Part 1
FARM EQUIPMENT

Part 1
Farm Equipment—Continued

page

TABLES

PART 1. FARM EQUIPMENT

GENERAL INFORMATION

Historical Background

Mechanization has been one of the more important aspects of the technological revolution in agriculture. Mechanization, which is generally considered to have begun with the invention of the reaper in the 1800's, has continued at an ever increasing rate. The development and improvement of farm equipment has been one of the more important factors in the rapidly increasing productivity of the farm worker. Farm employment was at an all-time high of 13.6 million persons in 1910; it has decreased to 4.6 million in 1969. In 1910, a single farm worker was able to provide food and farm products for seven other persons, but in 1969 each farm worker provided for 45 other persons. From 1964 to 1969, this productivity increased from 33 persons to 45.

Source of Statistics

In addition to the statistics collected in the 1969 Census of Agriculture, presented in this part of the chapter with data from previous censuses, selected statistics from Current Industrial Reports published by the Industry Division of the Bureau of the Census are shown for comparative purposes.

Table 1. Other Published Data for Equipment: 1969

Where found	Geographical area for which available	Period	Classification
Volume I			
State tables:			All farms
6	State	1969 - 1959	Total farms
9	State	1969	Total farms
			Class 1-5 farms
15	State	1969-1959	Total class 1-5 farms
24	State	1969	Tenure of operator and type of organization
25	State	1969	Age of operator
26	State	1969	Farms by size
27	State	1969	Farms by economic class
28	State	1969	Type of farm
29	State	1969	Type of farms by economic class
30	State	1969	Large-scale farms by type
County tables:			All Farms
6	County and State	1969-1964	Total farms
			Class 1-5 farms
15	County and State	1969-1964	Total class 1-5 farms
Volume II:			
Chapter 2,3,7,8	United States	1969	Total class 1-5 farms by classification of respective chapters

DEFINITIONS AND EXPLANATIONS

Reporting Forms and Instructions

Farm equipment items for which 1969 data are available refer to specific items of equipment normally kept on the individual farm and used for the farm business in 1968 or 1969, regardless of ownership. Respondents were also asked to identify equipment by date of manufacture according to one of two classifications—1964 or earlier and 1965 or later.

It should be noted that no definitions or instructions concerning equipment other than those appearing in the census forms and in the Leaflet Guide were provided for the farm operator. Essentially, the interpretation of the questions was left to the farm operators. Each farm operator had to decide for himself how to count or classify the various equipment items.

In prior censuses, the enumerators were provided with an instruction book which included some definitions for problem items. As a result, enumerated censuses tended to produce somewhat more consistency in the reporting of equipment items.

The estimated market value of all machinery and equipment was obtained in 1969 for the first time since 1945. This estimated value was to include not only the value of the specified items, for which numerical counts were obtained, but also the value of all other machinery and equipment usually kept on the farm and used for the farm business.

In 1969, the report forms for farms with sales of $2,500 and over and for farms with sales of less than $2,500 asked for information about machinery and equipment. The A1 form used for class 1-5 farms covered five items just as they appeared on the A2 form, two items in greater detail, and two additional items. The facsimiles of the machinery and equipment sections of the two 1969 report forms are presented on page 6.

Other Published Data

Data on farm equipment for the 1969 Census of Agriculture, in addition to those published in this chapter, are provided elsewhere as indicated in table 1. Data for prior censuses of agriculture for items not included in this chapter are in the published reports for those censuses.

Facsimile of Section 31, Form 69-A1

Section 31 – MACHINERY and EQUIPMENT on this place on December 31, 1969. *(Include only equipment used in 1968 or 1969. See Leaflet, section 31.)*

Selected machinery and equipment on this place, December 31, 1969	Number manufactured in – 1965 or later	1964 or earlier
1. Automobiles	570	571
2. Motortrucks – *Include pickups*	572	573
3. Wheel tractors other than garden tractors and motor tillers	574	575
4. Crawler tractors	576	577
5. Riding garden tractors, 7 hp. and over	578	579
6. Grain and bean combines, self-propelled only	580	581
7. Corn heads for combines	582	583
8. Other cornpickers and picker-shellers	584	585
9. Pickup balers	586	587
10. Windrowers – pull and self-propelled *(Exclude mower conditioners)*	588	589
11. Field forage harvesters, shear bar only	590	591

	CENTS NOT REQUIRED Dollars	Cents
12. Estimated market value of all machinery and equipment usually kept on this place and used for the farm business – *Include the items listed above and any other machinery and equipment.*	592 $	

