THIRTEENTH CENSUS OF THE UNITED STATES: 1910

DEPARTMENT OF COMMERCE AND LABOR

BULLETIN

BUREAU OF THE CENSUS
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IRRIGATION

KANSAS, NEBRASKA, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, AND TEXAS.

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INTRODUCTION.

This bulletin presents the larger part of the statistics of irrigation obtained in connection with the Thirteenth Census for the states of Kansas, Nebraska, North Dakota, Oklahoma, South Dakota, and Texas. Irrigation for rice growing in Texas is not covered by the statistics given here, but is treated in a report on irrigation for rice growing in Louisiana, Texas, and Arkansas. The data given in the present bulletin, with additional information, will be embodied in a special report of the Census of Irrigation and in the final reports of the Thirteenth Census. The statistics of the number of farms and acreage irrigated, cost of operation and maintenance, and irrigated crops are for the calendar year 1909; those of irrigation works, cost of enterprises, acreage enterprises were capable of irrigating in 1910, and acreage included in projects are of the date July 1, 1910.

These statistics have been collected under the law of February 25, 1910, which contained the following clause relating to irrigation:

> Inquiries shall also be made as to the location and character of irrigation enterprises, quantity of land irrigated in the arid region of the United States and in each state and county in that section under state and Federal laws; the price at which these lands, including water rights, are obtainable; the character and value of crops produced on irrigated lands, the amount of water used per acre for said irrigation and whether it was obtainable from national, state, or private works; the location of the various projects and methods of construction, with facts as to their physical condition; the amount of capital invested in such irrigation works.

The information called for by this law which could be supplied by farm operators was obtained on supplemental schedules by the regular census enumerators as a part of the agricultural census. The remaining data, which were supplied by the owners or officials of irrigation enterprises, were obtained on special schedules by special agents.

The states for which reports are included in this bulletin lie in the Great Plains east of the Rocky Mountains, extending in a continuous row north and south across the country. In general, the western part of this region is quite deficient in rainfall, and irrigation is more or less necessary to successful farming, while the eastern part lies within the humid section of the United States, where irrigation is ordinarily unnecessary. Throughout the western part of these states the rainfall fluctuates to a marked degree, being ample in one season for the growing of crops and in another wholly inadequate. Thus the amount of irrigation required in this section in any year depends very largely upon the dryness of the season.

Partly because irrigation is not necessary in every year, and partly because of the proximity of the lands which require no irrigation, the practice of irrigation has as yet been less developed in this section than in the states farther to the west.

The line marking a normal annual precipitation of 15 inches coincides roughly with the western boundaries of these states, while the normal annual precipitation at their eastern boundaries varies from 20 inches at the northeastern corner of North Dakota to 50 inches at the southeastern corner of Texas.

Number of farms irrigated.—In the sections which follow, the number of farms reported as irrigated is made up of the number reported on the supplemental schedules by the regular enumerators, together with an estimate of the number of farms covered by enterprises which were reported by special agents but not by the regular enumerators. This estimate is based on the average acreage irrigated per farm as shown by the supplemental schedules.

Acreage irrigated.—The acreage irrigated is taken from the special schedules filled out by agents from information secured from owners or officials of irrigation enterprises and, in some instances, from public records. The acreage thus obtained is considerably larger than the irrigated acreage reported on the supplemental schedules filled out by the farm enumerators. This difference is due in a measure to the fact that the special agents found enterprises not reported on any schedules returned by the enumerators, indicating that the irrigated acreage reported on the supplemental schedules is to some extent under the true figure. There is, however, a natural tendency for the officials of enterprises to report as irrigated the entire area of farms of which only a part was irrigated. Furthermore, some farms are so situated as to receive water from more than one enterprise, and may be reported as irrigated by each, which results in duplication. Owing to the two causes last enumerated, it is probable that the acreage reported as irrigated is somewhat excessive, but the excess is probably less than 10 per cent.

Cost of operation and maintenance.—The cost of operation and maintenance is not reported for individual and partnership enterprises, for the reason that farmers whose land is irrigated by such systems generally clean their own ditches at odd times without keeping any record of the time spent. In the case of the larger enterprises this cost represents a cash outlay by the farmers, while in the case of the smaller cooperative enterprises the cost is worked out by the farmers.

Crops.—The data relating to irrigated crops are taken from supplemental schedules filled out by the regular census enumerators. Since the special agents found enterprises which the enumerators had not reported, it is evident that the information relating to irrigated crops is incomplete to some extent. It shows, however, the relative importance of the different irrigated crops and is sufficiently complete to afford reliable averages of yields and values.

In accordance with the law, the data collected have been classified primarily on the basis of the state and Federal laws by virtue of which the land was brought under irrigation. The results are presented in detail at the end of the section relating to each state and summarized in text tables.

Such of the terms used as are not self-explanatory are defined below.

Farms irrigated.—The number of "farms irrigated" is the number of farms on which irrigation is practiced and is equivalent to the term "number of irrigators" used in previous census reports.

Types of enterprise.—The types of enterprise under which the lands irrigated in 1909 are classified are as follows:

United States Reclamation Service enterprises, which operate under the Federal law of June 17, 1902, providing for the construction of irrigation works with the receipts from the sale of public lands.

United States Indian Service enterprises, which operate under various acts of Congress providing for the construction by that service of works for the irrigation of land in Indian reservations.

Carey Act enterprises, which operate under the Federal law of August 18, 1894, granting to each of the states in the arid region 1,000,000 acres of land on condition that the state provide for its irrigation, and under amendments to that law granting additional areas to Idaho and Wyoming.

Irrigation districts, which are public corporations that operate under state laws providing for their organization and management, and empowering them to issue bonds and levy and collect taxes with the object of obtaining funds for the purchase or construction, and for the operation and maintenance of irrigation works.

Cooperative enterprises, which are controlled by the water users under some organized form of cooperation. The most common form of organization is the stock company, the stock of which is owned by the water users.

Commercial enterprises, which supply water for compensation to parties who own no interest in the works. Persons obtaining water from such enterprises are usually required to pay for the right to receive water, and to pay, in addition, annual charges based in some instances on the acreage irrigated and in others on the quantity of water received.

Individual and partnership enterprises, which belong to individual farmers or to neighboring farmers, who control them without formal organization. It is not always possible to distinguish between partnership and cooperative enterprises, but as the difference is slight this is unimportant.

Source of water supply.—Of the terms used in the classification according to source of water supply, none requires explanation except "reservoirs." The only reservoirs which are treated as independent sources of supply are those filled by collecting storm water or from watercourses that are ordinarily dry. When reservoirs are filled from streams or wells, the primary source is considered the source of supply.

Cost.—The cost of irrigation enterprises is that given by the owners. For the larger works the cost given is taken, in most cases, from the books of account and represents the actual cost. In the case of most of the private and partnership and many of the cooperative enterprises, however, the works were built by their owners without records of money or labor expended, and the cost given represents the owners' estimates. The cost reported for 1910 includes the cost of construction and of acquiring rights. The latter usually consists of filing fees only. In some instances it includes the purchase price of rights, but these cases are so rare that they are unimportant. The cost reported for 1899 is designated "cost of construction," but probably includes the cost of acquiring rights, as in 1910. Average cost per acre is based on acreage enterprises were capable of irrigating in 1910 and cost to July 1, 1910.

KANSAS.

Irrigation of any importance in Kansas is confined to the western third of the state, being most extensively practiced along the Arkansas River. More than 90 per cent of the total irrigated acreage in the state is in the three most westerly counties bordering this river.

The following table shows for the state as a whole the number of farms and acreage irrigated in 1909, in comparison with the total number of farms, the total land area, the total land in farms, and the total acreage of improved land in farms in 1910, together with the areas not yet irrigated for which water has been or is being made available. Comparative figures for the census of 1900 are included as far as possible.

	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Number of all farms	[1] 177,841	[2] 173,098	4,743	2.7
Approximate land area of the state.....acres..	52,335,360	52,335,360	.....	.....
Land in farms.....acres..	[1] 43,384,799	[2] 41,662,970	1,721,829	4.1
Improved land in farms.....acres..	[1] 29,904,067	[2] 25,040,550	4,863,517	19.4
Number of farms irrigated	[3] 1,006	[4] 929	77	8.3
Acreage irrigated	[3] 37,479	[4] 23,620	13,859	58.7
Acreage enterprises were capable of irrigating	[5] 139,995	([6])	.....	.....
Acreage included in projects	[5] 161,300	([6])	.....	.....
Percentage irrigated of—				
Number of all farms	0.6	0.5	0.1	.....
Approximate land area of the state	0.1	([7])	.....	.....
Land in farms	0.1	0.1	.....	.....
Improved land in farms	0.1	0.1	.....	.....
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909	102,516	.....	.....	.....
Excess of acreage included in projects over acreage irrigated in 1909	123,821	.....	.....	.....

[1] April 15. [2] June 1. [3] In 1909. [4] In 1899. [5] July 1. [6] Not reported. [7] Less than one-tenth of 1 per cent.

Number of farms irrigated.—From 1899 to 1909 there was an increase of 8.3 per cent in the number of farms irrigated in the state as a whole. Irrigation was practiced on only six-tenths of 1 per cent of the farms of the state in 1909. In 1899 the proportion of irrigated farms was slightly less (five-tenths of 1 per cent), and in 1889 it was still lower (three-tenths of 1 per cent).

In one of the three counties for which comparative figures as to the number of farms irrigated are given, there was a decrease between 1899 and 1909, the number in Finney decreasing from 182 to 173. Increases are shown for Hamilton and Kearny Counties.

Acreage irrigated.—The total acreage reported as irrigated in 1909 was 37,479, as against 23,620 in 1899, and 20,818 in 1889. The percentage of increase from 1889 to 1899 was 13.5, while from 1899 to 1909 it was 58.7.

The percentage of increase between 1899 and 1909 in the acreage irrigated was considerably higher than the percentage of increase in the number of farms irrigated, the acreage irrigated per farm increasing from 25.4 to 37.3 during the decade.

In both 1909 and 1899 the county for which the largest area of irrigated land was reported was Finney, with an irrigated acreage of 17,285 and 8,939 at the respective censuses. Kearny County was next in importance in this respect in both years, with 15,168 acres of irrigated land in 1909 and 7,071 acres in 1899. These were likewise the counties in which irrigated land formed the highest percentage of the total land area, the proportion in Kearny being 2.8 per cent and that in Finney 2.1 per cent. The only other counties that had irrigated areas in excess of 1,000 acres in 1909 were Cheyenne and Hamilton.

Acreage included in projects.—The table shows that in 1910 existing enterprises were ready to supply water to 139,995 acres, an area about three and three-fourths times the acreage irrigated in 1909. The acreage included in projects exceeds the acreage irrigated in 1909 by 123,821 acres, which is more than three times the acreage irrigated in 1909 and more than eight times the acreage brought under irrigation in the last decade. The greater part of this acreage represents land which will be available for the extension of irrigation in the next few years upon the completion of projects now under construction and without new undertakings, although some of it was reported for completed enterprises which are not utilized to their full extent.

Acreage irrigated, classified by character of enterprise.—The following table gives the distribution of the acreage irrigated in 1909 according to the character of the enterprise controlling the irrigation works:

CHARACTER OF ENTERPRISE.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All classes	37,479	100.0
U. S. Reclamation Service	6,953	18.6
Cooperative enterprises	27,372	73.0
Individual and partnership enterprises	3,154	8.4

In Kansas there are no Indian Service enterprises, Carey Act enterprises, or irrigation districts. The area here credited to the United States Reclamation Service was supplied with water by a cooperative canal, to which the Reclamation Service furnished an additional water supply for a few years, but since 1909 this land has been served by the cooperative canal exclusively. Thus the entire acreage in Kansas reported as irrigated in 1909 is now supplied by works controlled by the water users.

Acreage irrigated, classified by source of water supply.—The following table shows the distribution of the acreage irrigated in 1909, according to the source of water supply:

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All sources	37,479	100.0
Streams	35,489	94.7
Wells	1,961	5.2
Springs	27	0.1
Reservoirs	2	(1)

[1] Less than one-tenth of 1 per cent.

From the foregoing table it is apparent that up to the present time there has been comparatively little development of any source of water supply other than streams.

IRRIGATION WORKS.

The following table summarizes the data collected relating to works for supplying water for irrigation in 1910 and 1900.

	CENSUS OF—	
	1910	1900[1]
Independent enterprises.....number	716	(2)
Ditches, total length.....miles	316	(2)
Main ditches.....number	89	107
Length.....miles	274	324
Capacity.....cubic feet per second	2,600	(2)
Lateral ditches.....number	39	(2)
Length.....miles	42	(2)
Reservoirs.....number	42	(2)
Capacity.....acre-feet	31,024	(2)
Flowing wells.....number	3	(2)
Capacity.....gallons per minute	30	(2)
Pumped wells.....number	939	(2)
Capacity.....gallons per minute	73,362	(2)
Pumping plants.....number	698	(2)
Engine capacity.....horsepower	1,517	(2)
Pump capacity.....gallons per minute	128,276	(2)

[1] Figures relate only to systems obtaining water from streams in 1899.
[2] Not reported.

As only two of the items reported in 1910 were reported in 1900 there is little opportunity for comparison between the two censuses.

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average acreage irrigated per enterprise was 52.3, and the acreage irrigated per mile of main ditch was 136.8. For the enterprises represented by the figures for the preceding census, which include only the systems that received water from streams, the average acreage irrigated from streams per mile of main ditch was 67.

There was a considerable utilization of underground water for irrigation in Kansas. The table shows 3 flowing wells and 939 pumped wells used for irrigation, which together supplied water to 1,961 acres in 1909. Although the pumped wells are scattered over the state, 26.8 per cent of the total number were reported in Finney County, drawing water from the so-called underflow of the Arkansas River. At the Twelfth Census 599 wells were reported, but figures as to the number of each kind are not available.

Cost of construction, operation, and maintenance.—The following table shows the total cost of irrigation enterprises up to July 1, 1910, including construction of works and acquisition of rights but not operation and maintenance, with the average cost per acre, based on the acreage the enterprises were capable of irrigating in 1910; the estimated final cost of existing enterprises, including those completed and those under construction, with the average cost per acre, based on the acreage included in projects; and the total cost and average cost per acre of operation and maintenance in 1909. Data relating to the cost of construction of systems operated in 1899 are included for comparison.

	CENSUS OF—	
	1910	1900
Cost of irrigation enterprises	[1] $1,365,563	[2] $529,755
Average per acre	[3] $9.75	[4] $22.43
Estimated final cost of existing enterprises	$1,365,563	(5)
Average per acre included in projects	$8.47	(5)
Operation and maintenance:		
Acreage for which cost is reported	34,255	(5)
Total cost reported	[6] $54,595	(5)
Average cost per acre	$1.59	(5)

[1] Reported July 1.
[2] Cost of construction of systems operated in 1899.
[3] Based on acreage enterprises were capable of irrigating in 1910.
[4] Based on acreage irrigated in 1899.
[5] Not reported.
[6] For 1909.

The total cost of irrigation systems increased 157.8 per cent between the censuses of 1900 and 1910, while a decrease is shown in the average cost per acre. The average shown for the census of 1910 is based on the acreage under ditch in that year, but since the corresponding acreage for 1900 was not reported, the figure for average cost at the earlier census is based on the acreage actually irrigated in 1899. If computed on the basis of the acreage irrigated in 1909, the average cost in 1910 would be $36.44, representing an increase of 62.5 per cent over the figure for the average cost at the census of 1900.

The acreage for which cost of operation and maintenance in 1909 was reported constitutes 91.4 per cent of the total acreage reported as irrigated in 1909 or practically the total acreage reported as irrigated by enterprises other than those under individual or partnership control.

CROPS.

The next table shows the acreage, yield, and value of the principal crops reported as grown under irrigation in 1909.

Of the total acreage of the irrigated crops shown in the table about one-half (49.8 per cent) is that of alfalfa and more than one-fourth (26.8 per cent) that of sugar beets. No other single crop covered as much as 5 per cent of the total acreage of the irrigated crops in 1909.

Of the total irrigated acreage in alfalfa 41.7 per cent was in Finney County, 34.1 per cent in Kearny County, and 18.7 per cent in Hamilton County; and of the irrigated acreage in sugar beets, 58.1 per cent was in Finney County and 41.1 per cent in Kearny County.

CROP.	IRRIGATED CROPS: 1909				
	Acreage.	Yield.			Value.
		Unit.	Amount.	Average per acre.	
Cereals:					
Corn	745	Bu.	16,892	22.7	$9,748
Oats	487	Bu.	10,525	21.6	4,942
Wheat	930	Bu.	19,121	20.6	17,708
Barley	356	Bu.	6,145	17.3	3,281
Other seed:					
Alfalfa seed	725	Bu.	1,126	1.6	9,063
Hay and forage:					
Alfalfa	10,470	Tons.	21,099	2.07	153,250
Wild, salt, or prairie grasses	541	Tons.	527	0.97	3,099
Coarse forage	1,011	Tons.	2,509	2.48	11,759
Sundry crops:					
Potatoes	117	Bu.	12,871	110.0	8,890
Sugar beets	5,638	Tons.	45,346	8.04	226,931

COUNTY TABLE.

All the data summarized in the foregoing section relating to irrigation in Kansas, except those for crops, are given in detail for the state and principal counties in the next table.

KANSAS.—ACREAGE IRRIGATED, EXTENT AND COST OF IRRIGATION ENTERPRISES, AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910.

[Comparative data for 1899 in italics.]

