ARIZONA.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Arizona collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison: and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

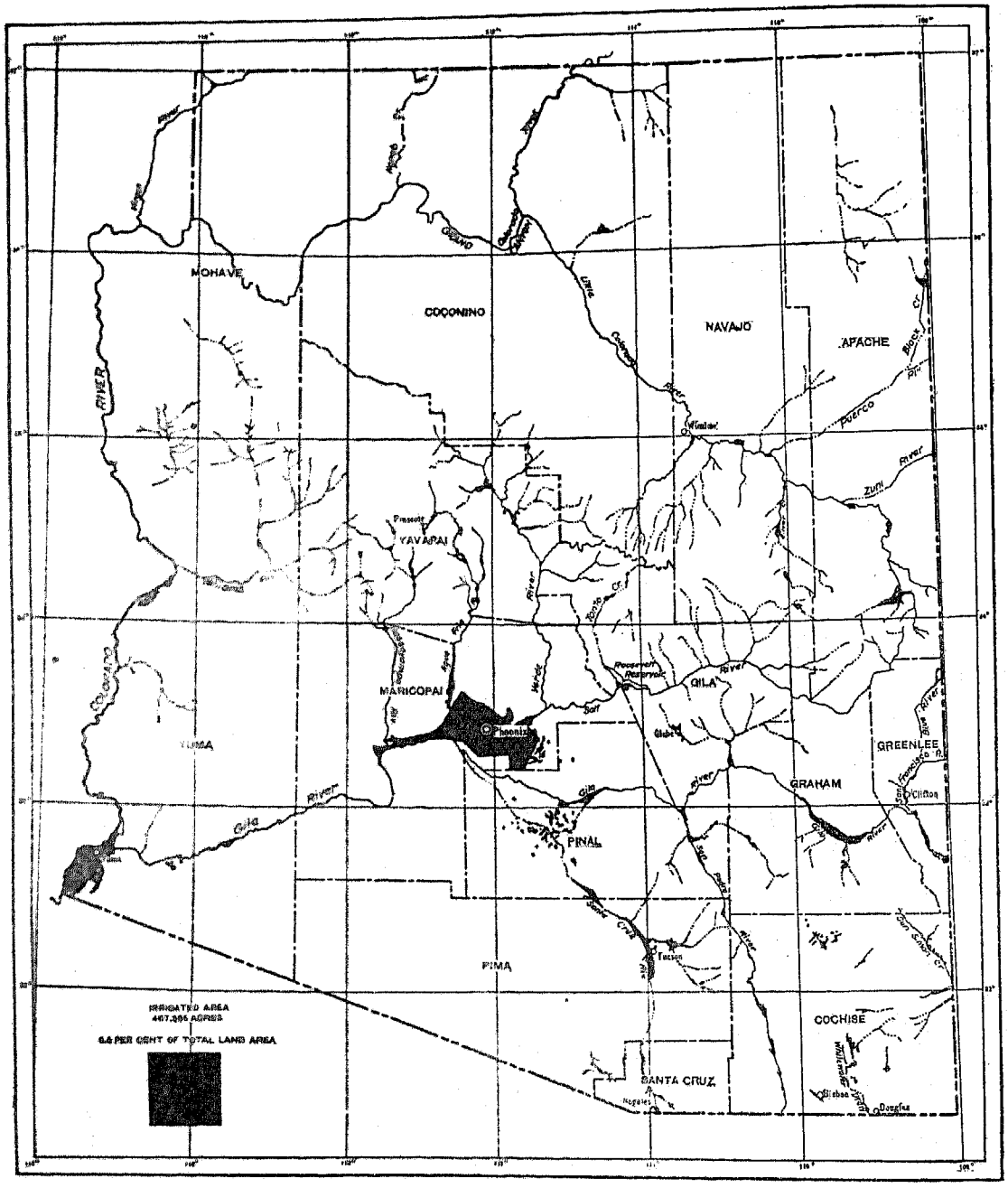
ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	9,975	9,227	748	8.1
Approximate land area of the state ..... acres	72,838,400	72,838,400	.....	.....
All land in farms ..... acres	5,802,126	1,246,613	4,555,513	365.4
Improved land in farms ..... acres	712,803	350,173	362,630	103.6
Number of farms irrigated	6,605	4,841	1,764	36.4
Area irrigated ..... acres	467,565	320,051	147,514	46.1
Area enterprises were capable of irrigating ..... acres	627,303	387,655	239,648	61.8
Area included in enterprises ..... acres	813,153	944,090	−130,937	−13.9
Per cent irrigated:				
Number of all farms	66.2	52.5	13.7	.....
Approximate land area of the state	0.6	0.4	0.2	.....
Land in farms	8.1	25.7	−17.6	.....
Improved land in farms	65.6	91.4	−25.8	.....
Excess of area enterprises were capable of irrigating over area irrigated ..... acres	159,738	67,604	92,134	136.3
Excess of area included in enterprises over area irrigated ..... acres	185,850	624,039	−438,189	−70.2
Area of irrigated land reported as available for settlement ..... acres	24,341	(2)	.....	.....
Capital invested	$33,498,094	$17,677,966	$15,820,128	89.5
Average per acre enterprises were capable of irrigating	$53.40	$45.60	$7.80	17.1
Estimated final cost of existing enterprises	$34,615,064	$24,828,868	$9,786,196	39.4
Average per acre included in enterprises	$42.57	$26.30	$16.27	61.9
Average cost of operation and maintenance per acre	$3.27	$0.93	$2.34	251.6
IRRIGATION WORKS.				
Number of enterprises	1,388	1,269	119	9.4
Number of main ditches	1,295	891	404	45.3
Length of main ditches ..... miles	1,769	1,727	42	2.4
Capacity of main ditches ..... second-feet	11,707	17,200	−5,493	−31.9
Number of lateral ditches	1,174	313	861	275.1
Length of lateral ditches ..... miles	1,599	870	729	83.8
Number of reservoirs	340	402	−62	−15.4
Capacity of reservoirs ..... acre-feet	1,510,856	1,349,938	160,918	11.9
Number of flowing wells	310	214	96	44.9
Capacity of flowing wells ..... gallons per minute	14,547	9,953	4,594	46.2
Number of pumped wells	999	470	529	112.6
Capacity of pumped wells ..... gallons per minute	1,042,590	765,921	276,669	36.1
Number of pumping plants	744	429	315	73.4
Engine capacity ..... horsepower	22,014	37,258	−15,244	−40.9
Pump capacity ..... gallons per minute	1,048,030	851,873	196,157	23.0
Average lift ..... feet	44	(2)	44	.....

[1] A minus sign (−) denotes decrease.

[2] Not reported in 1910.

ARIZONA

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

The whole of the state of Arizona may be classed as arid, although there are small parts of the state where some crops are grown without irrigation.

The central part of the state is mountainous, while the remainder of the state consists of extensive valleys or plateaus broken by isolated ranges of mountains and hills.

In the valley of the Colorado River, in the northwestern part of the state, the normal annual precipitation is about 10 inches, while in the mountains in the central part of the state it varies from 18 to 25 inches. In the northeastern part of the state, on the rolling plateau, the precipitation drops below 10 inches. On the lower Colorado and the Gila Rivers the average annual precipitation is below 5 inches, and to the east of this it increases, being about 7 inches at Phoenix, in the Salt River Valley; about 6 inches at Maricopa, in the Gila River Valley; and about 12 inches at Tucson. It is higher at many points which lie at higher elevations.

Throughout the state the larger part of the precipitation occurs in July, August, and early September, while the driest part of the year is April, May, and June.

Crops are grown without irrigation in the valleys of the Little Colorado, Hassayampa, and Agua Fria Rivers, and at many other points in the state that receive more than the average precipitation, but on the plateaus in northern Arizona and in the extensive valleys in southern Arizona no crops can be grown in this way.

The rainfall varies greatly from year to year, much of it coming in very heavy torrential storms that may do heavy damage by washing out crops, irrigation structures, and bridges.

The heat in the arid valleys is intense, and evaporation is great, making large quantities of water necessary to maintain plant growth.

In 1919 the spring was cold and late, and precipitation for the first six months of the year was below normal, but conditions improved later in the season, and the report of the United States Weather Bureau for Arizona states that "1919 was perhaps the most favorable year on record for both agriculture and live stock," and "crops both in the dry farming sections and under the irrigation projects were rated better than 100 per cent."

WATER SUPPLY FOR IRRIGATION.

With the exception of Colorado River all of the streams in Arizona are torrential in character, because of the limited and variable precipitation. Colorado River has its sources in the high, snow-covered mountains in Wyoming and Colorado, and maintains a good summer flow, although it is subject to heavy floods. Throughout its course in northern Arizona this stream flows through the Grand Canyon, and along most of the distance where it forms the boundary between Arizona and Nevada and Arizona and California there is very little land on which its water can be utilized. Near the southwest corner of the state water is diverted for use in both Arizona and California, and up to the present the normal low-water flow has been sufficient to meet the demands of both states. Extension of the areas irrigated will require storage, and plans that will provide for the largest use of the stream are being studied.

The Little Colorado rises in east central Arizona and flows in a northwesterly direction to its junction with Colorado River in the north central part of the state. The stream does not carry a large volume of water at any time, and gets very low or entirely dry at times during the summer. Consequently it is not a dependable source of water for irrigation. Plans for storage have been studied, but no large scheme has been carried out. The northeastern part of the state, north of the Little Colorado, consists of a high, rolling desert with almost no surface water supply.

Southern Arizona is drained by Gila and Salt Rivers. Gila River rises in western New Mexico and flows entirely across southern Arizona. It is a torrential stream, subject to heavy floods, and often entirely dry. It is little used for irrigation because of its uncertain flow. Storage of the flood waters would make it possible to irrigate large areas, and plans for such storage have been made but never carried out.

Salt River rises in east central Arizona and flows westward to its confluence with Gila River, slightly west of the center of the state. Salt River and its tributaries receive most of the drainage from the mountains of central Arizona and supply irrigation water to the Salt River Valley, which contains the largest irrigated area in the state. Like the other streams of the state, Salt River had a very variable flow until storage was provided by the construction of Roosevelt Reservoir. There is opportunity for additional storage on the tributaries.

South of Gila River there are extensive areas almost without surface water, and other valleys having drainage channels that carry water intermittently.

In some of the valleys in the southern part of the state there is a good supply of ground water, which can be made available by pumping. In the Salt River Valley irrigation has raised the ground water level so much that land has been injured. Both open drains and wells have been installed, primarily for the purpose of lowering the ground water, but affording, at the same time, an added supply of water for irrigation.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.	Per cent of all farms.	Acres.	Per cent of increase.	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	6,605	36.4	66.2	467,565	46.1	0.6	8.1	65.6
1910	4,841	62.4	52.5	320,051	72.6	0.4	25.7	91.4
1900	2,981	177.3	51.3	185,396	181.7	0.3	9.6	72.5
1890	1,075	.....	75.4	65,821	.....	0.1	5.1	63.2

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	1,388	813,153	467,565	57.5	627,303
Before 1860	19	1,955	332	17.0	660
1860-1869	10	2,020	720	35.1	776
1870-1879	61	71,786	55,327	77.1	62,077
1880-1889	85	78,516	41,358	52.7	55,332
1890-1899	78	35,616	19,975	56.1	23,930
1900-1904	67	21,966	10,944	49.8	11,270
1905-1909	158	348,591	260,639	74.8	285,462
1910-1914	226	42,994	18,692	43.5	27,738
1915-1919	486	178,826	42,595	23.8	138,571
Not reported	207	30,853	16,983	55.0	21,487

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	467,565	320,051	147,514	46.1	627,303	813,153
Streams, gravity	189,782	300,067	−110,285	−36.8	299,122	398,591
Streams, pumped	6,671	7,711	−1,040	−13.5	9,397	16,240
Wells, pumped	39,694	6,036	33,598	551.1	59,783	99,331
Wells, flowing	1,558	1,489	69	4.6	1,902	6,831
Wells, flowing and pumped	558	(2)	558	.....	799	2,016
Lakes, gravity	.....	570	−570	.....	.....	.....
Lakes, pumped	5	(2)	5	.....	5	130
Springs	2,578	3,631	−1,053	−29.0	3,520	6,078
Stored storm water	510	487	23	4.7	600	700
Sewage	195	(2)	195	.....	200	270
Streams, gravity, and pumped wells	217,799	(2)	217,799	.....	240,640	258,104
Streams, gravity, and flowing wells	525	(2)	525	.....	645	1,317
Other mixed	7,690	(2)	7,690	.....	10,690	22,945

[1] A minus sign (−) denotes decrease.
[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

Arizona, in common with other territory settled by the Spaniards, has many old irrigation enterprises, known as "community ditches" or "public acequias," which are operated in accordance with ancient laws and customs which have not been brought into a definite code. These laws and customs were continued by the law of 1871, which recognized the "laws and customs of Sonora and the usage of the people of Arizona." Such enterprises are controlled by the water users and are classed as cooperative.

Arizona enacted an irrigation district law in 1912, but almost nothing has been done under that law. The state accepted the conditions of the Federal Carey Act (act of Congress, Aug. 18, 1894) in 1912, but nothing has been done under that act.

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Acres.	Per cent.
ACREAGE IRRIGATED.				
Total	467,565	320,051	147,514	46.1
Individual and partnership	80,511	61,196	19,315	31.6
Cooperative	114,482	101,025	13,457	13.3
Irrigation district	300	(2)	300	.....
Commercial	14,500	80	14,420	.....
U. S. Reclamation Service	248,814	138,364	110,450	79.8
U. S. Indian Service	8,733	19,386	−10,653	−55.0
City	200	(2)	200	.....
Other and mixed	25	(2)	25	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	627,303	387,655	239,648	61.8
Individual and partnership	195,331	81,422	113,909	139.9
Cooperative	130,903	120,559	10,344	8.6
Irrigation district	300	(2)	300	.....
Commercial	20,000	200	19,800	.....
U. S. Reclamation Service	269,691	164,500	105,191	63.9
U. S. Indian Service	10,833	20,974	−10,141	−48.4
City	220	(2)	220	.....
Other and mixed	25	(2)	25	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total	813,153	944,090	−130,937	−13.9
Individual and partnership	288,510	175,834	112,676	64.1
Cooperative	157,849	360,639	−202,790	−56.2
Irrigation district	450	(2)	450	.....
Commercial	31,000	1,600	29,400	.....
U. S. Reclamation Service	314,691	370,000	−55,309	−14.9
U. S. Indian Service	20,058	36,017	−15,959	−44.3
City	300	(2)	300	.....
Other and mixed	295	(2)	295	.....

[1] A minus sign (−) denotes decrease. Per cent not shown when base is less than 100, or when per cent is more than 1,000.
[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The laws of Arizona relating to water rights are summarized in the following paragraphs:

The bill of rights of the territory of Arizona, approved October 4, 1864, contained the following declaration regarding water rights:

"All streams, lakes, and ponds of water capable of being used for purposes of navigation or irrigation are hereby declared to be public property; and no individual or corporation shall have the right to appropriate them exclusively to their own private use, except under such equitable regulations and restrictions as the legislature shall provide for that purpose."—Art. 22.

The law of 1871 declared all rivers, creeks, and streams of running water to be public and applicable to the purposes of irrigation and mining. This law provided that the appropriator should post a notice at the point of diversion and file a copy of the notice with the county recorder.

A law enacted in 1887 declared that the common law doctrine of riparian rights should not be in force in the territory, and the state constitution, adopted in 1910, contained a similar declaration (Art. 17).

In 1919 the state of Arizona adopted for the first time a comprehensive code of water laws. The code declares that "The water of all natural streams, or flowing in any canyon, ravine or other natural channel, and of springs and lakes, belongs to the public and is subject to beneficial use as herein provided." The office of state water commissioner is created; any party intending to acquire the right to use any water of the state is required to make application to the water commissioner for a permit, and upon an appropriation being perfected in accordance with a permit, the commissioner is to issue a certificate setting forth the rights acquired.

Until the enactment of the water code in 1919 there was no special procedure in the courts for hearing controversies regarding water rights. This code provides that the commissioner, on his own initiative or upon petition of one or more water users from any source, is to take testimony regarding rights to water from the source in question, examine the source of water supply and the works taking water therefrom, make findings of fact and an order defining all rights to water, and submit all testimony and his reports and findings to the superior court of the county in which reside the greatest number of the water users interested. The court reviews the whole record, and after proper hearings issues a decree defining rights. Pending the decision of the court the order of the commissioner is binding.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909, per cent of total.
	Acres.	Per cent of total.	
Total	467,565	100.0	100.0
Appropriation and use	226,846	48.5	76.7
Notice filed and posted	97,130	20.8	14.7
Adjudicated by court	84,978	18.2	8.4
Permit from state	10	(1)	
Riparian rights			0.2
Underground	41,624	8.9	(2)
Other and mixed	525	0.1	(2)
Not reported	16,452	3.5	(2)

[1] Less than one-tenth of 1 per cent.
[2] All land for which the class of water rights was not reported was included in "Appropriation and use."

ACREAGE, BY DRAINAGE BASIN.

The report of a special census taken in 1902 presented all data by drainage basins rather than by counties. The results of the census of 1920 have been tabulated on the same basis, and the data for 1902 are presented for purposes of comparison. For no other census have the results been tabulated in this form. The acreage reported for each drainage basin in 1919 comprises all the irrigated land in that drainage basin, including that watered from springs and wells. In the 1902 results the acreages irrigated from springs and wells were not reported for the smaller tributary streams, but the acreages for the tributaries were included in those reported for the main streams. This area is so small, however, that the comparison of the areas reported for the tributary streams is not seriously affected.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
Total	467,565	247,250	89.1	813,153	627,303
Colorado River and tributaries	461,694	246,866	87.0	796,530	617,353
Colorado River direct	48,326	7,823	517.7	107,311	56,531
Kanab Wash	450	700	−35.7	710	610
Virgin River	379	820	−53.8	533	512
Williams River	1,653	1,256	31.6	3,232	1,809
Little Colorado River and tributaries	17,036	11,355	43.7	35,358	21,880
Little Colorado River direct	10,260	7,270	41.1	20,821	14,131
Nutrioso Creek	636	320	98.8	1,224	952
Concho Creek	244	163	49.7	500	250
Other tributaries of Little Colorado River	5,896	[2] 4,102	43.7	12,813	6,547
Gila River and tributaries	391,417	223,771	74.9	643,480	533,521
Gila River direct	76,932	55,973	37.5	203,504	167,642
San Francisco River	429	239	79.5	4,148	476
San Pedro River	7,773	10,912	−28.8	18,959	10,861
Santa Cruz River	33,019	10,606	211.3	76,617	45,115
Salt River and tributaries	247,260	140,642	75.8	277,034	268,644
Salt River direct	235,825	125,007	88.6	253,603	253,308
Tonto Creek	502	1,829	−72.6	2,928	720
Rio Verde	6,564	11,502	−42.9	9,978	7,470
Other tributaries of Salt River	4,369	[2] 2,304	89.6	10,525	7,146
Agua Fria River	18,824	884	.....	38,699	30,000
Hassayampa River	956	1,091	−12.4	3,657	1,773
Other tributaries of Gila River	6,174	[2] 3,424	80.3	20,862	9,010
Other tributaries of Colorado River	2,433	[2] 641	279.6	5,906	2,490
Whitewater Draw and tributaries	5,871	384	.....	16,623	9,950

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1890 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.
1920	$33,498,094	89.5	$53.40	17.1
1910	17,677,966	298.3	45.60	90.5
1900	4,438,352	854.5	23.94	238.6
1890	465,000	.....	7.07	.....