Facsimile of Section 10, Form 69-A2

Section 10 – MACHINERY and EQUIPMENT on this place on December 31, 1969, whether owned by you or by others – *Include only equipment used in 1968 or 1969.*

Selected machinery and equipment on this place December 31, 1969	Number manufactured in – 1965 or later	1964 or earlier
1. Automobiles	940	941
2. Motortrucks – *Include pickups*	942	943
3. Tractors other than garden tractors and motor tillers	944	945
4. Riding garden tractors 7 hp. and over	946	947
5. Grain and bean combines – self-propelled only	948	949
6. Cornpickers and picker-shellers, including corn heads for combines	950	951
7. Pickup balers	952	953

	CENTS NOT REQUIRED Dollars	Cents
8. Estimated market value of all machinery and equipment usually kept on this place and used for the farm business – *Include the items listed above and any other machinery and equipment*	954 $	

The machinery and equipment items which have been covered in the census of agriculture, have varied from census to census. Various items of equipment have been added or dropped from the census report forms, based on the need to measure new trends in mechanization and the need for benchmark statistics for major items. In 1969, there were no census inquiries to obtain information about farm facilities, as there had been in previous censuses.

Table 2 indicates, for each of the 1969 inquiries for all farms, the availability of comparable census data from 1920 to 1964. Table 3 shows the comparable data available for Class 1-5 farms from 1950 to 1964.

Table 2. Farm Equipment Items for All Farms by Year of Census: 1920 to 1969

	Year of census[1] 1969	1964	1959	1954	1950	1945	1940	1930	1925	1920
Automobiles	X	X	X	X	X	X	X	X	X	X
Motor trucks	X	X	X	X	X	X	X	X	X	X
Tractors other than garden and motor tillers	X	X	X	X	[2]X					
Riding garden tractors 7 hp and over	X									
Grain and bean combines, self-propelled	X	X								
Cornpickers, corn heads, and picker-shellers	X	X	X	[3]X	[3]X					
Pickup balers	X	X	X	X	[2]X					
Value of machinery and equipment	X					X	X	X	X	X

Note: The 1935 report form did not have questions on farm equipment.
[1]Data for the 1954, 1945, 1940, 1930, 1925, and 1920 censuses are for the conterminous United States.
[2]Data for Alaska and Hawaii not included.
[3]Data for 1954 and 1950 refer only to cornpickers and does not include data for Alaska and Hawaii.

Table 3. Farm Equipment Items for Farms With Sales of $2,500 and Over: 1950 to 1969

	Year of census[1]				
	1969	1964	1959	1954	1950
Automobiles	X	X	X	X	X
Motor trucks including pickups	X	X	X	X	X
Tractors other than garden and motor tillers	X	X	X	X	X
Wheel tractors other than garden tractors and motor tillers	X	X	X	X	X
Crawler tractors	X	X	X	X	X
Riding garden tractors 7 hp and over	X				
Grain and bean combines, self-propelled	X	X			
Cornpickers, corn heads, and picker-shellers	X	X	X	[2]X	[2]X
Corn heads for combines	X				
Other cornpickers and picker-shellers	X				
Pickup balers	X	X	X	X	X
Windrowers, pull and self-propelled	X				
Field forage harvesters, shear bar	X	X			
Value of machinery and equipment	X				

[1]For 1959, 1954, and 1950 data are for the conterminous United States and are based on only a sample of farms.
[2]Data for 1954 and 1950 refer only to cornpickers.

Comparability of Data

From 1964 to 1969, the number of farms decreased by about 428 thousand or 14 percent. Approximately 80 percent of the decrease was accounted for by farms with sales of less than $2,500. The relatively large decrease in farms since 1964 has significantly affected the number of farms reporting various types of machinery and equipment.

Between 1964 and 1969, there was a sizable decrease in the proportion of farms reporting automobiles. Some of this decrease may be due to instructions on the census forms to report value of equipment (including automobiles) usually kept on this place and used for the farm business. The underreporting of automobiles kept mainly or wholly for nonfarm use is indicated by the data for nonresident farm operators. Of the approximately 460,000 nonresident operators, only one-half reported having an automobile, compared to three-fourths of all farm operators. Data for nonresident operators are presented in chapter 3.

A small decrease in the average number of automobiles per farm provides some indication that automobiles owned by members of the family or by hired workers living on the farm may not have been reported in the census. In previous censuses, enumerators usually reported all automobiles kept on the farm, since it was generally assumed that they had some farm use.

Other selected equipment items were subject to definitional reporting problems. For example, some farm operators may have included some pull-type grain or bean combines with self-propelled combines. Shearbar-type forage harvesters are difficult to define clearly. Among the manufacturers, various terminologies are used to describe the same type of equipment. Some types of forage harvesters contain a combination of types of cutting or chopping systems. These types of reporting problems may have resulted in some overstatement of the census figures for these equipment items.