		The State.	Cheyenne.	Finney.	Hamilton.	Kearny.	All other counties.
1	Number of all farms in 1910	177,841	796	716	659	585	175,085
2	Number of farms irrigated in 1909	1,006	10	173	54	121	648
3	Per cent of all farms	0.6	1.3	24.2	8.2	20.7	0.4
4	*Number of farms irrigated in 1899*	*929*	(1)	*182*	*39*	*88*	[1] *620*
5	Per cent of increase, 1899-1909	8.3	.....	[2] 4.9	38.5	37.5	(1)
	LAND AND FARM AREA						
6	Approximate land area.....acres	52,335,360	645,120	816,640	629,760	545,920	49,697,920
7	Land in farms.....acres	43,384,799	411,400	312,475	171,850	191,855	42,297,219
8	Improved land in farms.....acres	29,904,067	271,958	133,697	51,987	73,189	29,373,236
9	Acreage irrigated in 1909	37,479	1,515	17,285	2,366	15,168	1,145
10	Per cent of total land area	0.1	0.2	2.1	0.4	2.8	(3)
11	Per cent of land in farms	0.1	0.4	5.5	1.4	7.9	(3)
12	Per cent of improved land in farms	0.1	0.6	12.9	4.6	20.7	(3)
13	*Acreage irrigated in 1899*	*23,620*	*581*	*8,939*	*1,914*	*7,071*	*5,115*
14	Per cent of increase, 1899-1909	58.7	160.8	93.4	23.6	114.5	[2] 77.6
15	Acreage enterprises were capable of irrigating in 1910	139,995	3,025	96,287	10,606	28,445	1,632
16	Acreage included in projects	161,300	4,500	109,376	16,754	28,581	2,089
	ACREAGE IRRIGATED AND INCLUDED IN PROJECTS						
	CLASSIFIED BY CHARACTER OF ENTERPRISE.						
17	**U. S. Reclamation Service,** irrigated in 1909	6,953	.....	6,953	.....	.....	.....
18	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....
19	Included in projects	10,677	.....	10,677	.....	.....	.....
20	**U. S. Indian Service,** irrigated in 1909	.....	.....	.....	.....	.....	.....
21	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....
22	Included in projects	.....	.....	.....	.....	.....	.....
23	**Carey Act enterprises,** irrigated in 1909	.....	.....	.....	.....	.....	.....
24	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....
25	Included in projects	.....	.....	.....	.....	.....	.....
26	**Irrigation districts,** irrigated in 1909	.....	.....	.....	.....	.....	.....
27	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....
28	Included in projects	.....	.....	.....	.....	.....	.....
29	**Cooperative enterprises,** irrigated in 1909	27,372	750	9,504	2,070	15,048	.....
30	Enterprises were capable of irrigating in 1910	135,200	2,000	95,000	10,200	28,000	.....
31	Included in projects	144,200	3,000	97,000	16,200	28,000	.....
32	**Commercial enterprises,** irrigated in 1909	.....	.....	.....	.....	.....	.....
33	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....
34	Included in projects	.....	.....	.....	.....	.....	.....
35	**Individual and partnership enterprises,** irrigated in 1909	3,154	765	828	296	120	1,145
36	*Enterprises were capable of irrigating* in 1910	4,795	1,025	1,287	406	445	1,632
37	Included in projects	6,423	1,500	*1,609*	*554*	*581*	*2,089*
	ACREAGE IRRIGATED						
	CLASSIFIED BY SOURCE OF WATER SUPPLY.						
38	Supplied from streams	35,489	1,515	16,007	2,170	15,073	724
39	By gravity	35,469	1,515	16,007	2,170	15,073	704
40	By pumping	20	.....	.....	.....	.....	20
41	Supplied from lakes	.....	.....	.....	.....	.....	.....
42	By gravity	.....	.....	.....	.....	.....	.....
43	By pumping	.....	.....	.....	.....	.....	.....
44	Supplied from wells	1,961	.....	1,278	196	95	392
45	Flowing	2	.....	.....	.....	.....	2
46	By pumping	1,959	.....	1,278	196	95	390
47	Supplied from springs	27	.....	.....	.....	.....	27
48	Supplied from reservoirs	2	.....	.....	.....	.....	2
49	Total acreage supplied by pumping	1,979	.....	1,278	196	95	410
	IRRIGATION ENTERPRISES						
50	Independent enterprises.....number	716	6	39	11	10	650
51	*Number in 1899* [4]	.....	.....	.....	.....	.....	.....
52	Per cent of increase, 1899-1910	.....	.....	.....	.....	.....	.....
53	Main ditches.....number	89	4	32	8	5	40
54	*Number in 1899* [5]	*107*	*6*	*4*	*11*	*10*	*76*
55	Per cent of increase, 1899-1910	[2] 16.8	[2] 33.3	700.0	[2] 27.3	[2] 50.0	[2] 47.4
56	Length.....miles	274	27	100	33	65	49
57	*Length in 1899* [5].....miles	*324*	*69*	*60*	*14*	*104*	*77*
58	Per cent of increase, 1899-1910	[2] 15.4	[2] 60.9	66.7	135.7	[2] 37.5	[2] 36.4
59	Capacity.....cubic feet per second	2,600	125	1,400	492	493	90
60	Laterals.....number	39	1	11	4	10	13
61	Length.....miles	42	1	29	5	3	4
62	Reservoirs.....number	42	.....	*31*	4	*3*	4
63	Capacity.....acre-feet	31,024	.....	31,019	1	2	2
64	Flowing wells.....number	3	.....	.....	.....	.....	3
65	Capacity.....gallons per minute	30	.....	.....	.....	.....	30
66	Pumped wells.....number	939	.....	252	7	75	605
67	Capacity.....gallons per minute	73,362	.....	30,613	4,384	33,325	5,040
68	Pumping plants.....number	698	.....	61	9	19	609
69	*Engine capacity*.....horsepower	1,517	.....	992	66	225	234
70	*Pump capacity*.....gallons per minute	128,276	.....	80,113	6,384	33,725	*8,054*
	COST						
71	Cost of enterprises up to July 1, 1910.....dollars	1,365,563	6,384	1,089,048	25,908	218,694	25,529
72	*Cost in 1899*.....dollars	*529,756*	*106,220*	*102,225*	*9,050*	*213,500*	*98,760*
73	Per cent of increase, 1899-1910	157.8	[2] 94.0	965.3	186.3	2.4	[2] 74.2
74	Average cost per acre enterprises were capable of irrigating in 1910.....dollars	9.75	2.11	11.31	2.44	7.69	15.64
75	*Average cost per acre irrigated in 1899*.....dollars	*22.43*	*182.82*	*11.44*	*4.73*	*30.19*	*19.31*
76	Estimated final cost of existing enterprises.....dollars	1,365,563	6,384	1,089,048	25,908	218,694	25,529
77	Average per acre included in projects.....dollars	8.47	1.42	9.96	1.55	7.65	12.22
	OPERATION AND MAINTENANCE						
78	Acreage for which cost is reported	34,255	750	16,457	2,000	15,048	.....
79	Total cost reported.....dollars	54,595	750	41,962	2,460	9,423	.....
80	Average per acre for which cost is reported.....dollars	1.59	1.00	2.55	1.23	0.63	.....
81	*Average cost per acre in 1899* [4].....dollars	.....	.....	.....	.....	.....	.....
82	Per cent of increase, 1899-1909	.....	.....	.....	.....	.....	.....

[1] Statistics as to number of farms irrigated in Cheyenne County included in figure for number of farms irrigated in "all other counties" for 1899.
[2] Decrease.
[3] Less than one-tenth of 1 per cent.
[4] Not reported.
[5] Figures relate only to systems obtaining water from streams.

NEBRASKA.

Irrigation in Nebraska is confined almost wholly to the western half of the state, and the larger part of the irrigated land (more than 75 per cent of the total acreage reported as irrigated in 1909) is in the valley of the North Platte River.

The following table shows for the state as a whole the number of farms and acreage irrigated in 1909, in comparison with the total number of farms, the total land area, the total land in farms, and the total acreage of improved land in farms in 1910, together with the areas not yet irrigated for which water has been or is being made available. Comparative figures for the census of 1900 are included as far as they are available.

	CENSUS OF—		INCREASE.[1]	
	1910	1900	Amount.	Per cent.
Number of all farms	[2] 129,678	[3] 121,525	8,153	6.7
Approximate land area of the state.....acres..	49,157,120	49,157,120	.....	.....
Land in farms.....acres..	[2] 38,622,021	[3] 29,911,779	8,710,242	29.1
Improved land in farms.....acres..	[2] 24,382,577	[3] 18,432,595	5,949,982	32.3
Number of farms irrigated	[4] 1,852	[5] 1,932	−80	−4.1
Acreage irrigated	[4] 255,950	[5] 148,538	107,412	72.3
Acreage enterprises were capable of irrigating	[6] 429,225	(7)	.....	.....
Acreage included in projects	[6] 680,133	(7)	.....	.....
Percentage irrigated of—				
Number of all farms	1.4	1.6	−0.2	.....
Approximate land area of the state	0.5	0.3	0.2	.....
Land in farms	0.7	0.5	0.2	.....
Improved land in farms	1.0	0.8	0.2	.....
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909	173,275	.....	.....	.....
Excess of acreage included in projects over acreage irrigated in 1909	424,183	.....	.....	.....

[1] A minus sign (−) denotes decrease. [2] April 15. [3] June 1. [4] In 1909. [5] In 1899. [6] July 1. [7] Not reported.

Number of farms irrigated.—According to the figures presented in the table, irrigation was practiced on 1.4 per cent of the farms of the state in 1909. In 1899 the proportion of irrigated farms was higher (1.6 per cent), while in 1889 it was only 0.2 per cent. The only county in which more than one-half the farms were irrigated in 1909 was Scotts Bluff, where the percentage was 62.2. In five other counties the proportion was between 10 and 20 per cent and in five it was 5 per cent or over, but less than 10 per cent.

From 1899 to 1909 the number of farms on which irrigation was practiced decreased 4.1 per cent in the state as a whole. Only three of the counties for which comparative figures are available show increases in the number of such farms, but in two of these the increases were large—368 per cent in Sioux, and 141.2 per cent in Scotts Bluff. Both of these counties are affected by the North Platte project of the United States Reclamation Service, and Scotts Bluff County contains land supplied by another large enterprise. The decrease in the state outside of the three counties mentioned was due to a succession of wet seasons and the increase in the practice of dry farming.

Acreage irrigated.—The total acreage reported as irrigated in 1909 was 255,950, as against 148,538 in 1899 and 11,744 in 1889. The increase from 1889 to 1899 was 136,794 acres, or 1,164.8 per cent, while from 1899 to 1909 it was 107,412 acres, or 72.3 per cent.

The fact that there was an increase between 1899 and 1909 in the acreage irrigated but a decrease in the number of farms irrigated is explained by the abandonment of irrigation in parts of the state where it was practiced on a small scale and its extension in the western counties where the rainfall is less and where much larger parts of the farms are irrigated.

Scotts Bluff County, with an irrigated area of 100,301 acres in 1909 and 29,244 acres in 1899, had the largest acreage of irrigated land at both censuses, while Lincoln County, with 34,760 acres in 1909 and 22,508 acres in 1899, had the next largest acreage under irrigation in both years.

The irrigated land in Scotts Bluff County in 1909 formed 21.7 per cent of its total land area. In Morrill County, which shows the next highest proportion, irrigated land represented only 3.2 per cent of the total area.

Acreage included in projects.—The table shows that in 1910 existing enterprises were ready to supply water to 429,225 acres, or 173,275 acres more than were irrigated in 1909. The difference is considerably greater than the amount of land brought under irrigation in the ten years from 1899 to 1909. The acreage included in projects exceeds the acreage irrigated in 1909 by 424,183 acres, which is almost four times the acreage brought under irrigation in the last decade and more than one and one-half times the acreage irrigated in 1909. This acreage represents the area which will be

available for the extension of irrigation within the next few years upon the completion of the projects now under construction and without new undertakings.

Acreage irrigated, classified by character of enterprise.—The following table gives the distribution of the acreage irrigated in 1909 according to the character of the enterprise controlling the irrigation works:

CHARACTER OF ENTERPRISE.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All classes	255,950	100.0
U. S. Reclamation Service	30,536	11.9
U. S. Indian Service	300	0.1
Irrigation districts	76,448	29.9
Cooperative enterprises	78,605	30.7
Commercial enterprises	24,834	9.7
Individual and partnership enterprises	45,227	17.7

There are no Carey Act enterprises in Nebraska, as the state has never accepted the conditions of the Carey Act. Cooperative enterprises, irrigation districts, and individual and partnership enterprises, all of which are controlled by the water users, supplied about 78 per cent of the acreage irrigated in 1909, while United States Reclamation Service enterprises, which are to be turned over to the water users, supplied 11.9 per cent. Thus only about 10 per cent of the irrigated land was supplied with water by enterprises which are not either controlled by the water users or to be turned over to them ultimately.

Acreage irrigated, classified by source of water supply.—The following table shows the distribution of the acreage irrigated in 1909 according to the source of water supply:

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All sources	255,950	100.0
Streams	254,123	99.3
Wells	139	0.1
Springs	686	0.3
Reservoirs	1,002	0.4

From the foregoing table it is apparent that up to the present time there has been little development of any source of water supply other than streams. Irrigation from reservoirs is practiced principally in sections where there are large areas for which a water supply from streams is not available and the storage of storm waters affords the only means of irrigation.

IRRIGATION WORKS.

The following statement summarizes the data collected relating to works for supplying water for irrigation in 1910:

Independent enterprises	number	474
Ditches, total length	miles	2,728
Main ditches	number	420
Length	miles	1,459
Capacity	cubic feet per second	9,378
Lateral ditches	number	1,038
Length	miles	1,269
Reservoirs	number	44
Capacity	acre-feet	2,098
Pumped wells	number	66
Capacity	gallons per minute	3,363
Pumping plants	number	75
Engine capacity	horsepower	140
Pump capacity	gallons per minute	5,366

The only item for which a figure from the earlier census is available for comparison is the length of main ditches, which for systems receiving water from streams in 1899 was 1,701 miles. As compared with this figure, the length of main ditches reported in 1910 represents a decrease of 242 miles, or 14.2 per cent, which, however, is somewhat less than the actual decrease, owing to the fact that the figure for 1910 covers enterprises receiving water from sources other than streams. Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average acreage irrigated per enterprise in 1909 was 540, and the acreage irrigated per mile of main ditch was 175.4. In 1899 the acreage irrigated per mile of main ditch, exclusive of well systems, was 86.8. The increase in this average furnishes another indication of the abandonment of irrigation on small areas throughout the state and the extension of large projects.

There has been little utilization of underground water for irrigation as yet, no flowing wells and only 66 pumped wells being reported. The latter supplied water to 139 acres in 1909.

Cost of construction, operation, and maintenance.—The following table gives data in regard to the cost of construction, operation, and maintenance of irrigation enterprises similar to those given for Kansas in the preceding section:

	CENSUS OF—	
	1910	1900
Cost of irrigation enterprises	[1] $7,798,310	[2] $1,310,698
Average per acre	[3] $18.17	[4] $8.82
Estimated final cost of existing enterprises	$9,485,231	[5]
Average per acre included in projects	$13.95	[5]
Operation and maintenance:		
Acreage for which cost is reported	209,023	[5]
Total cost reported	[6] $227,385	[5]
Average cost per acre	$1.09	[5]

[1] Reported July 1.
[2] Cost of construction of systems operated in 1899.
[3] Based on acreage enterprises were capable of irrigating in 1910.
[4] Based on acreage irrigated in 1899.
[5] Not reported.
[6] For 1909.

The cost of irrigation systems shows an increase of 495 per cent, and the average cost per acre also shows a large increase, 106 per cent. The average cost per acre shown for the census of 1910 is based on the acreage under ditch in that year, but since the

corresponding acreage for 1900 was not reported, the figure for average cost at the earlier census is based on the acreage actually irrigated in 1899. If computed on the basis of the acreage irrigated in 1909, the average cost in 1910 would be $30.47, representing an increase of 245.5 per cent over the figure for the average cost at the census of 1900.

It should be noted, however, that a number of large enterprises are under construction in the state, upon which considerable expenditures have been made but by which little land has as yet been irrigated or brought under ditch. For this reason it is probable that the average cost per acre as shown in the table is higher than the true average. The average based on the estimated final cost and the acreage included in projects, $13.95 per acre, probably more truly represents the average cost per acre of irrigation in Nebraska.

Of the counties for which separate figures are given in the table, Garden shows the lowest average cost per acre enterprises were capable of irrigating in 1910, $4.13. The highest average cost per acre shown for any of these counties is $32.45 in Scotts Bluff County, where two large projects are nearly completed, but are not yet ready to supply water to the entire acreage which they are designed to irrigate.

The acreage for which cost of operation and maintenance in 1909 was reported constitutes 81.7 per cent of the total acreage reported as irrigated in 1909, and more than 99 per cent of the acreage reported as irrigated by other than individual and partnership enterprises. The cost reported can be said, therefore, to represent very fairly the average annual expense for all but individual and partnership enterprises.

CROPS.

The next table shows the acreage, yield, and value of the principal crops reported as grown under irrigation in 1909.

The crop comprising the largest irrigated acreage is "wild, salt, or prairie grasses," representing 27.3 per cent of the total irrigated acreage of the crops given. Alfalfa is next, with 23.5 per cent of this total, and is followed by corn, with 15.9 per cent, and oats, with 13.9 per cent. No other single crop covered as much as 7 per cent of the total acreage of the irrigated crops presented in the table.

The crops reported were distributed among the counties reporting irrigated lands about in proportion to the acreage irrigated in each, Scotts Bluff County leading in the acreage of most of the crops.

CROP.	IRRIGATED CROPS: 1909				
	Acreage.	Yield.			Value.
		Unit.	Amount.	Average per acre.	
Cereals:					
Corn	21,552	Bu.	563,857	26.2	$290,241
Oats	18,794	Bu.	555,048	29.5	219,389
Wheat	9,015	Bu.	170,952	19.0	135,554
Emmer and spelt	2,493	Bu.	69,575	27.9	28,126
Barley	3,495	Bu.	90,308	25.8	40,801
Rye	427	Bu.	7,475	17.5	4,624
Other seed:					
Alfalfa seed	1,192	Bu.	1,818	1.5	17,163
Hay and forage:					
Alfalfa	31,842	Tons.	81,225	2.55	497,656
Wild, salt, or prairie grasses	37,019	Tons.	38,796	1.05	254,216
Coarse forage	635	Tons.	1,365	2.15	6,440
Sundry crops:					
Potatoes	6,077	Bu.	888,766	146.3	274,910
Sugar beets	3,114	Tons.	36,849	11.83	152,310

COUNTY TABLE.

The next table gives in detail, for the states and the principal counties, the data summarized in this section, except those relating to crops.