TABLE 9.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$33,498,094	100.0	$53.40
Before 1860	2,058	(1)	3.12
1860-1869	9,770	(1)	12.59
1870-1879	1,881,284	5.6	30.31
1880-1889	921,806	2.8	16.66
1890-1899	645,369	1.9	26.97
1900-1904	437,719	1.3	38.84
1905-1909	20,951,874	62.5	73.40
1910-1914	3,778,003	11.3	136.20
1915-1919	4,419,044	13.2	31.89
Not reported	451,167	1.4	21.00

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

TABLE 10.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$33,498,094	100.0	$53.40	362,828	$3.27
Streams, gravity	11,587,884	34.6	36.74	111,225	2.27
Streams, pumped	521,852	1.6	55.53	6,082	8.12
Streams, pumped and gravity					
Wells, pumped	3,417,339	10.2	57.16	18,733	13.15
Wells, flowing	115,935	0.3	60.95	734	3.64
Wells, flowing and pumped	54,790	0.2	68.46	558	13.64
Lakes, pumped	400	(2)	80.00	5	10.00
Lakes, gravity					
Springs	271,358	0.8	77.09	1,525	3.88
Stored storm water	11,600	(2)	19.33		
Sewage	63,498	0.2	317.04	90	1.89
Streams, gravity, and pumped wells	17,092,899	51.0	71.63	216,397	2.70
Streams, gravity, and flowing wells	27,500	0.1	42.64	495	2.40
Other mixed	333,227	1.0	31.17	6,986	4.99

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	INCREASE.[1]	
			Amount.	Per cent.
Total	$33,498,094	$4,688,298	$28,809,796	614.5
Colorado River and tributaries	33,198,726	4,681,593	28,517,163	609.1
Colorado River direct	7,351,291	230,973	7,130,918	
Kanab Wash	20,509	4,799	15,800	326.2
Virgin River	7,474	3,425	4,049	118.2
Williams River	55,504	15,636	39,868	255.0
Little Colorado River and tributaries	460,206	265,701	194,505	73.2
Little Colorado River direct	146,913	218,900	−71,987	−32.9
Nutrioso Creek	16,500	2,600	13,900	534.6
Concho Creek	49,228	850	48,378	
Other tributaries of Little Colorado River	247,565	[2] 43,351	204,214	471.1
Gila River and tributaries	25,165,814	4,131,850	21,033,964	509.1
Gila River direct	2,841,526	1,203,882	1,637,644	136.0
San Francisco River	15,415	13,585	1,830	13.5
San Pedro River	359,153	40,125	319,018	749.9
Santa Cruz River	5,168,524	79,686	5,088,838	
Salt River and tributaries	14,909,694	2,697,189	12,241,845	453.9
Salt River direct	14,339,874	2,404,160	11,935,714	496.5
Tonto Creek	9,468	15,085	−5,617	−37.2
Rio Verde	209,482	250,813	−41,331	−16.5
Other tributaries of Salt River	350,210	[2] 27,131	353,079	
Agua Fria River	1,428,077	20,998	1,407,079	
Hassayampa River	51,299	11,160	40,139	359.7
Other tributaries of Gila River	362,786	[2] 65,215	297,571	456.3
Other tributaries of Colorado River	107,337	[2] 9,278	98,059	
Whitewater Draw and tributaries	299,368	6,735	292,633	

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.

In classifying capital invested by type of enterprise (Table 12) the average capital invested per acre is not presented, for the reason that it is not possible to compute this correctly. The United States Reclamation Service supplies stored water to enterprises controlled by agencies of most of the other classes shown in the table and a part of its expenditure is properly chargeable to those lands; but it is not possible to tell how much should be so charged or how it should be distributed among the various classes.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$33,498,094	100.0	362,828	$3.27
Individual and partnership	5,598,625	16.7	43,378	7.53
Cooperative	3,171,406	9.5	93,444	2.44
Irrigation district	100,000	0.3	300	6.67
Commercial	3,693,400	11.0	14,500	4.86
U. S. Reclamation Service	20,277,919	60.5	205,064	2.44
U. S. Indian Service	585,029	1.8	5,977	9.51
City	71,500	0.2	140	1.93
Not reported	215	(2)	25	5.00

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	31
Acreage included in enterprises reporting land drained or needing drainage	382,928
Acreage for which drains have been installed	25,173
Additional acreage needing drainage	71,357
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	6.6
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	3.1
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	11.9

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 14. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume of water entering canals, second-feet	4,199	2,967	1,232
Area irrigated in 1919.....acres	336,393	258,260	78,133
Average number of acres per second-foot	80	87	63
Total quantity of water entering canals, acre-feet	1,839,689	1,402,101	437,588
Area irrigated in 1919.....acres	358,383	283,376	75,007
Average quantity per acre.....acre-feet	5.1	4.9	5.8
Total quantity of water delivered.....acre-feet	876,016	690,083	185,933
Area irrigated in 1919.....acres	291,637	233,469	58,168
Average quantity per acre.....acre-feet	3.0	3.0	3.2

IRRIGATION WORKS.

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	248	99	1,295	11,707	1,769	1,174	1,599	340	1,510,856
Before 1860	1	4	9	24	7			4	4
1860–1869	5		11	14	11	4	1		
1870–1879	41	6	76	1,357	255	207	262	21	15,532
1880–1889	37	8	104	1,115	211	49	49	28	20,199
1890–1899	30	4	83	509	152	68	46	12	164
1900–1904	30	7	76	263	125	17	17	19	971
1905–1909	31	5	173	4,922	251	466	1,004	49	1,378,642
1910–1914	22	29	203	681	211	141	44	68	86,960
1915–1919	31	31	430	2,288	424	182	163	112	8,332
Not reported	20	5	130	534	122	40	13	27	52

DATE OF BEGINNING.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	104.5	310	14,547	999	1,042,590	744	22,014	1,001	1,048,030
Before 1860	0.1			9	6,400	7	147	8	5,900
1860–1869	0.1								
1870–1879		1		1	1,100	1	18	1	1,100
1880–1889	11.7	3	30	12	5,980	8	122	11	5,730
1890–1899	10.5	8	370	19	11,375	14	550	22	83,575
1900–1904	5.9	22	491	26	17,970	19	547	19	20,295
1905–1909	10.0	87	4,276	158	111,745	87	1,982	152	119,500
1910–1914	8.2	44	2,302	251	428,462	171	3,639	262	397,197
1915–1919	55.8	117	5,443	465	411,876	379	14,525	468	307,041
Not reported	2.2	28	1,635	53	47,682	53	484	53	47,692

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	248	99	1,295	11,707	1,769	1,174	1,599	340	1,510,856
Individual and partnership	200	93	1,160	4,581	1,151	400	209	309	100,625
Cooperative	34	5	78	2,390	431	265	320	23	31,424
Irrigation district	1		1		4				
Commercial	2		4	135	25	70	36	1	300
U. S. Reclamation Service	3	1	5	4,355	78	411	977	1	1,367,300
U. S. Indian Service	5		42	242	76	22	56	6	11,207
City			2	2	3	6	1		
Not reported	3		3	2	1				

CLASS.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	104.5	310	14,547	999	1,042,590	744	22,014	1,001	1,048,030
Individual and partnership	97.2	310	14,547	814	591,990	716	18,603	814	559,205
Cooperative	0.2			49	321,550	15	1,328	41	282,900
Commercial	0.8			83	78,750	3	1,400	88	78,750
U. S. Reclamation Service	0.9			48	45,600	2	95	48	45,600
U. S. Indian Service	1.3			5	4,700	8	588	10	81,675
City	4.1								

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	248	99	1,295	11,707	1,769	1,174	1,599	340	1,510,856
Colorado River and tributaries	242	48	1,120	11,154	1,648	1,082	1,592	264	1,425,785
Colorado River direct	2		6	713	52	174	221		
Kanab Wash	1		1	1		4	4	4	258
Virgin River		1	10	9	9	9	2		
Williams River	5		37	40	34	1	1	1	4
Little Colorado River and tributaries	32	14	82	341	156	43	43	45	37,098
Little Colorado River direct	19	9	36	208	78	15	22	18	30,823
Nutrioso Creek	4	1	7	17	8			4	1,050
Concho Creek			2	3	2	1	1	2	625
Other tributaries of Little Colorado River	9	4	37	113	68	27	20	21	4,600
Gila River and tributaries	199	33	950	10,032	1,385	836	1,316	210	1,377,408
Gila River direct	27	1	91	2,520	370	219	203	2	210
San Francisco River	28	1	38	22	12			2	
San Pedro River	30	9	114	270	162	31	15	45	894
Santa Cruz River	31	5	237	1,196	260	147	75	26	392
Salt River and tributaries	44	3	174	5,084	290	313	911	11	1,367,307
Salt River direct	8	1	18	4,447	111	271	898	2	1,367,300
Tonto Creek	9	1	34	58	26			1	1
Rio Verde	22		75	359	107	29	7	5	1
Other tributaries of Salt River	5	1	47	220	46	13	6	3	5
Agua Fria River	12	5	106	525	107	105	101	16	24
Hassayampa River	1	1	24	46	18			1	180
Other tributaries of Gila River	26	8	166	369	166	21	11	107	8,399
Other tributaries of Colorado River	3		34	18	12	15	5	4	11,019
Whitewater Draw and tributaries	6	51	175	553	121	92	7	76	85,071

DRAINAGE BASIN.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.				
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.		Average lift (feet).
								Number.	Capacity (gallons per minute).	
Total	104.5	310	14,547	999	1,042,590	744	22,014	1,001	1,048,030	44
Colorado River and tributaries	99.4	300	14,044	790	969,803	546	19,611	792	974,063	45
Colorado River direct				3	750	7	414	10	80,200	14
Kanab Wash	1.3									
Virgin River										
Williams River	10.1			5	2,015	6	39	8	2,590	20
Little Colorado River and tributaries		2		2	1,000	1	1	2	1,000	30
Little Colorado River direct		2								
Nutrioso Creek										
Concho Creek										
Other tributaries of Little Colorado River				2	1,000	1	1	2	1,000	30
Gila River and tributaries	87.9	298	14,044	774	965,338	525	19,087	765	889,573	44
Gila River direct	1.0			78	78,531	80	2,382	84	92,581	34
San Francisco River	1.4			4	225	11	70	12	5,335	19
San Pedro River	5.1	133	5,195	25	11,474	27	285	29	12,949	30
Santa Cruz River	25.0			365	576,234	241	8,073	366	528,649	44
Salt River and tributaries	4.3	1		132	150,874	75	2,653	124	153,184	69
Salt River direct	1.5			72	75,319	14	629	60	75,719	54
Tonto Creek				1	500	2	25	2	1,500	16
Rio Verde	1.8	1		3		11	96	11	1,070	63
Other tributaries of Salt River	1.0			56	75,055	48	1,903	51	74,895	75
Agua Fria River	34.3	1		114	120,635	41	4,749	100	68,575	47
Hassayampa River	4.1			15	6,420	13	204	13	5,810	35
Other tributaries of Gila River	2.7	163	8,849	41	20,895	37	671	37	21,990	49
Other tributaries of Colorado River	0.1			6	700	7	70	7	700	20
Whitewater Draw and tributaries	5.1	10	503	209	72,787	198	2,403	209	73,967	44

CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 AND 1909.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AREA HARVESTED.					Unit.	QUANTITY HARVESTED.				
		1919		1909		Per cent of increase.[1]		1919		1909		Per cent of increase.[1]
		Acres.	Per cent of total for state.	Acres.	Per cent of total for state.			Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	8,726	39.4	7,797	50.0	10.5	Bu	205,909	46.1	171,907	57.6	19.8
2	Winter wheat	28,997	93.3	17,901	89.4	79.6	Bu	682,332	94.5	358,175	98.7	109.0
3	Spring wheat	3,250	53.7				Bu	66,378	58.6			
4	Oats	4,448	37.5	5,406	92.1	−17.7	Bu	136,227	36.1	177,057	93.5	−23.1
5	Barley	19,811	91.1	32,268	98.1	−38.6	Bu	600,752	91.5	1,001,611	99.3	−40.0
6	Kafir and milo	20,316	60.4				Bu	609,333	71.7			
	Hay and forage:											
7	Alfalfa	97,240	88.7	65,369	98.9	48.5	Tons	323,052	95.7	194,171	99.8	66.4
8	Other tame grasses	5,117	53.8	437	20.0		Tons	9,555	62.0	438	14.7	
9	Annual legumes cut for hay	792	69.7	15,266	80.1	−26.5	Tons	1,081	72.6	24,291	81.8	−36.0
10	Small grains cut for hay	10,517	45.5				Tons	14,457	48.8			
11	Wild, salt, or prairie grasses	1,050	12.6	1,462	15.4	−28.2	Tons	1,096	14.0	1,756	21.5	−37.6
12	Silage crops	5,634	77.7				Tons	36,130	84.1			
13	Corn cut for forage	3,110	35.8	[2]			Tons	7,461	52.0	[2]		
14	Kafir, sorghum, etc., for forage	12,245	42.3	[2]			Tons	23,183	52.6	[2]		
	Vegetables:											
15	Cantaloupes and muskmelons	3,123	94.6									
16	Watermelons	807	74.9									
17	Potatoes	1,011	40.4	1,011	87.8		Bu	37,371	21.4	66,351	68.3	−43.7
	Miscellaneous:											
18	Clover and alfalfa seed [3]	4,217	87.2	6,355	99.6	−33.6	Bu	28,193	90.0	22,264	99.0	26.6
19	Dry beans	1,295	13.7	759	33.0	70.6	Bu	9,876	12.0	6,863	37.2	43.9
20	Cotton	101,080	95.1				Bales	56,067	95.3			
	Fruits:											
21	Grapes	[4] 14,072	17.0	[2]			Lbs	139,690	20.9	[2]		
22	Apples	[5] 30,749	43.8	[2]			Bu	54,643	45.2	[2]		
23	Peaches	[5] 32,880	32.3	[2]			Bu	49,942	36.1	[2]		
24	Oranges	[5] 32,196	69.0	[2]			Boxes	48,764	61.2	[2]		

	CROP.	AVERAGE YIELD PER ACRE, 1919.						VALUE.				
		Unit.	For state.	On nonirrigated land.	On irrigated land.			1919		1909		Per cent of increase.
					Average.	Per cent of average for state.	Per cent of average on nonirrigated land.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	Bu	20.1	17.7	23.9	118.9	135.0	$401,523	46.1	$158,993	54.1	152.5
2	Winter wheat	Bu	23.2	18.2	23.6	101.7	129.7	1,569,364	94.5	398,294	97.1	332.4
3	Spring wheat	Bu	18.7	16.7	20.4	109.1	122.2	152,669	58.6			
4	Oats	Bu	31.8	32.6	30.6	96.2	93.9	156,661	36.1	127,003	97.4	23.4
5	Barley	Bu	30.2	29.0	30.3	100.3	104.5	871,090	91.5	711,251	99.5	22.5
6	Kafir and milo	Bu	25.3	18.1	30.0	118.6	165.7	914,000	71.7			
	Hay and forage:											
7	Alfalfa	Tons	3.08	1.16	3.33	108.1	287.1	7,914,774	95.7	1,880,244	99.1	320.9
8	Other tame grasses	Tons	1.62	1.33	1.87	115.4	140.6	181,545	62.0	5,213	12.2	
9	Annual legumes cut for hay	Tons	1.31	1.18	1.36	103.8	115.3	21,020	72.6	285,166	77.4	26.7
10	Small grains cut for hay	Tons	1.28	1.20	1.39	108.6	115.8	339,740	48.8			
11	Wild, salt, or prairie grasses	Tons	0.93	0.92	1.04	111.8	113.0	15,344	14.0	13,459	16.4	14.0
12	Silage crops	Tons	5.92	4.22	6.41	108.3	151.9	343,235	84.1			
13	Corn cut for forage	Tons	1.65	1.23	2.43	147.3	197.6	82,071	52.0	[2]		
14	Kafir, sorghum, etc., for forage	Tons	1.52	1.25	1.89	124.3	151.2	347,745	52.6	[2]		
	Vegetables:											
15	Cantaloupes and muskmelons							428,855	92.1			
16	Watermelons							80,501	73.4			
17	Potatoes	Bu	69.6	91.7	37.0	53.2	40.3	93,428	21.4	74,885	76.0	24.8
	Miscellaneous:											
18	Clover and alfalfa seed [3]	Bu	6.5	5.1	6.7	103.1	131.4	592,053	90.0	156,343	99.8	278.7
19	Dry beans	Bu	8.7	8.9	7.6	87.4	85.4	46,417	12.0	14,712	32.7	215.5
20	Cotton	Bales	0.56	0.54	0.56	100.0	103.7	19,176,213	95.3			
	Fruits:											
21	Grapes	Lbs	[6] 8.1	[6] 7.7	[6] 9.9	122.2	128.6	8,381	20.9	[2]		
22	Apples	Bu	[7] 1.7	[7] 1.7	[7] 1.8	105.9	105.9	131,143	45.2	[2]		
23	Peaches	Bu	[7] 1.4	[7] 1.3	[7] 1.5	107.1	115.4	127,352	36.1	[2]		
24	Oranges	Boxes	[7] 1.7	[7] 2.1	[7] 1.5	88.2	71.4	195,056	61.2	[2]		

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Not reported separately in 1909.
[3] Not including red clover seed.
[4] Number of vines of bearing age.
[5] Number of trees of bearing age.
[6] Yield per vine.
[7] Yield per tree.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100.]

		THE STATE.	Apache.	Cochise.	Coconino.	Gila.	Graham.[1]	Greenlee.[1]
1	Number of all farms in 1920	9,975	337	1,251	362	289	870	262
2	Number of farms irrigated in 1919	6,605	181	507	50	117	533	199
3	Per cent of all farms	66.2	53.7	40.5	13.8	40.5	61.3	76.0
4	Number of farms irrigated in 1909	4,841	184	293	38	251	765	.....
5	Per cent of increase, 1909–1919	36.4	−1.6	73.0	.....	−53.4	.....	.....
	LAND AND FARM AREA.							
6	Approximate land area (acres)	72,838,400	7,282,560	3,948,800	11,918,720	3,007,360	2,963,200	1,201,920
7	All land in farms (acres)	5,802,126	717,898	998,242	164,669	35,752	165,691	24,383
8	Improved land in farms (acres)	712,803	27,452	120,229	19,827	8,909	38,632	7,990
9	Area irrigated in 1919 (acres)	467,565	12,070	12,982	1,479	1,797	32,400	6,974
10	Per cent of improved land in farms	65.6	44.0	10.8	7.5	20.2	83.9	87.3
11	Area irrigated in 1909 (acres)	320,051	8,353	4,900	901	2,778	38,824	.....
12	Per cent of increase, 1909–1919	46.1	36.3	164.9	64.2	−35.3	.....	.....
13	Area enterprises were capable of irrigating in 1920 (acres)	627,303	16,159	19,130	1,902	2,379	34,355	8,086
14	Area enterprises were capable of irrigating in 1910 (acres)	387,655	9,330	6,488	1,183	3,272	41,223	.....
15	Per cent of increase, 1910–1920	61.8	73.2	194.9	60.8	−27.3	.....	.....
16	Area included in enterprises in 1920 (acres)	813,153	27,571	33,999	2,040	7,012	41,938	15,288
17	Area included in enterprises in 1910 (acres)	944,090	34,807	14,141	3,223	4,233	52,143	.....
18	Per cent of increase, 1910–1920	−13.9	−20.8	140.4	−36.7	65.7	.....	.....
19	Area of irrigated land reported as available for settlement (acres)	24,341	.....	2,100	.....	.....	3,407	.....
	IRRIGATION WORKS.							
	Independent enterprises:							
20	Number, 1920	1,388	39	328	21	83	100	69
21	Number, 1910	1,269	64	244	20	117	190	.....
	Main ditches:							
22	Number, 1920	1,295	55	303	26	83	96	72
23	Number, 1910	891	67	71	20	102	124	.....
24	Length, 1920 (miles)	1,769	97	266	24	93	190	70
25	Length, 1910 (miles)	1,727	112	94	17	90	216	.....
26	Capacity, 1920 (second-feet)	11,707	249	837	49	162	883	232
27	Capacity, 1910 (second-feet)	17,200	577	349	49	453	1,075	.....
	Laterals:							
28	Number, 1920	1,174	24	124	20	3	208	.....
29	Number, 1910	313	46	3	25	11	10	.....
30	Length, 1920 (miles)	1,599	27	23	11	2	181	.....
31	Length, 1910 (miles)	870	40	2	20	5	14	.....
	Reservoirs:							
32	Number, 1920	340	36	165	4	2	56	2
33	Number, 1910	402	32	170	11	3	73	.....
34	Capacity, 1920 (acre-feet)	1,510,856	45,614	86,017	13	1	1,471	.....
35	Capacity, 1910 (acre-feet)	1,349,938	39,456	68	5,428	1	2,950	.....
	Flowing wells:							
36	Number, 1920	310	.....	204	.....	.....	95	.....
37	Number, 1910	214	.....	90	.....	.....	117	.....
38	Capacity, 1920 (gallons per minute)	14,547	.....	9,643	.....	.....	4,054	.....
39	Capacity, 1910 (gallons per minute)	9,953	.....	2,959	.....	.....	6,799	.....
	Pumped wells:							
40	Number, 1920	999	2	255	.....	18	4	14
41	Number, 1910	470	4	194	.....	10	9	.....
42	Capacity, 1920 (gallons per minute)	1,042,590	1,000	90,531	.....	5,930	1,880	3,125
43	Capacity, 1910 (gallons per minute)	765,921	65	27,185	.....	2,858	4,002	.....
	Pumping plants:							
44	Number, 1920	744	1	241	2	19	10	21
45	Number, 1910	429	4	194	.....	11	19	.....
46	Engine capacity, 1920 (horsepower)	22,014	15	2,909	50	146	104	126
47	Engine capacity, 1910 (horsepower)	37,258	7	4,336	.....	43	1,248	.....
48	Pump capacity, 1920 (gallons per minute)	1,048,030	1,000	94,556	30	5,900	11,030	8,735
49	Pump capacity, 1910 (gallons per minute)	851,873	65	27,185	.....	2,908	8,517	.....
50	Average lift, 1920 (feet)	44	30	43	22	24	18	20
	CAPITAL INVESTED.							
51	Capital invested to Jan. 1, 1920 (dollars)	33,498,094	275,010	611,883	72,317	59,749	945,403	75,158
52	Capital invested to July 1, 1910 (dollars)	17,677,966	234,838	513,333	42,266	38,667	335,971	.....
53	Per cent of increase, 1910–1920	89.5	17.1	19.2	71.1	54.5	.....	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920 (dollars)	53.40	17.02	31.99	38.02	25.12	27.52	9.29
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910 (dollars)	45.60	25.17	79.12	35.73	11.82	8.15	.....
	ESTIMATED FINAL COST.							
56	Estimated final cost of existing enterprises in 1920 (dollars)	34,615,064	283,240	635,248	72,317	60,749	995,803	77,758
57	Estimated final cost of existing enterprises in 1910 (dollars)	24,828,898	384,838	513,333	42,266	38,667	346,721	.....
58	Per cent of increase, 1910–1920	39.4	−26.4	23.7	71.1	57.1	.....	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920 (dollars)	42.57	10.27	18.68	35.45	8.66	23.74	5.09
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910 (dollars)	26.30	11.06	36.30	13.11	9.13	6.65	.....