The data on the year of manufacture which were obtained in the 1969 Census of Agriculture appear to be subject to frequent reporting errors in the classification between the two age groups. A comparison of this data with statistics from other sources, along with a small research study matching 1969 census reports to 1964 census reports indicates that a sizable number of farm operators may have reported all of their selected items of machinery and equipment in the first reporting column of the equipment section, "manufactured 1965 or later," regardless of the actual year of manufacture.

This resulted in an overstatement of machinery and equipment manufactured in the period 1965 or later and an understatement of that manufactured in 1964 or earlier. The totals for machinery and equipment of all ages are not believed to be affected by the apparent age misclassification.

Table 4 provides a comparison of census data, by years of manufacture, with farm equipment data from the Current Industrial Reports.

The estimated market value of machinery and equipment as reported by farm operators was subject to the operator's interpretation of the question. The wide variations in the values reported indicate that, in place of market value, operators in some cases reported the replacement value; in other cases, they reported the depreciated value used for tax purposes; or yet in other cases, they reported an estimate of the value for only those items of equipment which had been listed on the report farm.

Only the most obvious errors in reported value were located and corrected by an imputation procedure during the computer edit process. For those census reports with an entry for some machinery or equipment, but for which a value was not reported, an estimated value of equipment was imputed. The value imputation was based on a census report for a farm with a similar type of operation and value-of-sales class.

CHANGES IN FARM EQUIPMENT AND MACHINERY

Automobiles

Since 1954, there has been a steady decline in both the number of farms reporting automobiles and in the number of automo-

Table 4. Comparison of Selected Items of Machinery and Equipment

	1969 Census of Agriculture				Current Industrial Reports—Number manufactured		Census reported equipment numbers as percentage of Current Industrial Report equipment numbers	
	Total		Manufactured 1965-69					
	Farms	Number	Farms	Number	1960-69	1965-69	1960-69	1965-69
Wheel tractors	1,527,318	3,581,426	696,472	1,146,199	1,536,865	836,511	233	137
Grain and bean combines, self-propelled	419,858	467,226	190,821	207,617	241,584	143,520	193	145
Corn heads[1]	176,625	184,032	111,021	114,880	154,357	99,020	119	116
Other cornpickers and picker-shellers[1]	389,513	403,785	117,949	121,091	178,739	67,015	226	181
Pickup balers	686,137	708,044	235,125	240,057	372,572	177,379	190	135
Windrowers, pull and self-propelled[1]	258,559	276,127	123,181	129,408	65,376	44,613	422	290
Field forage harvester, shear bar only[1]	202,609	214,637	90,839	94,464	144,249	83,597	149	113

[1]1969 Census of Agriculture data represent class 1-5 farms only.

Source: 1969 Census of Agriculture; Current Industrial Reports, Series M35A 1950-69, and Yearly Summaries 1960, 1961, and 1962.

biles located on these farms. However, the average number per farm reporting any automobiles has remained approximately the same during the period. The number of farms with automobiles decreased 24 percent from 1964 to 1969 while the number of automobiles on these farms declined by 25 percent. It should be noted that the number of farms with automobiles is closely related to the number of farms counted in the census. For farms with sales of $2,500 and over, there was a 17-percent decline in automobiles.

Seventy-five percent of all farms reported automobiles in 1969 versus 85 percent in 1964. For farms with sales of $2,500 and over, the percentage with automobiles declined from 91 percent in 1964 to 81 percent in 1969. Of the total automobiles reported, 59 percent were reported as manufactured in the period 1965 or later.

Motortrucks

Censuses prior to 1969 had showed increases in both the number of farms reporting trucks and the actual number reported on these farms. For 1969, both the number of farms reporting trucks and the number of trucks on these farms declined. There were about 158,000 fewer farms with motortrucks and about 45,000 fewer motortrucks than in 1964. At the same time, the average number of trucks per farm increased slightly from 1964 to 1969. In contrast, for farms with sales of $2,500 and over, there was a 6-percent increase in motortrucks between 1964 and 1969 representing a numerical increase of over 120,000. Some 77 percent of the trucks reported as manufactured in 1965 or later were on farms with sales of $2,500 and over.

Tractors

There was a decrease of 213,000 farms reporting tractors other than garden tractors and motor tillers from 1964 to 1969. This was accompanied by a decrease of 168,000 tractors. About 77 percent of all farms and 90 percent of farms with sales of $2,500 and over reported tractors in 1964. The comparable figures for 1969 are 81 percent and 89 percent, respectively. The average number of tractors per farm increased slightly between 1964 and 1969.