Change of boundaries.—In comparing the data secured in 1910 with those for the preceding census, the following changes in counties should be borne in mind: The organization of Morrill County from a part of Cheyenne County in 1909; and the organization of Garden County from a part of Deuel County in 1910.

NEBRASKA—ACREAGE IRRIGATED, EXTENT AND COST OF IRRIGATION ENTERPRISES,

[Comparative data for 1899 in italics.]

		The State.	Chase.	Cheyenne.[1]	Dawes.	Dawson.	Deuel.[1]	Dundy.	Garden.
1	Number of all farms in 1910	129,678	609	635	781	2,093	262	749	835
2	Number of farms irrigated in 1909	1,852	14	33	67	109	31	28	70
3	Per cent of all farms	1.4	2.3	5.2	8.6	5.2	11.8	3.7	8.4
4	*Number of farms irrigated in 1899*	*1,932*	*(2)*	*162*	*105*	*333*	*101*	*63*	*(1)*
5	Per cent of increase, 1899–1909	[3] 4.1			[3] 36.2	[3] 67.3		[3] 55.6	
	LAND AND FARM AREA								
6	Approximate land area—acres	49,157,120	575,360	764,160	897,280	630,400	280,960	593,280	1,057,280
7	Land in farms—acres	38,622,021	423,464	342,837	701,159	574,370	150,687	479,392	666,923
8	Improved land in farms—acres	24,382,577	161,011	66,104	141,854	411,462	40,236	201,446	262,648
9	Acreage irrigated in 1909	255,950	3,226	3,635	7,029	12,742	4,745	3,069	16,164
10	Per cent of total land area	0.5	0.6	0.5	0.8	2.0	1.7	0.5	1.5
11	Per cent of land in farms	0.7	0.8	1.1	1.0	2.2	3.1	0.6	2.4
12	Per cent of improved land in farms	1.0	2.0	5.5	5.0	3.1	11.8	1.5	6.2
13	*Acreage irrigated in 1899*	*148,688*	*(2)*	*21,288*	*4,027*	*20,097*	*11,794*	*4,552*	*(1)*
14	Per cent of increase, 1899–1909	72.3			74.5	[3] 36.6		[3] 32.6	
15	Acreage enterprises were capable of irrigating in 1910	429,225	4,767	3,995	12,389	30,933	4,660	6,006	21,604
16	Acreage included in projects	680,133	6,187	4,345	12,896	126,809	9,508	6,121	47,429
	ACREAGE IRRIGATED AND INCLUDED IN PROJECTS								
	Classified by Character of Enterprise.								
17	**U. S. Reclamation Service**, irrigated in 1909	30,536							
18	Enterprises were capable of irrigating in 1910	66,241							
19	Included in projects	107,520							
20	**U. S. Indian Service**, irrigated in 1909	300							
21	Enterprises were capable of irrigating in 1910	300							
22	Included in projects	600							
23	**Carey Act enterprises**, irrigated in 1909								
24	Enterprises were capable of irrigating in 1910								
25	Included in projects								
26	**Irrigation districts**, irrigated in 1909	76,448					4,000		3,000
27	Enterprises were capable of irrigating in 1910	77,228					4,000		3,000
28	Included in projects	91,076					5,000		4,032
29	**Cooperative enterprises**, irrigated in 1909	78,605			575			1,000	8,007
30	Enterprises were capable of irrigating in 1910	168,260			1,600			2,000	8,577
31	Included in projects	240,009			1,904			2,000	28,677
32	**Commercial enterprises**, irrigated in 1909	24,834			100	12,734			
33	Enterprises were capable of irrigating in 1910	52,724			1,800	30,924			
34	Included in projects	154,623			1,823	120,800			
35	**Individual and partnership enterprises**, irrigated in 1909	45,227	3,226	3,635	6,354	8	745	1,469	5,157
36	Enterprises were capable of irrigating in 1910	64,472	4,767	3,995	8,989	9	660	4,006	10,027
37	Included in projects	86,305	6,187	4,345	9,169	9	4,568	4,121	14,720
	ACREAGE IRRIGATED								
	Classified by Source of Water Supply.								
38	Supplied from streams	254,123	3,226	3,615	7,028	12,734	4,745	3,063	16,120
39	By gravity	254,105	3,226	3,615	7,028	12,734	4,745	3,063	16,120
40	By pumping	18							
41	Supplied from lakes								
42	By gravity								
43	By pumping								
44	Supplied from wells	139			1	8		6	6
45	Flowing								
46	By pumping	139			1	8		6	6
47	Supplied from springs	686		20					38
48	Supplied from reservoirs	1,002							
49	Total acreage supplied by pumping	157			1	8		6	6
	IRRIGATION ENTERPRISES								
50	Independent enterprises—number	474	6	25	73	8	7	16	33
51	*Number in 1899*[6]								
52	Per cent of increase, 1899–1910								
53	Main ditches—number	420	6	37	75	3	5	12	34
54	*Number in 1899*[6]								
55	Per cent of increase, 1899–1910								
56	Length—miles	1,459	24	33	113	67	16	45	119
57	*Length in 1899*[7]	*1,701*		*152*	*132*	*180*	*110*	*42*	*(1)*
58	Per cent of increase, 1899–1910	[3] 14.2			[3] 14.4	[3] 62.8		7.1	
59	Capacity—cubic feet per second	9,378	86	95	232	600	72	161	816
60	Laterals—number	1,038	9	41	99	8	6	8	38
61	Length—miles	1,269	3	15	32	71	8	5	17
62	Reservoirs—number	44	1	8	7	1		2	1
63	Capacity—acre-feet	2,098	1	40	220	1		12	2
64	Flowing wells—number								
65	Capacity—gallons per minute								
66	Pumped wells—number	66			1	5			4
67	Capacity—gallons per minute	3,363			10	80			100
68	Pumping plants—number	75			1	5		5	4
69	Engine capacity—horsepower	140			1	8		5	10
70	Pump capacity—gallons per minute	5,366			10	80		54	100
	COST								
71	Cost of enterprises up to July 1, 1910—dollars	7,798,310	28,273	19,388	70,479	230,250	44,967	41,479	89,323
72	*Cost in 1899*[7]—dollars	*1,310,698*	*(2)*	*83,029*	*39,208*	*199,075*	*67,140*	*38,665*	*(1)*
73	Per cent of increase, 1899–1910—dollars	495.0			79.8	15.7		7.3	
74	Average cost per acre enterprises were capable of irrigating in 1910—dollars	18.17	[5] 5.03	4.85	5.69	7.44	9.65	6.91	4.13
75	*Average cost per acre irrigated in 1899*[8]—dollars	*8.82*	*(2)*	*3.91*	*9.73*	*9.92*	*5.70*	*8.52*	
76	Estimated final cost of existing enterprises—dollars	9,485,231	28,273	19,388	70,479	230,250	44,967	41,479	89,323
77	Average per acre included in projects—dollars	13.95	4.57	4.46	5.47	1.82	4.70	6.78	1.88
	OPERATION AND MAINTENANCE								
78	Acreage for which cost is reported	209,023							
79	Total cost reported—dollars	227,385			675	12,734	4,000	1,600	11,007
80	Average per acre for which cost is reported—dollars	1.09			1,720	7,412	14,770	1,400	3,491
81	*Average cost per acre in 1899*[4]—dollars				2.55	0.58	3.69	0.88	0.32
82	Per cent of increase, 1899–1909								

[1] Change of boundary. (See explanation at close of text.)
[2] Included in "all other counties."
[3] Decrease.
[4] Does not include the same territory in the two censuses.
[5] Less than one-tenth of 1 per cent.
[6] Not reported.

AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910.

[Comparative data for 1899 in italics.]

		Hitchcock.	Keith.	Kimball.	Lincoln.	Morrill.	Scotts Bluff.	Sioux.	All other counties.
1	Number of all farms in 1910	801	583	411	1,976	883	1,128	1,420	116,512
2	Number of farms irrigated in 1909	102	98	18	98	109	702	234	139
3	Per cent of all farms	12.7	16.8	4.4	5.0	12.3	62.2	16.5	0.1
4	*Number of farms irrigated in 1899*	(2)	*73*	*21*	*200*	(1)	*291*	*50*	*638*
5	Per cent of increase, 1899–1909		34.2	[3] 14.3	[3] 51.0		141.2	368.0	(4)
	LAND AND FARM AREA								
6	Approximate land area—acres	463,360	683,520	613,120	1,623,040	906,880	462,720	1,315,200	38,290,560
7	Land in farms—acres	375,475	451,151	264,525	1,216,235	499,869	291,026	960,857	31,224,051
8	Improved land in farms—acres	174,075	172,920	36,241	568,112	214,804	121,413	187,933	21,622,318
9	Acreage irrigated in 1909	12,210	13,140	3,432	34,760	29,445	100,301	5,576	6,476
10	Per cent of total land area	2.6	1.9	0.6	2.1	3.2	21.7	0.4	(5)
11	Per cent of land in farms	3.3	2.9	1.3	2.9	5.9	34.5	0.6	(5)
12	Per cent of improved land in farms	7.0	7.6	9.5	6.1	13.7	82.6	3.0	(5)
13	*Acreage irrigated in 1899*	(2)	*12,646*	*4,226*	*22,508*	(1)	*29,244*	*1,438*	*16,724*
14	Per cent of increase, 1899–1909		3.9	[3] 18.8	54.4		243.0	289.1	(4)
15	Acreage enterprises were capable of irrigating in 1910	12,850	19,581	3,507	38,240	56,990	191,206	7,170	15,327
16	Acreage included in projects	21,250	36,160	3,901	55,820	70,296	224,185	39,159	16,007
	ACREAGE IRRIGATED AND INCLUDED IN PROJECTS								
	CLASSIFIED BY CHARACTER OF ENTERPRISE.								
17	**U. S. Reclamation Service,** irrigated in 1909						30,536		
18	Enterprises were capable of irrigating in 1910						66,241		
19	Included in projects					6,750	69,900	30,870	
20	**U. S. Indian Service,** irrigated in 1909								300
21	Enterprises were capable of irrigating in 1910								300
22	Included in projects								600
23	**Carey Act enterprises,** irrigated in 1909								
24	Enterprises were capable of irrigating in 1910								
25	Included in projects								
26	**Irrigation districts,** irrigated in 1909		8,200		19,980	1,465	39,803		
27	Enterprises were capable of irrigating in 1910		8,200		20,260	1,465	40,303		
28	Included in projects		18,169		20,260	2,141	41,474		
29	**Cooperative enterprises,** irrigated in 1909	1,200	1,513		14,080	22,880	28,800		
30	Enterprises were capable of irrigating in 1910	1,540	6,983		14,120	49,940	83,500		
31	Included in projects	3,840	6,983		31,700	54,455	110,450		
32	**Commercial enterprises,** irrigated in 1909	10,000							2,000
33	Enterprises were capable of irrigating in 1910	10,000							10,000
34	Included in projects	16,000							10,000
35	**Individual and partnership enterprises,** irrigated in 1909	1,010	3,427	3,432	700	5,150	1,162	5,576	4,176
36	Enterprises were capable of irrigating in 1910	1,310	4,398	3,507	3,860	5,585	1,162	7,170	5,027
37	Included in projects	1,410	11,008	3,901	3,860	6,950	2,361	8,289	5,407
	ACREAGE IRRIGATED								
	CLASSIFIED BY SOURCE OF WATER SUPPLY.								
38	Supplied from streams	12,210	13,038	3,432	34,760	28,935	99,999	4,903	6,315
39	By gravity	12,210	13,038	3,432	34,760	28,935	99,999	4,895	6,305
40	By pumping							8	10
41	Supplied from lakes								
42	By gravity								
43	By pumping								
44	Supplied from wells		2			80	2		34
45	Flowing								
46	By pumping		2			80	2		34
47	Supplied from springs		100			430		68	30
48	Supplied from reservoirs						300	605	97
49	Total acreage supplied by pumping		2			80	2	8	44
	IRRIGATION ENTERPRISES								
50	Independent enterprises—number	5	26	26	8	36	20	76	109
51	*Number in 1899* [6]								
52	Per cent of increase, 1899–1910								
53	Main ditches—number	5	24	26	9	39	22	74	49
54	*Number in 1899* [6]								
55	Per cent of increase, 1899–1910								
56	Length—miles	56	93	42	134	191	326	100	100
57	*Length in 1899*—miles	(2)	*97*	*25*	*232*	(1)	*179*	*84*	*418*
58	Per cent of increase, 1899–1910		[3] 4.1	68.0	[3] 52.5		82.1	19.0	(4)
59	Capacity—cubic feet per second	217	410	104	1,175	1,058	3,923	151	278
60	Laterals—number	1	13	36	12	215	465	69	18
61	Length—miles	2	20	13	45	253	755	23	7
62	Reservoirs—number		2				1	16	5
63	Capacity—acre-feet		2				1,000	560	260
64	Flowing wells—number								
65	Capacity—gallons per minute								
66	Pumped wells—number		2			1	1		52
67	Capacity—gallons per minute		5			2,500	165		503
68	Pumping plants—number		2			1	1	1	55
69	Engine capacity—horsepower		2			20	6	8	80
70	Pump capacity—gallons per minute		5			2,500	165	412	2,040
	COST								
71	Cost of enterprises up to July 1, 1910—dollars	216,350	84,200	15,778	255,950	337,191	6,204,582	69,122	90,978
72	*Cost in 1899* [8]—dollars	(2)	*122,219*	*32,321*	*142,567*	(1)	*237,161*	*7,899*	*307,704*
73	Per cent of increase, 1899–1910		[3] 31.1	[3] 51.2	79.5		2,516.2	775.1	(4)
74	Average cost per acre enterprises were capable of irrigating in 1910—dollars	16.84	4.30	4.50	6.69	5.92	32.45	9.64	5.94
75	*Average cost per acre irrigated in 1899* [8]—dollars	(2)	*9.67*	*7.65*	*6.39*	(1)	*8.12*	*5.58*	(4)
76	Estimated final cost of existing enterprises—dollars	216,350	84,200	15,778	255,950	337,191	7,891,503	69,122	90,978
77	Average cost per acre included in projects—dollars	10.18	2.33	4.04	4.59	4.80	35.20	1.77	5.68
	OPERATION AND MAINTENANCE								
78	Acreage for which cost is reported	11,200	8,313		34,060	24,295	99,139		2,000
79	Total cost reported—dollars	6,500	6,643		13,328	10,795	156,439		4,887
80	Average per acre for which cost is reported—dollars	0.58	0.80		0.39	0.44	1.58		2.44
81	*Average cost per acre in 1899* [6]—dollars	(2)							
82	Per cent of increase, 1899–1909								

[7] Figures relate only to systems obtaining water from streams by gravity diversion.
[8] Total cost for state includes $33,720, representing the cost of well systems, which was not shown by counties. County figures relate only to enterprises obtaining water from streams by gravity diversion.

NORTH DAKOTA.

The entire area of North Dakota lies within the Great Plains. Throughout the state the rainfall is sufficient in most seasons for the maturing of crops without irrigation, the normal annual precipitation ranging from about 20 inches at the eastern boundary to about 15 inches at the western boundary.

Irrigation is for the most part confined to the extreme northwestern counties of the state, along the Missouri River. The western counties bordering on this river, McKenzie and Williams, contain about 87 per cent of the total acreage reported as irrigated in 1909.

The following table shows for the state as a whole the number of farms and acreage irrigated in 1909, in comparison with the total number of farms, the total land area, the total land in farms, and the total acreage of improved land in farms in 1910, together with the areas not yet irrigated for which water has been or is being made available. Comparative figures for the census of 1900 are included as far as possible.

	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Number of all farms	[1] 74,360	[2] 45,332	29,028	64.0
Approximate land area of the state.....acres..	44,917,120	44,917,120	.....	.....
Land in farms.....acres..	[1] 28,426,650	[2] 15,542,640	12,884,010	82.9
Improved land in farms.....acres..	[1] 20,455,092	[2] 9,644,520	10,810,572	112.1
Number of farms irrigated	[3] 69	[4] 54	15	27.8
Acreage irrigated	[3] 10,248	[4] 4,872	5,376	110.3
Acreage enterprises were capable of irrigating	[5] 21,917	[6]	.....	.....
Acreage included in projects	[5] 38,173	[6]	.....	.....
Percentage irrigated of—				
Number of all farms	0.1	0.1	.....	.....
Approximate land area of the state	[7]	[7]	.....	.....
Land in farms	[7]	[7]	.....	.....
Improved land in farms	0.1	0.1	.....	.....
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909	11,669	.....	.....	.....
Excess of acreage included in projects over acreage irrigated in 1909	27,925	.....	.....	.....

[1] April 15. [2] June 1. [3] In 1909. [4] In 1899. [5] July 1. [6] Not reported. [7] Less than one-tenth of 1 per cent.

Number of farms irrigated.—According to the figures presented in the table, irrigation was practiced on only about one-tenth of 1 per cent of the farms in the state in either 1909 or 1899. Williams County, with 2 per cent of its farms irrigated, was the only county in which the proportion of irrigated farms was as high as 1 per cent.

From 1899 to 1909 the increase in the number of farms irrigated was 27.8 per cent.

Acreage irrigated.—The total acreage reported as irrigated in 1909 was 10,248, as against 4,872 acres in 1899 and 445 acres in 1889.

The average acreage irrigated per farm increased from 90.2 in 1899 to 148.5 in 1909. During the same period the average size of the farms in the state increased from 342.9 to 382.3.

At both censuses the larger part of the irrigated land was in Williams County, where 8,043 acres were irrigated in 1909 and 2,632 acres in 1899. McKenzie County had the next largest irrigated area in 1909—850 acres.

Acreage included in projects.—The foregoing table shows that in 1910 existing enterprises were ready to supply water to 21,917 acres, or 11,669 acres more than were irrigated in 1909. The acreage included in projects exceeds the acreage irrigated in 1909 by 27,925 acres, which is more than five times the acreage brought under irrigation between 1899 and 1909, and nearly three times the acreage irrigated in 1909. This acreage represents the area which will be available for the extension of irrigation in the next few years upon the completion of existing enterprises and without new undertakings.