[1] Part of Graham County taken to form Greenlee County in 1911.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100.]

		Maricopa.	Mohave.	Navajo.	Pima.	Pinal.	Santa Cruz.	Yavapai.	Yuma.
1	Number of all farms in 1920	3,930	130	341	434	293	248	598	630
2	Number of farms irrigated in 1919	3,384	59	183	228	213	63	329	559
3	Per cent of all farms	86.1	45.4	53.7	52.5	72.7	25.4	55.0	88.7
4	Number of farms irrigated in 1909	1,726	44	181	188	570	75	297	229
5	Per cent of increase, 1909–1919	96.1	.....	1.1	21.3	—62.6	.....	10.8	144.1
	LAND AND FARM AREA.								
6	Approximate land area—acres	5,690,240	8,509,600	6,335,360	6,083,200	3,443,200	786,560	5,216,000	6,391,680
7	All land in farms—acres	502,396	31,022	1,213,629	413,278	152,643	150,593	874,490	57,440
8	Improved land in farms—acres	279,334	6,317	23,753	35,785	41,876	24,929	36,811	40,959
9	Area irrigated in 1919—acres	282,130	2,342	5,832	16,883	28,647	2,608	11,506	49,855
10	Per cent of improved land in farms	101.0	37.1	24.6	47.2	68.4	10.5	31.4	121.7
11	Area irrigated in 1909—acres	199,052	1,688	6,458	10,160	25,431	4,773	8,571	7,662
12	Per cent of increase, 1909–1919	41.7	38.7	—9.7	66.2	12.6	—45.4	34.9	550.7
13	Area enterprises were capable of irrigating in 1920—acres	394,599	2,672	6,596	25,443	34,706	3,413	13,382	64,481
14	Area enterprises were capable of irrigating in 1910—acres	236,061	8,726	8,276	11,876	31,100	4,895	9,538	15,687
15	Per cent of increase, 1910–1920	67.2	—69.4	—20.3	114.2	11.6	—30.3	40.3	311.0
16	Area included in enterprises in 1920—acres	409,967	3,395	11,956	40,978	65,799	7,162	17,108	128,940
17	Area included in enterprises in 1910—acres	455,361	40,624	24,997	24,484	89,400	6,872	16,588	177,217
18	Per cent of increase, 1910–1920	—10.0	—91.6	—52.2	67.4	—26.4	4.2	3.1	—27.2
19	Area of irrigated land reported as available for settlement—acres	5,980	.....	.....	5,134	7,720	.....	.....	.....
	IRRIGATION WORKS.								
	Independent enterprises:								
20	Number, 1920	105	63	18	125	167	19	224	27
21	Number, 1910	88	57	17	110	77	66	196	23
	Main ditches:								
22	Number, 1920	85	58	28	107	175	20	169	18
23	Number, 1910	64	57	28	53	67	45	176	17
24	Length, 1920—miles	305	34	59	129	229	28	159	86
25	Length, 1910—miles	433	61	87	70	179	64	211	93
26	Capacity, 1920—second-feet	6,371	46	94	449	940	102	492	801
27	Capacity, 1910—second-feet	7,468	336	98	698	2,353	170	752	2,822
	Laterals:								
28	Number, 1920	352	14	14	134	16	.....	66	199
29	Number, 1910	29	46	50	9	36	12	24	12
30	Length, 1920—miles	1,019	2	14	61	15	.....	11	238
31	Length, 1910—miles	525	7	40	4	57	12	9	135
	Reservoirs:								
32	Number, 1920	5	5	8	18	9	6	23	1
33	Number, 1910	17	9	11	27	5	10	31	3
34	Capacity, 1920—acre-feet	1,367,305	338	2,410	360	57	51	7,209	10
35	Capacity, 1910—acre-feet	1,284,013	3,124	3,428	135	9,961	135	1,235	4
	Flowing wells:								
36	Number, 1920	.....	.....	2	6	1	.....	2	.....
37	Number, 1910	.....	.....	1	.....	.....	.....	6	.....
38	Capacity, 1920—gallons per minute	.....	.....	.....	350	500	.....	.....	.....
39	Capacity, 1910—gallons per minute	.....	.....	20	.....	.....	.....	175	.....
	Pumped wells:								
40	Number, 1920	238	11	1	248	136	16	26	30
41	Number, 1910	95	3	1	68	25	21	25	15
42	Capacity, 1920—gallons per minute	288,339	1,515	.....	456,766	149,099	15,500	5,460	23,345
43	Capacity, 1910—gallons per minute	617,790	2,170	700	38,829	48,875	17,242	3,047	3,158
	Pumping plants:								
44	Number, 1920	95	11	1	136	124	14	36	33
45	Number, 1910	55	6	2	62	21	20	21	14
46	Engine capacity, 1920—horsepower	7,945	90	.....	3,990	4,940	343	191	1,165
47	Engine capacity, 1910—horsepower	26,781	112	25	769	779	345	70	2,743
48	Pump capacity, 1920—gallons per minute	243,334	1,790	.....	408,581	148,924	15,200	6,005	102,945
49	Pump capacity, 1910—gallons per minute	617,790	10,224	2,020	39,243	48,875	17,242	4,071	73,733
50	Average lift, 1920—feet	72	20	.....	38	48	25	37	29
	CAPITAL INVESTED.								
51	Capital invested to Jan. 1, 1920—dollars	17,491,021	86,612	246,783	4,549,400	891,345	116,050	523,638	7,553,725
52	Capital invested to July 1, 1910—dollars	10,759,817	85,948	258,803	427,077	631,934	58,051	219,770	4,071,491
53	Per cent of increase, 1910–1920	62.6	0.8	—4.6	965.2	41.1	99.9	138.3	85.5
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	44.33	32.41	37.41	178.81	25.68	34.00	39.13	117.15
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	45.58	9.85	31.27	35.96	20.32	11.86	23.04	259.55
	ESTIMATED FINAL COST.								
56	Estimated final cost of existing enterprises in 1920—dollars	17,517,921	88,112	264,283	4,595,575	893,345	119,050	655,888	8,355,775
57	Estimated final cost of existing enterprises in 1910—dollars	13,418,557	320,248	299,915	427,077	631,934	58,051	224,770	8,122,491
58	Per cent of increase, 1910–1920	30.5	—72.5	—11.9	976.1	41.4	105.1	191.8	2.9
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	42.73	25.95	22.10	112.15	13.58	16.62	38.34	64.80
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	29.47	7.88	12.00	17.44	7.07	8.45	13.55	45.83

ARKANSAS.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Arkansas collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

Rice is the only crop grown under irrigation in Arkansas, with the exception of a few small tracts in other crops, and practically all the rice grown in the state is irrigated. The area harvested in 1919 is reported as 143,211 acres, the quantity of rough rice produced 6,797,126 bushels, and the value $18,352,240.

TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	232,604	214,678	17,926	8.4
Approximate land area of the state—acres	33,616,000	33,616,000	.....	.....
All land in farms—acres	17,456,750	17,416,075	40,675	0.2
Improved land in farms—acres	9,210,556	8,076,254	1,134,302	14.0
Number of farms irrigated	1,166	232	934	402.6
Area irrigated—acres	143,946	27,753	116,193	418.7
Area enterprises were capable of irrigating—acres	179,013	47,136	131,877	279.8
Area included in enterprises—acres	246,480	52,883	193,597	366.1
Per cent irrigated:				
Number of all farms	0.5	0.1	0.4	.....
Approximate land area of the state	0.4	0.1	0.3	.....
Land in farms	0.8	0.2	0.6	.....
Improved land in farms	1.6	0.3	1.3	.....
Excess of area enterprises were capable of irrigating over area irrigated—acres	35,067	19,383	15,684	80.9
Excess of area included in enterprises over area irrigated—acres	102,534	25,130	77,404	308.0
Capital invested	$7,183,322	$587,834	$6,595,488	.....
Average per acre enterprises were capable of irrigating	$40.13	$12.47	$27.66	221.8
Estimated final cost of existing enterprises	$7,283,522	$612,834	$6,670,688	.....
Average per acre included in enterprises	$29.55	$11.59	$17.96	155.0
Average cost of operation and maintenance per acre	$13.67	[2]	.....	.....
IRRIGATION WORKS.				
Number of enterprises	944	310	634	204.5
Number of main ditches	84	217	−133	−61.3
Length of main ditches—miles	68	131	−63	−48.1
Capacity of main ditches—second-feet	1,205	[2]	1,205	.....
Number of lateral ditches	50	[2]	50	.....
Length of lateral ditches—miles	18	[2]	18	.....
Number of reservoirs	16	19	−3	−15.8
Capacity of reservoirs—acre-feet	20	3	17	566.7
Number of flowing wells	[3]	[2]	.....	.....
Capacity of flowing wells—gallons per minute	[3]	[2]	.....	.....
Number of pumped wells	1,089	307	782	254.7
Capacity of pumped wells—gallons per minute	1,470,147	268,829	1,201,318	446.9
Number of pumping plants	1,041	315	726	230.5
Engine capacity—horsepower	58,332	12,440	45,892	368.9
Pump capacity—gallons per minute	1,654,097	436,402	1,217,695	279.0
Average lift—feet	50	[2]	50	.....

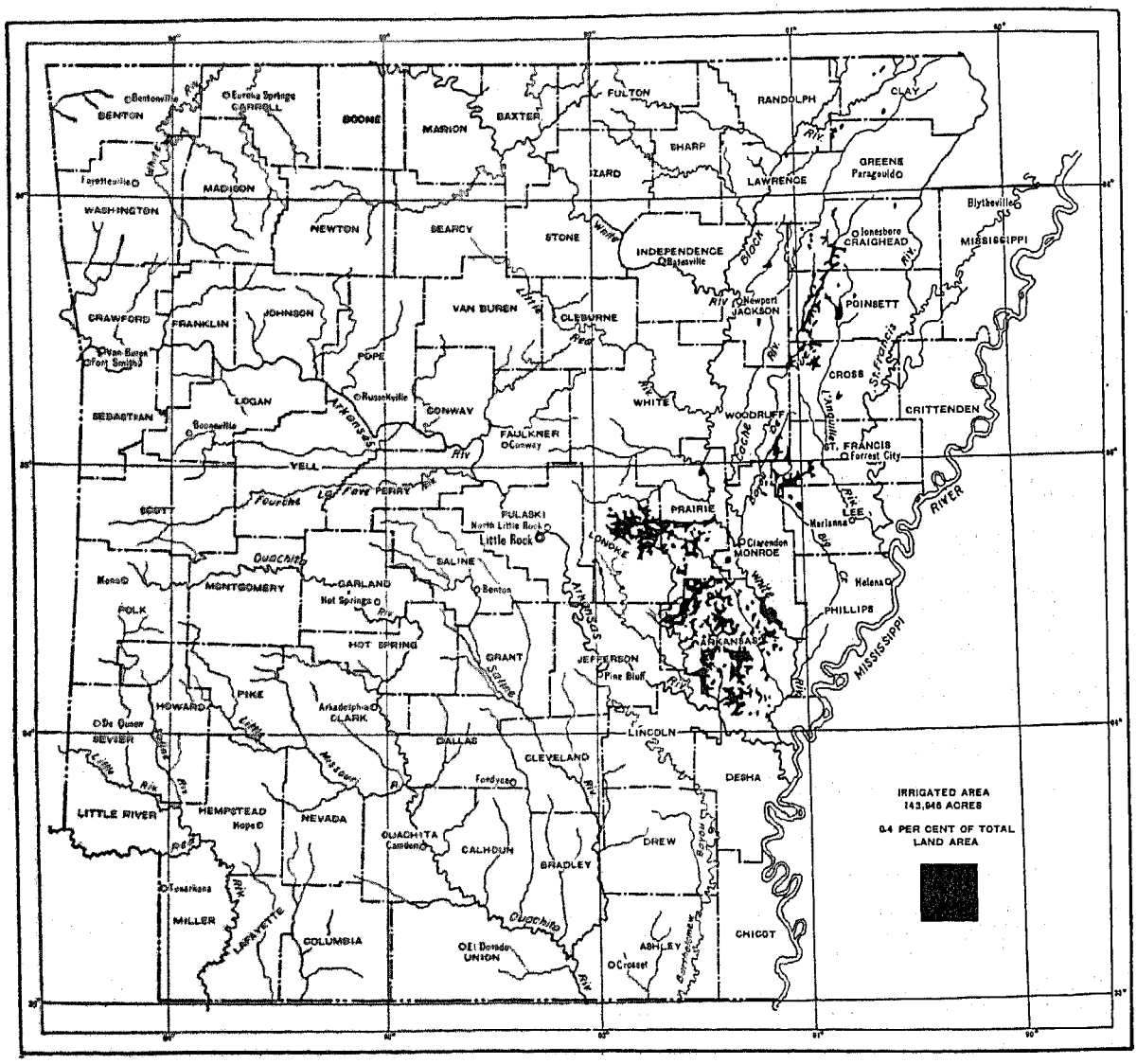
[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.

[2] Not reported in 1910.

[3] Not reported in 1920.

ARKANSAS

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

The rainfall in Arkansas is sufficient for the growing of general crops without irrigation, the annual average being about 47 inches.

The rainfall for the year 1919 was about 7 inches above the normal, and rice was damaged to some extent by rain during harvest.

WATER SUPPLY FOR IRRIGATION.

Arkansas is abundantly supplied with streams, but about 94 per cent of the rice is watered from wells, from which the water is pumped. The average lift is about 50 feet, and there seems to be sufficient water for all the land that the farmers care to irrigate.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.[1]	Per cent of all farms.	Acres.	Per cent of increase.[1]	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	1,166	402.6	0.5	143,946	418.7	0.4	0.3	1.6
1910	232	.....	0.1	27,753	.....	0.1	0.2	0.3
1900	20	.....	(2)	25	.....	(2)	(2)	(2)
1890	.....	.....	.....	9	.....	(2)	(2)	(2)

[1] Per cent not shown when base is less than 100.
[2] Less than one-tenth of 1 per cent.

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	944	246,480	143,946	58.4	179,013
1890-1899	3	2,400	1,640	68.3	1,640
1900-1904	2	700	470	67.1	550
1905-1909	68	19,230	11,840	61.6	14,304
1910-1914	335	92,862	49,100	52.9	61,227
1915-1919	447	105,869	64,474	60.9	79,108
Not reported	89	25,419	16,422	64.6	22,184

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	143,946	27,753	116,193	418.7	179,013	246,480
Streams, gravity	120	2,542	−2,422	−95.3	220	220
Streams, pumped	6,009	543	5,466	.....	6,585	6,825
Wells, pumped	135,260	24,398	110,862	454.4	168,548	235,620
Lakes, pumped	450	270	180	66.7	950	950
Stored storm water	40	(2)	40	.....	55	55
Streams, gravity, and pumped wells	250	(2)	250	.....	300	300
Other mixed	1,817	(2)	1,817	.....	2,355	2,510

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

The state of Arkansas has no legislation regarding the organization of enterprises for supplying water for irrigation, and, as shown by Table 5, almost the entire area irrigated is supplied with water by individual or partnership enterprises. With a very few exceptions, each rice grower has his own well and pumping plant.

Neither the Federal Carey Act (act of Aug. 18, 1894) nor the Federal reclamation act (act of June 17, 1902) applies to this state.

The acreage irrigated in 1909 was not reported in this way, but in that year, as in 1919, the irrigated land was practically all supplied with water from private wells.

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

ITEM.	Total acreage.	CHARACTER OF ENTERPRISE.		
		Individual and partnership.	Cooperative.	Commercial.
Acreage irrigated	143,946	140,471	1,075	2,400
Acreage enterprises were capable of irrigating	179,013	175,338	1,275	2,400
Acreage included in enterprises	246,480	242,380	1,500	2,600

ACREAGE, BY DRAINAGE BASIN.

In Table 6 the acreage figures are presented by the drainage basins in which the land lies. The figures for Arkansas have not been presented in this form in the report of any previous census, consequently no comparisons can be made. The rice-growing industry in Arkansas has been developed since 1902, when a special census was taken, for which the results were presented by drainage basins.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919.

DRAINAGE BASIN.	Area irrigated in 1919 (acres).	Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
Total	143,946	246,480	179,013
Red River	500	500	500
Ouachita River	42	140	105
White River	74,918	131,346	95,709
Arkansas River	63,521	100,296	76,779
St. Francis River	4,965	14,198	5,920

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 7.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1910 AND 1920.

CENSUS YEAR.	Amount.	AVERAGE PER ACRE.	
		Amount.	Per cent of increase.
1920	$7,183,322	$40.13	221.8
1910	587,834	12.47	.....

TABLE 8.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING

DATE OF BEGINNING.	AMOUNT.	Per cent of total.	Average per acre.
Total	$7,183,322	100.0	$40.13
1890–1899	93,111	1.3	56.78
1900–1904	25,926	0.3	45.50
1905–1909	459,542	6.4	32.13
1910–1914	2,276,584	31.7	37.18
1915–1919	3,302,492	46.0	41.75
Not reported	1,025,567	14.3	46.28

TABLE 9.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$7,183,322	100.0	$40.13	99,255	$13.67
Streams, gravity	3,374	0.1	17.61	.....	.....
Streams, pumped	99,455	1.3	14.65	3,509	7.06
Wells, pumped	7,028,773	97.8	41.70	93,471	14.06
Lakes, pumped	9,500	0.1	10.00	450	11.78
Stored storm water	1,500	(2)	27.27	49	10.00
Streams, gravity, and pumped wells	8,500	0.1	28.33	170	30.15
Other mixed	34,725	0.5	14.75	1,815	4.16

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

TABLE 10.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$7,183,322	100.0	99,255	$13.67
Individual and partnership	7,073,297	98.5	99,255	13.67
Cooperative	60,013	0.8	.....	.....
Commercial	50,012	0.7	.....	.....