Table 5. Tractors, Cropland Harvested, Cropland Harvested Per Tractor, by Economic Class of Farm: 1969

		Tractors			Cropland			Average acres of cropland harvested per tractor
	Total farms reporting	Farms reporting	Number	Average number per farm	Farms reporting	Acres	Average acres per farm	
All farms...	2,730,250	2,205,379	4,618,672	2.1	2,219,631	273,016,000	123	59
Class 1-5 farms, total...	1,733,683	1,543,425	3,740,509	2.4	1,571,866	261,137,583	166	70
Class 1.....	221,690	208,341	816,161	3.9	199,821	85,820,196	429	105
Class 1a.	51,995	48,718	257,798	5.3	44,089	30,860,296	700	120
Class 2.....	330,992	310,669	869,609	2.8	312,460	72,341,980	232	83
Class 3.....	395,472	363,574	872,085	2.4	372,933	57,242,801	153	66
Class 4.....	390,425	339,143	659,888	1.9	353,853	29,885,920	84	45
Class 5.....	395,104	321,698	522,766	1.6	332,799	15,846,686	48	30

Tractors per farm and per acre of cropland harvested vary widely by the type of farm and by economic class of farm. Data for farms with sales of $2,500 and over, by these categories, are presented in Tables 5 and 6.

Table 6. Tractors, Cropland Harvested, Cropland Harvested Per Tractor, by Type of Farm: 1969

		Tractors			Cropland			Average acres of cropland harvested per tractor
	Total farms reporting	Farms reporting	Number	Average number per farm	Farms reporting	Acres	Average acres per farm	
Total Class 1-5.....	1,733,683	1,543,425	3,740,509	2.4	1,571,866	261,137,583	166	70
Cash grain..	369,312	339,774	862,677	2.5	368,298	100,348,738	272	116
Tobacco.....	89,903	75,665	128,997	1.7	89,878	2,721,231	30	21
Cotton.....	40,534	36,914	101,281	2.7	40,471	10,355,068	256	102
Other field crop.....	31,190	28,119	83,614	3.0	31,113	6,354,237	204	76
Vegetable...	19,660	17,885	63,207	3.5	19,632	2,874,710	146	45
Fruit and nut.....	53,754	43,627	101,427	2.3	53,215	3,790,579	71	37
Poultry.....	57,545	43,816	77,701	1.8	31,537	1,750,855	56	23
Dairy.....	260,956	245,257	665,708	2.7	246,896	27,929,786	113	42
Livestock other than poultry and dairy.....	568,201	509,938	1,187,012	2.3	503,460	75,221,844	149	63
Livestock ranches....	79,683	60,307	120,614	2.0	36,742	4,536,884	123	38
General.....	126,527	116,545	296,260	2.5	126,195	24,379,233	193	82
Miscellaneous....	36,418	25,578	52,011	2.0	24,429	874,418	36	17

For class 1-5 farms, the number of wheel tractors other than garden tractors and motor tillers declined by 79,000, but the number per farm increased from 2.2 in 1964 to 2.3 in 1969. The decrease in wheel tractors was partly offset by an increase of 11,000 crawler tractors.

The decrease in the number of tractors on farms is offset, to some extent, by the trend toward larger tractors. While data from the census of agriculture provide no direct information concerning the size of tractors on farms, data in table 7 on tractors manufactured show a continuous increase in the proportion of tractors of 70 horsepower and over in recent years.

Table 7. Tractors Manufactured, Percent Distribution by Horsepower Groups: 1961 to 1969

		Percent distribution						
	Total manufactured	40 hp and above	50 hp and above	60 hp and above	70 hp and above	90 hp and above	100 hp and above	120 hp and above
1969.....	131,469	79	72	62	49	38	13	6
1968.....	151,946	81	75	62	50	39	13	5
1967.....	180,292	82	75	61	49	34	9	3
1966.....	197,163	80	71	55	39	28	7	2
1965.....	175,641	77	65	54	36	24	3	(NA)
1964.....	142,247	82	65	55	39	25	(NA)	(NA)
1963.....	148,527	79	60	47	29	10	(NA)	(NA)
1962.....	146,348	74	56	40	21	(NA)	(NA)	(NA)
1961.....	130,787	74	55	37	16	(NA)	(NA)	(NA)

Current Industrial Reports, Farm Machines and Equipment, Series M35A 1950-1969, U.S. Department of Commerce, Bureau of Census, Washington, D.C. 20233

In spite of an apparent trend to more powerful tractors, census data show a decline in the average acres of cropland harvested per tractor from 1950 to 1969, although the change from 1964 to 1969 is not significant.

