acreage by adding any acreage he owned to any acreage he rented from others, then subtracting any acreage he rented to others. Land in farms consists primarily of "agricultural" land; that is, land used for crops and pasture or grazing. It includes areas of forest and wasteland and some cropland not actually under cultivation nor used for pasture or grazing. Federal government lands used for grazing livestock under permit or special license on a per-head or animal-unit basis are not included.

Total cropland—This includes the sum of acreage for cropland harvested, cropland used for pasture or grazing, cropland used for cover crops, cropland on which all crops failed, cropland in cultivated summer fallow, and cropland idle.

Harvested cropland—This includes all land from which crops were harvested, including hay cut, and all land in orchards, citrus groves, vineyards, and nursery and greenhouse products.

Irrigated land—This consists of land in farms watered for agricultural purposes by artificial means.

Drained land—This consists of land in farms benefited to some extent by artificial drainage facilities including ditches, underground drains, grading for drainage, dikes, and pumping to control water.

Conservation Practices

Soil-conservation practices reported in the 1969 Census of Agriculture include contour planting, stripcropping, and terracing.

Contour farming refers to planting crops in level rows or strips at right angles to the natural slope of the land. It prevents rapid run-off of water from the soil, conserves moisture, and reduces erosion. Land that is farmed on the contour usually is also terraced or stripcropped. Only acreage of grain or row crops farmed on the contour was to be reported; hay and grass crops were to be excluded.

Stripcropping is the practice of alternating close-sown crops, such as small grains or hay and pasture with strips of row crops, such as corn, vegetables, etc., or of alternating close-sown or row crops with fallow land. The purpose of stripcropping is to control soil erosion by slowing the rate of water runoff, or to conserve moisture and reduce wind erosion.

Terraces are ridges or channels constructed across sloping land to control erosion by slowing the rate of water flow.

Market Value of Agricultural Products Sold

Farm operators were asked to report market value of agricultural products sold from the place in 1969. The report form used for the enumeration of class 1-5 farms in the 1969 census (form 69-A1) provided for farm operators to report value of sales in 15 commodity and livestock groups. The report form used for farms with expected sales less than \$2,500 (form 69-A2) provided for reporting value of sales in three groups.

Data for the sales of farm products represent total sales for the entire farm, regardless of who shared the receipts. For tenant-operated farms, the landlord's share of the agricultural products was considered as sold provided the products were moved off the tenant farm.

All sales data relate to agricultural products sold from the place in 1969 regardless of when the crop was harvested or when livestock or products were raised or produced.

Farm-Related Income

Three categories of farm-related income were reported by farm operators in 1969. Instructions were to report gross amounts received before taxes and expenses.

Customwork and other agricultural services—This category of farm-related income includes any customwork such as plowing,

spraying, harvesting, preparation of products for market, etc., done on another farm, and any other farmwork done for others for which the farm operator was paid.

Recreational services—This category includes charges for the use of land or facilities for hunting, fishing, camping, lodging, picnicking, boating, swimming, horseback riding, skiing, hiking, or other recreational activities.

Government payments—The farm operator was to report all government payments received from any of the following direct-payment programs:

Feed-grain diversion and price support	Conservation reserve (soil bank)
Wheat diversion and marketing certificate	Appalachian Land Stabilization and Conservation
Upland cotton diversion and price support	Sugar
Agricultural conservation	Wool and mohair
Emergency conservation	Cropland conversion
Cropland adjustment	Milk indemnity payment
	Great Plains Conservation

Farm Production Expenses

Farm production expenses include expenses paid by the farm operator and by anyone else for the production on the farm of crops, poultry, livestock, and other agricultural products. Tenant farmers were instructed to report spending by landlords for agricultural operations on the farm as well as their own spending. Farm operators who rent part of their land to others were to report only those expenses applicable to the land they actually used. If the farm operator produced poultry, livestock, or crops for others under contract he was to report the estimated cost of all items furnished by the contractor.

Hired Farm Labor

Number of hired farm workers includes all persons hired to do farm work for cash payment. Members of the farm operator's family were included if they were paid cash and even if they were doing construction or repair work along with their farm work. Operators of hired machines were excluded if their pay was included in the cost of the customwork. Also excluded were operators' family members who worked without cash pay, persons performing contract work, and persons employed by a labor contractor.

It is estimated that considerable duplication exists in the number of hired workers working less than 150 days, particularly in vegetable- and fruit-producing areas. Workers moving from farm to farm should have been counted on each farm where they were employed.

Machinery and Equipment

For individual items of farm equipment, the farm operator was to report only the equipment on the farm December 31, 1969,

regardless of ownership, that was used for the farm business in 1968 or 1969. Newly purchased equipment not yet used was to be included.