[1] Based on area irrigated in 1919.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	1920
Total	$7,183,322
Red River	20,006
Ouachita River	1,100
White River	3,992,967
Arkansas River	2,950,522
St. Francis River	218,727

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 12 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 12.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	134
Acreage included in enterprises reporting land drained or needing drainage	37,574
Acreage for which drains have been installed	27,350
Additional acreage needing drainage	2,821
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	72.8
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	11.1
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	12.2

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. None of the water used in 1919 was measured, and quantities are probably taken from the rated capacities of the pumps and the time the pumps were operated. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 13.—QUANTITY OF WATER USED IN 1919.

Average volume of water entering canals	second-feet..	550
Area irrigated in 1919	acres..	12,685
Average number of acres per second-foot		23
Total quantity of water entering canals	acre-feet..	50,859
Area irrigated in 1919	acres..	12,720
Average quantity per acre	acre-feet..	4.0
Total quantity of water delivered	acre-feet..	13,089
Area irrigated in 1919	acres..	5,189
Average quantity per acre	acre-feet..	2.5

IRRIGATION WORKS.

TABLE 14.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.		Pipe lines, length (miles).	PUMPED WELLS.		PUMPING PLANTS.			
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).		Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.	
															Number.	Capacity (gallons per minute).
Total	63	17	84	1,205	68	50	18	16	20	0.4	1,089	1,470,147	1,041	58,332	1,121	1,654,097
1890-1899											8	9,400	7	460	8	6,400
1900-1904											3	4,200	3	185	3	4,200
1905-1909	1	1	9	67	15	1	2	3			80	106,050	79	4,547	80	144,450
1910-1914	13	4	37	210	29	20	10	6			389	499,100	371	20,036	393	591,200
1915-1919	49	12	36	916	21	29	6	6		0.4	459	633,655	462	26,744	476	692,005
Not reported			2	12	3			1	20		150	217,742	119	6,360	156	215,842

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.		Pipe lines, length (miles).	PUMPED WELLS.		PUMPING PLANTS.			
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).		Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.	
															Number.	Capacity (gallons per minute).
Total	63	17	84	1,205	68	50	18	16	20	0.4	1,089	1,470,147	1,041	58,332	1,121	1,654,097
Individual and partnership	63	17	82	1,160	59	50	18	16	20	0.4	1,081	1,455,647	1,031	57,502	1,111	1,620,097
Cooperative											8	14,500	8	530	8	14,000
Commercial			2	45	9								2	300	2	20,000

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.		Pipe lines, length (miles).	PUMPED WELLS.		PUMPING PLANTS.				
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).		Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.		Average lift (feet).
															Number.	Capacity (gallons per minute).	
Total	63	17	84	1,205	68	50	18	16	20	0.4	1,089	1,470,147	1,041	58,332	1,121	1,654,097	50
Red River											3	1,200	1		3	2,500	35
Ouachita River	1		1							0.4							
White River	62	14	58	1,067	49	40	11	5			626	820,388	584	30,537	633	858,688	50
Arkansas River		3	24	136	19	10	7	11	20		404	575,509	404	25,572	421	714,459	53
St. Francis River			1	2							56	73,050	52	2,223	64	78,450	31

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		THE STATE.	Arkansas.	Clay.[1]	Craighead.	Cross.	Jackson.[1]	Lawrence.[1]
1	Number of all farms in 1920	232,604	2,121	3,335	3,549	2,507	3,227	2,759
2	Number of farms reporting irrigation for rice growing in 1919	1,166	609	4	26	40	2	11
3	Per cent of all farms	0.5	28.7	0.1	0.7	1.6	0.1	0.4
4	Number of farms reporting irrigation for rice growing in 1909	232	102	.....	(2)	(2)	.....	.....
5	Per cent of increase, 1909-1919	402.6	497.1	.....	.....	.....	.....	.....
	LAND AND FARM AREA.							
6	Approximate land area—acres	33,616,000	640,000	418,560	439,680	396,160	405,760	378,880
7	All land in farms—acres	17,456,750	282,097	215,298	204,899	144,134	221,310	220,054
8	Improved land in farms—acres	9,210,556	195,910	156,989	141,459	82,529	129,882	126,953
9	Area irrigated for rice growing in 1919—acres	143,946	76,511	345	3,190	3,410	810	889
10	Per cent of improved land in farms	1.6	39.1	0.2	2.3	4.1	0.6	0.7
11	Area irrigated for rice growing in 1909—acres	27,753	13,250	.....	100	60	.....	.....
12	Per cent of increase, 1909-1919	418.7	477.4	.....	.....	.....	.....	.....
13	Area enterprises were capable of irrigating in 1920—acres	179,613	89,546	905	5,047	4,655	875	2,145
14	Area enterprises were capable of irrigating in 1910—acres	47,136	20,240	.....	200	120	.....	.....
15	Per cent of increase, 1910-1920	279.8	342.4	.....	.....	.....	.....	.....
16	Area included in enterprises in 1920—acres	246,480	117,822	1,040	6,869	11,830	900	3,725
17	Area included in enterprises in 1910—acres	52,883	22,485	.....	260	120	.....	.....
18	Per cent of increase, 1910-1920	366.1	424.0	.....	.....	.....	.....	.....
	IRRIGATION WORKS.							
	Independent enterprises:							
19	Number, 1920	944	454	4	44	35	2	13
20	Number, 1910	310	127	.....	2	1	.....	.....
	Main ditches:							
21	Number, 1920	84	17	5	12	.....	1	17
22	Number, 1910	217	170	.....	2	.....	.....	.....
23	Length, 1920—miles	68	22	7	6	.....	1	11
24	Length, 1910—miles	131	73	.....	2	.....	.....	.....
25	Capacity, 1920—second-feet	1,205	166	15	820	.....	5	89
26	Capacity, 1910—second-feet	.....	.....	.....	.....	.....	.....	.....
	Laterals:							
27	Number, 1920	50	4	.....	.....	.....	.....	35
28	Number, 1910	.....	.....	.....	.....	.....	.....	.....
29	Length, 1920—miles	18	4	.....	.....	.....	.....	9
30	Length, 1910—miles	.....	.....	.....	.....	.....	.....	.....
	Reservoirs:							
31	Number, 1920	16	.....	.....	.....	.....	.....	2
32	Number, 1910	19	7	.....	1	.....	.....	.....
33	Capacity, 1920—acre-feet	20	.....	.....	.....	.....	.....	.....
34	Capacity, 1910—acre-feet	3	.....	.....	1	.....	.....	.....
	Pumped wells:							
35	Number, 1920	1,089	496	4	63	41	3	13
36	Number, 1910	307	119	.....	2	1	.....	.....
37	Capacity, 1920—gallons per minute	1,470,147	573,524	9,700	66,000	63,650	8,250	26,000
38	Capacity, 1910—gallons per minute	268,829	22,835	.....	13,500	1,200	.....	.....
	Pumping plants:							
39	Number, 1920	1,041	497	4	51	36	3	13
40	Number, 1910	315	128	.....	2	1	.....	.....
41	Engine capacity, 1920—horsepower	58,322	29,299	180	1,987	2,013	220	425
42	Engine capacity, 1910—horsepower	12,440	5,298	.....	50	40	.....	.....
43	Pump capacity, 1920—gallons per minute	1,654,097	749,974	9,000	67,500	61,350	5,250	25,200
44	Pump capacity, 1910—gallons per minute	436,402	173,305	.....	13,500	1,200	.....	.....
45	Average lift, 1920—feet	50	61	26	30	27	42	20
	CAPITAL INVESTED.							
46	Capital invested to Jan 1, 1920—dollars	7,183,322	3,492,391	47,414	140,375	174,628	43,000	47,950
47	Capital invested to July 1, 1910—dollars	587,834	90,219	.....	5,950	1,500	.....	.....
48	Per cent of increase, 1910-1920	.....	.....	.....	.....	.....	.....	.....
49	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	40.13	39.00	52.39	27.81	37.51	49.14	22.35
50	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	12.47	4.46	.....	29.75	12.50	.....	.....
	ESTIMATED FINAL COST.							
51	Estimated final cost of existing enterprises in 1920—dollars	7,283,522	3,564,791	47,414	140,375	174,628	43,000	48,450
52	Estimated final cost of existing enterprises in 1910—dollars	612,834	115,219	.....	5,950	1,500	.....	.....
53	Per cent of increase, 1910-1920	.....	.....	.....	.....	.....	.....	.....
54	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	29.55	30.26	45.59	20.44	14.76	47.78	13.01
55	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	11.59	5.12	.....	22.88	12.50	.....	.....

[1] No irrigation reported in 1909.

[2] Not shown in report for 1910.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		Lonoke.	Monroe.[1]	Poinsett.	Prairie.	St. Francis.	Woodruff.	Other counties.
1	Number of all farms in 1920	5,596	3,305	2,257	2,413	4,586	2,853	194,096
2	Number of farms reporting irrigation for rice growing in 1919	166	3	77	165	26	18	19
3	Per cent of all farms	3.0	0.1	3.4	6.8	0.6	0.6	(2)
4	Number of farms reporting irrigation for rice growing in 1909	58	.....	16	35	9	5	7
5	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	.....	.....
	LAND AND FARM AREA.							
6	Approximate land area—acres	516,480	385,920	461,440	423,680	401,920	369,280	28,378,240
7	All land in farms—acres	320,088	150,029	127,124	238,994	190,175	163,305	14,979,243
8	Improved land in farms—acres	217,981	101,215	78,191	153,830	133,540	104,386	7,588,191
9	Area irrigated for rice growing in 1919—acres	24,941	1,135	10,310	10,225	6,840	3,838	1,502
10	Per cent of improved land in farms	11.4	1.1	13.2	6.6	5.1	3.7	(2)
11	Area irrigated for rice growing in 1909—acres	7,223	.....	978	3,587	1,450	725	380
12	Per cent of increase, 1909–1919	245.3	.....	954.2	185.1	371.7	429.4	295.3
13	Area enterprises were capable of irrigating in 1920—acres	30,788	1,565	12,850	13,216	9,355	5,245	2,821
14	Area enterprises were capable of irrigating in 1910—acres	12,651	.....	1,975	6,045	2,720	1,230	1,955
15	Per cent of increase, 1910–1920	143.4	.....	550.6	118.6	243.9	326.4	44.3
16	Area included in enterprises in 1920—acres	34,502	2,733	26,578	16,900	10,490	9,915	3,176
17	Area included in enterprises in 1910—acres	14,335	.....	2,920	6,253	2,865	1,340	2,305
18	Per cent of increase, 1910–1920	140.7	.....	810.2	170.3	266.1	639.9	37.8
	IRRIGATION WORKS.							
	Independent enterprises:							
19	Number, 1920	145	6	107	70	28	30	6
20	Number, 1910	88	.....	23	37	14	11	7
	Main ditches:							
21	Number, 1920	24	2	2	.....	1	.....	3
22	Number, 1910	19	.....	4	10	5	4	3
23	Length, 1920—miles	16	.....	.....	.....	3	.....	2
24	Length, 1910—miles	13	.....	20	5	9	3	6
25	Capacity, 1920—second-feet	81	8	5	.....	12	.....	4
26	Capacity, 1910—second-feet	.....	.....	.....	.....	.....	.....	.....
	Laterals:							
27	Number, 1920	9	2	.....	.....	.....	.....	.....
28	Number, 1910	.....	.....	.....	.....	.....	.....	.....
29	Length, 1920—miles	5	.....	.....	.....	.....	.....	.....
30	Length, 1910—miles	.....	.....	.....	.....	.....	.....	.....
	Reservoirs:							
31	Number, 1920	14	.....	.....	.....	.....	.....	.....
32	Number, 1910	8	.....	2	.....	.....	.....	1
33	Capacity, 1920—acre-feet	20	.....	.....	.....	.....	.....	.....
34	Capacity, 1910—acre-feet	2	.....	.....	.....	.....	.....	.....
	Pumped wells:							
35	Number, 1920	149	8	128	79	58	38	9
36	Number, 1910	91	.....	24	39	15	12	4
37	Capacity, 1920—gallons per minute	272,850	11,400	168,600	92,415	104,358	59,200	14,200
38	Capacity, 1910—gallons per minute	121,745	.....	19,467	44,077	21,365	14,640	10,000
	Pumping plants:							
39	Number, 1920	152	7	117	77	46	31	7
40	Number, 1910	90	.....	24	38	13	12	7
41	Engine capacity, 1920—horsepower	9,745	330	4,697	4,431	3,175	1,445	335
42	Engine capacity, 1910—horsepower	3,530	.....	561	1,504	615	342	500
43	Pump capacity, 1920—gallons per minute	279,150	11,400	173,850	99,165	96,358	59,900	16,000
44	Pump capacity, 1910—gallons per minute	128,685	.....	21,160	46,977	21,365	14,640	15,570
45	Average lift, 1920—feet	43	73	33	59	33	45	23
	CAPITAL INVESTED.							
46	Capital invested to Jan. 1, 1920—dollars	1,272,693	76,674	404,158	787,275	425,414	192,550	78,800
47	Capital invested to July 1, 1910—dollars	230,714	.....	31,600	128,682	51,552	22,715	24,902
48	Per cent of increase, 1910–1920	451.6	.....	.....	511.8	725.2	747.7	216.4
49	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	41.34	48.99	31.45	59.57	45.47	36.71	27.93
50	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	18.24	.....	16.00	21.29	18.95	18.47	12.74
	ESTIMATED FINAL COST.							
51	Estimated final cost of existing enterprises in 1920—dollars	1,297,493	76,674	404,158	789,275	425,414	192,550	79,300
52	Estimated final cost of existing enterprises in 1910—dollars	230,714	.....	31,600	128,682	51,552	22,715	24,902
53	Per cent of increase, 1910–1920	462.4	.....	.....	513.4	725.2	747.7	218.4
54	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	37.61	28.05	15.21	46.70	40.55	19.42	24.97
55	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	16.09	.....	10.82	20.58	17.99	16.95	10.80

[1] No irrigation reported in 1909.

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

CALIFORNIA.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of California collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

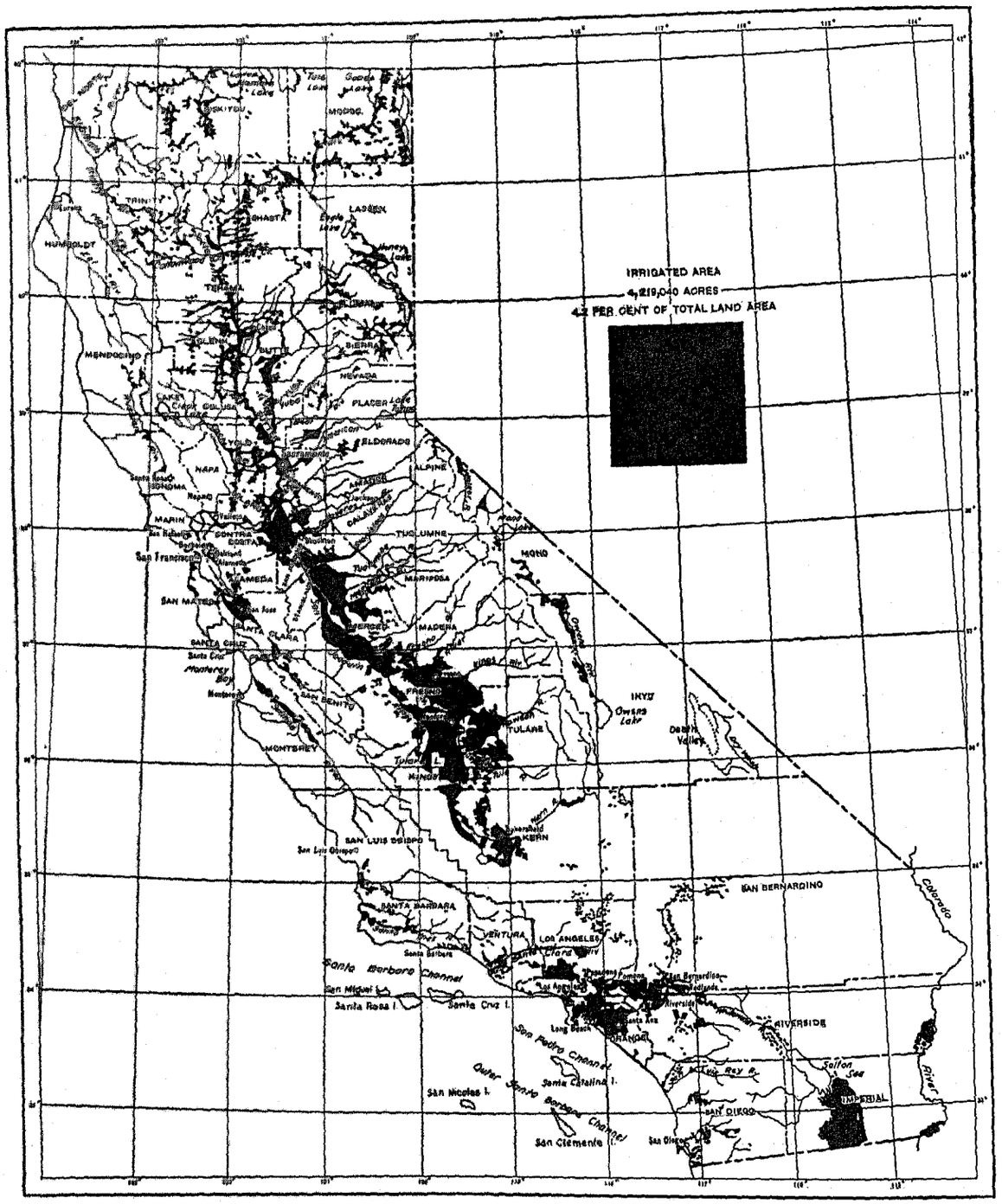
ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	117,670	88,197	29,473	33.4
Approximate land area of the state.....acres..	99,617,280	99,617,280	.....	.....
All land in farms.....acres..	29,365,667	27,931,444	1,434,223	5.1
Improved land in farms.....acres..	11,878,339	11,389,894	488,445	4.3
Number of farms irrigated	67,391	39,352	28,039	71.3
Area irrigated.....acres..	4,219,040	2,664,104	1,554,936	58.4
Area enterprises were capable of irrigating.....acres..	5,894,466	3,619,378	2,275,088	62.9
Area included in enterprises.....acres..	7,805,207	5,490,360	2,314,847	42.2
Per cent irrigated:				
Number of all farms	57.3	44.6	12.7	.....
Approximate land area of the state	4.2	2.7	1.5	.....
Land in farms	14.4	9.5	4.9	.....
Improved land in farms	35.5	23.4	12.1	.....
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	1,675,426	955,274	720,152	75.4
Excess of area included in enterprises over area irrigated.....acres..	3,586,167	2,826,256	759,911	26.9
Area of irrigated land reported as available for settlement....acres..	533,981	(2)	.....	.....
Capital invested	$194,886,388	$72,580,030	$122,306,358	168.5
Average per acre enterprises were capable of irrigating	$33.06	$20.05	$13.01	64.9
Estimated final cost of existing enterprises	$225,799,123	$84,392,344	$141,406,779	167.6
Average per acre included in enterprises	$28.93	$15.37	$13.56	88.2
Average cost of operation and maintenance per acre	$4.40	$1.54	$2.86	185.7
IRRIGATION WORKS.				
Number of enterprises	24,115	13,970	10,145	72.6
Number of main ditches	6,040	8,590	−2,550	−29.7
Length of main ditches.....miles..	14,437	12,620	1,817	14.4
Capacity of main ditches.....second-feet..	115,237	89,597	25,640	28.6
Number of lateral ditches	9,190	6,143	3,047	49.6
Length of lateral ditches.....miles..	12,947	8,509	4,438	52.2
Number of reservoirs	3,030	1,583	1,447	91.4
Capacity of reservoirs.....acre-feet..	1,091,394	743,269	348,125	46.8
Number of flowing wells	1,415	2,361	−946	−40.1
Capacity of flowing wells.....gallons per minute..	287,187	477,343	−190,156	−39.8
Number of pumped wells	25,401	10,724	14,677	136.9
Capacity of pumped wells.....gallons per minute..	10,608,476	4,119,575	6,488,901	157.5
Number of pumping plants	21,561	9,297	12,264	131.9
Engine capacity.....horsepower..	386,200	128,143	258,057	201.4
Pump capacity.....gallons per minute..	16,773,692	5,276,298	11,497,394	217.9
Average lift.....feet..	41	(2)	41	.....