	Acres of cropland harvested	Number of tractors	Acreage of cropland harvested per tractor
1969	273,016,000	4,618,672	59
1964	286,892,202	4,786,835	60
1959	311,476,141	4,688,493	67
1954	332,870,479	4,345,234	77
1950	344,398,550	3,393,760	101

Over 70 percent of the class 1-5 farms with tractors reported two tractors or more in 1969 and approximately 17 percent reported having four tractors or more. About 47 percent of the class 1 farms had four tractors or more per farm as compared with only 3 percent of the class 5 farms.

Percent Distribution of Farms With Tractors by Number of Tractors

	Any tractors	1 tractor	2 or 3 tractors	4 tractors or more
Total	100.0	28.6	54.7	16.7
Class 1	100.0	10.6	42.1	47.3
Class 2	100.0	13.3	62.0	24.7
Class 3	100.0	20.4	65.8	13.9
Class 4	100.0	37.6	55.9	6.5
Class 5	100.0	54.7	42.1	3.2

Data in the table below indicate the growing number of class 1-5 farms with four tractors or more. These farms average 4.9 tractors in 1969.

	Farms reporting		Tractors		
				Increase or decrease	
	Number	Percent distribution	Number	Number	Percent
Total:					
1969	1,543,425	100.0	3,740,509	−68,091	−1.8
1964	1,645,960	100.0	3,808,600	68,124	1.8
1959	1,801,198	100.0	3,740,476	527,441	16.4
1954	1,785,364	100.0	3,213,035	–	–
2 or 3 tractors:					
1969	844,491	54.7	2,036,699	−238,917	−10.5
1964	961,948	58.4	2,275,616	−42,756	−1.8
1959	1,006,433	55.9	2,318,372	388,120	20.1
1954	867,674	48.6	1,930,252	–	–
4 or more tractors:					
1969	257,956	16.7	1,262,832	201,119	18.9
1964	212,741	12.9	1,061,713	277,981	35.5
1959	156,393	8.7	783,732	330,007	72.7
1954	88,632	5.0	453,725	–	–

From 1954 to 1969, the number of farms with four tractors or more tripled. The percent of farms with two or three tractors had increased in each census from 1954 to 1964; however, it decreased from 1964 to 1969. In numbers, farms with two or three tractors actually decreased between 1964 and 1969 more than farms with one tractor. At least some of the decrease can be attributed to those farms moving up to the group with four or more tractors.

Wheel Tractors

Data for wheel tractors were collected only for class 1-5 farms in 1969. Between 1964 and 1969, both the number of farms reporting and the number of wheel tractors declined, but at the same time the average number of tractors per farm increased. By year of manufacture, 32 percent were reported as made in the period 1965 or later.

Crawler Tractors

The number of crawler tractors has varied significantly from one census to another. From 1964 to 1969, the number of farms and the number of crawler tractors increased. Some of the crawler tractors which have been included in the census were used mainly for nonfarm purposes such as construction and lumbering. About 23 percent of the 159,000 crawler tractors in class 1-5 farms were reported as manufactured in the period 1965 or later.

Riding Garden Tractors

In 1969, riding garden tractors of 7 horsepower and over were reported by 9 percent of all farms. Of the 262,000 riding garden tractors, 73 percent were reported as manufactured in 1965 or later. In previous censuses, garden tractors and motor tillers were enumerated, but without respect to size or to whether they were the riding type. Due to the more restrictive definition used in 1969, data are not comparable with prior censuses.

Self-Propelled Grain and Bean Combines

The number of farms reporting self-propelled grain and bean combines, as well as the number of combines reported, showed a large increase from 1964 to 1969. The number of farms with combines increased 15 percent and the number of combines increased 37 percent. It should be noted that some pull-type combines may have been reported as self-propelled.

Almost two-thirds of the combines are concentrated in the North Central region. A significant portion of the combines in the Corn Belt States are equipped with corn heads and are used primarily for the harvesting of corn. A large proportion of the increase in combines occured in States with large acreages of corn and soybeans. For States in the Great Plains and in the West, combines are used primarily for the harvest of wheat, sorghum, and other small grains.

In recent years, self-propelled combines have been replacing pull-type combines at a rapid rate. In 1964, self-propelled

combines represented 37 percent of all combines on farms. Manufacturing statistics for 1969 indicate that 27,000 self-propelled combines were produced compared with less than 1,000 of the pull-type combines.

Not only is the proportion of self-propelled combines increasing, but also the average size. Manufacturing data, as shown in table 8, indicates that one-half of the self-propelled combines made in 1964 had a header under 14 feet in size. In comparison, for 1969 two-thirds of the self-propelled combines had headers of 16 feet and over.