Acreage irrigated, classified by character of enterprise.—The next table gives the distribution of the acreage irrigated in 1909 according to the character of the enterprise controlling the irrigation works.

CHARACTER OF ENTERPRISE.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All classes	10,248	100.0
U. S. Reclamation Service	1,610	15.7
Individual and partnership enterprises	8,638	84.3

North Dakota has not accepted the conditions of the Carey Act and has no irrigation district law. As United States Reclamation Service enterprises are to be turned over to the water users eventually, it is evident that the entire acreage irrigated in 1909 was supplied by works that are either controlled by the water users or to come under their control later.

Acreage irrigated, classified by source of water supply.—The following table shows the distribution of the acreage irrigated in 1909 according to the source of water supply:

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All sources	10,248	100.0
Streams	8,767	85.5
Wells	1	(1)
Springs	200	2.0
Reservoirs	1,280	12.5

[1] Less than one-tenth of 1 per cent.

From the table it is apparent that up to the present time there has been comparatively little development of any source of water supply other than streams.

IRRIGATION WORKS.

The following statement summarizes the data collected relating to works for supplying water for irrigation in 1910. None of these items was reported in 1900.

Independent enterprises	number	49
Ditches, total length	miles	126
Main ditches	number	47
Length	miles	52
Capacity	cubic feet per second	2,161
Lateral ditches	number	46
Length	miles	74
Reservoirs	number	22
Capacity	acre-feet	132,187
Pumped wells	number	1
Capacity	gallons per minute	15
Pumping plants	number	4
Engine capacity	horsepower	2,038
Pump capacity	gallons per minute	182,115

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average acreage irrigated per enterprise was 209.1, and the acreage irrigated per mile of main ditch was 197.1.

There has been almost no utilization of underground water for irrigation, no flowing wells being reported and only one pumped well, which watered 1 acre in 1909. The water pumped for irrigation is taken principally from the Missouri River by the United States Reclamation Service at its Williston projects.

Cost of construction, operation, and maintenance.—The following table gives data in regard to the cost of construction, operation, and maintenance of irrigation enterprises similar to those given for other states in earlier tables.

	CENSUS OF—	
	1910	1900
Cost of irrigation enterprises	[1] $836,482	[2] $16,980
Average per acre	[3] $38.17	[4] $3.49
Estimated final cost of existing enterprises	$836,482	(5)
Average per acre included in projects	$21.91	(5)
Operation and maintenance:		
Acreage for which cost is reported	1,610	(5)
Total cost reported	[6] $45,718	(5)
Average cost per acre	$28.40	(5)

[1] Reported July 1.
[2] Cost of construction of systems operated in 1899.
[3] Based on acreage enterprises were capable of irrigating in 1910.
[4] Based on acreage irrigated in 1899.
[5] Not reported.
[6] For 1909.

The cost of irrigation systems reported at the census of 1910 is nearly 50 times as great as that reported at the preceding census, and the average cost per acre, as given in the table, likewise shows a large increase. The average cost per acre shown for the census of 1910 is based on the acreage under ditch in that year, but since the corresponding acreage for 1900 was not reported, the figure for average cost at the earlier census is based on the acreage actually irrigated in 1899. If computed on the basis of the acreage irrigated in 1909, the average cost in 1910 would be $81.62, which is more than twice as great as the average based on the acreage enterprises were capable of irrigating in 1910. This high average cost per acre irrigated is due to the fact that some of the enterprises upon which heavy expenditures have been made did not operate to their full capacity in either 1909 or 1910. An average based on the estimated final cost and the acreage included in projects, $21.91, probably represents the average cost per acre of irrigation in North Dakota more exactly than either of the averages noted above.

The average cost per acre enterprises were capable of irrigating in 1910 was $6.63 in McLean County, $7.84 in McKenzie County, and $39.72 in Williams County. Williams County also shows a higher estimated final cost per acre included in projects than either of the other counties referred to, $22.40, as compared with $2.02 in McLean County and $4.35 in McKenzie County.

The entire cost of operation and maintenance reported relates to a single large pumping enterprise which is supplying water to only a small part of the land which it was designed to serve. For this reason the average cost per acre shown is not representative of the normal cost of operating and maintaining such works.

CROPS.

The following table shows the acreage, yield, and value of the principal crops reported as grown under irrigation in 1909:

CROP.	IRRIGATED CROPS: 1909				
	Acreage.	YIELD.			Value.
		Unit.	Amount.	Average per acre.	
Cereals:					
Oats	544	Bu.	25,655	47.2	$8,368
Wheat	1,268	Bu.	28,011	22.1	26,145
Hay and forage:					
Alfalfa	136	Tons.	274	2.01	2,115
Wild, salt, or prairie grasses	1,057	Tons.	1,424	1.35	9,518

Although other crops were irrigated to some extent, the areas reported for these are in every case less than 100 acres. Alfalfa is the only crop shown in the table of which the acreage under irrigation formed as much as 1 per cent of the total acreage in that crop, the proportion for alfalfa being 4.5 per cent.

Of the crops shown in the table, wheat has the largest acreage, representing 42.2 per cent of the total irrigated acreage of the crops given. "Wild, salt, or prairie grasses" are next, with 35.2 per cent of this total, and oats follow with 18.1 per cent.

COUNTY TABLE.

The next table gives in detail, for the state and principal counties, the data summarized in this section, except those relating to crops.

Change of boundaries.—In comparing the data secured in 1910 with those for the preceding census, the following changes in the boundaries of the counties which are shown separately in the table should be considered: The organization of McKenzie County from parts of Stark and Billings counties in 1905; that of Sheridan County from part of McLean County in 1909; and that of Divide County from part of Williams County in 1910.

NORTH DAKOTA.—ACREAGE IRRIGATED, EXTENT AND COST OF IRRIGATION ENTERPRISES, AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910.

[Comparative data for 1899 in italics.]

		THE STATE.	McKenzie.	McLean.[1]	Williams.[1]	All other counties.
1	Number of all farms in 1910	74,360	1,406	2,379	2,602	67,973
2	Number of farms irrigated in 1909	69	7	1	53	8
3	Per cent of all farms	0.1	0.5	(2)	2.0	(2)
4	*Number of farms irrigated in 1899*	*54*	(1)		*23*	*31*
5	Per cent of increase, 1899–1909	27.8				(3)
	LAND AND FARM AREA					
6	Approximate land area—acres	44,917,120	1,822,080	1,475,200	1,368,320	40,251,520
7	Land in farms—acres	28,426,650	277,857	837,250	786,983	26,524,560
8	Improved land in farms—acres	20,455,092	95,295	580,606	305,292	19,473,899
9	Acreage irrigated in 1909	10,248	850	120	8,043	1,235
10	Per cent of total land area	(2)	(2)	(2)	0.6	(2)
11	Per cent of land in farms	(2)	0.3	(2)	1.0	(2)
12	Per cent of improved land in farms	0.1	0.9	(2)	2.6	(2)
13	*Acreage irrigated in 1899*	*4,872*	(1)		*2,632*	*2,240*
14	Per cent of increase, 1899–1909	110.3				(3)
15	Acreage enterprises were capable of irrigating in 1910	21,917	850	163	19,664	1,240
16	Acreage included in projects	38,173	1,532	535	34,865	1,241
	ACREAGE IRRIGATED AND INCLUDED IN PROJECTS					
	CLASSIFIED BY CHARACTER OF ENTERPRISE.					
17	**U. S. Reclamation Service**, irrigated in 1909	1,610			1,610	
18	Enterprises were capable of irrigating in 1910	12,096			12,096	
19	Included in projects	24,480			24,480	
20	**Individual and partnership enterprises**, irrigated in 1909	8,638	850	120	6,433	1,235
21	Enterprises were capable of irrigating in 1910	9,821	850	163	7,568	1,240
22	Included in projects	13,693	1,532	535	10,385	1,241
	ACREAGE IRRIGATED					
	CLASSIFIED BY SOURCE OF WATER SUPPLY.					
23	Supplied from streams	8,767	590	120	6,843	1,214
24	By gravity	7,153	590	120	5,233	1,210
25	By pumping	1,614			1,610	4
26	Supplied from wells	1				1
27	By pumping	1				1
28	Supplied from springs	200			200	
29	Supplied from reservoirs	1,280	260		1,000	20
30	Total acreage supplied by pumping	1,615			1,610	5
	IRRIGATION ENTERPRISES					
31	Independent enterprises—number	49	6	1	34	8
32	Main ditches—number	47	5	1	35	6
33	Length—miles	52	8	1	40	3
34	Capacity—cubic feet per second	2,161	162	3	1,703	293
35	Laterals—number	46	16		30	
36	Length—miles	74	1		73	
37	Reservoirs—number	22	8	1	13	
38	Capacity—acre-feet	132,187	25	5	132,157	
39	Pumped wells—number	1				1
40	Capacity—gallons per minute	15				15
41	Pumping plants—number	4	1		1	2
42	Engine capacity—horsepower	2,038	30		2,000	8
43	Pump capacity—gallons per minute	182,115	2,000		180,000	115
	COST					
44	Cost of enterprises up to July 1, 1910—dollars	836,482	(1)	1,080	781,100	47,639
45	*Cost in 1899*—dollars	*16,980*	6,663		*7,989*	*8,991*
46	Per cent of increase, 1899–1910—dollars	4,826.3				(3)
47	Average cost per acre enterprises were capable of irrigating in 1910—dollars	38.17	7.84	6.63	39.72	38.42
48	*Average cost per acre irrigated in 1899*—dollars	*3.49*	(1)		*3.04*	*4.01*
49	Estimated final cost of existing enterprises—dollars	836,482	6,663	1,080	781,100	47,639
50	Average per acre included in projects—dollars	21.91	4.35	2.02	22.40	38.39
	OPERATION AND MAINTENANCE					
51	Acreage for which cost is reported	1,610			1,610	
52	Total cost reported—dollars	45,718			45,718	
53	Average per acre for which cost is reported—dollars	28.40			28.40	

[1] Change of boundary. (See explanation at close of text.)
[2] Less than one-tenth of 1 per cent.
[3] Does not include the same territory at the two censuses.

OKLAHOMA.

Most of the irrigated land in Oklahoma is in the section made up of the three counties forming the western extension of the state and the adjoining county, Harper. The irrigated acreage in these four counties represented 90.1 per cent of all the land irrigated in the state in 1909. The following table shows for the state as a whole the number of farms and acreage irrigated in 1909, in comparison with the total number of farms, the total land area, the total land in farms, and the total acreage of improved land in farms in 1910, together with the areas not yet irrigated for which water has been or is being made available. Comparative figures for the census of 1900 are included as far as possible.

	CENSUS OF—		INCREASE.	
	1910	1900 [1]	Amount.	Per cent.
Number of all farms	[2] 190,192	[3] 108,000	82,192	76.1
Approximate land area of the state.....acres.	44,424,960	44,424,960	.....	.....
Land in farms.....acres.	[2] 28,859,353	[3] 22,988,339	5,871,014	25.5
Improved land in farms.....acres.	[2] 17,551,337	[3] 8,574,187	8,977,150	104.7
Number of farms irrigated	[4] 137	[5] 124	13	10.5
Acreage irrigated	[4] 4,388	[5] 2,759	1,629	59.0
Acreage enterprises were capable of irrigating	[6] 6,397.	(7)	.....	.....
Acreage included in projects	[6] 8,528	(7)	.....	.....
Percentage irrigated of—				
Number of all farms	0.1	0.1	.....	.....
Approximate land area of the state	(8)	(8)	.....	.....
Land in farms	(8)	(8)	.....	.....
Improved land in farms	(8)	(8)	.....	.....
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909	2,009	.....	.....	.....
Excess of acreage included in projects over acreage irrigated in 1909	4,140	.....	.....	.....

[1] Figures for Oklahoma and Indian Territory combined.
[2] April 15.
[3] June 1.
[4] In 1909.
[5] In 1899.
[6] July 1.
[7] Not reported.
[8] Less than one-tenth of 1 per cent.

Number of farms irrigated.—According to the figures presented in the table irrigation was practiced on only 0.1 per cent of the farms of the state in 1909, being an almost negligible factor in agriculture in Oklahoma. The only county in which more than 1 per cent of the farms were irrigated is Cimarron, where the percentage was 2.4.

From 1899 to 1909 the increase in the number of farms irrigated was 10.5 per cent. Since the boundaries of all the counties represented in the table have been changed since 1900 no comparisons by counties can be made.

Acreage irrigated.—The total acreage reported as irrigated in 1909 was 4,388 as against 2,759 in 1899, an increase of 59 per cent. This percentage of increase is considerably higher than the percentage of increase in the number of farms irrigated, the average acreage irrigated per farm having increased from 22.3 in 1899 to 32 in 1909.

Acreage included in projects.—The table shows that in 1910 existing enterprises were ready to supply water to 6,397 acres, or 2,009 acres more than were irrigated in 1909. The acreage included in projects exceeds the acreage irrigated in 1909 by 4,140 acres, which is about two and one-half times the acreage brought under irrigation in the last decade, and almost equal to the total acreage irrigated in 1909. This acreage represents the area which will be available for the extension of irrigation in the next few years upon the completion of the projects now under construction, and without new undertakings.

Acreage irrigated, classified by character of enterprise.—The entire acreage irrigated in Oklahoma in 1909 was supplied with water by enterprises which were controlled by the water users, 2,000 acres, or 45.6 per cent of the total, being served by cooperative enterprises, and 2,388 acres, or 54.4 per cent, by individual and partnership enterprises.

Acreage irrigated, classified by source of water supply.—The following table shows the distribution of the acreage irrigated in 1909 according to the source of water supply:

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All sources	4,388	100.0
Streams	4,255	97.0
Lakes	28	0.6
Wells	69	1.6
Springs	16	0.4
Reservoirs	20	0.5

From the foregoing table it is apparent that up to the present time there has been little development of any source of water supply other than streams.

IRRIGATION WORKS.

The following table summarizes the data collected relating to works for supplying water for irrigation in 1910 and 1900:

IRRIGATION WORKS.	CENSUS OF— 1910	1900 [1]
Independent enterprises.....number..	114	(2)
Ditches, total length.....miles..	85	(2)
Main ditches.....number..	47	119
Length.....miles..	54	68
Capacity.....cubic feet per second..	155	(2)
Lateral ditches.....number..	106	(2)
Length.....miles..	31	(2)
Reservoirs.....number..	11	(2)
Capacity.....acre-feet..	22	(2)
Pumped wells.....number..	65	(2)
Capacity.....gallons per minute..	1,791	(2)
Pumping plants.....number..	68	(2)
Engine capacity.....horsepower..	107	(2)
Pump capacity.....gallons per minute..	4,541	(2)

[1] Figures relate only to systems obtaining water from streams in 1899.
[2] Not reported.

The only items contained in the table for which figures from the census of 1900 are available are the number and length of main ditches, in both of which there were decreases between 1900 and 1910. As crops can be grown in Oklahoma without irrigation, it is probable that some ditches were in use in 1900 which were not in use in 1909, and consequently not reported in the later year.

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average acreage irrigated per enterprise was 38.5, and the acreage irrigated per mile of main ditch was 81.3. For the enterprises represented by the figures from the preceding census, which include only the systems that received water from streams, the average acreage irrigated per mile of main ditch was 38.5.

There has been little utilization of underground water as yet. The table shows no flowing wells used for irrigation, and only 65 pumped wells, scattered through the state, which watered a total of 69 acres.

Cost of construction, operation, and maintenance.—The following table presents statistics in regard to the cost of construction, operation, and maintenance of irrigation enterprises similar to those given for other states in earlier tables:

	CENSUS OF— 1910	1900
Cost of irrigation enterprises	[1] $47,200	[2] $21,872
Average per acre	[3] $7.38	[4] $7.93
Estimated final cost of existing enterprises	$47,200	(5)
Average per acre included in projects	$5.53	(5)
Operation and maintenance:		
Acreage for which cost is reported	1,969	(5)
Total cost reported	[6] $1,000	(5)
Average cost per acre	$0.51	(5)

[1] Reported July 1.
[2] Cost of construction of systems operated in 1899.
[3] Based on acreage enterprises were capable of irrigating in 1910.
[4] Based on acreage irrigated in 1899.
[5] Not reported.
[6] For 1909.

The cost of irrigation systems shows an increase of 115.8 per cent from 1900 to 1910, while in the average cost per acre as given in the table there was a slight decrease. The average cost per acre shown for the census of 1910 is based on the acreage under ditch in that year, but since the corresponding acreage for 1900 was not reported, the figure for the average cost at the earlier census is based on the acreage actually irrigated in 1899. If computed on the basis of the acreage irrigated in 1909, the average cost in 1910 would be $10.76, representing an increase of 35.7 per cent over the figure for the average cost at the census of 1900.

The acreage for which cost of operation and maintenance in 1909 was reported constitutes 44.9 per cent of the total acreage reported as irrigated in 1909, and 98.5 per cent of the acreage reported as irrigated by the enterprises not under individual or partnership control, that is, by the cooperative enterprises. The cost reported can be said, therefore, to represent fairly the average annual expense for the cooperative enterprises.

CROPS.

The following table shows the acreage, yield, and value of the principal crops reported as grown under irrigation in 1909:

CROP.	IRRIGATED CROPS: 1909 Acreage.	Yield. Unit.	Amount.	Average per acre.	Value.
Cereals:					
Corn	77	Bu....	2,025	26.3	$1,099
Oats	80	Bu....	3,350	41.9	1,600
Wheat	969	Bu....	25,500	26.3	25,220
Hay and forage:					
Alfalfa	1,383	Tons..	1,867	1.35	12,273
Wild, salt, or prairie grasses	231	Tons..	277	1.20	5,333

Of the total irrigated acreage of the crops given in the table 50.5 per cent is that of alfalfa. Wheat is next in importance in respect to irrigated acreage with 35.4 per cent of the total, and is followed by "wild, salt, or prairie grasses," with 8.4 per cent.

COUNTY TABLE.

The next table gives in detail, for the state and principal counties, the data from the Thirteenth Census that are summarized in this section, except those relating to crops. Comparative data for 1899 are given for the state as a whole, and for Beaver County. Owing to the fact that Cimarron and Texas Counties were organized from Beaver County in 1907, however, the figures for these counties for 1909 should be combined with those for Beaver County in making any comparison with 1899. The only other county shown in the table, Harper, was organized from a part of Woodward in 1907.