[1] A minus sign (−) denotes decrease.

[2] Not reported in 1910.

CALIFORNIA

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

In California both the amount and the seasonal distribution of precipitation have an important influence on the necessity for irrigation. The state has a very wide range in amount of precipitation, the average annual amount reaching about 60 inches in the northwestern part of the state and only 2 or 3 inches in the southeastern part. Throughout the state there is a well-defined wet season during the winter months and an almost entire absence of rainfall in the summer months. The latter condition makes irrigation necessary for the growing of summer crops in some sections where the total precipitation would be sufficient if more evenly distributed throughout the year, while the concentration of the year's precipitation in a short period makes it possible to grow some crops, particularly grain, without irrigation where it would not be possible if the rainfall were distributed through the year.

That part of the state lying north of San Francisco Bay, except a part of the Sacramento Valley, receives more than 20 inches of precipitation annually, and crops are grown both with and without irrigation, while the part of the state south of San Francisco Bay, except in the high mountains, receives less than 20 inches, and irrigation is generally practiced, although some crops are grown without it.

In Sacramento Valley the average annual precipitation is between 15 and 20 inches, but practically all of this occurs in the winter. Grain crops are generally grown without irrigation, and alfalfa, rice, and orchards are irrigated.

In San Joaquin Valley the average annual precipitation is from 5 to 14 inches, and here most crops except grain are generally irrigated; while there are large areas of irrigated grain.

In the southeastern part of the state desert conditions are found, the average annual precipitation being from 2 to 5 inches, and no crops can be grown without irrigation.

Along the coast of southern California the precipitation is from 15 to 20 inches, and crops are quite generally grown both with and without irrigation.

In the Sierra Nevada Mountains the snowfall in the winter is very heavy, and this maintains a good summer flow in most of the streams.

The summer of 1919 was one of the driest on record and in some sections, especially in the San Joaquin Valley, this occasioned a shortage of water for irrigation.

WATER SUPPLY FOR IRRIGATION.

In northern California, except the Sacramento Valley, the supply of water available for irrigation is limited, and the area irrigated is small.

In the Sacramento Valley water is taken from the Sacramento and its tributaries, and while there is a shortage at times there is a very large supply of flood water available for storage.

In the San Joaquin Valley, where the larger part of the irrigated land of the state is located, the water supply comes principally from San Joaquin River and its tributaries from the east which rise in the high Sierras. These rivers carry large volumes of water during the rainy season and in the early summer when the snow in the mountains is melting, but have a low discharge in the summer, so that there is usually a shortage of water in this season. While some storage has been provided, there is opportunity for much more, and efforts are being made to have the owners of existing enterprises combine to build reservoirs and coordinate their canal systems in such a way as to save the flood waters and make the largest use of them. Natural overflow and seepage from irrigation have brought the ground water near the surface in many places, and during recent years many wells have been sunk and water is pumped from them to supplement the supply from streams when they are low. There is opportunity for a large extension of irrigation from this source as well as from the storage of flood waters. In 1919 the water supply in this section was unusually short, and much land usually irrigated was not watered.

In the coast region of southern California there are many short streams rising in the coast range and discharging into the Pacific. In some sections there is little opportunity for storage, and a large part of the water goes unused. In this section, as well as in other parts of the state, there are many wells, both flowing and pumped. The heavy draft on the underground supplies has lowered the ground water to such an extent that many wells that once flowed are now pumped, and the lift in pumped wells has greatly increased. This condition is being remedied to some extent by spreading the flood waters over the gravelly lands where the streams emerge from the mountains, so that some of the water will find its way into the underground supply rather than waste down the stream channels.

Similar work is proposed for the Coachella Valley, in southeastern California, where small areas are watered from wells.

Imperial Valley is supplied from Colorado River. Although the water supply in the river is usually sufficient there is sometimes difficulty in getting the water from the river into the canal because of silting. Plans for storage and for relocating the canal are under discussion. A large area of land in this valley is available for cultivation and a large quantity of water is available for storage. There are other opportunities in California to use water from Colorado River, where it forms the boundary between California and Arizona, and some land has been irrigated. Here, as in the Imperial Valley, the water supply is ample if storage is provided for the surplus flood waters.

Colorado River extends into or borders seven states, and there are conflicting claims as to the use of its waters that are delaying the construction of reservoirs. Attempts are being made to settle these conflicts through a compact between the states. Such a compact has been authorized by Congress.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.	Per cent of all farms.	Acres.	Per cent of increase.	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	67,391	71.3	57.3	4,219,040	58.4	4.2	14.4	35.5
1910	39,352	53.3	44.6	2,664,104	84.2	2.7	9.5	23.4
1900	25,675	87.0	35.4	1,446,114	44.0	1.5	5.0	12.1
1890	13,732	.....	26.0	1,004,233	.....	1.0	4.7	8.2

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	24,115	7,805,207	4,219,040	54.1	5,894,466
Before 1860	258	219,261	108,200	49.3	134,969
1860–1869	338	152,858	88,485	57.9	116,015
1870–1879	519	1,902,946	1,039,852	53.0	1,573,635
1880–1889	641	573,569	347,685	60.6	392,478
1890–1899	788	757,611	404,133	53.3	625,592
1900–1904	1,195	628,448	456,261	72.6	558,366
1905–1909	1,854	498,171	290,086	58.2	359,151
1910–1914	6,762	1,356,230	649,875	47.9	928,067
1915–1919	7,573	1,220,876	541,500	44.4	849,319
Not reported	4,277	435,237	292,963	67.3	356,874

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	4,219,040	2,664,104	1,554,936	58.4	5,894,466	7,805,207
Streams, gravity	2,564,445	2,216,757	347,688	15.7	3,627,280	4,499,148
Streams, pumped	295,673	29,965	265,708	886.7	480,926	664,287
Streams, pumped and gravity	60,278	(2)	60,278	.....	62,913	84,768
Wells, pumped	826,846	276,595	550,251	198.9	1,068,229	1,488,213
Wells, flowing	17,653	74,128	−56,475	−76.2	21,826	34,739
Wells, flowing and pumped	23,561	(2)	23,561	.....	27,318	57,788
Lakes, gravity	48,084	15,896	32,188	202.5	48,321	159,827
Lakes, pumped	4,168	2,574	1,594	61.9	4,429	14,067
Springs	27,698	31,779	−4,081	−12.8	36,285	56,227
Stored storm water	20,351	16,410	3,941	24.0	29,681	38,546
City water	515	(2)	515	.....	577	887
Sewage	1,385	(2)	1,385	.....	1,398	2,189
Streams, gravity, and pumped wells	87,897	(2)	87,897	.....	99,277	127,651
Streams, gravity, and flowing wells	4,255	(2)	4,255	.....	5,114	5,686
Other mixed	228,424	(2)	228,424	.....	371,033	560,364
Other and not reported	7,807	(2)	7,807	.....	9,549	10,820

[1] A minus sign (−) denotes decrease. [2] Not included in classification in 1909.

ACREAGE, BY CHARACTER OF ENTERPRISE.

California was the first state to enact an irrigation district law containing the provision for issuing bonds that are a lien on the lands within the districts. The so-called "Wright Act," containing this provision, was enacted in 1887, and has served as a basis for practically all irrigation district legislation in the United States. Many districts were organized under this act, only a few of which, however, have survived to the present time.

Prior to the enactment of the Wright Act there were some districts created by special act, and there was a special law providing for the organization of districts, without the bonding power, in Los Angeles County.

The Wright Act was amended and reenacted in 1897, the new law being known as the "Bridgeford Act." This law has been amended in various particulars by almost every legislature since its passage, but is still in force.

In 1915 there was enacted a law creating a State Irrigation Board, which was empowered to organize "water districts" under state supervision, rather than county supervision, as was done under the older laws, but this law has been declared unconstitutional by the state supreme court.

Many irrigation districts in California have been organized to build irrigation works, and some have taken over works built by other agencies. The lands in the Imperial Valley have been organized into an irrigation district, which controls the diversion works and the main canal, while mutual companies control the distributing canals. This land is reported under "Cooperative" in Table 5.

California accepted the conditions of the Federal Carey Act (act of Aug. 18, 1894) in 1915, providing for a "Carey Act Commission" and for the organization of "state irrigation districts" to reclaim Carey Act lands. However, no land is reported as irrigated under this law.

In 1917 California enacted a "land settlement" law, providing for the building of irrigation works and other improvements, including dwellings, etc., by the state, and the sale of the farms created on long-time and easy terms to settlers. Only one enterprise had advanced far enough to be reported in the Fourteenth Census, and this appears under "State" in Table 5. Other projects have been begun.

Most of the cooperative enterprises reported in Table 5 are mutual water companies supplying water to members only.

Commercial companies in California are subject to control by the state railroad commission as to rates charged and conditions of service.

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Acres.	Per cent.
ACREAGE IRRIGATED.				
Total	4,219,040	2,664,104	1,554,936	58.4
Individual and partnership	1,502,870	961,136	541,734	56.4
Cooperative	1,215,096	779,020	436,676	56.1
Irrigation district	577,168	173,793	403,375	232.1
Commercial	873,499	746,265	127,234	17.0
U. S. Reclamation Service	36,622	400	36,222	.....
U. S. Indian Service	697	3,490	−2,793	−80.0
State	2,936	(2)	2,936	.....
City	6,213	(2)	6,213	.....
Other	3,064	(2)	3,064	.....
Not reported	275	(2)	275	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	5,894,466	3,619,378	2,275,088	62.9
Individual and partnership	1,919,663	1,131,951	787,712	69.6
Cooperative	1,705,647	984,570	721,077	73.2
Irrigation district	899,785	294,108	605,677	205.9
Commercial	1,307,968	1,204,059	103,909	8.6
U. S. Reclamation Service	42,805	1,200	41,605	.....
U. S. Indian Service	986	3,490	−2,504	−71.7
State	4,210	(2)	4,210	.....
City	9,073	(2)	9,073	.....
Other	4,054	(2)	4,054	.....
Not reported	275	(2)	275	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total	7,805,207	5,490,360	2,314,847	42.2
Individual and partnership	2,698,798	1,512,511	1,186,287	78.4
Cooperative	2,148,711	1,388,435	760,276	54.8
Irrigation district	1,101,220	606,351	494,869	81.6
Commercial	1,778,135	1,965,063	−186,928	−9.5
U. S. Reclamation Service	47,669	14,200	33,469	235.7
U. S. Indian Service	5,252	3,800	1,452	38.2
State	6,259	(2)	6,259	.....
City	10,645	(2)	10,645	.....
Other	8,168	(2)	8,168	.....
Not reported	350	(2)	350	.....

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The laws of California relating to water rights are summarized in the following paragraphs:

In 1850 California adopted the common law of England, but without specific mention of water rights.

The first legislation in California relating to water rights was the act of 1872. This act provided that rights to water "flowing in a river or stream or down a canyon or ravine may be acquired by appropriation in the manner provided by law"; that the appropriation must be for some useful or beneficial purpose; that as between appropriators the "first in time is the first in right"; and that the appropriator must post a notice at the point of intended diversion and file a copy in the county records. This law was in effect until 1913.

The constitution of the state, adopted in 1879, contained the following section relating to water rights: "The use of all waters now appropriated, or that may hereafter be appropriated, for sale, rental, or distribution is hereby declared to be a public use, and subject to the regulation and control of the state, in the manner to be prescribed by law." (Art. XIV.)

While the constitution and laws provide for rights being acquired by appropriation, the courts of the state have recognized riparian rights under the law of 1850 referred to above. (Lux *v.* Haggins, 69 Cal., 255.)

In 1913 California adopted a new system of public control of the use of water and attempted to eliminate the conflict between riparian rights and right by appropriation by providing that owners of riparian lands must put water to use in order to retain their rights. The section of the law relating to this point is as follows: "Section 11. All water or the use of water which has never been appropriated, or which has been heretofore appropriated and which has not been in process, from the date of the initial act of appropriation, of being put, with due diligence in proportion to the magnitude of the work necessary properly to utilize for the purpose of such appropriation such water or the use of water, or which has not been put, or which has ceased to be put to some useful or beneficial purpose, or which may hereafter be appropriated and cease to be put, to the useful or beneficial purpose for which it was appropriated, or which in the future may be appropriated and not be, in the process of being put, from the date of the initial act of the appropriation, to the useful or beneficial purpose for which it was appropriated, with due diligence in proportion to the magnitude of the work necessary properly to utilize for the purpose of such appropriation, such water or the use of water, is hereby declared to be unappropriated. And all waters flowing in any river, stream, canyon, ravine, or other natural channel, excepting so far as such waters have been or are being applied to useful and beneficial purpose upon, or in so far as such waters are or may be reasonably needed for useful, and beneficial purposes upon lands riparian thereto, or otherwise appropriated, is and are hereby declared to be public waters of the state of California and subject to appropriation in accordance with the provisions of the act. If any portion of the waters of any stream shall not be put to a useful or beneficial purpose to or upon lands riparian to such stream for any continuous period of 10 consecutive years after the passage of this act, such nonapplication shall be deemed to be conclusive presumption that the use of such portions of the waters of such stream is not needed upon said riparian lands for any useful or beneficial purpose; and such portion of the waters of any stream so nonapplied, unless otherwise appropriated for a useful or beneficial purpose, is hereby declared to be in the use of the state and subject to appropriation in accordance with the provisions of this act."

The new law created a water commission, and provided that parties wishing to take water should apply to the water commission for permission to do so, and that the commission should issue licenses on completion of the works in accordance with the permits.

The law of 1913 provided also for the preparation by the commission of findings regarding rights to water, which were to be filed with the courts and were to serve as bases for adjudications of water rights. This part of the law was amended in 1917, changing the procedure and providing that the findings of the commission shall be filed with the courts, and shall be issued as decrees by the courts, after hearings and such changes as the courts may make. After a decree is rendered the commission is to issue to each claimant a certificate setting forth his rights as determined by the court.

An act of 1917 provided that after three years' nonuse of water for the purpose for which it was appropriated or adjudicated "such unused water shall revert to the public and shall be regarded as unappropriated public water."

The portion of the law of 1913 relating to the acquiring of rights is in operation, but the commission is delaying any action for adjudication of rights until the expiration of 10 years from the passage of the act, when rights attaching to riparian lands but not utilized will have expired under the terms of the act.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909, per cent of total.
	Acres.	Per cent of total.	
Total	4,219,040	100.0	100.0
Appropriation and use	479,361	11.4	47.3
Notice filed and posted	704,608	16.7	16.6
Adjudicated by court	982,157	23.3	28.0
Permit from state	80,484	1.9	(1)
Certificate or license from state	25,484	0.6	(1)
Riparian rights	240,512	5.7	8.2
Underground	863,613	20.5	(2)
Other and mixed	396,703	9.4	(2)
Not reported	446,118	10.6	(2)

[1] No provision for permits or licenses from state in 1909.
[2] All land for which the class of water rights was not reported was included in "Appropriation and use."

ACREAGE, BY DRAINAGE BASIN.

The report of a special census taken in 1902 presented all data by drainage basins rather than by counties. The results of the census of 1920 have been tabulated on the same basis, and the data for 1902 are presented for purposes of comparison. For no other census have the results been tabulated in this form. The acreage reported for each drainage basin in 1919 comprises all the irrigated land in that drainage basin, including that watered from springs and wells. In the 1902 results the acreages irrigated from springs and wells were not reported for the smaller tributary streams, but the acreages for the tributaries were included in those reported for the main streams. This area is so small, however, that the comparison of the areas reported for the tributary streams is not seriously affected.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
Total	4,219,040	1,708,720	146.9	7,805,207	5,894,466
Colorado River	447,384	10,000	.....	621,015	494,975
Independent streams, northern California	139,861	125,779	11.2	259,336	193,255
Carson River	4,459	4,683	—4.8	7,027	4,819
Long Valley Creek	12,543	4,060	208.9	18,840	15,951
Mono Lake and tributaries	4,190	3,818	9.7	70,377	45,760
Susan River	31,784	23,533	35.1	36,225	33,313
Walker River	39,261	52,975	—25.9	42,295	40,355
Other independent streams	47,624	[2] 36,710	29.7	84,572	53,057
Independent streams, southern California	200,818	59,358	238.3	346,831	257,988
Mohave River	4,608	540	753.3	21,523	6,510
Owens River	144,024	51,902	177.5	200,147	182,748
San Jacinto River	20,829	5,040	314.1	34,974	22,263
Whitewater River	14,643	[3]	.....	37,604	22,282
Other independent streams	16,674	[2] 1,876	788.8	52,583	24,185
Pacific Ocean streams north of San Francisco Bay	66,091	56,272	17.3	146,670	85,698
Klamath River	62,535	52,709	18.6	122,853	70,275
Russian River	3,045	314	869.7	12,475	4,200
Other Pacific Ocean streams north of San Francisco Bay	421	[2] 3,249	—87.0	10,742	10,623
Pacific Ocean streams south of San Francisco Bay	543,285	279,519	94.4	831,490	662,847
Pajaro River	19,771	14,157	39.7	33,620	25,769
Salinas River	48,097	10,604	353.6	60,989	57,436
Santa Maria River	9,623	1,544	523.3	22,903	20,460
Santa Ynez River	3,491	1,423	153.8	10,082	9,645
Santa Clara River	28,270	14,214	98.9	43,205	30,216
Los Angeles River	39,072	5,310	.....	82,657	73,606
San Gabriel River	127,146	33,766	276.6	161,737	145,022
Santa Ana River	155,508	70,492	163.2	281,630	218,735
San Diego River	8,812	5,130	71.8	14,030	10,789
Other Pacific Ocean streams south of San Francisco Bay	53,595	[2] 122,899	—56.4	120,628	71,149
Sacramento River and tributaries	649,950	206,312	210.7	1,204,799	864,605
Sacramento River direct	194,397	10,942	.....	439,189	296,748
Pit River	89,984	72,072	24.9	129,964	107,478
Cow Creek	6,068	2,321	161.4	12,488	7,446
Cottonwood Creek	2,972	1,358	60.6	21,016	4,112
Battle Creek	2,966	2,642	12.3	6,290	5,108
Stony Creek	23,559	4,110	473.2	45,143	36,191
Feather River	142,841	67,111	112.8	186,796	107,463
Yuba River	19,473	[3]	.....	68,674	23,492
Cache Creek	24,541	2,756	553.4	56,498	31,212
American River	47,156	10,112	366.3	82,695	62,842
Other tributaries of Sacramento River	86,993	[2] 31,288	177.2	155,256	132,513

[1] A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.
[3] Not reported separately in 1902.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902—Continued.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
San Joaquin River and tributaries	2,103,694	932,931	125.5	4,294,966	3,248,919
San Joaquin River direct	642,261	129,647	395.4	1,083,802	873,300
Kern River	200,641	116,189	72.7	432,481	299,665
Tulare Lake	70,134	[2]	.....	204,860	147,444
Tule River	61,223	[2]	.....	175,777	109,412
Kaweah River	149,932	[2]	.....	356,703	299,474
Kings River	552,601	596,091	—7.3	1,052,406	895,263
Fresno River	12,414	10,729	15.7	30,004	14,016
Merced River	65,151	19,636	231.8	222,715	71,709
Tuolumne River	165,533	[2]	.....	298,418	250,425
Stanislaus River	75,359	13,840	444.5	155,453	111,192
Calaveras River	13,323	[2]	.....	21,598	16,489
Mokelumne River	36,848	5,558	563.0	155,480	72,144
Cosumnes River	3,259	[2]	.....	9,011	6,405
Other tributaries of San Joaquin River	55,015	[3] 41,241	33.4	96,198	81,981
Tributaries of San Francisco Bay, other than Sacramento and San Joaquin Rivers	76,947	38,549	99.6	100,730	86,779
Coyote Creek	25,092	8,483	195.8	30,979	26,526
Guadalupe River	29,248	6,547	346.7	34,549	31,008
Other tributaries of San Francisco Bay	22,607	[3] 23,519	—3.9	35,202	29,245

[1] A minus sign (—) denotes decrease.
[2] Not reported separately in 1902.
[3] Includes springs and wells.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1890 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.
1920	$194,886,388	168.5	$33.06	64.9
1910	72,580,080	278.4	20.05	51.1
1900	19,181,610	47.5	13.27	2.5
1890	13,004,817	.....	12.95	.....