Table 8. Number of Self-Propelled Combines Manufactured, Number by Size of Header, Percent Distribution by Size of Header: 1962 to 1969

	Total manufactured	Size of header			Percent distribution			
		Under 14 feet	14 to 15 feet	16 feet and over	Total	Under 14 feet	14 to 15 feet	16 feet and over
1969.....	18,988	3,217	3,286	12,485	100	17	17	66
1968.....	26,586	4,733	5,520	16,333	100	18	21	61
1967.....	33,676	7,644	7,572	18,460	100	23	22	55
1966.....	36,329	8,684	10,007	17,638	100	24	28	48
1965.....	27,941	7,779	7,432	12,730	100	28	27	45
1964.....	25,888	13,214	6,380	6,294	100	51	25	24
1963.....	21,827	16,660	2,942	2,225	100	76	13	11
1962.....	16,199	7,809	4,432	3,958	100	48	27	25

Current Industrial Reports, Farm Machines and Equipment, Series M35A 1950-1969, U.S. Department of Commerce, Bureau of the Census.

Of the total 467,000 self-propelled combines reported in the 1969 census, 54 percent were reported as manufactured prior to 1965. The proportions of combines manufactured in 1965 or later vary greatly by State and region. In general, data for States in the corn and soybean producing acres indicate that more than half of the self-propelled combines were manufactured in 1965 or later. These data indicate that the development of corn heads for combines is resulting in the rapid replacement of corn pickers with self-propelled combines with corn heads on the larger corn producing farms. Proportionately, there were substantial increases in the number of self-propelled combines in the soybean producing States of the South. Much of this increase in combines is the result of large increases in the acreage of soybeans in these areas since 1964.

Cornpickers, Corn Heads for Combines, and Picker-Shellers

In recent years, there have been substantial technological changes in corn harvesting equipment. The development of corn heads for combines has made possible the rapid increase in the proportion of corn for grain harvested by field shelling methods.

Between 1964 and 1969, there was a decrease of 106,000 farms reporting cornpickers, corn heads, or picker-shellers and a decrease of 55,000 machines. At the same time, the acreage of corn harvested per machine increased from 78 to 83 acres and the bushels of corn per machine increased from about 4,900 to about 7,000 bushels. These figures reflect the increased size and efficiency of the new harvesting equipment.

Class 1 to 5 farms, which produced 91 percent of all corn harvested for grain also accounted for 93 percent of all cornpickers, corn heads, and picker-shellers. Between 1964 and 1969, there was an increase in the average number of machines per farm from 1.0 to 1.2 units. This increase is consistent with the increase in average acres of corn for grain per farm which changed from 50 to 64 acres.

Corn Heads for Combines

Data for corn heads were obtained separately for the first time in 1969, but only for farms with sales of $2,500 and over. For the 1964 census, corn-head attachments for combines were included with cornpickers. Corn heads first came into widespread use in the late 1950's; however, it was 1964 before corn heads were manufactured in numbers exceeding that of cornpickers. Corn heads now being manufactured range in size from 2-row to 6-row with 4-row being the most common. In comparison, most cornpickers manufactured are of the one- or two-row size.

In 1969, there were 184,000 corn heads on class 1-5 farms. By age, about three-fifths of the corn heads were reported as manufactured in 1965 or later. It is apparent from a comparison of data for corn heads with other cornpickers that corn heads are replacing cornpickers at a rapid rate. The one-step picking and shelling process provides a significant advantage to farmers in terms of labor and time. In addition, the farmer is able to obtain dual use of his basic combine.

Data by class of farm in the table below indicate that the proportion of corn heads to all corn harvesting machines increases as the size of farm sales increases.

	Cornpickers, corn heads, and picker-shellers (percent)	Corn heads (percent)	Cornpickers and picker-shellers (percent)	Average acres of corn for grain per farm reporting (acres)
Total	100.0	31.3	68.7	63.7
Class 1	100.0	47.6	52.4	159.3
Class 2	100.0	35.5	64.5	81.7
Class 3	100.0	27.1	72.9	50.3
Class 4	100.0	20.7	79.3	30.3
Class 5	100.0	15.9	84.1	19.0

Other Cornpickers and Picker-Shellers

In 1969, there were 404,000 other cornpickers or picker-shellers on class 1-5 farms. The vast majority of these were one- or two-row cornpickers either of the pull-type or tractor-mounted type. The number of picker-shellers manufactured is estimated to be low in proportion to the total number of cornpickers.