OKLAHOMA.—ACREAGE IRRIGATED, EXTENT AND COST OF IRRIGATION ENTERPRISES AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910.

[Comparative data for 1899 in italics. These figures include Indian Territory.]

		The State.	Beaver.[1]	Cimarron.	Harper.	Texas.	All other counties.
1	Number of all farms in 1910	190,192	3,568	1,307	1,955	3,026	180,336
2	Number of farms irrigated in 1909	137	11	32	13	7	74
3	Per cent of all farms	0.1	0.3	2.4	0.7	0.2	(2)
4	*Number of farms irrigated in 1899*	*124*	*54*	(1)	(1)	(1)	*70*
5	Per cent of increase, 1899–1909	10.5					(3)
	LAND AND FARM AREA						
6	Approximate land area—acres	44,424,960	1,160,320	1,183,360	661,120	1,321,600	40,098,560
7	Land in farms—acres	28,859,353	845,527	293,296	533,417	748,383	26,438,730
8	Improved land in farms—acres	17,551,337	487,283	117,828	280,669	456,356	16,209,201
9	Acreage irrigated in 1909	4,388	138	708	2,769	338	435
10	Per cent of total land area	(2)	(2)	0.1	0.4	(2)	(2)
11	Per cent of land in farms	(2)	(2)	0.2	0.5	(2)	(2)
12	Per cent of improved land in farms	(2)	(2)	0.6	1.0	0.1	(2)
13	*Acreage irrigated in 1899*	*2,759*	*1,393*	(1)	(1)	(1)	*1,366*
14	Per cent of increase, 1899–1909	59.0					(3)
15	Acreage enterprises were capable of irrigating in 1910	6,397	259	995	3,881	738	524
16	Acreage included in projects	8,528	353	1,165	4,347	1,838	825
	ACREAGE IRRIGATED AND INCLUDED IN PROJECTS						
	CLASSIFIED BY CHARACTER OF ENTERPRISE.						
17	**U. S. Reclamation Service**, irrigated in 1909						
18	Enterprises were capable of irrigating in 1910						
19	Included in projects						
20	**U. S. Indian Service**, irrigated in 1909						
21	Enterprises were capable of irrigating in 1910						
22	Included in projects						
23	**Carey Act enterprises**, irrigated in 1909						
24	Enterprises were capable of irrigating in 1910						
25	Included in projects						
26	**Irrigation districts**, irrigated in 1909						
27	Enterprises were capable of irrigating in 1910						
28	Included in projects						
29	**Cooperative enterprises**, irrigated in 1909	2,000	31		1,969		
30	Enterprises were capable of irrigating in 1910	3,000	119		2,881		
31	Included in projects	3,500	153		3,347		
32	**Commercial enterprises**, irrigated in 1909						
33	Enterprises were capable of irrigating in 1910						
34	Included in projects						
35	**Individual and partnership enterprises**, irrigated in 1909	2,388	107	708	800	338	435
36	Enterprises were capable of irrigating in 1910	3,397	140	995	1,000	738	524
37	Included in projects	5,028	200	1,165	1,000	1,838	825
	ACREAGE IRRIGATED						
	CLASSIFIED BY SOURCE OF WATER SUPPLY.						
38	Supplied from streams	4,255	123	684	2,769	336	343
39	By gravity	4,205	123	669	2,769	336	308
40	By pumping	50		15			35
41	Supplied from lakes	28					28
42	By gravity	28					28
43	By pumping						
44	Supplied from wells	69	15	24		2	28
45	Flowing						
46	By pumping	69	15	24		2	28
47	Supplied from springs	16					16
48	Supplied from reservoirs	20					20
49	Total acreage supplied by pumping	119	15	39		2	63
	IRRIGATION ENTERPRISES						
50	Independent enterprises—number	114	11	32	2	5	64
51	*Number in 1899*[4]						
52	Per cent of increase, 1899–1910						
53	Main ditches—number	47	2	16	2	3	24
54	*Number in 1899*[5]	*119*	*38*	(1)	(1)	(1)	*81*
55	Per cent of increase, 1899–1910	[6] 60.5					(3)
56	Length—miles	54	3	10	19	6	16
57	*Length in 1899*—miles	*68*	*44*	(1)	(1)	(1)	*24*
58	Per cent of increase, 1899–1910	[6] 20.6					
59	Capacity—cubic feet per second	155	2	42	68	33	10
60	Laterals—number	100	13	59	20	8	6
61	Length—miles	31	3	13	10	2	3
62	Reservoirs—number	11	5				6
63	Capacity—acre-feet	22	10				12
64	Flowing wells—number						
65	Capacity—gallons per minute						
66	Pumped wells—number	65	7	17		2	39
67	Capacity—gallons per minute	1,791	199	400		15	1,177
68	Pumping plants—number	68	7	18		2	41
69	Engine capacity—horsepower	107	7	32		2	66
70	Pump capacity—gallons per minute	4,541	199	1,240		15	3,087
	COST						
71	Cost of enterprises up to July 1, 1910—dollars	47,200	3,699	8,360	18124	3,238	13,779
72	*Cost in 1899*[7]—dollars	*21,872*	*9,267*	(1)	(1)	(1)	*10,405*
73	Per cent of increase, 1899–1910	115.8					(3)
74	Average cost per acre enterprises were capable of irrigating in 1910—dollars	7.38	14.28	8.40	4.67	4.39	26.30
75	*Average cost per acre irrigated in 1899*[5]—dollars	*7.93*	*7.18*				*7.82*
76	Estimated final cost of existing enterprises—dollars	47,200	3,699	8,360	18,124	3,238	13,779
77	Average per acre included in projects—dollars	5.53	10.48	7.18	4.17	1.76	16.70
	OPERATION AND MAINTENANCE						
78	Acreage for which cost is reported	1,969			1,969		
79	Total cost reported—dollars	1,000			1,000		
80	Average per acre for which cost is reported—dollars	0.51			0.51		
81	*Average cost per acre in 1899*[4]—dollars						
82	Per cent of increase, 1899–1909						

[1] Change of boundary. (See explanation at close of text.) [2] Less than one-tenth of 1 per cent. [3] Does not include the same territory for the two censuses.
[4] Not reported. [5] Figures relate only to systems obtaining water from streams. [6] Decrease.
[7] Total cost for the state includes $2,200, representing the cost of well systems, which was not shown by counties. County figures relate only to systems obtaining water from streams.

SOUTH DAKOTA.

South Dakota lies wholly within the Great Plains, except for a small area in the southwest corner of the state occupied by the Black Hills. Throughout the state the rainfall is sufficient in most seasons for the maturing of some crops without irrigation, the normal annual precipitation ranging from about 23 inches at the eastern boundary to about 15 inches at the western boundary.

Irrigation is confined almost wholly to the western part of the state, the counties along the western boundary containing about 84 per cent of the total acreage of irrigated land reported.

The following table shows for the state as a whole the number of farms and acreage irrigated in 1909, in comparison with the total number of farms, the total land area, the total land in farms, and the total acreage of improved land in farms in 1910, together with the areas not yet irrigated for which water has been or is being made available. Comparative figures for the census of 1900 are included as far as possible.

	CENSUS OF—		INCREASE.[1]	
	1910	1900	Amount.	Per cent.
Number of all farms	[2] 77,644	[3] 52,622	25,022	47.6
Approximate land area of the state.....acres..	49,195,520	49,195,520	.....	.....
Land in farms.....acres..	[2] 26,016,892	[3] 19,070,616	6,946,276	36.4
Improved land in farms.....acres..	[2] 15,827,208	[3] 11,285,983	4,541,225	40.2
Number of farms irrigated	[4] 500	[5] 606	−106	−17.5
Acreage irrigated	[4] 63,248	[5] 43,676	19,572	44.8
Acreage enterprises were capable of irrigating	[6] 128,481	[7]	.....	.....
Acreage included in projects	[6] 261,625	[7]	.....	.....
Percentage irrigated of—				
Number of all farms	0.6	1.2	−0.6	.....
Approximate land area of the state	0.1	0.1	.....	.....
Land in farms	0.2	0.2	.....	.....
Improved land in farms	0.4	0.4	.....	.....
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909	65,233	.....	.....	.....
Excess of acreage included in projects over acreage irrigated in 1909	138,377	.....	.....	.....

[1] A minus sign (−) denotes decrease. [2] April 15. [3] June 1. [4] In 1909. [5] In 1899. [6] July 1. [7] Not reported.

Number of farms irrigated.—According to the figures presented in the table, irrigation was practiced on less than 1 per cent (0.6 per cent) of the farms in the state in 1909. In 1899 the proportion of irrigated farms was higher, 1.2 per cent, while in 1889 it was only 0.4 per cent.

The only counties in which more than 5 per cent of the farms were irrigated in 1909 were Lawrence, Butte, and Custer, in which the proportions were 15.5, 9.3, and 9.2 per cent, respectively.

From 1899 to 1909 there was a decrease of 17.5 per cent in the number of farms irrigated.

Acreage irrigated.—The total acreage reported as irrigated in 1909 was 63,248, as against 43,676 in 1899, and 15,717 in 1889. The percentage of increase from 1889 to 1899 was 177.9, while that from 1899 to 1909 was 44.8. The absolute increase also was greater during the earlier decade, amounting to 27,959 acres, as against 19,572 acres during the later decade.

The fact that, coincident with the increase in acreage irrigated, there was a decrease in the number of farms irrigated, is explained by the abandonment of irrigation on scattered farms throughout the state where it was practiced on a small scale, and the increasing use of irrigation on a larger scale in the western part of the state. The average acreage irrigated per farm was 126.5 in 1909, as against 72.1 in 1899. During the same period the average size of farms in the state decreased from 362.4 acres to 335.1 acres.

Butte and Pennington Counties were the only counties in which the acreage irrigated in 1909 formed as much as 1 per cent of the total area or as much as 3 per cent of the total land in farms. In three counties, Butte, Custer, and Pennington, the irrigated acreage was equal to more than 10 per cent of the improved land in farms, the percentages being 29.5, 13.7, and 11.2, respectively.

In both 1909 and 1899 the county for which the largest acreage of irrigated land was reported was Pennington, with an irrigated acreage of 19,463 and 14,896 at the respective censuses. One other county, Butte, shows an irrigated acreage in excess of 10,000 in 1909, while in two counties, Custer and Meade, the irrigated area was between 5,000 and 10,000 acres.

Acreage included in projects.—The foregoing table shows that in 1910 existing enterprises were ready to supply water to 128,481 acres, or 65,233 acres more than were irrigated in 1909. It is probable that, after allowance is made for an increase in the area irrigated in 1910 over that irrigated in 1909, there

remained at the close of 1910 under ditch but not irrigated about as much land as was irrigated in the year 1909, and fully three times as much land as was brought under irrigation in the 10 years from 1899 to 1909. The acreage included in projects exceeds the acreage irrigated in 1909 by 138,377 acres, which is more than seven times the acreage brought under irrigation in the last decade and more than twice the acreage irrigated in 1909. This acreage represents the area which will be available for the extension of irrigation in the next few years upon the completion of existing enterprises and without new undertakings.

Acreage irrigated, classified by character of enterprise.—The following table gives the distribution of the acreage irrigated in 1909 according to the character of the enterprise controlling the irrigation works:

CHARACTER OF ENTERPRISE.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All classes	63,248	100.0
U. S. Reclamation Service	5,613	8.9
U. S. Indian Service	50	0.1
Cooperative enterprises	13,601	21.5
Commercial enterprises	6,300	10.0
Individual and partnership enterprises	37,684	59.6

There are no Carey Act enterprises or irrigation districts in South Dakota. Cooperative enterprises and individual and partnership enterprises supplied water to about 81 per cent of the acreage irrigated in 1909, while United States Reclamation Service enterprises which are eventually to be turned over to the water users, supplied 8.9 per cent of the acreage irrigated. Thus only 10 per cent of the irrigated land was supplied by enterprises which are not either controlled by the water users or to be turned over to them ultimately.

Acreage irrigated, classified by source of water supply.—The following table shows the distribution of the acreage irrigated in 1909 according to the source of water supply:

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All sources	63,248	100.0
Streams	47,662	75.4
Lakes	200	0.3
Wells	1,456	2.3
Springs	395	0.6
Reservoirs	13,535	21.4

Streams constituted the source of water supply for about three-fourths of the land irrigated in 1909 and reservoirs for slightly more than one-fifth of this total. Irrigation from reservoirs is practiced principally on the higher areas where for large parts of the land a water supply from streams is not available and the storage of storm waters affords the only means of irrigation.

The acreage irrigated from wells in 1909 was considerably smaller than that supplied from this source in 1899 the advance of dry farming and a heavier rainfall in 1909 than in some previous years having led to the abandonment of irrigation from some of the artesian wells in the eastern and central parts of the state. These wells, however, will be used again in dry years.

IRRIGATION WORKS.

The following table summarizes the data collected relating to works for supplying water for irrigation in 1910 and 1900. As only two of the items reported in 1910 were reported in 1900, there is little opportunity for comparisons between the two censuses.

IRRIGATION WORKS.[1]	CENSUS OF—	
	1910	1900[1]
Independent enterprises.....number	395	[2]
Ditches, total length.....miles	1,256	[2]
Main ditches.....number	348	188
Length.....miles	631	223
Capacity.....cubic feet per second	3,598	[2]
Lateral ditches.....number	332	[2]
Length.....miles	625	[2]
Reservoirs.....number	314	[2]
Capacity.....acre-feet	216,205	[2]
Flowing wells.....number	42	[2]
Capacity.....gallons per minute	14,382	[2]
Pumped wells.....number	4	[2]
Capacity.....gallons per minute	24	[2]
Pumping plants.....number	8	[2]
Engine capacity.....horsepower	63	[2]
Pump capacity.....gallons per minute	5,289	[2]

[1] Figures relate only to systems obtaining water from streams by gravity diversion in 1899.
[2] Not reported.

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average acreage irrigated per enterprise was 160.1, and the acreage irrigated per mile of main ditch was 100.2. For the enterprises represented by the figures from the preceding census, which include only systems receiving water from streams, the average acreage irrigated per mile of main ditch was 172.4.

There was at one time considerable utilization of underground water for irrigation in South Dakota, especially from flowing wells in the eastern part of the state, but, as already stated, wells were not so extensively used in 1909 as in 1899. Previous reports do not show the number of artesian wells used for irrigation, but the fact that the acreage irrigated from such wells has decreased greatly, suggests a corresponding decrease in the number of wells used for irrigation.

Cost of construction, operation, and maintenance.—The next table presents statistics in regard to the cost of construction, operation, and maintenance of irrigation enterprises similar to those given for other states in earlier tables.

	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Cost of irrigation enterprises	[1] $3,043,140	[2] $284,747	$2,758,393	968.7
Average per acre	[3] $23.69	[4] $6.52	([5])	.....
Estimated final cost of existing enterprises	$3,800,556	([6])	.....	.....
Average per acre included in projects	$18.85	([6])	.....	.....
Operation and maintenance:				
Acreage for which cost is reported	25,514	([6])	.....	.....
Total cost reported	[7] $16,288	([6])	.....	.....
Average cost per acre	$0.64	[8] $0.23	$0.41	178.3

[1] Reported July 1.
[2] Cost of systems operated in 1899.
[3] Based on acreage enterprises were capable of irrigating in 1910.
[4] Based on acreage irrigated in 1899.
[5] Figures not comparable. (See explanation in text.)
[6] Not reported.
[7] For 1909.
[8] Figure relates only to systems obtaining water from streams.

The cost of irrigation systems shows an increase of 968.7 per cent. In the average cost per acre, as given in the table, there was also a large increase. The average cost per acre shown for the census of 1910 is based on the acreage under ditch in that year, but since the corresponding acreage for 1900 was not reported, the figure for the average cost at the earlier census is based on the acreage actually irrigated in 1899. If computed on the basis of the acreage irrigated in 1909, the average cost in 1910 would be $48.11, representing an increase of 637.9 per cent over the figure for the average cost at the census of 1900. The high average cost per acre is due in part to the considerable expenditures made on a large project which was nearly completed, but which was not used to its full capacity, and was ready to supply water to only a part of the acreage the enterprise is intended to supply. The average, based on the estimated final cost and the acreage included in projects, $18.85 per acre, probably represents the average cost per acre of irrigation in South Dakota more exactly than either of the averages referred to above.

Among the counties for which separate figures are given in the table, the lowest average cost per acre enterprises were capable of irrigating in 1910, $5.09, is in Pennington, which contained a larger irrigated acreage in 1909 than any other county and a larger acreage that enterprises were capable of irrigating in 1910 than any other except one. The highest average cost per acre, $42.81, is in Butte County, where large expenditures have been made on uncompleted projects. The estimated final cost per acre included in projects in Butte County, $28.03, is likewise the highest reported for the counties of the state.

The acreage for which cost of operation and maintenance in 1909 was reported constitutes 40.3 per cent of the total acreage reported as irrigated in 1909 and 99.8 per cent of the acreage reported as irrigated by other than individual and partnership enterprises.

CROPS.

The following table shows the acreage, yield, and value of the principal crops grown under irrigation in 1909:

CROP.	IRRIGATED CROPS: 1909				
	Acreage.	Yield.			Value.
		Unit.	Amount.	Average per acre.	
Cereals:					
Corn	1,166	Bu.	25,470	21.8	$17,532
Oats	2,526	Bu.	91,045	36.0	42,035
Wheat	1,329	Bu.	*25,590*	*19.3*	*21,100*
Barley	317	Bu.	6,086	19.2	3,143
Other seed:					
Alfalfa seed	137	Bu.	293	2.1	2,196
Hay and forage:					
Timothy alone	1,927	Tons.	3,352	1.74	25,290
Timothy and clover mixed	2,116	Tons.	3,189	1.51	21,229
Alfalfa	10,005	Tons.	28,520	2.85	160,414
Wild, salt, or prairie grasses	17,652	Tons.	20,334	1.15	145,667
Sundry crops:					
Potatoes	439	Bu.	35,666	81.2	25,049
Orchard fruits	327	Bu.	.....	.....	17,698

Acreage.—While small quantities of crops other than those shown in the table are grown on irrigated land, the acreage reported for no one of these crops is as much as 100.