TABLE 9.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$194,886,388	100.0	$33.06	3,714,361	$4.40
Streams, gravity	78,139,147	40.1	21.54	2,275,082	2.06
Streams, pumped	16,267,561	8.3	33.83	267,826	5.10
Streams, pumped and gravity	3,084,038	1.6	49.02	60,137	1.93
Wells, pumped	54,057,185	27.7	50.60	724,593	10.40
Wells, flowing	807,353	0.4	36.99	4,341	5.91
Wells, flowing and pumped	1,776,156	0.9	65.02	20,426	7.63
Lakes, pumped	90,081	[2]	20.34	3,783	1.66
Lakes, gravity	674,320	0.3	13.96	41,962	0.39
Springs	1,298,308	0.7	35.78	21,635	2.21
Stored storm water	6,593,659	3.4	222.15	18,963	4.25
City water	61,055	[2]	69.62	58	24.05
Sewage	59,959	[2]	42.89	1,286	11.25
Streams, gravity, and pumped wells	10,001,650	5.1	100.74	67,779	15.62
Streams, gravity, and flowing wells	1,264,530	0.6	247.27	1,860	28.93
Other mixed	19,906,271	10.2	53.65	196,886	5.36
Other and not reported	805,115	0.4	84.31	7,744	16.13

[1] Based on area irrigated in 1919.
[2] Less than one-tenth of 1 per cent.

TABLE 10.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$194,886,388	100.0	$33.06
Before 1860	6,802,109	3.5	50.40
1860-1869	2,589,615	1.3	22.32
1870-1879	16,475,201	8.5	10.47
1880-1889	19,046,449	9.8	48.53
1890-1899	31,330,191	16.1	50.08
1900-1904	19,106,308	9.8	34.22
1905-1909	15,252,978	7.8	42.47
1910-1914	41,765,878	21.4	45.00
1915-1919	32,990,398	16.9	38.85
Not reported	9,521,261	4.9	26.68

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	INCREASE.[1] Amount.	INCREASE.[1] Per cent.
Total	$194,886,388	$23,772,157	$171,114,231	719.8
Colorado River	14,833,041	500,000	14,333,041	.....
Independent streams, northern California	6,257,200	629,548	5,627,652	893.9
Carson River	40,385	22,939	17,446	76.1
Long Valley Creek	171,642	16,345	155,297	950.1
Mono Lake and tributaries	5,363,858	15,200	5,348,658	.....
Susan River	242,426	203,205	39,221	19.3
Walker River	37,575	196,445	−158,870	−80.9
Other independent streams	401,314	[2] 175,414	225,900	128.8
Independent streams, southern California	12,493,213	1,354,970	11,138,243	.....
Mohave River	616,769	114,800	501,969	437.3
Owens River	5,785,132	408,875	5,376,257	.....
San Jacinto River	2,139,257	775,000	1,364,257	176.0
Whitewater River	2,242,944	([3])	2,242,944	.....
Other independent streams	1,709,111	[2] 56,295	1,652,816	.....
Pacific Ocean streams north of San Francisco Bay	*2,378,513*	*304,952*	*2,073,561*	*680.0*
Klamath River	1,690,958	281,896	1,409,062	499.9
Russian River	162,630	2,463	160,167	.....
Other Pacific Ocean streams north of San Francisco Bay	524,925	[2] 20,593	504,332	.....
Pacific Ocean streams south of San Francisco Bay	53,456,601	9,509,767	43,946,834	462.1
Pajaro River	1,248,343	168,593	1,079,750	640.4
Salinas River	2,570,331	101,960	2,468,371	.....
Santa Maria River	573,194	32,380	540,814	.....
Santa Ynez River	284,037	33,745	250,292	741.7
Santa Clara River	2,211,473	374,151	1,837,322	491.1
Los Angeles River	5,508,400	309,611	5,198,789	.....
San Gabriel River	12,862,319	772,597	12,089,722	.....
Santa Ana River	19,918,550	1,919,531	17,999,019	937.7
San Diego River	1,789,124	32,100	1,757,024	.....
Other Pacific Ocean streams south of San Francisco Bay	6,490,830	[2] 5,765,099	725,731	12.6
Sacramento River and tributaries	28,833,106	1,882,227	26,950,879	.....
Sacramento River direct	11,830,374	49,368	11,781,006	.....
Pit River	799,913	274,671	525,242	191.2
Cow Creek	126,946	15,246	111,700	732.7
Cottonwood Creek	573,601	124,473	449,128	360.8
Battle Creek	95,139	34,796	60,343	173.4
Stony Creek	1,539,614	42,250	1,497,364	.....
Feather River	3,937,380	869,841	3,067,539	352.7
Yuba River	2,518,770	([3])	2,518,770	.....
Cache Creek	916,477	28,115	888,362	.....
American River	2,890,114	112,758	2,777,356	.....
Other tributaries of Sacramento River	3,604,778	[2] 330,709	3,274,069	990.0
San Joaquin River and tributaries	71,694,653	9,103,242	62,591,411	687.6
San Joaquin River direct	9,224,164	1,504,238	7,719,926	513.2
Kern River	17,573,637	796,340	16,777,297	.....
Tulare Lake	3,910,620	([3])	3,910,620	.....
Tule River	2,842,495	([3])	2,842,495	.....
Kaweah River	6,186,840	([3])	6,186,840	.....
Kings River	8,145,446	2,976,688	5,168,758	173.6
Fresno River	415,385	400,514	14,871	3.7
Merced River	3,812,235	1,542,834	2,269,401	147.1
Tuolumne River	7,173,802	([3])	7,173,802	.....
Stanislaus River	7,840,486	968,964	6,871,522	709.2
Calaveras River	818,995	([3])	818,995	.....
Mokelumne River	*1,675,137*	*305,239*	*1,369,898*	*448.8*
Cosumnes River	153,899	([3])	153,899	.....
Other tributaries of San Joaquin River	1,921,512	[2] 608,425	1,313,087	215.8
Tributaries of San Francisco Bay, other than Sacramento and San Joaquin Rivers	4,940,061	487,451	4,452,610	913.4
Coyote Creek	1,453,138	43,345	1,409,793	.....
Guadalupe River	1,883,049	75,795	1,807,254	.....
Other tributaries of San Francisco Bay	1,603,874	[2] 368,311	1,235,563	335.5

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells. [3] Not reported separately in 1902.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920. Amount.	CAPITAL INVESTED, 1920. Per cent of total.	OPERATION AND MAINTENANCE, 1919. Area for which cost is reported (acres).	OPERATION AND MAINTENANCE, 1919. Average cost per acre.[1]
Total	$194,886,388	100.0	3,714,361	$4.40
Individual and partnership	57,616,716	29.6	1,185,770	6.28
Cooperative	48,899,448	25.1	1,074,361	4.46
Irrigation district	33,985,301	17.4	566,654	3.42
Commercial	44,996,723	23.1	854,574	2.39
U. S. Reclamation Service	2,398,220	1.2	25,300	1.56
U. S. Indian Service	55,556	([2])	423	4.96
State	224,909	0.1	191	17.54
City	1,401,320	0.7	4,026	19.52
Other	5,277,490	2.7	3,062	6.14
Not reported	30,705	([2])	.....	.....

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	545
Acreage included in enterprises reporting land drained or needing drainage	1,623,330
Acreage for which drains have been installed	319,573
Additional acreage needing drainage	409,933
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	19.7
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	4.1
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	9.3

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 14. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume of water entering canals, second-feet	29,110	13,190	15,920
Area irrigated in 1919.....acres	1,511,038	1,137,205	373,833
Average number of acres per second-foot	52	86	23
Total quantity of water entering canals, acre-feet	14,793,933	10,581,929	4,212,004
Area irrigated in 1919.....acres	2,167,485	1,785,976	381,509
Average quantity per acre.....acre-feet	6.8	5.9	11.0
Total quantity of water delivered...acre-feet	3,409,367	1,627,316	1,782,051
Area irrigated in 1919.....acres	1,438,099	751,327	687,372
Average quantity per acre.....acre-feet	2.4	2.2	2.6

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920—Continued.

DRAINAGE BASIN.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.				
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.		Average lift (feet).
								Number.	Capacity (gallons per minute).	
Total	6,885.9	1,415	287,187	25,401	10,608,476	21,561	386,200	24,134	16,773,692	41
Colorado River	0.4	.....	.....	1	900	2	73	2	2,000	42
Independent streams, northern California	8.6	75	6,647	30	13,144	27	552	28	28,414	35
Carson River	0.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long Valley Creek	2.1	.....	.....	1	480	3	9	3	1,180	17
Susan River	2.0	.....	.....	1	75	4	34	4	3,460	23
Other independent streams	4.0	75	6,647	28	12,589	20	509	21	23,774	37
Independent streams, southern California	769.7	368	51,386	1,087	404,122	843	15,093	892	433,667	58
Mohave River	28.8	31	4,874	88	45,477	86	2,145	86	45,960	80
Owens River	388.5	23	537	9	4,088	12	137	12	4,558	24
San Jacinto River	145.0	9	115	236	66,833	183	3,546	203	76,386	73
Whitewater River	77.5	242	36,860	325	121,466	235	3,212	247	126,356	41
Other independent streams	129.9	63	9,000	429	166,258	327	6,053	344	180,407	57
Pacific Ocean streams north of San Francisco Bay	52.4	4	.....	107	35,194	186	3,858	190	168,163	22
Klamath River	19.1	3	.....	14	4,375	43	2,695	47	111,709	13
Russian River	27.2	1	.....	89	30,234	128	1,058	128	51,239	23
Other Pacific Ocean streams north of San Francisco Bay	6.1	.....	.....	4	585	15	105	15	5,215	17
Pacific Ocean streams south of San Francisco Bay	4,041.4	713	164,294	7,068	3,064,724	5,203	129,331	6,071	3,694,090	57
Pajaro River	83.2	17	2,000	688	186,255	370	7,083	417	203,845	35
Salinas River	169.6	18	3,808	697	422,195	239	10,085	286	424,002	25
Santa Maria River	28.9	13	2,700	118	66,393	62	2,934	78	204,534	47
Santa Ynez River	28.7	7	1,510	60	16,401	61	1,611	84	199,630	30
Santa Clara River	154.0	1	700	136	92,049	125	5,126	161	102,184	67
Los Angeles River	528.2	45	24,963	849	443,036	745	16,208	825	458,932	52
San Gabriel River	832.9	160	28,363	1,034	557,934	825	25,675	951	579,153	72
Santa Ana River	924.5	360	62,693	1,816	1,002,743	1,523	45,345	1,836	1,048,090	61
San Diego River	145.2	1	8	533	54,216	319	2,313	374	65,462	56
Other Pacific Ocean streams south of San Francisco Bay	1,146.2	91	37,549	1,137	223,502	934	12,951	1,059	408,258	59
Sacramento River and tributaries	361.2	36	2,957	3,508	1,473,602	3,430	64,163	3,898	4,184,240	26
Sacramento River direct	61.2	.....	.....	514	279,456	655	28,625	807	2,616,658	24
Pit River	2.9	14	693	4	395	36	440	36	32,886	18
Cow Creek	0.4	.....	.....	.....	.....	11	87	11	8,955	14
Cottonwood Creek	0.6	.....	.....	.....	.....	9	100	10	7,565	33
Battle Creek	0.3	.....	.....	2	750	3	63	4	3,300	25
Stony Creek	17.5	.....	.....	68	40,451	61	759	66	45,959	25
Feather River	117.3	9	1,284	845	341,583	728	8,425	828	394,677	22
Yuba River	6.2	2	30	8	2,725	9	1,572	11	2,751	35
Cache Creek	0.4	.....	.....	144	91,211	75	1,524	76	92,391	24
American River	77.8	.....	.....	163	93,694	172	2,358	190	95,838	26
Other tributaries of Sacramento River	76.6	11	950	1,760	623,337	1,671	20,210	1,859	883,260	30
San Joaquin River and tributaries	1,396.6	145	48,828	11,149	4,911,280	9,973	136,911	10,951	7,400,131	34
San Joaquin River direct	184.8	49	15,155	1,531	668,420	1,481	30,086	1,639	1,295,475	25
Kern River	83.1	17	13,850	441	219,674	384	6,676	405	223,606	47
Tulare Lake	261.9	24	8,253	1,100	434,565	906	12,841	1,069	1,330,434	59
Tule River	162.7	2	251	1,146	493,272	974	11,329	1,083	995,319	45
Kaweah River	269.7	3	17	2,136	842,085	1,734	21,932	1,930	876,254	41
Kings River	239.3	34	10,000	2,547	1,183,710	2,283	25,426	2,397	1,225,607	23
Fresno River	6.3	1	200	145	79,255	134	1,520	144	82,738	33
Merced River	5.2	1	75	216	120,465	213	2,774	235	157,865	21
Tuolumne River	14.4	1	400	63	53,880	66	1,231	69	59,360	33
Stanislaus River	41.0	.....	.....	34	26,490	36	1,158	41	73,140	26
Calaveras River	29.4	6	220	565	189,181	544	4,358	585	200,337	26
Mokelumne River	82.2	2	25	709	356,156	694	8,309	765	451,434	33
Cosumnes River	5.5	.....	.....	117	50,870	111	1,788	131	84,740	28
Other tributaries of San Joaquin River	11.1	5	382	399	193,257	413	7,483	458	343,822	28
Tributaries of San Francisco Bay, other than Sacramento and San Joaquin Rivers	264.6	74	13,075	2,451	705,510	1,897	36,219	2,102	862,987	55
Coyote Creek	60.2	14	3,450	821	246,483	657	12,407	725	312,320	50
Guadalupe River	99.3	51	7,700	725	242,912	512	13,480	572	278,221	67
Other tributaries of San Francisco Bay	105.1	9	1,925	905	216,115	728	10,332	805	272,446	50

CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 AND 1909.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AREA HARVESTED.					QUANTITY HARVESTED.					
		1919		1909		Per cent of increase.[1]	Unit.	1919		1909		Per cent of increase.[1]
		Acres.	Per cent of total for state.	Acres.	Per cent of total for state.			Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	56,958	48.8	17,802	34.3	220.0	Bu.	1,964,828	57.0	491,978	38.6	299.4
2	Oats	9,359	6.4	5,903	3.1	58.5	Bu.	266,878	9.0	205,727	5.0	29.7
3	Winter wheat	85,245	9.2	22,603	4.7	491.0	Bu.	1,636,503	11.2	408,706	6.6	476.0
4	Spring wheat	48,330	29.9				Bu.	717,549	31.8			
5	Barley	128,812	13.0	77,785	6.5	65.6	Bu.	3,299,308	15.1	1,844,971	7.0	78.8
6	Rye	2,546	13.8	107	1.5		Bu.	29,294	15.8	1,265	1.8	
7	Kafir, milo, etc.	124,092	73.9	(2)			Bu.	3,253,711	80.3	(2)		
8	Rough rice	130,367	100.0	(2)			Bu.	6,926,313	100.0	(2)		
9	Mixed crops	1,633	59.2	(2)			Bu.	58,300	78.5	(2)		
	Other grains and seeds:											
10	Clover and alfalfa seed [3]	2,319	18.0	2,570	29.3	−9.8	Bu.	9,702	23.7	5,911	24.5	64.1
11	Dry beans, navy, etc	148,379	31.5	11,384	7.2		Bu.	2,459,350	37.5	244,624	7.3	905.4
12	Dry peas (Canada)	1,504	7.2	290	9.8	418.6	Bu.	24,850	13.6	9,902	17.2	151.0
13	Sugar-beet seed	503	71.4	(2)			Lbs.	138,000	51.8	(2)		
14	Flower and vegetable seed	3,234	22.9	(2)			Lbs.	2,056,510	37.6	(2)		
	Hay and forage:											
15	Timothy alone	2,919	22.5	8,026	58.5	−63.6	Tons.	4,936	25.5	11,236	56.2	−56.1
16	Timothy and clover mixed	38,786	74.2	20,880	44.7	85.8	Tons.	54,806	72.8	34,177	46.7	60.4
17	Clover alone	4,882	32.1	1,176	13.8	315.1	Tons.	6,396	26.0	2,689	13.2	137.9
18	Alfalfa	556,656	77.5	366,692	75.7	51.8	Tons.	1,967,529	81.6	1,280,105	78.1	53.7
19	Other tame grasses	15,863	31.8	6,504	7.0	143.9	Tons.	22,676	33.7	10,656	8.7	112.8
20	Annual legumes cut for hay	3,055	11.8	101,187	6.3	46.7	Tons.	3,726	12.4	146,013	7.2	39.1
21	Small grains cut for hay	145,337	13.4				Tons.	199,432	15.4			
22	Wild, salt, or prairie grasses	85,603	48.0	153,672	60.7	−44.3	Tons.	96,722	52.1	189,964	67.6	−49.1
23	Silage crops	16,244	55.0	(2)			Tons.	119,291	57.4	(2)		
24	Corn cut for forage	5,069	37.1	(2)			Tons.	12,946	51.9	(2)		
25	Kafir, sorghum, etc., for forage	7,418	51.1	(2)			Tons.	14,667	59.8	(2)		
26	Root crops for forage	634	9.4	(2)			Tons.	5,712	4.5	(2)		
	Vegetables:											
27	Potatoes	29,698	46.9	32,735	48.4	−9.3	Bu.	4,502,597	54.8	5,180,006	52.7	−13.1
28	Sweet potatoes and yams	5,858	76.8	(2)			Bu.	659,734	76.1	(2)		
29	Cabbages	3,279	60.5	(2)								
30	Cantaloupes and muskmelons	13,800	64.3	(2)								
31	Celery	2,605	48.7	(2)								
32	Cucumbers	477	26.7	(2)								
33	Beans (green)	1,564	37.9	(2)								
34	Peas (green)	2,258	27.4	(2)								
35	Lettuce	4,266	69.7	(2)								
36	Onions	5,801	68.2	(2)								
37	Corn (sweet)	2,219	42.2	(2)								
38	Tomatoes	16,997	54.1	(2)								
39	Watermelons	3,979	54.2	(2)								
40	Asparagus	9,626	55.2	(2)								
41	Cauliflower	2,362	64.4	(2)								
42	Peppers (green)	4,255	87.4	(2)								
43	Pumpkins	544	48.1	(2)								
44	Spinach	867	36.1	(2)								
	Miscellaneous crops:											
45	Sugar beets grown for sugar	55,720	63.1	14,657	18.6	280.2	Tons.	422,427	63.3	171,494	20.3	146.3
46	Cotton	83,963	96.2	(2)			Bales.	44,681	96.3	(2)		
47	Broom corn	883	40.5	(2)			Lbs.	351,700	44.4	(2)		
48	Hops	2,172	26.8	(2)			Lbs.	3,691,623	29.3	(2)		
	Small fruits:											
49	Strawberries	1,465	29.5	(2)			Qts.	5,143,533	47.6	(2)		
	Orchard fruits:											
50	Apples	[4] 804,683	25.7	(2)			Bu.	1,335,057	17.0	(2)		
51	Peaches	[4] 5,662,259	62.5	(2)			Bu.	10,318,362	64.6	(2)		
52	Pears	[4] 1,017,060	44.1	(2)			Bu.	1,783,951	45.1	(2)		
53	Plums and prunes	[4] 3,841,678	43.8	(2)			Bu.	6,542,548	49.6	(2)		
54	Cherries	[4] 284,509	43.3	(2)			Bu.	320,449	49.9	(2)		
55	Apricots	[4] 1,630,763	44.2	(2)			Bu.	2,608,136	44.1	(2)		
56	Quinces	[4] 12,403	48.0	(2)			Bu.	18,315	58.3	(2)		
57	**Grapes**	[5] 73,217,234	47.8	74,984			Lbs.	1,128,175,200	54.9	(2)		
	Subtropical fruits:											
58	Oranges	[4] 8,678,956	84.3	(2)			Boxes.	18,725,602	86.6	(2)		
59	Lemons	[4] 2,299,716	79.7	(2)			Boxes.	5,776,149	88.2	(2)		
60	Grapefruit (pomeloes)	[4] 193,819	83.9	(2)			Boxes.	393,923	84.7	(2)		
61	Figs	[4] 246,884	49.0	(2)			Lbs.	10,074,552	46.2	(2)		
62	Alligator pears (avocados)	[4] 10,674	89.6	(2)			Crates.	7,294	92.1	(2)		
63	Dates	[4] 14,406	83.3	(2)			Lbs.	118,311	81.6	(2)		
64	Olives	[4] 536,543	58.9	(2)			Lbs.	12,264,764	69.8	(2)		
65	Japanese persimmons	[4] 5,510	39.8	(2)			Bu.	9,500	44.3	(2)		
66	Pomegranates	[4] 14,710	60.6	(2)			Lbs.	590,091	61.9	(2)		
	Nuts:											
67	Almonds	[4] 464,071	19.3	(2)			Lbs.	3,190,813	20.3	(2)		
68	Walnuts (English or Persian)	[4] 616,372	48.4	(2)			Lbs.	30,210,494	51.1	(2)		