About 30 percent of these machines were reported as manufactured in the period 1965 or later, according to the census of agriculture. According to the manufacturing statistics, this may be a sizable overstatement of the actual number manufactured in 1965 and after. The data, by class of farm, show that cornpickers were more common on the smaller farms which, in general, cannot justify the large expenditures for a combine with a corn-head attachment. Approximately 56,000 class 1-5 farms were reported as having both a corn head and a cornpicker or picker-sheller.

Pickup Balers

In comparison to other types of equipment, the basic pickup hay baler has not changed drastically in recent years. However,

there has been a substantial change and development in labor-reducing machinery and methods for the handling of hay after baling. Measures of these changes are not available from the census. The number of farms with pickup balers declined from 738,000 in 1964 to 686,000 in 1969. The number of pickup balers decreased 43,000. Although most States in the North and the West showed a decline in the number of pickup balers, 10 of the 16 Southern States showed an increase.

About 38 percent of the pickup balers were reported manufactured in 1965 or later. However, figures for the South indicates that almost one-half of the pickup balers on farms were made in 1965 or later.

Approximately 87 percent of the pickup balers were on class 1-5 farms. Of these balers, more than one-half were located in States in the North Central region. Class 1-5 farms accounted for over three-fourths of the total decrease in pickup balers since 1964.

Changes in hay and forage handling and feeding techniques may be somewhat responsible for the decline in pickup balers in some areas of the country. Increasing numbers of farms are feeding loose hay or grass silage, haylage, or green-cut hay crops in place of baled hay.

Windrowers, Pull and Self-Propelled

Data for windrowers, which were limited to class 1-5 farms, were obtained in the census for the first time in 1969. There were about 276,000 windrowers reported on 259,000 farms in 1969. Over one-half of these were located in the North Central States.

Windrowers, as reported by farm operators, in the census for 1969 apparently included a large number of side-delivery rakes in addition to windrowers or swathers. In common usage, many farmers may have considered side-delivery rakes to be a type of windrower. However, technically, windrowers include only those machines which both cut and windrow in one operation. Data from the Current Industrial Reports Series M35A indicate that about 45,000 windrowers and 124,000 side-delivery rakes were manufactured in the period 1965 to 1969. In comparison for the same years, 129,000 windrowers were reported in the census.

Field Forage Harvesters, Shear Bar

This classification of forage harvester was intended to be the equivalent of the cylinder or flywheel type, for which data were obtained in 1964. In 1964, there were 250,000 machines reported on all farms, of which 242,000 were of class 1-5 farms. About 44 percent of the 215,000 shear-bar-type forage harvesters reported for 1969 were reported as manufactured in 1965 or later.

The number of farms reporting shear-bar forage harvesters decreased 13 percent and the number of machines decreased 11 percent between 1964 and 1969. It should be pointed out that some of the change in the number of forage harvesters, between 1964 and 1969, may be due to a difference in interpretation of the terminology or wording by farm operators.

ESTIMATED MARKET VALUE OF ALL MACHINERY AND EQUIPMENT

This information was obtained in 1969 for the first time since the 1945 census. Prior to 1945, the value of equipment and machinery had been obtained in each census beginning with 1890, with the exception of 1935.

This inquiry of 1969, like that of earlier censuses, is subject to a wide range of reporting problems. The estimated value to be reported was to include the value of all equipment used for the farm, not just the value of the items listed on the report forms. Most of the same explanations and limitations which were used to describe the 1945 data are valid for the 1969 data. It was pointed out in the 1945 analysis that a group inquiry of this type probably does not obtain as high a total as would have been secured if a listing had first been made of the component items and a value placed on each item. The 1945 analysis also indicated that the reported values largely represent individual farm operator's opinions.

In 1969, the value of all machinery and equipment on farms was estimated to be $25.3 billion. The average value per farm was $9,282. Of the total 2.7 million farms, 95 percent reported a value for equipment. For those farms not reporting a value for equipment, some undoubtedly had hand tools or other small items of equipment which were of insignificant value; hence, their value was not reported. Others may have used equipment owned by landlords, or used rented equipment, or custom hired whatever machine work was necessary.

Class 1-5 farms reported $22.3 billion or 88 percent of the total value of machinery and equipment for all farms. The average value per farm amounted to $12,864. For these farms, less than 3 percent reported no value for equipment in 1969.

The average value of machinery and equipment per farm in 1969 varies from a low of $4,172 in West Virginia to a high of $24,301 in Hawaii. The average value in the South was $6,601 compared to $12,849 in the West. Averages for States in the western region, except Alaska, exceed the national average value. For class 1-5 farms, the extremes ranged from a low of $7,252 for Kentucky to a high of $29,776 for Hawaii.