The irrigated acreage in alfalfa formed 15.1 per cent of the total acreage of that crop in the state in 1909, and the irrigated acreage in alfalfa seed 5.4 per cent of the total for that crop. The fact that these are the only crops in the state of which as much as 2 per cent of the total acreage was irrigated in 1909 shows that irrigation is a very small factor in South Dakota agriculture.

Of the crops shown in the table, "wild, salt, or prairie grasses" have the largest irrigated acreage, representing 46.5 per cent of the total irrigated acreage of the crops given. Alfalfa is next, with 26.4 per cent of this total, and is followed by oats, with 6.7 per cent, "timothy and clover mixed," with 5.6 per cent, and "timothy alone," with 5.1 per cent. No other single crop covered as much as 5 per cent of the total acreage of the irrigated crops presented in the table.

COUNTY TABLE.

The next table gives in detail, for the state and principal counties, the data summarized in this section, except those relating to crops.

Change of boundaries.—In comparing the data secured in 1910 with those from the census of 1900, it should be borne in mind that Harding and Perkins Counties were organized from parts of Butte County in 1909.

SOUTH DAKOTA.—ACREAGE IRRIGATED, EXTENT AND COST OF IRRIGATION ENTERPRISES, AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910.

[Comparative data for 1899 in italics.]

		The State.	Butte.[1]	Custer.	Fall River.	Harding.	Lawrence.	Meade.	Pennington.	Perkins.	All other counties.
1	Number of all farms in 1910	77,644	1,037	965	1,524	947	445	3,339	1,877	3,307	64,203
2	Number of farms irrigated in 1909	500	96	89	40	28	69	45	83	9	41
3	Per cent of all farms	0.6	9.3	9.2	2.6	3.0	15.5	1.3	4.4	0.3	0.1
4	*Number of farms irrigated in 1899*	*606*	*104*	*71*	*29*	(1)	*130*	*44*	*95*	(1)	*133*
5	Per cent of increase, 1899–1909	[2] 17.5	.....	25.4	37.9	.....	[2] 46.9	2.3	[2] 12.6	.....	[2] 69.2
	LAND AND FARM AREA										
6	Approximate land area—acres	49,195,520	1,464,960	1,006,720	1,123,840	1,716,480	510,080	2,234,240	1,786,880	1,864,960	37,487,360
7	Land in farms—acres	26,016,892	238,527	282,345	397,277	235,183	124,626	913,943	626,946	670,798	22,527,247
8	Improved land in farms—acres	15,827,208	48,775	56,938	58,117	47,244	41,014	180,821	173,501	108,085	15,112,113
9	Acreage irrigated in 1909	63,248	14,378	7,820	4,633	3,315	3,355	7,949	19,463	897	1,438
10	Per cent of total land area	0.1	1.0	0.8	0.4	0.2	0.7	0.4	1.1	(3)	(3)
11	Per cent of land in farms	0.2	6.0	2.8	1.2	1.4	2.7	0.9	3.1	0.1	(3)
12	Per cent of improved land in farms	0.4	29.5	13.7	8.0	7.0	8.2	4.4	11.2	0.8	(3)
13	*Acreage irrigated in 1899*	*43,676*	*7,276*	*5,054*	*1,475*	(1)	*6,690*	*2,984*	*14,896*	(1)	*5,301*
14	Per cent of increase, 1899–1909	44.8	.....	54.7	214.1	.....	[2] 49.9	166.4	30.7	.....	[2] 72.9
15	Acreage enterprises were capable of irrigating in 1910	128,481	59,684	11,315	9,858	4,598	4,682	9,922	25,593	1,370	1,459
16	Acreage included in projects	201,625	118,160	15,263	11,746	5,170	5,285	12,136	31,034	1,370	1,461
	ACREAGE IRRIGATED AND INCLUDED IN PROJECTS										
	Classified by Character of Enterprise.										
17	**U. S. Reclamation Service,** irrigated in 1909	5,613	5,613	.....	.....	.....	.....	.....	.....	.....	.....
18	Enterprises were capable of irrigating in 1910	47,508	47,508	.....	.....	.....	.....	.....	.....	.....	.....
19	Included in projects	101,967	101,967	.....	.....	.....	.....	.....	.....	.....	.....
20	**U. S. Indian Service,** irrigated in 1909	50	.....	.....	.....	.....	.....	.....	50	.....	.....
21	Enterprises were capable of irrigating in 1910	50	.....	.....	.....	.....	.....	.....	50	.....	.....
22	Included in projects	100	.....	.....	.....	.....	.....	.....	100	.....	.....
23	**Carey Act enterprises,** irrigated in 1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	Included in projects	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	**Irrigation districts,** irrigated in 1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
27	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	Included in projects	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	**Cooperative enterprises,** irrigated in 1909	13,601	1,160	.....	200	.....	.....	1,400	10,841	.....	.....
30	Enterprises were capable of irrigating in 1910	18,243	1,160	.....	2,600	.....	.....	1,603	12,880	.....	.....
31	Included in projects	22,687	1,900	.....	2,600	.....	.....	1,603	16,584	.....	.....
32	**Commercial enterprises,** irrigated in 1909	6,300	5,600	.....	700	.....	.....	.....	.....	.....	.....
33	Enterprises were capable of irrigating in 1910	6,800	6,000	.....	800	.....	.....	.....	.....	.....	.....
34	Included in projects	6,900	6,000	.....	900	.....	.....	.....	.....	.....	.....
35	**Individual and partnership enterprises,** irrigated in 1909	37,684	2,005	7,820	3,733	3,315	3,355	6,549	8,572	897	1,438
36	Enterprises were capable of irrigating in 1910	55,820	4,956	11,315	6,458	4,598	4,682	8,319	12,663	1,370	1,459
37	Included in projects	69,971	8,293	15,263	8,246	5,170	5,285	10,533	14,350	1,370	1,461
	ACREAGE IRRIGATED										
	Classified by Source of Water Supply.										
38	Supplied from streams	47,662	12,903	6,320	2,542	1,376	3,065	5,055	15,938	463	.....
39	By gravity	47,122	12,903	6,320	2,042	1,376	3,065	5,055	15,898	463	.....
40	By pumping	540	.....	.....	500	.....	.....	.....	40	.....	.....
41	Supplied from lakes	200	.....	.....	.....	.....	200	.....	.....	.....	.....
42	By gravity	200	.....	.....	.....	.....	200	.....	.....	.....	.....
43	By pumping	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
44	Supplied from wells	1,456	.....	.....	1	83	.....	2	5	.....	1,365
45	Flowing	1,448	.....	.....	.....	83	.....	.....	.....	.....	1,365
46	By pumping	8	.....	.....	1	.....	.....	2	5	.....	.....
47	Supplied from springs	395	.....	9	200	.....	85	.....	29	.....	72
48	Supplied from reservoirs	13,535	1,475	1,491	1,890	1,856	5	2,892	3,491	434	1
49	Total acreage supplied by pumping	548	.....	.....	501	.....	.....	2	45	.....	.....
	IRRIGATION ENTERPRISES										
50	Independent enterprises—number	395	42	92	36	23	24	60	68	10	40
51	*Number in 1899* [4]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
52	Per cent of increase, 1899–1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
53	Main ditches—number	348	41	84	31	29	21	50	62	9	21
54	*Number in 1899* [5]	*188*	*19*	*52*	*17*	(1)	*42*	*20*	*29*	(1)	*9*
55	Per cent of increase, 1899–1910	85.1	.....	61.5	82.4	.....	[2] 50.0	150.0	113.8	.....	133.3
56	Length—miles	631	177	97	63	42	31	67	126	14	14
57	*Length in 1899* [5]—miles	*223*	*38*	*41*	*7*	(1)	*44*	*24*	*67*	(1)	*2*
58	Per cent of increase, 1899–1910	183.0	.....	136.6	800.0	.....	[2] 29.5	179.2	88.1	.....	600.0
59	Capacity—cubic feet per second	3,598	1,852	380	198	68	104	219	566	172	39
60	Laterals—number	332	23	80	49	11	52	56	41	20	.....
61	Length—miles	625	482	39	11	8	14	35	28	8	.....
62	Reservoirs—number	314	52	62	48	30	3	62	43	11	3
63	Capacity—acre-feet	216,205	202,466	843	1,472	2,302	632	7,791	569	95	35
64	Flowing wells—number	42	2	.....	.....	3	.....	.....	.....	.....	37
65	Capacity—gallons per minute	14,382	22	.....	.....	830	.....	.....	.....	.....	13,530
66	Pumped wells—number	4	.....	.....	1	.....	.....	2	1	.....	.....
67	Capacity—gallons per minute	24	.....	.....	10	.....	.....	10	4	.....	.....
68	Pumping plants—number	8	.....	.....	4	.....	.....	2	2	.....	.....
69	Engine capacity—horsepower	63	.....	.....	49	.....	.....	2	12	.....	.....
70	Pump capacity—gallons per minute	5,289	.....	.....	4,975	.....	.....	10	304	.....	.....
	COST										
71	Cost of enterprises up to July 1, 1910—dollars	3,043,140	2,554,828	64,058	93,926	62,054	30,428	58,961	130,315	12,817	35,753
72	*Cost in 1899* [6]—dollars	*284,747*	*110,573*	*18,118*	*4,422*	(1)	*27,764*	*8,522*	*61,636*	(1)	*710*
73	Per cent of increase, 1899–1910	968.7	2,091.6	253.7	2,024.1	.....	9.6	591.9	111.4	.....	4,935.6
74	Average cost per acre enterprises were capable of irrigating in 1910—dollars	23.69	42.81	5.66	9.53	13.50	6.50	5.94	5.09	9.36	24.51
75	*Average cost per acre irrigated in 1899* [6]—dollars	*6.52*	*16.07*	*3.59*	*3.00*	(1)	*4.16*	*2.86*	*4.14*	(1)	*5.50*
76	Estimated final cost of existing enterprises—dollars	3,800,556	3,312,244	64,058	93,926	62,054	30,428	58,961	130,315	12,817	35,753
77	Average per acre included in projects—dollars	18.85	28.03	4.20	8.00	12.00	5.76	4.86	4.20	9.36	24.47
	OPERATION AND MAINTENANCE										
78	Acreage for which cost is reported	25,514	12,373	.....	900	.....	.....	1,400	10,841	.....	.....
79	Total cost reported—dollars	16,288	10,838	.....	2,300	.....	.....	300	2,850	.....	.....
80	Average per acre for which cost is reported—dollars	0.64	0.88	.....	2.56	.....	.....	0.21	0.26	.....	.....
81	*Average cost per acre in 1899*—dollars	*0.23*	*0.18*	*0.54*	*0.20*	(1)	*0.19*	*0.30*	*0.16*	(1)	*0.12*
82	Per cent of increase, 1899–1909	178.3	388.9	.....	1,180.0	.....	.....	[2] 30.0	62.5	.....	.....

[1] Change of boundary. (See explanation at close of text.) [2] Decrease. [3] Less than one-tenth of 1 per cent. [4] Not reported.
[5] Figures relate only to systems obtaining water from streams by gravity diversion.
[6] Total cost for state includes $47,007, representing the cost of well systems, which was not shown by counties. County figures relate only to systems obtaining water from streams by gravity diversion.

TEXAS.

The greater part of the state of Texas lies within the Great Plains, although there are some broken mountainous areas in the southwest and extensive swamp lands along the Gulf coast. In the eastern part of the state the rainfall is usually sufficient for growing crops, and throughout most of the remaining area the rainfall, though often deficient, is in most years sufficient for some crops. The normal annual precipitation ranges from about 50 inches at the eastern boundary to about 10 inches in the extreme western part of the state.

Irrigation is practiced to some extent in most sections of the state, but except in connection with rice growing, is most common in the valleys of the Rio Grande, Pecos, and Nueces rivers, about 50 per cent of the total acreage irrigated in 1909, exclusive of that in rice, being situated in the valley of the Rio Grande. In the southeastern part of the state, along the Gulf Coast, about 287,000 acres were irrigated for rice growing in 1909, but data for such irrigation are not included in this bulletin, being given in a bulletin devoted to irrigation for rice growing in the states of Louisiana, Texas, and Arkansas.

The following table shows for the state as a whole the number of farms and acreage irrigated in 1909, exclusive of irrigation for rice growing, in comparison with the total number of farms, the total land area, the total land in farms, and the total acreage of improved land in farms in 1910, together with the areas not yet irrigated for which water has been or is being made available. Comparative figures for the census of 1900 are included as far as possible.

	CENSUS OF—		INCREASE.[1]	
	1910	1900	Amount.	Per cent.
Number of all farms	[2] 417,770	[3] 352,190	65,580	18.6
Approximate land area of the state.....acres.	167,934,720	167,934,720		
Land in farms.....acres.	[2] 112,435,067	[3] 125,807,017	—13,371,950	—10.6
Improved land in farms.....acres.	[2] 27,360,666	[3] 19,576,076	7,784,590	39.8
Number of farms irrigated	[4] 4,150	[5] 1,252	2,898	231.5
Acreage irrigated	[4] 164,283	[5] 40,952	123,331	301.2
Acreage enterprises were capable of irrigating	[6] 340,641	(7)		
Acreage included in projects	[6] 753,699	(7)		
Percentage irrigated of—				
Number of all farms	1.0	0.4	0.6	
Approximate land area of the state	0.1	(8)		
Land in farms	0.1	(8)		
Improved land in farms	0.6	0.2	0.4	
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909	176,358			
Excess of acreage included in projects over acreage irrigated in 1909	589,416			

[1] A minus sign (—) denotes decrease.
[2] April 15.
[3] June 1.
[4] In 1909, exclusive of irrigation for rice growing.
[5] In 1899, exclusive of irrigation for rice growing.
[6] July 1.
[7] Not reported.
[8] Less than one-tenth of 1 per cent.

Number of farms irrigated.—According to the figures given in the table, irrigation for purposes other than rice growing was practiced on only 1 per cent of the farms of the state in 1909. In 1899 the proportion was still smaller, 0.4 per cent. It is evident, therefore, that in the state as a whole irrigation has not up to the present time been an important factor in agriculture.

In three counties, Ward, El Paso, and Dimmit, more than half the farms are irrigated, the percentages being 77.1, 66.7, and 61, respectively. In two counties, Cameron and Hidalgo, the proportion is between 40 and 50 per cent; in two, Irion and Valverde, it is between 30 and 40 per cent; and in five between 20 and 30 per cent.

From 1899 to 1909 the increase in the number of farms irrigated, exclusive of those planted in rice, was 231.5 per cent for the state as a whole.

Acreage irrigated.—The total acreage reported as irrigated in 1909, exclusive of that in rice, was 164,283, as against 40,952 in 1899 and 18,241 in 1889. The percentage of increase from 1889 to 1899 was 124.5, while from 1899 to 1909 it was 301.2.

The percentage of increase between 1899 and 1909 in the acreage irrigated was considerably higher than the percentage of increase in the number of farms irrigated, the acreage irrigated per farm increasing from 32.7 in 1899 to 39.6 in 1909. This increase in the acreage irrigated per farm is probably due to the abandonment of irrigation on small tracts in the central and eastern parts of the state and the extension of irrigation in the western part of the state, where much larger areas are irrigated per farm.

In neither 1899 nor 1909 was as much as one-tenth of 1 per cent of the total land area of the state under irrigation, outside of the area in rice. In 1909 the

irrigated acreage formed slightly more than one-tenth of 1 per cent of the land in farms, but in 1899 the proportion was considerably below this. The ratio of the irrigated land to the improved land in farms increased from 0.2 per cent to 0.6 per cent during the decade.

In 1899 El Paso County had more land under ditch than any other county in the state, about 30,000 acres, but owing to shortage of water only 4,826 acres were actually irrigated, an area which was exceeded by the irrigated acreage of Reeves County, 6,757 acres. In 1909 Cameron County, at the lower end of the Rio Grande, contained the largest area of irrigated land, 29,439 acres, and El Paso County the second largest, 23,308 acres. One other county, Hidalgo, had an irrigated area of more than 20,000 acres in 1909, while in two the irrigated acreage was between 10,000 and 20,000.

The counties in which the irrigated land formed the highest percentage of the total land area were Ward and Cameron, the proportion being 3.1 per cent in the former and 1.9 per cent in the latter.

Acreage included in projects.—The foregoing table shows that in 1910 existing enterprises were ready to supply water to 340,641 acres, or 176,358 acres more than were irrigated in 1909. It is probable that after allowance is made for an increase in the area irrigated in 1910 over that irrigated in 1909 there remained at the close of 1910 under ditch but not irrigated considerably more land than was brought under irrigation in the 10 years from 1899 to 1909, and about as much as was irrigated in 1909. The acreage included in projects exceeds the acreage irrigated in 1909 by 589,416 acres, which is nearly five times the acreage brought under irrigation in the last decade and more than three times the entire acreage irrigated in 1909. This acreage represents the area which will be available for the extension of irrigation in the next few years upon the completion of existing enterprises and without new undertakings.

Acreage irrigated, classified by character of enterprise.—The following table gives the distribution of the acreage irrigated for purposes other than rice growing in 1909, according to the character of the enterprise controlling the irrigation works:

CHARACTER OF ENTERPRISE.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All classes	**164,283**	**100.0**
Cooperative enterprises	41,186	25.1
Commercial enterprises	73,440	44.7
Individual and partnership enterprises	49,657	30.2

In Texas no land is irrigated by the United States Reclamation Service or by the United States Indian Service. The Carey Act does not apply to this state, and no irrigation districts had been organized in 1909. Cooperative enterprises and individual and partnership enterprises, both of which classes are controlled by the water users, supplied about 55 per cent of the total acreage irrigated in 1909, while commercial enterprises controlled the water supply for the remainder of the land irrigated. Some of the latter enterprises, however, supply water under contracts providing that the works shall become the property of the water users when the water rights sold are paid for.