Farm operators were asked to estimate the market value of all machinery and equipment usually kept on the farm and used for the farm business. The reported value was supposed to represent an estimate of how much the machinery and equipment would sell for in its present condition; not the replacement cost or the depreciated value.

Agricultural Chemicals Used

This section refers to the acreage on which commercial fertilizer was used, and acreage treated with insecticides, herbicides, fungicides, and other chemicals.

The leaflet guide mailed with the census form contained instructions for the respondent to report the acres only once with respect to any one kind of chemical treatment even though the chemical may have been applied more than once. For dual-purpose chemical applications, for example spraying fruit trees for insect and disease control, the total acres treated were to be reported for both items—acreage treated for insect control and acreage treated for disease control. All land treated was to be reported even when the crop was abandoned and not harvested.

Livestock and Poultry

In 1969, livestock, poultry, and their products accounted for 62.5 percent of the value of all farm products sold. Livestock provide a market for pasture and range forage which does not have any other appropriate use. In addition, livestock and poultry provide an outlet for a major part of our harvested crop tonnage.

About 57 percent (almost 610 million acres) of the land in farms in 1969 was used for pasture. In addition, over 288 million acres of land not in farms was used in grazing. The combined acreage of land in farms and land not in farms used for pasture or grazing was equal to two-fifths of the total land area of the United States.

Of approximately 273 million acres of land used for harvested crops, feed for livestock and poultry was derived from more than 53 million acres of hay and almost 100 million acres of feed grains. In total, four-fifths of all U.S. farm and nonfarm land used for agriculture was used for the production of animal and poultry feed.

Cattle and calves on class 1-5 farms accounted for 50 percent of the value of sales of all livestock and poultry and their products and 31 percent of the total value of all farm products sold. About 63 percent of all farm operators reported cattle in 1969. Approximately 21 percent of the farms reported one milk cow or more in 1969, down from 36 percent in 1964. One-fifth of all class 1-5 farms reported dairy products sold. Dairy products on class 1-5 farms accounted for 19 percent of the value of all livestock and poultry and their products sold in 1969.

Hogs and pigs were reported on 25 percent of the farms. More than one-half of all hogs and pigs were on the farms in Iowa, Illinois, Indiana, and Missouri. Nearly three-fifths of the sheep and lambs in the United States in 1969 were in six States (Texas, Wyoming, California, Colorado, South Dakota, and Montana). In 1969, only 17 percent of the Nation's farm operators reported chickens 3 months old and over on hand and more than one-half of the total inventory was on 1 percent of the farms reporting such poultry. Over 85 percent of the 2.8 billion chickens sold were sold as broilers, and approximately 7,600 farms accounted for nearly three-fifths of all broilers sold.

In 1969, more than 69 percent of the turkeys sold were sold from fewer than 1,000 farms.

Crops

Crops harvested—In most instances, the acres reported for individual crops represented the area harvested during 1969. A small part of the acreage of corn, sorghums, peanuts, soybeans, and cowpeas counted as harvested was hogged off or grazed when mature or almost mature. The acreage of land from which crops were harvested was not necessarily the same as the total acres of all crops harvested, since more than one crop may have been harvested from the same land during the same crop year.

Vegetables harvested for sale—Vegetables for market and vegetables for sale to canners, freezers, dehydrators, or other processors were included in this category. The total acres of each vegetable crop harvested was to be reported, thus the acres of vegetables (or vegetables and field crops) harvested may frequently be greater than the acres of land from which the crops were harvested.

Berries, fruits, and nuts—In 1969, the acreage for these crops totaled 4.4 million acres, or about 1.6 percent of the cropland harvested. The value of sales of berries, fruits, and nuts from 4.1 million acres on class 1-5 farms was \$1.7 billion or about 10 percent of the value of all crops sold from all farms.

How the Maps Were Made

Much of the technology used to produce the maps in this report was developed specifically to meet the challenge presented by their subject matter and purpose. It seems fitting, therefore, to include here a brief description of the computer technology used.

Dot maps—The dot maps in this report were prepared by a computer-driven plotter from the output of a computer program which located the dots within subareas of the Nation's 3,076 counties as determined by a 16-level land-use filter. In the past, the production of dot maps has been a laborious, tedious, manual effort. This new computer mapping procedure enables all of the tedious work associated with the manual placement of dots to be done automatically by a computer program and to have the resulting map drawn by a computer-driven plotter.