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Not reported separately in 1909.
[3] Excluding red clover seed (1919).
[4] Number of trees of bearing age.
[5] Number of vines of bearing age.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 AND 1909—Continued.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AVERAGE YIELD PER ACRE, 1919.						VALUE.				
					On irrigated land.			1919		1909		
		Unit.	For state.	On non-irrigated land. [2]	Average.	Per cent of average for state.	Per cent of average on nonirrigated land.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	Per cent of increase. [1]
	Cereals:											
1	Corn	Bu.	29.5	24.8	34.5	116.9	139.1	$3,340,208	57.0	$440,312	40.9	658.6
2	Oats	Bu.	20.2	19.6	28.5	141.1	145.4	266,878	9.0	137,160	5.2	94.6
3	Winter wheat	Bu.	15.8	15.5	19.2	121.5	123.9	3,583,942	11.2	428,668	6.8	.....
4	Spring wheat	Bu.	13.9	13.5	14.8	106.5	109.6	1,571,432	31.8			
5	Barley	Bu.	22.2	21.7	25.6	115.3	118.0	5,278,893	15.1	1,097,541	6.4	381.0
6	Rye	Bu.	10.1	9.9	11.5	113.9	116.2	54,194	15.8	1,133	1.7	.....
7	Kafir, milo, etc	Bu.	24.1	18.2	26.2	108.7	144.0	5,531,309	80.3	[3]	.....	.....
8	Rough rice	Bu.	53.1	.....	53.1	100.0	.....	20,432,627	100.0	[3]	.....	.....
9	Mixed crops	Bu.	26.9	14.1	35.7	132.7	253.2	81,620	78.5	[3]	.....	.....
	Other grains and seeds:											
10	Clover and alfalfa seed [4]	Bu.	3.2	3.0	4.2	131.3	140.0	203,742	23.7	53,829	26.8	278.5
11	Dry beans, navy, etc	Bu.	13.9	12.7	16.6	119.4	130.7	11,558,944	37.5	378,770	6.0	.....
12	Dry peas (Canada)	Bu.	8.7	8.1	16.5	189.7	203.7	88,218	13.6	15,331	15.2	475.4
13	Sugar-beet seed	Lbs.	378.7	639.8	274.4	72.5	42.9	96,600	51.8	[3]	.....	.....
14	Flower and vegetable seed	Lbs.	386.7	312.9	635.9	164.4	203.2	2,056,510	37.6	[3]	.....	.....
	Hay and forage:											
15	Timothy alone	Tons.	1.50	1.44	1.69	112.7	117.4	93,784	25.5	90,083	48.5	4.1
16	Timothy and clover mixed	Tons.	1.44	1.52	1.41	97.9	92.8	1,013,911	72.8	316,993	50.4	219.9
17	Clover alone	Tons.	1.62	1.76	1.31	80.9	74.4	118,326	26.0	40,429	19.0	192.7
18	Alfalfa	Tons.	3.36	2.75	3.53	105.1	128.4	44,269,402	81.6	9,983,370	76.3	343.4
19	Other tame grasses	Tons.	1.35	1.32	1.43	105.9	108.3	396,830	33.7	112,097	8.8	254.0
20	Annual legumes cut for hay	Tons.	1.16	1.15	1.22	105.2	106.1	74,520	12.4	1,532,681	6.4	210.6
21	Small grains cut for hay	Tons.	1.19	1.17	1.37	115.1	117.1	4,686,652	15.4			
22	Wild, salt, or prairie grasses	Tons.	1.04	0.96	1.13	108.7	117.7	1,354,108	52.1	1,194,716	58.9	13.3
23	Silage crops	Tons.	7.04	6.67	7.34	104.3	110.0	1,133,264	57.4	[3]	.....	.....
24	Corn cut for forage	Tons.	1.83	1.40	2.55	139.3	182.1	181,244	51.9	[3]	.....	.....
25	Kafir, sorghum, etc., for forage	Tons.	1.69	1.39	1.98	117.2	142.4	220,005	59.8	[3]	.....	.....
26	Root crops for forage	Tons.	18.67	19.67	9.01	48.3	45.8	94,248	4.5	[3]	.....	.....
	Vegetables:											
27	Potatoes	Bu.	129.8	110.6	151.6	116.8	137.1	10,355,973	54.8	2,440,931	50.0	324.3
28	Sweet potatoes and yams	Bu.	113.6	117.0	112.6	99.1	96.2	1,517,388	76.1	[3]	.....	.....
29	Cabbages	.....	.....	.....	.....	.....	.....	547,205	57.4	[3]	.....	.....
30	Cantaloupes and muskmelons	.....	.....	.....	.....	.....	.....	2,753,155	70.7	[3]	.....	.....
31	Celery	.....	.....	.....	.....	.....	.....	721,521	47.5	[3]	.....	.....
32	Cucumbers	.....	.....	.....	.....	.....	.....	87,701	28.0	[3]	.....	.....
33	Beans (green)	.....	.....	.....	.....	.....	.....	292,953	56.1	[3]	.....	.....
34	Peas (green)	.....	.....	.....	.....	.....	.....	387,079	36.1	[3]	.....	.....
35	Lettuce	.....	.....	.....	.....	.....	.....	1,190,363	70.4	[3]	.....	.....
36	Onions	.....	.....	.....	.....	.....	.....	2,009,151	71.3	[3]	.....	.....
37	Corn (sweet)	.....	.....	.....	.....	.....	.....	197,015	42.9	[3]	.....	.....
38	Tomatoes	.....	.....	.....	.....	.....	.....	2,121,514	59.3	[3]	.....	.....
39	Watermelons	.....	.....	.....	.....	.....	.....	327,028	52.8	[3]	.....	.....
40	Asparagus	.....	.....	.....	.....	.....	.....	1,653,081	62.6	[3]	.....	.....
41	Cauliflower	.....	.....	.....	.....	.....	.....	437,886	68.3	[3]	.....	.....
42	Peppers (green)	.....	.....	.....	.....	.....	.....	632,101	83.9	[3]	.....	.....
43	Pumpkins	.....	.....	.....	.....	.....	.....	18,753	48.0	[3]	.....	.....
44	Spinach	.....	.....	.....	.....	.....	.....	128,516	41.1	[3]	.....	.....
	Miscellaneous crops:											
45	Sugar beets grown for sugar	Tons.	7.56	7.51	7.58	100.3	100.9	5,491,551	63.3	839,561	19.5	554.1
46	Cotton	Bales.	0.53	0.52	0.53	100.0	101.9	8,891,519	96.3	[3]	.....	.....
47	Broom corn	Lbs.	363.6	340.0	398.3	109.5	117.1	28,136	44.4	[3]	.....	.....
48	Hops	Lbs.	1,553.3	1,499.9	1,699.6	109.4	113.3	1,919,644	29.3	[3]	.....	.....
	Small fruits:											
49	Strawberries	Qts.	2,172.9	1,614.3	3,510.9	161.6	217.5	1,028,707	47.6	[3]	.....	.....
	Orchard fruits:											
50	Apples	Bu.	[4] 2.5	[4] 2.8	[4] 1.7	68.0	60.7	2,069,338	17.0	[3]	.....	.....
51	Peaches	Bu.	[4] 1.8	[4] 1.7	[4] 1.8	100.0	105.9	19,088,970	64.6	[3]	.....	.....
52	Pears	Bu.	[4] 1.7	[4] 1.7	[4] 1.8	105.9	105.9	3,211,112	45.1	[3]	.....	.....
53	Plums and prunes	Bu.	[4] 1.5	[4] 1.4	[4] 1.7	113.3	121.4	14,066,478	49.6	[3]	.....	.....
54	Cherries	Bu.	[4] 1.0	[4] 0.9	[4] 1.1	110.0	122.2	1,305,796	49.9	[3]	.....	.....
55	Apricots	Bu.	[4] 1.6	[4] 1.6	[4] 1.6	100.0	100.0	5,216,272	44.1	[3]	.....	.....
56	Quinces	Bu.	[4] 1.2	[4] 1.0	[4] 1.5	125.0	150.0	36,630	58.3	[3]	.....	.....
57	**Grapes**	Lbs.	[5] 13.4	[5] 11.6	[5] 15.4	114.9	132.8	36,101,606	54.9	3,038,435	28.0	.....
	Subtropical fruits:											
58	Oranges	Boxes.	[4] 2.1	[4] 1.8	[4] 2.2	104.8	122.2	58,049,366	86.6	[3]	.....	.....
59	Lemons	Boxes.	[4] 2.3	[4] 1.3	[4] 2.5	108.7	192.3	16,750,832	88.2	[3]	.....	.....
60	Grape fruit (pomeloes)	Boxes.	[4] 2.0	[4] 1.9	[4] 2.0	100.0	105.3	787,846	84.7	[3]	.....	.....
61	Figs	Lbs.	[4] 43.3	[4] 45.6	[4] 40.8	94.2	89.5	1,007,455	46.2	[3]	.....	.....
62	Alligator pears (avocados)	Crates.	[4] 0.7	[4] 0.5	[4] 0.7	100.0	140.0	58,352	92.1	[3]	.....	.....
63	Dates	Lbs.	[4] 8.4	[4] 9.2	[4] 8.2	97.6	89.1	23,662	81.6	[3]	.....	.....
64	Olives	Lbs.	[4] 19.3	[4] 14.2	[4] 22.9	118.7	161.3	981,181	69.8	[3]	.....	.....
65	Japanese persimmons	Bu.	[4] 1.5	[4] 1.4	[4] 1.7	113.3	121.4	38,000	44.3	[3]	.....	.....
66	Pomegranates	Lbs.	[4] 39.3	[4] 38.1	[4] 40.1	102.0	105.2	35,405	61.9	[3]	.....	.....
	Nuts:											
67	Almonds	Lbs.	[4] 6.5	[4] 6.4	[4] 6.9	106.2	107.8	797,703	20.3	[3]	.....	.....
68	Walnuts (English or Persian)	Lbs.	[4] 46.4	[4] 43.9	[4] 49.0	105.6	111.6	9,063,148	51.1	[3]	.....	.....

[1] Per cent not shown when more than 1,000.
[2] Not reported separately in 1909.
[3] Excluding red clover seed (1919).
[4] Yield per tree.
[5] Yield per vine.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		THE STATE.	Alameda.	Alpine.	Amador.	Butte.	Calaveras.	Colusa.	Contra Costa.	Eldorado.
1	Number of all farms in 1920	[1] 117,670	2,778	21	479	2,219	606	816	1,675	729
2	Number of farms irrigated in 1919	67,391	473	18	101	989	306	325	131	393
3	Per cent of all farms	57.3	17.0	85.7	21.1	44.6	50.5	39.8	7.8	53.9
4	Number of farms irrigated in 1909	39,352	50	32	73	556	154	112	78	244
5	Per cent of increase, 1909–1919	71.3	.....	.....	.....	77.9	98.7	190.2	.....	61.1
	LAND AND FARM AREA.									
6	Approximate land area.....acres	[1] 99,617,280	468,480	496,640	384,640	1,086,720	657,280	729,600	456,960	1,111,680
7	All land in farms.....acres	[1] 20,365,667	359,742	10,042	312,106	464,625	360,195	438,417	375,065	240,265
8	Improved land in farms.....acres	[1] 11,878,339	185,324	4,306	59,986	253,745	58,957	302,429	238,369	43,413
9	Area irrigated in 1919.....acres	4,219,040	9,346	4,459	326	93,559	2,859	44,097	33,079	6,731
10	Per cent of improved land in farms	35.5	5.0	103.6	0.5	36.9	4.8	14.6	13.9	15.5
11	Area irrigated in 1909.....acres	2,664,104	1,859	3,349	826	28,754	1,275	4,276	26,856	5,122
12	Per cent of increase, 1909–1919	58.4	402.7	33.1	−60.5	225.4	124.2	931.3	23.2	31.4
13	Area enterprises were capable of irrigating in 1920.....acres	5,894,466	13,357	4,819	489	114,754	33,828	69,149	46,482	9,833
14	Area enterprises were capable of irrigating in 1910.....acres	3,619,378	1,872	3,399	3,973	115,075	3,161	16,541	32,562	5,501
15	Per cent of increase, 1910–1920	62.9	613.5	41.8	−87.7	−0.3	970.2	318.0	42.7	78.7
16	Area included in enterprises in 1920.....acres	7,805,207	16,543	7,027	1,093	123,524	42,093	88,948	67,876	16,848
17	Area included in enterprises in 1910.....acres	5,490,360	2,605	3,435	4,139	233,500	3,919	18,783	32,640	20,264
18	Per cent of increase, 1910–1920	42.2	535.0	104.6	−73.6	−47.1	974.1	373.6	108.0	−16.9
19	Area of irrigated land reported as available for settlement.....acres	533,981	.....	.....	.....	4,500	2,960	.....	8,000	.....
	IRRIGATION WORKS.									
	Independent enterprises:									
20	Number, 1920	24,115	264	15	35	197	140	99	56	91
21	Number, 1910	13,970	53	21	49	144	150	45	185	50
	Main ditches:									
22	Number, 1920	6,040	48	18	23	74	144	84	11	82
23	Number, 1910	8,590	49	25	55	135	148	38	176	56
24	Length, 1920.....miles	14,437	12	20	64	225	247	258	186	1,268
25	Length, 1910.....miles	12,620	21	34	185	270	124	44	172	285
26	Capacity, 1920.....second-feet	115,237	23	52	53	2,751	466	2,695	339	390
27	Capacity, 1910.....second-feet	89,597	605	179	255	2,028	206	531	60	445
	Laterals:									
28	Number, 1920	9,190	142	14	3	181	52	100	111	46
29	Number, 1910	6,143	.....	3	12	145	32	10	.....	25
30	Length, 1920.....miles	12,947	19	1	30	27	131	120	175	110
31	Length, 1910.....miles	8,509	.....	1	56	170	31	7	.....	55
	Reservoirs:									
32	Number, 1920	3,030	10	2	18	8	47	2	1	35
33	Number, 1910	1,583	52	.....	14	27	29	.....	1	22
34	Capacity, 1920.....acre-feet	1,091,394	1	4	196	30	10,935	51,000	5	19,966
35	Capacity, 1910.....acre-feet	743,269	3	.....	309	360	12,029	.....	1	711
	Flowing wells:									
36	Number, 1920	1,415	.....	.....	.....	.....	5	.....	2	.....
37	Number, 1910	2,361	.....	.....	.....	.....	6	.....	1	.....
38	Capacity, 1920.....gallons per minute	287,187	.....	.....	.....	.....	65	.....	.....	.....
39	Capacity, 1910.....gallons per minute	477,343	.....	.....	.....	.....	40	.....	143	.....
	Pumped wells:									
40	Number, 1920	25,401	382	.....	4	153	20	66	49	6
41	Number, 1910	10,724	56	.....	.....	46	7	3	26	.....
42	Capacity, 1920.....gallons per minute	10,608,476	95,329	.....	150	53,890	1,205	48,735	5,897	780
43	Capacity, 1910.....gallons per minute	4,119,575	3,740	.....	.....	29,686	844	977	1,339	.....
	Pumping plants:									
44	Number, 1920	21,561	290	.....	9	157	32	103	56	6
45	Number, 1910	9,297	57	.....	1	46	9	12	30	.....
46	Engine capacity, 1920.....horsepower	386,200	3,797	.....	34	2,863	234	6,931	3,236	15
47	Engine capacity, 1910.....horsepower	128,143	384	.....	5	555	44	516	751	.....
48	Pump capacity, 1920.....gallons per minute	16,773,692	112,508	.....	1,890	113,036	7,986	528,610	74,004	830
49	Pump capacity, 1910.....gallons per minute	5,276,298	5,019	.....	100	32,391	1,094	51,365	138,947	.....
50	Average lift, 1920.....feet	41	40	.....	32	24	41	25	44	37
	CAPITAL INVESTED.									
51	Capital invested to Jan. 1, 1920.....dollars	194,886,388	530,053	40,385	91,295	3,383,646	1,315,617	2,594,164	1,380,210	499,269
52	Capital invested to July 1, 1910.....dollars	72,580,030	57,156	7,493	265,608	1,231,894	121,033	76,112	90,503	346,939
53	Per cent of increase, 1910–1920	168.5	827.4	439.0	−65.6	174.7	987.0	.....	.....	43.9
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	33.06	39.68	8.38	186.70	29.49	38.89	37.52	29.69	50.77
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	20.05	30.53	2.20	66.85	10.71	38.29	4.60	2.78	63.07
	ESTIMATED FINAL COST.									
56	Estimated final cost of existing enterprises in 1920...dollars	225,799,123	538,538	41,385	91,295	3,776,271	1,329,119	2,881,964	1,587,960	702,269
57	Estimated final cost of existing enterprises in 1910...dollars	84,392,344	57,156	7,493	265,608	1,381,894	121,033	76,112	90,503	346,939
58	Per cent of increase, 1910–1920	167.6	842.2	452.3	−65.6	173.3	998.1	.....	.....	102.4
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	28.93	32.55	5.89	83.53	30.57	31.58	32.40	23.40	41.68
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	15.37	21.94	2.18	64.17	5.92	30.88	4.05	2.77	17.12