Acreage irrigated, classified by source of water supply.—The following table shows the distribution of the acreage irrigated, exclusive of that in rice, in 1909, according to the source of water supply:

SOURCE OF SUPPLY.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All sources	**164,283**	**100.0**
Streams	134,692	82.0
Lakes	458	0.3
Wells	9,862	6.0
Springs	13,068	8.0
Reservoirs	6,203	3.8

While more than four-fifths of the acreage irrigated in 1909 was supplied from streams, there has been considerable utilization of other sources of supply. The state has many large springs, the water from which is being used for irrigation.

IRRIGATION WORKS.

The following statement summarizes the data collected relating to works for supplying water for irrigation in 1910, other than those for rice irrigation. As the report for the census of 1900 does not segregate works used for rice irrigation, no comparison with the results of that census is made.

Independent enterprises	number	2,161
Ditches, total length	miles	1,663
Main ditches	number	636
Length	miles	941
Capacity	cubic feet per second	12,818
Lateral ditches	number	616
Length	miles	722
Reservoirs	number	288
Capacity	acre-feet	72,051
Flowing wells	number	122
Capacity	gallons per minute	36,939
Pumped wells	number	1,412
Capacity	gallons per minute	121,631
Pumping plants	number	1,784
Engine capacity	horsepower	20,915
Pump capacity	gallons per minute	1,455,285

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average acreage irrigated per enterprise was 76, and the acreage irrigated per mile of main ditch was 174.6.

As shown by the table, there has been considerable utilization of underground water for irrigation in Texas, 122 flowing wells and 1,412 pumped wells being reported. The area irrigated from wells in 1909 was 9,862 acres, or 6 per cent of the total irrigated acreage of the state, exclusive of that irrigated for rice growing.

Pumping for irrigation is common, 40 per cent of the acreage irrigated in 1909, other than that in rice, being supplied with pumped water. About two-thirds of the area thus supplied is along the lower Rio Grande in Cameron and Hidalgo Counties.

Cost of construction, operation, and maintenance.—The following table presents statistics in regard to the cost of construction, operation, and maintenance of irrigation enterprises similar to those given for other states in earlier tables:

	CENSUS OF—	
	1910	1900
Cost of irrigation enterprises	[1] $7,346,708	[2] $705,608
Average per acre	[3] $21.57	[4] $17.23
Estimated final cost of existing enterprises	$8,613,533	[5]
Average per acre included in projects	$11.43	[5]
Operation and maintenance:		
Acreage for which cost is reported	109,697	[5]
Total cost reported	[6] $356,260	[5]
Average cost per acre	$3.25	[5]

[1] Reported July 1.
[2] Cost of construction of systems operated in 1899, exclusive of estimated cost for those operated in connection with rice growing.
[3] Based on acreage enterprises were capable of irrigating in 1910.
[4] Based on acreage irrigated in 1899.
[5] Not reported.
[6] For 1909.

The cost of the irrigation systems operated in 1899, exclusive of those operated in connection with rice culture, was $705,608. The corresponding cost in 1910 was $7,346,708, or more than 10 times as great, and the average cost per acre likewise shows some increase, though much less in degree. The average cost per acre shown for the census of 1910 is based on the acreage enterprises were capable of irrigating in that year, but since the corresponding acreage for 1900 was not reported, the figure for average cost at the earlier census is based on the acreage actually irrigated in 1899. If computed on the basis of the acreage irrigated in 1909, the average cost in 1910 would be $44.72, representing an increase of 159.5 per cent over the figure given for average cost at the census of 1900.

Of the counties for which separate figures are given in the table, the one showing the lowest average cost per acre enterprises were capable of irrigating in 1910, $1.76, is Loving. The highest average cost per acre, $57.44, is in Comal County. Since, however, neither of these counties has a large irrigated acreage, these extremes do not materially affect the average for the state.

The acreage for which cost of operation and maintenance in 1909 was reported constitutes 66.8 per cent of the total acreage reported as irrigated in 1909, and 95.7 per cent of the acreage reported as irrigated by other than individual and partnership enterprises. The cost reported can be said, therefore, to represent fairly the average annual expense for all but individual and partnership enterprises.

CROPS.

The next table shows the acreage, yield, and value of the principal crops reported as grown under irrigation in 1909, except rice.

CROP.	IRRIGATED CROPS: 1909				
	Acreage.	Yield.			Value.
		Unit.	Amount.	Average per acre.	
Cereals:					
Corn	9,068	Bu.	191,474	21.1	$162,467
Oats	2,496	Bu.	60,015	24.0	38,668
Wheat	1,386	Bu.	26,681	19.3	23,408
Kafir corn and milo maize	1,154	Bu.	29,449	25.5	19,612
Hay and forage:					
Alfalfa	13,778	Tons.	43,771	3.18	598,911
Other tame or cultivated grasses [1]	5,009	Tons.	6,655	1.33	80,460
Wild, salt, or prairie grasses	593	Tons.	773	1.30	10,743
Coarse forage	4,651	Tons.	14,108	3.03	153,626
Sundry crops:					
Cotton	7,474	Bales.	2,299	0.31	143,157
Sugar cane	1,759	Tons.	36,665	20.84	90,170
Potatoes	961	Bu.	90,089	93.7	81,052
Onions	1,842	.....	.....	.....	297,440
Cabbages	1,416	.....	.....	.....	143,671
Other vegetables	4,178	.....	.....	.....	646,651

[1] Includes millet.

In addition 531 acres in orchards not bearing were irrigated, but no single crop other than those shown in the table covered an irrigated area of 500 acres.

Acreage.—The crop most extensively grown on irrigated land is alfalfa, its acreage representing 24.7 per cent of the total for the irrigated crops given. Corn is next, with 16.3 per cent of this total, and is followed by cotton, with 13.4 per cent. The greater part of the irrigated cotton acreage is in Cameron and Ward Counties.

The area devoted to the raising of vegetables under irrigation in 1909 amounted to 8,397 acres, comprising 1,842 acres of onions, 1,416 acres of cabbages, 961 acres of potatoes, and 4,178 acres of other vegetables. Of the irrigated land in onions, more than two-thirds was in La Salle, Hidalgo, Cameron, and Dimmit Counties; of that in cabbages more than 94 per cent was in Cameron and Hidalgo Counties; and of that in potatoes about 43 per cent was in Bexar County. Other vegetables were grown on a commercial scale by means of irrigation in Webb, Cameron, Hidalgo, Bexar, and El Paso Counties.

COUNTY TABLE.

The next table gives in detail, for the state and principal counties, the data summarized in this section, except those relating to crops.

Change in boundaries.—In comparing the data secured in 1910 with those for the preceding census, it should be borne in mind that a part of Tom Green County was taken to form Reagan County in 1903, and a part of Pecos County was taken to form Terrell County in 1905.

Land in farms in specified counties.—In accordance with the instructions to enumerators to assign all of the acreage of a farm to the county in which the residence of the operator was located, large acreages in adjoining counties have been tabulated as in Nueces and Tom Green Counties.

TEXAS.—ACREAGE IRRIGATED, EXTENT AND COST OF IRRIGATION ENTERPRISES, AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910.

[Statistics as to irrigation for rice growing are not included. Comparative data for 1899 in italics.]

		The State.	Bexar.	Brown.	Cameron.	Comal.	Dimmit.	El Paso.	Hardeman.
1	Number of all farms in 1910	417,770	2,943	2,741	709	899	154	669	1,068
2	Number of farms irrigated in 1909	4,150	175	25	314	29	94	446	2
3	Per cent of all farms	1.0	5.9	0.9	44.3	3.2	61.0	66.7	0.2
4	*Number of farms irrigated in 1899*	*1,252*	*76*	(1)	(1)	(1)	(1)	*200*	(1)
5	Per cent of increase, 1899–1909	231.5	130.3	.....	.....	.....	.....	123.0	.....
	LAND AND FARM AREA								
6	Approximate land area.....acres	167,934,720	808,320	611,840	1,557,760	357,760	870,400	5,971,840	487,040
7	Land in farms.....acres	112,435,067	777,596	542,843	546,004	353,821	391,745	2,340,329	310,388
8	Improved land in farms.....acres	27,360,666	185,534	173,629	32,968	47,453	8,053	16,772	133,187
9	Acreage irrigated in 1909	164,283	4,690	715	29,439	431	3,327	[2] 23,308	4,040
10	Per cent of total land area	0.1	0.6	0.1	1.9	0.1	0.4	0.4	0.8
11	Per cent of land in farms	0.1	0.6	0.1	5.4	0.1	0.8	1.0	1.3
12	Per cent of improved land in farms	0.6	2.5	0.4	89.3	0.9	41.3	139.0	3.0
13	*Acreage irrigated in 1899*	*40,952*	*1,720*	(1)	(1)	(1)	(1)	*4,826*	(1)
14	Per cent of increase, 1899–1909	301.2	172.7	.....	.....	.....	.....	383.0	.....
15	Acreage enterprises were capable of irrigating in 1910	340,641	7,122	979	115,363	599	5,618	25,324	4,040
16	Acreage included in projects	753,699	9,438	1,066	156,349	634	9,934	35,287	5,075
	ACREAGE IRRIGATED AND INCLUDED IN PROJECTS								
	CLASSIFIED BY CHARACTER OF ENTERPRISE.								
17	**U. S. Reclamation Service,** irrigated in 1909	.....	.....	.....	.....	.....	.....	.....	.....
18	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....	.....	.....
19	Included in projects	.....	.....	.....	.....	.....	.....	.....	.....
20	**U. S. Indian Service,** irrigated in 1909	.....	.....	.....	.....	.....	.....	.....	.....
21	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....	.....	.....
22	Included in projects	.....	.....	.....	.....	.....	.....	.....	.....
23	**Carey Act enterprises,** irrigated in 1909	.....	.....	.....	.....	.....	.....	.....	.....
24	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....	.....	.....
25	Included in projects	.....	.....	.....	.....	.....	.....	.....	.....
26	**Irrigation districts,** irrigated in 1909	.....	.....	.....	.....	.....	.....	.....	.....
27	Enterprises were capable of irrigating in 1910	.....	.....	.....	.....	.....	.....	.....	.....
28	Included in projects	.....	.....	.....	.....	.....	.....	.....	.....
29	**Cooperative enterprises,** irrigated in 1909	41,186	1,598	.....	6,397	.....	.....	7,546	.....
30	Enterprises were capable of irrigating in 1910	75,011	1,018	.....	17,300	.....	.....	8,821	.....
31	Included in projects	146,795	3,418	.....	32,985	.....	.....	13,621	.....
32	**Commercial enterprises,** irrigated in 1909	73,440	200	.....	21,525	.....	400	15,000	.....
33	Enterprises were capable of irrigating in 1910	200,344	200	.....	95,700	.....	800	15,000	.....
34	Included in projects	502,800	200	.....	119,700	.....	960	20,000	.....
35	**Individual and partnership enterprises,** irrigated in 1909	49,657	2,892	715	1,517	431	2,927	762	4,040
36	Enterprises were capable of irrigating in 1910	65,286	5,004	979	2,363	599	4,818	1,503	4,040
37	Included in projects	104,044	5,820	1,066	3,664	634	8,974	1,666	5,075
	ACREAGE IRRIGATED								
	CLASSIFIED BY SOURCE OF WATER SUPPLY.								
38	Supplied from streams	134,692	2,056	330	29,094	408	510	22,834	.....
39	By gravity	75,496	2,013	.....	10,500	34	400	22,564	.....
40	By pumping	59,196	43	330	18,594	374	110	270	.....
41	Supplied from lakes	458	.....	.....	.....	.....	25	.....	.....
42	By gravity	163	.....	.....	.....	.....	.....	.....	.....
43	By pumping	295	.....	.....	.....	.....	25	.....	.....
44	Supplied from wells	9,862	2,434	4	345	16	2,792	474	.....
45	Flowing	3,710	1,386	.....	25	.....	1,580	.....	.....
46	By pumping	6,152	1,048	4	320	16	1,212	474	.....
47	Supplied from springs	13,068	200	.....	.....	7	.....	.....	.....
48	Supplied from reservoirs	6,203	.....	331	.....	.....	.....	.....	4,040
49	Total acreage supplied by pumping	65,643	1,091	334	18,914	390	1,347	744	.....
	IRRIGATION ENTERPRISES								
50	Independent enterprises.....number	2,161	36	24	26	26	76	63	2
51	*Number in 1899* [3]	.....	.....	.....	.....	.....	.....	.....	.....
52	Per cent of increase, 1899–1910	.....	.....	.....	.....	.....	.....	.....	.....
53	Main ditches.....number	636	10	13	32	11	37	21	2
54	*Number in 1899* [3]	.....	.....	.....	.....	.....	.....	.....	.....
55	Per cent of increase, 1899–1910	.....	.....	.....	.....	.....	.....	.....	.....
56	Length.....miles	941	30	4	158	5	34	73	11
57	*Length in 1899* [3].....miles	.....	.....	.....	.....	.....	.....	.....	.....
58	Per cent of increase, 1899–1910	.....	.....	.....	.....	.....	.....	.....	.....
59	Capacity.....cubic feet per second	12,818	1,153	38	3,099	21	197	2,327	60
60	Laterals.....number	616	7	.....	112	.....	5	20	.....
61	Length.....miles	722	6	.....	241	.....	4	44	.....
62	Reservoirs.....number	288	16	12	16	11	63	1	2
63	Capacity.....acre-feet	72,051	6,364	126	32,964	11	295	2	5
64	Flowing wells.....number	122	21	.....	2	.....	42	.....	.....
65	Capacity.....gallons per minute	36,939	11,983	.....	90	.....	17,368	.....	.....
66	Pumped wells.....number	1,412	18	4	12	17	48	61	.....
67	Capacity.....gallons per minute	121,631	11,207	94	5,175	224	24,760	37,190	.....
68	Pumping plants.....number	1,784	24	19	39	23	52	65	.....
69	Engine capacity.....horsepower	20,915	461	245	3,538	162	692	878	.....
70	Pump capacity.....gallons per minute	1,455,285	17,710	10,494	607,610	6,341	30,712	46,240	.....
	COST								
71	Cost of enterprises up to July 1, 1910.....dollars	7,346,708	221,236	24,001	2,024,500	34,406	243,078	282,590	75,850
72	*Cost in 1899*.....dollars	[4] *705,608*	*15,600*	(1)	(1)	(1)	(1)	*192,200*	(1)
73	Per cent of increase, 1899–1910	941.2	1,526.7	.....	.....	.....	.....	47.0	.....
74	Average cost per acre enterprises were capable of irrigating in 1910.....dollars	21.57	31.06	24.52	17.55	57.44	43.27	11.16	18.77
75	*Average cost per acre irrigated in 1899*.....dollars	[4] *17.23*	*7.91*	(1)	(1)	(1)	.....	*39.83*	.....
76	Estimated final cost of existing enterprises.....dollars	8,613,533	221,236	24,001	2,518,199	34,406	243,078	282,590	75,850
77	Average per acre included in projects.....dollars	11.43	23.44	22.52	16.11	54.27	24.47	8.01	14.95
	OPERATION AND MAINTENANCE								
78	Acreage for which cost is reported	109,097	1,798	.....	27,807	.....	400	20,846	.....
79	Total cost reported.....dollars	356,260	6,028	.....	163,586	.....	600	32,350	.....
80	Average per acre for which cost is reported.....dollars	3.25	3.35	.....	5.88	.....	1.50	1.55	.....
81	*Average cost per acre in 1899* [3].....dollars	.....	.....	.....	.....	.....	.....	.....	.....
82	Per cent of increase, 1899–1909	.....	.....	.....	.....	.....	.....	.....	.....

[1] Included in "all other counties" for 1899.
[2] Acreage irrigated includes wild grass for pasture, while improved land does not.
[3] Figures not available.
[4] The estimated cost of enterprises operated in connection with rice growing has been deducted from the reported figures for the state and for "all other counties."

TEXAS.—ACREAGE IRRIGATED, EXTENT AND COST OF IRRIGATION ENTERPRISES.

[Statistics as to irrigation for rice growing are not included. Comparative data for 1899 in italics.]