The estimated market value of machinery and equipment in 1969 was almost five times the value reported in the 1945 census, which did not include the value of automobiles. Although there has been a substantial increase in the numbers of most kinds of equipment on farms over the years, a comparison of the value of equipment for 1969 with that of earlier censuses does not provide a satisfactory measure of mechanization. Such comparisons should consider changes in price levels. The table on page 12 provides a historical summary of the value of machinery and equipment and an index of prices paid by farmers for farm machinery.

Of the total farms reporting a value for equipment, 49.1 percent reported values of less than $5,000, 85.4 percent reported values of less than $20,000, and less than 2.5 percent reported values of $50,000 or more. For class 1-5 farms, the equivalent percentages were 31.7, 78.4, and 3.6. Although the 63,000 farms with equipment values of $50,000 and over represented only 2.4 percent of the total, the values of the equipment on

Summary of Value of Equipment and Index of Prices

	Farms reporting		Value of equipment (million dollars)	Index of prices paid[1] 1910 to 1914 = 100
	Number	Percent of all farms		
1969	[2]2,593,906	[2]95.0	25,343	509
1945[3] [4]	4,704,549	80.3	5,147	176
1940[3]	5,015,252	82.3	3,060	153
1930[3]	5,529,424	87.9	3,302	152
1925[3]	NA	NA	2,692	154
1920[3]	NA	NA	3,595	166
1910[3]	NA	NA	1,265	100
1900[3]	NA	NA	750	NA

[1] Index of prices paid by farms for farm machinery—Agricultural Statistics—1971, 1967, 1962, 1957.
[2] Includes counts for farms where value was imputed, see text.
[3] Data for Alaska and Hawaii are not included.
[4] Data for 1945 do not include the value of automobiles.

these farms was 19.1 percent of the total value. The following table provides the percentage distribution by value groups for farms and equipment values for all farms and for class1-5 farms.

Percent Distribution of Farms by Value of Equipment

	All farms		Class 1-5 farms	
	Farms reporting	Value (dollars)	Farms reporting	Value (dollars)
Total	100.0	100.0	100.0	100.0
$1 to $999	7.6	0.4	1.8	6.4
$1,000 to $4,999	41.5	10.8	29.9	
$5,000 to $9,999	20.0	13.4	23.7	12.0
$10,000 to $19,999	16.4	21.9	23.1	22.8
$20,000 to $29,999	7.4	17.2	10.9	18.7
$30,000 to $49,000	4.7	17.1	7.0	18.8
$50,000 and over	2.4	19.1	3.6	21.2

By regions of the country, there are sizable differences in the distribution of farms by value of equipment. For the South, 63 percent of the farms reported values of less than $5,000, whereas for the North Central only 38 percent had such values. On the other extreme, 11 percent of the farms in the West reported values of $30,000 and over compared to slightly over 4 percent of the farms in the South.

Percent Distribution of All Farms in Each Region by Value of Equipment

	North-east	North Central	South	West
Total	100.0	100.0	100.0	100.0
$1 to $999	4.1	4.3	11.9	5.8
$1,000 to $4,999	35.1	33.9	51.3	36.9
$5,000 to $9,999	22.9	21.6	17.8	20.5
$10,000 to $19,999	20.6	21.2	10.6	17.4
$20,000 to $29,999	9.3	10.2	4.0	8.2
$30,000 to $49,999	5.4	6.3	2.6	6.2
$50,000 and over	2.5	2.4	1.8	5.1

As would be expected, the large and more productive farms have a significantly greater investment in machinery and equipment. Data shown in the table which follows indicates that over 40 percent of the farms with sales of $40,000 and over have equipment valued at $30,000 and over. In comparison, 80 percent or more of those farms with sales of less than $2,500 have equipment values of less than $5,000. Additional data for equipment and values by class of farms can be found in chapter 7 of this volume.

Percent Distribution of Farms in Each Class by Value of Equipment

	Total	Less than $5,000	$5,000 to $5,999	$10,000 to $29,999	$30,000 and over
All farms	100.0	49.1	20.0	23.8	7.2
Class 1	100.0	6.2	8.6	44.6	40.6
Class 2	100.0	10.4	18.3	55.2	16.1
Class 3	100.0	22.1	29.9	42.0	5.9
Class 4	100.0	44.9	30.4	22.1	2.5
Class 5	100.0	61.7	24.0	12.8	1.5
Class 6	100.0	81.7	12.2	5.4	0.8
Part time	100.0	80.4	14.4	4.8	0.5
Part retirement	100.0	85.7	10.0	3.9	0.4
Abnormal	100.0	13.1	12.3	32.7	42.0