The dot-mapping algorithm which was used to prepare these maps was developed by Mr. Wendell K. Beckwith under the

direction of Dr. Joel Morrison at the Cartographic Laboratory of the University of Wisconsin-Madison. The basic system utilizes several computer-mapping packages which were developed at the Laboratory. The data required for the dot-mapping system consists of individual totals for the data items, the land area of each county, and a center of the county shown as a pair of longitude and latitude coordinates. These data items were then processed through a computer program which computes the average density of dots for each unit in respect to the land area of the county and the absolute number of dots which apply to that county. This density value is then screened by a 16-level land-use filter to further position the dots with regard to the agricultural subareas of the county. The land-use filter is a mask of approximately one-half million cells covering the entire United States. It was extracted from the land-use map which appeared in the 1970 National Atlas on pages 158 and 159. Each of the land-use categories shown in the land-use map was converted into a numeric record by digitizing; this information was then utilized to modify the probability of the dot falling within specific portions of the county's total land area.

A numeric check was maintained on the number of dots which should fall in an area and the number of dots which were actually placed in that area. If an area received too few dots in comparison with the number dictated by the base data, the program reprocessed that area and relaxed the dot densities which had been previously calculated so that more potential dot locations were created within the county, even if this meant that some of the dots would tend to coalesce. After the required number of dots had been placed in an area, the program would then move on to the next area. Similarly, the entire map would be examined and the dot values calculated in respect to the potential density of dots within the county; the dot densities would be further screened by the land-use categories, and finally the dots would be plotted and compared to the ideal number.

The increase-decrease maps used an additional feature of the program. Since it is logically impossible for a dot representing an increase to be placed within the same county as a dot representing a decrease, the program, once any dots had been placed within a county, excluded the possibility of the opposite type of a dot being placed within the same county unit. This procedure avoids the problem of having two contradictory patterns occurring within the same physical area.

The resulting computer plots dramatically illustrate the clustering feature of the algorithm. Particularly for crops or agricultural activities which occur within highly localized areas (e.g., irrigated fields), the concentration of dots is extremely pronounced. Generally, the mountain and desert regions of the Nation have been avoided in the placement of dots. Likewise, large water bodies, urban areas, and otherwise uninhabitable areas have no dots placed within their confines. It is, however, possible that because of the density procedures of the algorithm, a few dots could be located in a county immediately adjacent to where they actually should have been placed.

The cost of producing these dot maps by automated techniques shows that there is a definite advantage over the largely clerical procedures used previously. It is estimated that each of the dot maps included within this report cost approximately one-fourth what they would have cost if they had been produced by traditional manual methods.

Pattern maps—The pattern (choropleth) maps in this graphic supplement were prepared by a new computer-mapping program which automatically created color separation negatives. The program plots the maps on 35mm film on a COM (Computer Output on Microfilm) unit. Each of the map images produced by the COM device corresponds to one of the class intervals that were used to subdivide the agricultural data prior to mapping. The negatives have a series of "windows", each of which corresponds to the counties for that class of data. The remainder of the negative is left unexposed. This procedure is directly analogous to the manual procedures used by cartographers to prepare color maps and is the product of the combination of modern computer technology with standard cartographic techniques. Thus, the maps have the quality of hand crafted choropleth maps and the low cost and relatively fast production time typical of automated cartography.

The county boundary file was derived from the digitized State-county boundary file prepared by the Federal Highway Administration. This file was reprocessed into a new file which contained sets of horizontal lines corresponding to the lines the COM unit would plot to completely cover a county's territory on the final map. Each of these sets of lines was organized by county as sets of plotter coordinates for the COM.

The agricultural data were extracted from the agriculture data tapes and were assigned into classes corresponding to the data

intervals that were desired on the maps. This tape was then processed in conjunction with the file of plotter coordinates. By matching the State and county codes, the data class intervals were correctly associated with the appropriate set of plotter coordinates. The combined file was then sorted so as to group all of the counties by class intervals, one map at a time. This insured that all counties which were assigned to the first class interval appeared together. The same procedure was used to group the other classes together. The operation produced a tape of plotting instructions which were then processed on the FR 80 COM unit operated by the National Oceanic and Atmospheric Administration in Suitland, Md.

Generally, six separate film images were produced by the COM for each map. Each of these images corresponded to a separate class interval of the data and also to a separate color on the final printed maps. The 35mm negatives, which were produced on the COM, were enlarged, lettered, screened, and composited by the Census' Geographic Operations Branch in Jeffersonville, Ind. The printer was given three final publication negatives for each map corresponding to the red, yellow, and black inks which were used in the printing of the maps. This computer-mapping procedure is being used for the first time in this publication. The results have shown that this approach to automated cartography can significantly reduce the cost of producing choropleth maps without lessening the final quality of the maps.