		Hays.	Hidalgo.	Irion.	Kimble.	Kinney.	La Salle.	Loving.	Maverick.
1	Number of all farms in 1910	1,561	677	94	415	150	263	79	49
2	Number of farms irrigated in 1909	7	278	31	59	16	58	12	8
3	Per cent of all farms	0.4	41.1	33.0	14.2	10.7	22.1	15.2	16.3
4	*Number of farms irrigated in 1899*	(2)	(2)	*35*	(2)	(2)	(2)	(2)	(2)
5	Per cent of increase, 1899–1909			[3] 11.4					
	LAND AND FARM AREA								
6	Approximate land area—acres	398,720	1,456,640	638,720	832,640	839,680	999,040	481,920	800,640
7	Land in farms—acres	350,826	656,322	154,716	700,384	562,624	990,232	199,519	194,981
8	Improved land in farms—acres	92,277	31,407	5,257	16,692	7,752	23,482	580	3,346
9	Acreage irrigated in 1909	439	21,048	1,511	2,297	3,359	2,165	[5] 1,040	1,166
10	Per cent of total land area	0.1	1.4	0.2	0.3	0.4	0.2	0.2	0.1
11	Per cent of land in farms	0.1	3.2	1.0	0.3	0.6	0.2	0.5	0.6
12	Per cent of improved land in farms	0.5	67.0	28.7	13.8	43.3	9.2	179.3	34.8
13	*Acreage irrigated in 1899*	(2)	(2)	*760*	(2)	(2)	(2)	(2)	(2)
14	Per cent of increase, 1899–1909			98.8					
15	Acreage enterprises were capable of irrigating in 1910	594	71,327	1,562	2,569	3,359	3,022	5,551	2,345
16	Acreage included in projects	709	222,569	1,662	9,885	3,634	15,640	30,061	2,545
	ACREAGE IRRIGATED AND INCLUDED IN PROJECTS								
	CLASSIFIED BY CHARACTER OF ENTERPRISE.								
17	**U. S. Reclamation Service**, irrigated in 1909								
18	Enterprises were capable of irrigating in 1910								
19	Included in projects								
20	**U. S. Indian Service**, irrigated in 1909								
21	Enterprises were capable of irrigating in 1910								
22	Included in projects								
23	**Carey Act enterprises**, irrigated in 1909								
24	Enterprises were capable of irrigating in 1910								
25	Included in projects								
26	**Irrigation districts**, irrigated in 1909								
27	Enterprises were capable of irrigating in 1910								
28	Included in projects								
29	**Cooperative enterprises**, irrigated in 1909								
30	Enterprises were capable of irrigating in 1910		7,550	644					50
31	Included in projects		25,000	644					800
			43,800	644					800
32	**Commercial enterprises**, irrigated in 1909								
33	Enterprises were capable of irrigating in 1910		13,065		950			1,000	
34	Included in projects		45,494		950			*5,500*	
35	**Individual and partnership enterprises**, irrigated in 1909		177,000		7,000			30,000	
36	Enterprises were capable of irrigating in 1910	439	433	807	1,347	3,359	2,165	40	1,116
37	Included in projects	594	833	918	1,619	3,359	3,022	51	1,545
		709	1,769	1,018	2,885	3,634	15,640	61	1,745
	ACREAGE IRRIGATED								
	CLASSIFIED BY SOURCE OF WATER SUPPLY.								
38	Supplied from streams	438	21,043	1,507	2,219	3,356	1,893	1,040	1,166
39	By gravity		8	1,117	1,716	3,356		31	371
40	By pumping	438	21,035	390	503		1,893	1,009	795
41	Supplied from lakes						195		
42	By gravity								
43	By pumping						195		
44	Supplied from wells	1	5	4		3	77		
45	Flowing						18		
46	By pumping	1	5	4		3	*59*		
47	Supplied from springs				78				
48	Supplied from reservoirs								
49	Total acreage supplied by pumping	439	21,040	394	503	3	2,147	1,009	795
	IRRIGATION ENTERPRISES								
50	Independent enterprises—number	7	12	11	32	*15*	54	4	7
51	*Number in 1899* [1]								
52	Per cent of increase, 1899–1910								
53	Main ditches—number	5	12	11	24	13	37	4	4
54	*Number in 1899* [1]								
55	Per cent of increase, 1899–1910								
56	Length—miles	2	99	13	39	21	16	9	3
57	*Length in 1899* [1]								
58	Per cent of increase, 1899–1910								
59	Capacity—cubic feet per second	11	1,911	44	141	42	158	557	24
60	Laterals—number		146	1	27	31		4	3
61	Length—miles		173	2	17	14		7	1
62	Reservoirs—number	2	5	3	2	2	18		
63	Capacity—acre-feet	3	2,627	22	4	70	219		
64	Flowing wells—number						2		
65	Capacity—gallons per minute						21		
66	Pumped wells—number	1	3			2	10		
67	Capacity—gallons per minute	2	81			30	760		
68	Pumping plants—number	7	23	7	13	2	53	2	4
69	Engine capacity—horsepower	325	3,707	98	257	3	1,131	54	458
70	Pump capacity—gallons per minute	7,355	355,589	11,531	12,338	30	30,582	8,700	18,250
	COST								
71	Cost of enterprises up to July 1, 1910—dollars	16,446	1,961,902	17,090	62,790	11,676	117,559	9,785	24,198
72	*Cost in 1899*—dollars	(2)	(2)	*2,450*	(2)	(2)	(2)	(2)	(2)
73	Per cent of increase, 1899–1910—dollars			597.6					
74	Average cost per acre enterprises were capable of irrigating in 1910—dollars	27.69	27.51	10.94	24.44	3.48	38.90	1.76	10.32
75	*Average cost per acre irrigated in 1899*—dollars	(2)	(2)	*3.22*		(2)	(2)	(2)	(2)
76	Estimated final cost of existing enterprises—dollars	16,446	2,342,318	17,090	62,790	11,676	117,559	190,285	24,198
77	Average per acre included in projects—dollars	23.20	10.52	10.28	6.35	3.21	7.52	6.33	9.51
	OPERATION AND MAINTENANCE								
78	Acreage for which cost is reported		20,615	320	950				
79	Total cost reported—dollars		110,245	352	1,600				
80	Average per acre for which cost is reported—dollars		5.35	1.10	1.68				
81	*Average cost per acre in 1899* [1]—dollars								
82	Per cent of increase, 1899–1909—dollars								

[1] Change of boundary. (See explanation at close of text.)
[2] Included in "all other counties."
[3] Decrease.
[4] See explanation at close of text.

AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910—Continued.

[Statistics as to irrigation for rice growing are not included. Comparative data for 1899 in italics.]

		Menard.	Mills.	Nueces.	Pecos. [1]	Presidio.	Reeves.	San Saba.	Starr.
1	Number of all farms in 1910	331	1,484	945	56	186	225	1,530	918
2	Number of farms irrigated in 1909	52	26	41	2	43	63	50	26
3	Per cent of all farms	15.7	1.8	4.3	3.6	23.1	28.0	3.3	2.8
4	*Number of farms irrigated in 1899*	*70*	(2)	(2)	*17*	*25*	*33*	*28*	(2)
5	Per cent of increase, 1899–1909	[3] 25.7				72.0	90.9	78.6	
	LAND AND FARM AREA								
6	Approximate land area—acres	584,960	445,440	1,456,000	2,645,760	2,439,680	1,779,840	714,240	1,712,000
7	Land in farms—acres	537,081	406,705	[4] 1,713,189	2,166,445	968,288	563,033	656,371	675,184
8	Improved land in farms—acres	18,049	94,872	59,615	6,524	6,939	15,674	89,108	34,769
9	Acreage irrigated in 1909	3,499	1,208	919	2,300	855	13,986	2,022	744
10	Per cent of total land area	0.6	0.3	0.1	0.1	(5)	0.8	0.3	(5)
11	Per cent of land in farms	0.7	0.3	0.1	0.1	0.1	2.5	0.3	0.1
12	Per cent of improved land in farms	19.4	1.3	1.5	35.3	12.3	89.2	2.3	2.1
13	*Acreage irrigated in 1899*	*2,820*	(2)	(2)	*4,568*	*1,404*	*6,757*	*464*	(2)
14	Per cent of increase, 1899–1909	24.1				[3] 39.1	107.0	335.8	
15	Acreage enterprises were capable of irrigating in 1910	3,847	1,468	1,486	3,300	887	17,378	2,379	1,244
16	Acreage included in projects	5,440	1,829	6,057	35,600	897	44,858	3,135	1,383
	ACREAGE IRRIGATED AND INCLUDED IN PROJECTS								
	CLASSIFIED BY CHARACTER OF ENTERPRISE.								
17	**U. S. Reclamation Service**, irrigated in 1909								
18	Enterprises were capable of irrigating in 1910								
19	Included in projects								
20	**U. S. Indian Service**, irrigated in 1909								
21	Enterprises were capable of irrigating in 1910								
22	Included in projects								
23	**Carey Act enterprises**, irrigated in 1909								
24	Enterprises were capable of irrigating in 1910								
25	Included in projects								
26	**Irrigation districts**, irrigated in 1909								
27	Enterprises were capable of irrigating in 1910								
28	Included in projects								
29	**Cooperative enterprises**, irrigated in 1909	1,835	226	100		490	12,550		
30	Enterprises were capable of irrigating in 1910	1,835	226	100		517	15,050		
31	Included in projects	2,950	450	3,700		527	41,600		
32	**Commercial enterprises**, irrigated in 1909				2,000				
33	Enterprises were capable of irrigating in 1910				3,000				
34	Included in projects				35,000				
35	**Individual and partnership enterprises**, irrigated in 1909	1,664	982	819	300	365	1,436	2,022	744
36	Enterprises were capable of irrigating in 1910	2,012	1,242	1,386	300	370	1,728	2,379	1,244
37	Included in projects	2,490	1,379	2,357	600	370	3,258	3,135	1,383
	ACREAGE IRRIGATED								
	CLASSIFIED BY SOURCE OF WATER SUPPLY.								
38	Supplied from streams	3,424	1,199	51	2,000	854	2,212	1,495	427
39	By gravity	1,852			2,000	854	1,740		
40	By pumping	1,572	1,199	51			472	1,495	427
41	Supplied from lakes								65
42	By gravity								
43	By pumping								65
44	Supplied from wells		1	838		1	74	2	252
45	Flowing			103			35		55
46	By pumping		1	735		1	39	2	197
47	Supplied from springs	75			300		11,700	485	
48	Supplied from reservoirs		8	30				40	
49	Total acreage supplied by pumping	1,572	1,200	786		1	511	1,497	689
	IRRIGATION ENTERPRISES								
50	Independent enterprises—number	19	14	41	2	9	16	38	19
51	*Number in 1899* [7]								
52	Per cent of increase, 1899–1910								
53	Main ditches—number	17	7	25	2	3	12	32	12
54	*Number in 1899* [7]								
55	Per cent of increase, 1899–1910								
56	Length—miles	21	6	17	13	3	62	19	5
57	*Length in 1899* [7]—miles								
58	Per cent of increase, 1899–1910								
59	Capacity—cubic feet per second	145	44	67	37	16	297	280	9
60	Laterals—number	2	7	8	9	6	107	4	
61	Length—miles	4	4	2	11	2	75	1	
62	Reservoirs—number		3	14		1	5	4	9
63	Capacity—acre-feet		25	71		1	5,002	307	8
64	Flowing wells—number			7			2		2
65	Capacity—gallons per minute			555			600		100
66	Pumped wells—number		1	27		1	7	1	15
67	Capacity—gallons per minute		8	8,015		7	2,156	15	3,090
68	Pumping plants—number	15	14	32		1	10	32	19
69	Engine capacity—horsepower	504	498	400		1	111	675	278
70	Pump capacity—gallons per minute	27,350	16,685	12,478		7	5,556	23,908	5,243
	COST								
71	Cost of enterprises up to July 1, 1910—dollars	61,238	26,230	82,258	50,950	2,500	211,910	49,527	40,480
72	*Cost in 1899*—dollars	*30,400*	(2)	(2)	*27,800*	*8,550*	*19,000*	*3,895*	(2)
73	Per cent of increase, 1899–1910	101.4				[3] 70.8	1,015.8	1,194.8	
74	Average cost per acre enterprises were capable of irrigating in 1910—dollars	15.92	17.87	55.36	15.44	2.82	12.19	20.82	32.54
75	*Average cost per acre irrigated in 1899*—dollars	*10.78*	(2)	(2)	*6.09*	*6.09*	*2.81*	*8.24*	(2)
76	Estimated final cost of existing enterprises—dollars	61,238	26,230	82,258	75,950	6,000	211,910	49,527	40,480
77	Average per acre included in projects—dollars	11.26	14.34	13.58	2.13	6.69	4.72	[6] 15.80	29.27
	OPERATION AND MAINTENANCE								
78	Acreage for which cost is reported	1,835	226	100	2,000		12,300		
79	Total cost reported—dollars	659	500	590	2,500		8,100		
80	Average per acre for which cost is reported—dollars	0.36	2.21	5.90	1.25		0.66		
81	*Average cost per acre in 1899* [7]—dollars								
82	Per cent of increase, 1899–1909								

[5] Acreage irrigated includes wild grass for pasture, while improved land does not.
[6] Less than one-tenth of 1 per cent.
[7] Figures not available.

TEXAS.—ACREAGE IRRIGATED, EXTENT AND COST OF IRRIGATION ENTERPRISES, ETC.—Continued.

		Tom Green.[1]	Uvalde.	Val Verde.	Ward.	Webb.	Wichita.	Zavalla.	All other counties.
1	Number of all farms in 1910	998	706	191	231	337	1,039	150	395,972
2	Number of farms irrigated in 1909	102	16	59	178	76	21	32	1,809
3	Per cent of all farms	10.2	2.3	30.9	77.1	22.6	2.0	21.3	0.5
4	*Number of farms irrigated in 1899*	*87*	*9*	*43*	*131*	(2)	(2)	(2)	*498*
5	Per cent of increase, 1899–1909		77.8	37.2	35.9				(3)
	LAND AND FARM AREA								
6	Approximate land area—acres	930,560	1,016,960	1,973,120	529,280	2,060,160	386,560	862,720	131,284,480
7	Land in farms—acres	[4] 940,939	656,789	1,337,711	325,108	1,058,274	326,628	443,912	90,580,580
8	Improved land in farms—acres	105,014	64,014	3,608	17,590	16,918	174,656	6,165	25,868,702
9	Acreage irrigated in 1909	6,227	1,676	2,416	16,406	4,186	1,502	1,021	6,341
10	Per cent of total land area	0.7	0.2	0.1	3.1	0.2	0.4	0.1	(5)
11	Per cent of land in farms	0.7	0.3	0.2	5.0	0.4	0.5	0.2	(5)
12	Per cent of improved land in farms	5.9	2.6	67.0	93.3	24.7	0.9	16.6	(5)
13	*Acreage irrigated in 1899*	*4,748*	*366*	*2,179*	*4,148*	(2)	(2)	(2)	*6,197*
14	Per cent of increase, 1899–1909		357.9	10.9	295.5				(3)
15	Acreage enterprises were capable of irrigating in 1910	6,703	1,676	4,036	28,712	5,625	3,362	1,818	7,356
16	Acreage included in projects	7,372	4,380	4,036	105,012	10,677	4,860	3,440	10,235
	ACREAGE IRRIGATED AND INCLUDED IN PROJECTS								
	CLASSIFIED BY CHARACTER OF ENTERPRISE.								
17	**U. S. Reclamation Service**, irrigated in 1909								
18	Enterprises were capable of irrigating in 1910								
19	Included in projects								
20	**U. S. Indian Service**, irrigated in 1909								
21	Enterprises were capable of irrigating in 1910								
22	Included in projects								
23	**Carey Act enterprises**, irrigated in 1909								
24	Enterprises were capable of irrigating in 1910								
25	Included in projects								
26	**Irrigation districts**, irrigated in 1909								
27	Enterprises were capable of irrigating in 1910								
28	Included in projects								
29	**Cooperative enterprises**, irrigated in 1909	2,200							
30	Enterprises were capable of irrigating in 1910	2,200							
31	Included in projects	2,300							
32	**Commercial enterprises**, irrigated in 1909			1,200	16,400		1,500		200
33	Enterprises were capable of irrigating in 1910			2,000	28,700		2,500		500
34	Included in projects			2,000	105,000		4,000		2,000
35	**Individual and partnership enterprises**, irrigated in 1909	4,027	1,676	1,216	6	4,186	2	1,021	6,141
36	Enterprises were capable of irrigating in 1910	4,503	1,676	2,036	12	5,625	852	1,818	6,856
37	Included in projects	5,072	4,380	2,036	12	10,677	860	3,440	8,235
	ACREAGE IRRIGATED								
	CLASSIFIED BY SOURCE OF WATER SUPPLY.								
38	Supplied from streams	6,223	1,658	2,406	16,400	4,161		770	3,518
39	By gravity	3,843	1,629	2,406	16,400			400	2,262
40	By pumping	2,380	29			4,161		370	1,256
41	Supplied from lakes								173
42	By gravity								163
43	By pumping								10
44	Supplied from wells	4	18	10	6		2	251	2,248
45	Flowing							206	302
46	By pumping	4	18	10	6		2	45	1,946
47	Supplied from springs								223
48	Supplied from reservoirs					25	1,500		179
49	Total acreage supplied by pumping	2,384	47	10	6	4,161	2	415	3,212
	IRRIGATION ENTERPRISES								
50	Independent enterprises—number	30	17	5	6	62	3	19	1,466
51	*Number in 1899* [6]								
52	Per cent of increase, 1899–1910								
53	Main ditches—number	20	12	9	7	57	4	11	170
54	*Number in 1899* [6]								
55	Per cent of increase, 1899–1910								
56	Length—miles	43	11	22	65	54	17	9	57
57	*Length in 1899* [6] —miles								
58	Per cent of increase, 1899–1910								
59	Capacity—cubic feet per second	110	67	160	1,306	165	40	44	249
60	Laterals—number	16	12	21	12		25		31
61	Length—miles	9	5	13	68		10		9
62	Reservoirs—number	2		1		9	1	9	77
63	Capacity—acre-feet	1,320		1		196	22,000	90	318
64	Flowing wells—number							11	33
65	Capacity—gallons per minute							3,500	2,722
66	Pumped wells—number	1	4	1	7		1	6	1,164
67	Capacity—gallons per minute	45	180	60	2,714		45	4,750	21,023
68	Pumping plants—number	23	3	1	7	15	1	10	1,218
69	Engine capacity—horsepower	573	58	8	66	2,850	2	249	2,633
70	Pump capacity—gallons per minute	38,199	1,700	60	2,714	87,341	45	11,350	59,167
	COST								
71	Cost of enterprises up to July 1, 1910—dollars	97,732	16,149	122,138	780,382	203,312	105,700	49,456	259,639
72	*Cost in 1899*—dollars	*53,925*	*5,500*	*25,000*	*185,000*	(2)	(2)	(2)	[7] *138,358*
73	Per cent of increase, 1899–1910	81.2	193.6	388.6	321.8				(3)
74	Average cost per acre enterprises were capable of irrigating in 1910—dollars	14.58	9.64	30.26	27.18	46.81	31.53	27.20	35.30
75	*Average cost per acre irrigated in 1899*—dollars	*11.37*	*15.03*	*11.47*	*44.60*	(2)	(2)	(2)	*22.33*
76	Estimated final cost of existing enterprises—dollars	97,732	16,149	122,138	950,382	203,312	105,700	49,456	273,349
77	Average per acre included in projects—dollars	13.26	3.69	30.26	9.05	24.66	21.75	14.38	26.71
	OPERATION AND MAINTENANCE								
78	Acreage for which cost is reported	2,200		1,200	15,400		1,500		200
79	Total cost reported—dollars	886		1,156	24,995		1,500		613
80	Average per acre for which cost is reported—dollars	0.40		0.96	1.62		1.00		307
81	*Average cost per acre in 1899*—dollars								
82	Per cent of increase, 1899–1909								

[1] Change of boundary. (See explanation at close of text.)
[2] Included in "all other counties."
[3] Does not include the same territory for the two censuses.
[4] See explanation at close of text.
[5] Less than one-tenth of 1 per cent.
[6] Figures not available.
[7] The estimated cost of enterprises operated in connection with rice growing has been deducted from the reported figures for the state and for "all other counties."