[1] Includes Del Norte County, for which no irrigation is reported.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		Fresno.	Glenn.	Humboldt.	Imperial.	Inyo.	Kern.	Kings.	Lake.	Lassen.
1	Number of all farms in 1920	8,917	1,320	1,756	2,843	521	2,020	2,171	771	606
2	Number of farms irrigated in 1919	7,792	897	53	2,707	329	1,474	1,634	71	306
3	Per cent of all farms	87.4	68.0	3.0	95.2	63.1	73.0	75.3	9.2	50.5
4	Number of farms irrigated in 1909	5,310	195	33	1,250	408	876	1,126	43	355
5	Per cent of increase, 1909-1919	46.7	357.7	.....	116.6	—19.4	68.3	45.1	.....	—13.8
	LAND AND FARM AREA.									
6	Approximate land area—acres	3,808,000	855,680	2,288,000	2,616,960	6,394,240	5,121,920	741,760	792,320	2,899,840
7	All land in farms—acres	1,319,531	524,467	717,174	347,485	140,029	1,497,045	505,553	241,899	741,220
8	Improved land in farms—acres	672,591	336,482	98,064	310,708	39,904	390,932	259,639	45,355	140,887
9	Area irrigated in 1919—acres	547,587	195,004	355	415,304	74,958	223,593	187,868	1,107	53,884
10	Per cent of improved land in farms	81.4	31.2	0.4	133.7	187.8	57.2	72.4	2.4	38.2
11	Area irrigated in 1909—acres	402,318	5,661	208	190,711	65,163	190,034	190,949	582	77,079
12	Per cent of increase, 1909-1919	36.1	.....	70.7	117.8	15.0	17.7	—1.6	90.2	—30.1
13	Area enterprises were capable of irrigating in 1920—acres	838,048	126,992	500	457,815	79,771	329,773	376,906	1,517	71,582
14	Area enterprises were capable of irrigating in 1910—acres	560,326	16,804	333	242,000	71,815	217,418	289,523	828	89,815
15	Per cent of increase, 1910-1920	49.6	655.7	50.2	89.2	11.1	51.7	30.2	83.2	—20.3
16	Area included in enterprises in 1920—acres	1,098,755	202,399	664	530,855	97,998	475,645	490,835	1,831	85,873
17	Area included in enterprises in 1910—acres	633,652	220,664	966	375,000	92,319	402,806	310,523	1,268	149,530
18	Per cent of increase, 1910-1920	73.4	—8.3	—31.3	41.6	6.2	18.1	58.1	44.4	—42.6
19	Area of irrigated land reported as available for settlement—acres	67,667	4,745	.....	1,800	4,300	524	14,000	.....	3,000
	IRRIGATION WORKS.									
	Independent enterprises:									
20	Number, 1920	2,968	213	33	17	87	875	345	70	175
21	Number, 1910	975	116	33	9	188	244	77	43	233
	Main ditches:									
22	Number, 1920	106	86	27	46	56	165	98	33	208
23	Number, 1910	254	50	33	12	184	178	27	44	295
24	Length, 1920—miles	1,339	181	34	537	132	445	396	18	404
25	Length, 1910—miles	831	136	26	117	396	441	137	26	368
26	Capacity, 1920—second-feet	10,765	2,515	200	10,575	1,368	6,314	13,586	242	2,732
27	Capacity, 1910—second-feet	6,299	1,659	145	3,250	2,752	9,990	4,840	90	2,248
	Laterals:									
28	Number, 1920	1,044	168	4	395	5	224	323	22	231
29	Number, 1910	688	554	4	179	326	118	51	21	263
30	Length, 1920—miles	2,003	329	6	2,690	4	149	387	1	114
31	Length, 1910—miles	1,354	1,073	2	890	168	257	159	2	116
	Reservoirs:									
32	Number, 1920	72	9	3	.....	18	536	20	9	31
33	Number, 1910	8	12	5	.....	1	51	37	3	29
34	Capacity, 1920—acre-feet	141	8	6	.....	1,006	61,183	6,063	181	194,422
35	Capacity, 1910—acre-feet	402	45,009	7	.....	11,300	1,601	111	2	169,552
	Flowing wells:									
36	Number, 1920	59	.....	.....	.....	23	27	13	7	10
37	Number, 1910	3	.....	.....	.....	10	25	75	1	.....
38	Capacity, 1920—gallons per minute	18,400	.....	.....	.....	537	17,643	2,180	950	233
39	Capacity, 1910—gallons per minute	450	.....	.....	.....	500	12,283	19,436	75	.....
	Pumped wells:									
40	Number, 1920	2,281	263	.....	1	9	983	498	17	4
41	Number, 1910	855	105	2	.....	1	140	20	3	.....
42	Capacity, 1920—gallons per minute	1,280,347	176,251	.....	900	4,088	415,412	202,967	5,545	1,305
43	Capacity, 1910—gallons per minute	443,024	26,484	105	.....	100	90,618	8,700	272	.....
	Pumping plants:									
44	Number, 1920	2,130	215	3	1	13	869	346	33	11
45	Number, 1910	888	77	1	.....	1	114	18	11	2
46	Engine capacity, 1920—horsepower	32,361	9,214	36	38	137	12,504	5,225	241	93
47	Engine capacity, 1910—horsepower	8,990	896	3	.....	5	2,846	174	49	90
48	Pump capacity, 1920—gallons per minute	1,442,383	1,065,729	2,000	900	4,558	1,219,402	283,339	13,111	6,990
49	Pump capacity, 1910—gallons per minute	515,380	62,449	105	.....	100	90,668	12,759	4,577	6,100
50	Average lift, 1920—feet	22	23	11	70	24	53	23	18	22
	CAPITAL INVESTED.									
51	Capital invested to Jan. 1, 1920—dollars	8,067,930	5,886,804	37,298	14,223,585	2,487,561	18,419,752	3,989,358	116,286	519,656
52	Capital invested to July 1, 1910—dollars	1,898,460	1,519,361	29,027	4,955,272	962,698	1,788,635	687,381	12,124	884,965
53	Per cent of increase, 1910-1920	325.0	287.7	28.5	187.0	158.4	929.8	480.4	859.1	—41.3
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	9.63	43.99	74.60	31.07	31.18	55.86	10.58	76.66	7.26
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	3.39	90.43	87.17	20.48	13.41	8.23	2.37	14.64	9.85
	ESTIMATED FINAL COST.									
56	Estimated final cost of existing enterprises in 1920—dollars	9,249,614	7,283,303	37,798	14,323,585	2,607,111	18,829,815	4,362,178	216,346	583,456
57	Estimated final cost of existing enterprises in 1910—dollars	1,898,460	3,716,976	29,027	5,884,182	962,698	1,788,635	687,381	12,124	1,034,965
58	Per cent of increase, 1910-1920	387.2	95.9	30.2	143.4	170.8	952.7	534.6	.....	—43.6
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	8.42	25.98	56.92	26.98	26.60	39.59	8.89	118.16	6.79
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	3.00	16.84	30.05	15.69	10.43	4.44	2.21	9.56	6.92

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		Los Angeles.	Madera.	Marin.	Mariposa.	Mendocino.	Merced.	Modoc.	Mono.	Monterey.	Napa.
1	Number of all farms in 1920	12,444	1,402	718	367	1,759	2,846	743	74	1,712	1,428
2	Number of farms irrigated in 1919	9,102	930	14	48	92	2,334	441	66	451	39
3	Per cent of all farms	73.1	66.3	1.9	13.1	5.2	82.0	59.4	89.2	26.3	2.7
4	Number of farms irrigated in 1909	4,669	158	6	56	39	1,417	437	76	258	36
5	Per cent of increase, 1909–1919	94.9	488.6	.....	.....	.....	64.7	0.9	.....	74.8	.....
	LAND AND FARM AREA.										
6	Approximate land area—acres	2,633,600	1,351,680	338,560	936,320	2,264,960	1,276,800	2,446,720	1,939,200	2,131,200	501,120
7	All land in farms—acres	882,333	536,726	290,148	235,849	923,087	1,122,550	596,757	42,034	1,104,048	293,925
8	Improved land in farms—acres	483,096	262,971	87,846	49,587	101,220	506,582	168,251	8,740	398,320	116,723
9	Area irrigated in 1919—acres	248,412	100,220	554	66	1,255	212,851	82,845	46,012	47,336	660
10	Per cent of improved land in farms	51.4	38.1	0.6	0.1	1.2	42.0	49.2	.....	11.9	0.6
11	Area irrigated in 1909—acres	145,586	38,705	67	376	371	151,998	82,075	49,027	15,056	1,191
12	Per cent of increase, 1909–1919	70.6	158.9	.....	—82.4	238.3	40.0	0.9	—6.1	214.4	—44.6
13	Area enterprises were capable of irrigating in 1920—acres	319,368	118,672	704	89	11,566	288,157	89,801	89,335	56,159	1,284
14	Area enterprises were capable of irrigating in 1910—acres	133,506	51,230	71	546	590	248,670	89,476	50,007	27,176	2,035
15	Per cent of increase, 1910–1920	74.0	131.6	.....	—83.7	.....	15.9	0.4	78.6	106.6	—36.9
16	Area included in enterprises in 1920—acres	364,574	161,032	713	109	11,686	457,494	112,200	121,878	59,659	1,405
17	Area included in enterprises in 1910—acres	241,794	82,321	71	767	1,365	281,719	124,166	84,973	29,914	2,443
18	Per cent of increase, 1910–1920	50.8	95.6	.....	—85.8	756.1	62.4	—9.6	43.4	99.4	—42.5
19	Area of irrigated land reported as available for settlement—acres	6,100	.....	.....	.....	.....	212,500	.....	40,000	.....	.....
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	1,863	689	4	9	64	479	376	73	189	32
21	Number, 1910	1,567	35	6	48	37	135	388	77	117	35
	Main ditches:										
22	Number, 1920	414	29	.....	6	23	233	470	101	120	6
23	Number, 1910	601	34	5	49	33	45	446	85	106	26
24	Length, 1920—miles	332	63	.....	3	13	684	655	223	108	1
25	Length, 1910—miles	800	79	5	21	19	261	637	172	223	8
26	Capacity, 1920—second-feet	5,059	2,066	.....	6	86	3,972	3,078	1,526	528	20
27	Capacity, 1910—second-feet	2,296	1,515	21	28	49	4,478	2,907	1,243	1,903	25
	Laterals:										
28	Number, 1920	621	34	.....	.....	28	763	175	15	398	.....
29	Number, 1910	494	30	.....	.....	8	353	490	101	23	3
30	Length, 1920—miles	221	126	.....	.....	365	552	101	14	98	.....
31	Length, 1910—miles	500	294	.....	.....	6	352	175	65	32	3
	Reservoirs:										
32	Number, 1920	411	107	1	3	10	64	71	12	9	3
33	Number, 1910	279	3	1	8	7	10	32	.....	10	3
34	Capacity, 1920—acre-feet	37,591	418	3	.....	296	20,651	80,285	44,740	54	1
35	Capacity, 1910—acre-feet	993	12,341	1	3	10	15,003	33,993	.....	2	13
	Flowing wells:										
36	Number, 1920	123	8	1	.....	.....	13	71	.....	1	1
37	Number, 1910	376	.....	.....	.....	.....	29	45	.....	.....	.....
38	Capacity, 1920—gallons per minute	41,336	2,100	.....	.....	.....	3,212	5,607	.....	400	1,000
39	Capacity, 1910—gallons per minute	70,818	.....	.....	.....	.....	2,567	1,256	.....	.....	.....
	Pumped wells:										
40	Number, 1920	2,223	753	7	.....	14	543	7	10	606	11
41	Number, 1910	1,673	33	1	2	6	78	2	.....	102	2
42	Capacity, 1920—gallons per minute	1,131,797	189,455	308	.....	1,859	299,395	675	5,919	407,310	9,005
43	Capacity, 1910—gallons per minute	871,143	26,518	150	49	2,296	52,008	44	.....	196,236	300
	Pumping plants:										
44	Number, 1920	1,854	701	4	.....	39	539	11	9	203	31
45	Number, 1910	1,361	25	6	2	10	108	2	.....	124	17
46	Engine capacity, 1920—horsepower	45,752	8,307	19	.....	481	6,094	146	214	9,631	314
47	Engine capacity, 1910—horsepower	30,632	604	48	1	65	1,505	2	.....	5,338	115
48	Pump capacity, 1920—gallons per minute	1,166,131	396,483	325	.....	18,424	349,580	3,250	5,919	406,617	21,126
49	Pump capacity, 1910—gallons per minute	872,718	26,518	1,100	49	3,586	93,239	44	.....	260,513	7,751
50	Average lift, 1920—feet	60	33	27	.....	33	22	30	34	33	24
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920—dollars	21,038,616	1,351,854	15,731	3,786	582,040	6,614,674	663,660	5,679,375	2,450,643	70,168
52	Capital invested to July 1, 1910—dollars	7,817,023	512,098	3,380	13,440	30,297	3,748,211	301,040	64,282	495,916	53,948
53	Per cent of increase, 1910–1920	169.1	164.0	365.4	—71.8	.....	76.5	120.5	.....	394.2	30.1
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	65.88	11.39	22.35	42.54	50.38	22.96	7.39	63.57	43.64	54.65
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	42.60	10.00	47.61	24.62	51.35	15.07	3.36	1.29	18.25	26.51
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920—dollars	23,271,909	1,366,599	15,731	3,786	588,040	13,106,429	760,435	7,045,875	2,460,643	72,668
57	Estimated final cost of existing enterprises in 1910—dollars	9,266,023	512,098	3,380	13,440	30,297	3,748,211	316,040	64,282	578,916	53,948
58	Per cent of increase, 1910–1920	151.2	166.9	365.4	—71.8	.....	249.7	140.6	.....	325.0	34.7
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	63.83	8.49	22.06	34.73	50.32	28.65	6.78	57.81	41.25	51.72
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	38.32	6.22	47.61	17.52	22.20	13.30	2.55	0.76	19.35	22.08

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100.]

		Nevada.	Orange.	Placer.	Plumas.	River-side.	Sacra-mento.	San Benito.	San Ber-nardino.	San Diego.	San Fran-cisco.
1	Number of all farms in 1920	481	4,188	1,280	150	3,949	2,975	945	4,023	3,200	74
2	Number of farms irrigated in 1919	311	3,846	814	108	2,670	1,747	349	3,350	1,698	23
3	Per cent of all farms	64.7	91.8	63.6	72.0	67.6	58.7	36.9	83.3	53.1	31.1
4	Number of farms irrigated in 1909	300	2,215	618	151	2,174	1,053	240	2,463	890	25
5	Per cent of increase, 1909–1919	3.7	73.6	31.7	−28.5	22.8	65.9	45.4	36.0	90.8	.....
	LAND AND FARM AREA.										
6	Approximate land area—acres	623,360	508,800	903,040	1,659,520	4,622,720	629,120	890,880	12,912,000	2,701,440	26,880
7	All land in farms—acres	198,441	325,703	233,153	101,653	676,293	555,503	539,378	415,738	925,192	1,295
8	Improved land in farms—acres	26,196	200,945	136,455	34,223	348,538	399,024	122,606	175,272	262,646	840
9	Area irrigated in 1919—acres	3,441	87,330	27,520	22,852	105,212	72,960	12,468	105,306	24,996	372
10	Per cent of improved land in farms	13.1	43.5	20.2	66.8	30.5	18.3	10.2	60.1	9.5	44.3
11	Area irrigated in 1909—acres	3,839	55,056	16,845	36,602	71,436	53,683	7,186	70,278	24,944	383
12	Per cent of increase, 1909–1919	−10.4	58.6	63.4	−37.6	48.7	35.9	73.5	49.8	0.2	−2.9
13	Area enterprises were capable of irrigating in 1920—acres	5,002	102,976	27,520	25,478	128,788	103,271	17,186	120,798	32,148	412
14	Area enterprises were capable of irrigating in 1910—acres	4,259	63,486	23,365	37,529	103,233	69,970	13,790	86,107	31,205	383
15	Per cent of increase, 1910–1920	17.4	60.8	17.8	−32.1	24.8	47.6	24.6	40.3	3.0	7.6
16	Area included in enterprises in 1920—acres	5,601	113,026	40,000	28,265	226,927	141,275	23,017	184,024	68,401	412
17	Area included in enterprises in 1910—acres	5,267	71,444	61,751	37,901	210,452	74,588	20,067	152,415	45,535	383
18	Per cent of increase, 1910–1920	6.3	58.2	−35.2	−25.4	7.8	89.4	14.7	20.7	50.2	7.6
19	Area of irrigated land reported as available for settlement—acres	.....	.....	.....	.....	11,240	15,086	1,700	.....	7,500	.....
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	96	1,012	64	102	807	1,159	217	622	637	33
21	Number, 1910	103	619	35	127	610	889	109	521	384	39
	Main ditches:										
22	Number, 1920	98	34	38	116	91	134	88	96	50	.....
23	Number, 1910	110	309	35	147	301	213	64	291	288	24
24	Length, 1920—miles	342	82	131	135	235	269	64	141	137	.....
25	Length, 1910—miles	236	180	194	201	500	238	61	466	259	7
26	Capacity, 1920—second-feet	454	780	657	1,369	2,649	1,937	264	1,291	1,653	.....
27	Capacity, 1910—second-feet	372	876	437	1,176	2,825	1,556	366	1,315	1,464	11
	Laterals:										
28	Number, 1920	33	116	53	213	221	254	80	81	107	.....
29	Number, 1910	46	115	46	62	262	5	12	237	244	.....
30	Length, 1920—miles	3	73	218	66	196	148	29	30	18	.....
31	Length, 1910—miles	32	246	108	16	288	8	33	283	140	.....
	Reservoirs:										
32	Number, 1920	25	27	17	1	201	7	19	99	134	.....
33	Number, 1910	24	19	29	.....	131	2	6	83	68	27
34	Capacity, 1920—acre-feet	30,021	1,044	10,112	240	113,996	698	5,996	1,399	22,142	.....
35	Capacity, 1910—acre-feet	26,438	189	53,354	.....	58,440	352	5,302	96,969	28,845	2
	Flowing wells:										
36	Number, 1920	3	365	.....	6	306	.....	4	124	5	1
37	Number, 1910	.....	588	.....	3	553	.....	.....	79	.....	.....
38	Capacity, 1920—gallons per minute	38	34,199	.....	476	69,110	.....	600	20,310	231	.....
39	Capacity, 1910—gallons per minute	.....	92,689	.....	504	90,331	.....	.....	21,825	.....	.....
	Pumped wells:										
40	Number, 1920	5	1,151	31	.....	837	1,433	365	675	1,122	48
41	Number, 1910	5	580	2	.....	792	1,168	87	449	438	39
42	Capacity, 1920—gallons per minute	146	549,910	4,532	.....	378,010	480,229	104,860	400,293	147,860	1,725
43	Capacity, 1910—gallons per minute	48	260,947	289	.....	289,472	260,303	25,822	209,747	110,807	4,444
	Pumping plants:										
44	Number, 1920	8	1,002	44	2	628	1,465	183	583	651	48
45	Number, 1910	4	433	5	.....	405	1,192	54	402	363	39
46	Engine capacity, 1920—horsepower	38	24,495	276	170	15,473	17,283	4,009	20,120	5,190	154
47	Engine capacity, 1910—horsepower	12	8,575	30	.....	11,067	5,059	677	10,700	2,857	89
48	Pump capacity, 1920—gallons per minute	464	604,759	8,131	9,000	404,046	788,172	114,360	423,835	161,517	1,807
49	Pump capacity, 1910—gallons per minute	848	286,003	1,284	.....	346,788	335,666	29,452	233,136	112,256	4,444
50	Average lift, 1920—feet	31	51	29	10	58	28	34	82	52	83
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920—dollars	1,190,790	6,501,903	1,162,774	226,717	12,473,520	3,810,695	754,861	8,738,603	4,948,939	70,831
52	Capital invested to July 1, 1910—dollars	1,569,028	1,948,246	2,798,740	107,118	5,648,469	1,452,471	177,924	9,416,960	3,753,127	21,975
53	Per cent of increase, 1910–1920	−24.1	233.7	−58.5	111.7	120.8	162.4	324.3	−7.2	31.9	222.3
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	238.06	63.70	42.25	8.90	96.85	36.90	43.92	72.34	153.94	171.92
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	368.40	30.69	119.78	2.85	54.72	20.76	12.90	109.36	120.27	57.38
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920—dollars	1,190,790	6,758,018	1,163,209	226,717	14,796,051	4,291,620	767,701	8,938,516	5,592,954	70,831
57	Estimated final cost of existing enterprises in 1910—dollars	1,569,028	1,948,246	2,798,740	107,118	5,698,469	1,452,471	267,924	13,038,449	3,767,127	21,975
58	Per cent of increase, 1910–1920	−24.1	246.9	−58.4	111.7	159.6	195.5	186.5	−31.4	48.5	222.3
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	212.60	59.79	29.08	8.02	65.20	30.38	33.35	48.57	81.77	171.92
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	297.90	27.27	45.32	2.83	27.08	19.47	13.35	85.55	82.73	57.38

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100.]

		San Joaquin.	San Luis Obispo.	San Mateo.	Santa Barbara.	Santa Clara.	Santa Cruz.	Shasta.	Sierra.	Siskiyou.	Solano.
1	Number of all farms in 1920	4,500	1,803	624	1,485	5,016	1,759	949	77	1,052	1,358
2	Number of farms irrigated in 1919	3,047	143	205	437	2,649	145	598	62	584	278
3	Per cent of all farms	67.7	7.9	32.9	29.4	52.8	8.2	63.0	80.5	55.5	20.5
4	Number of farms irrigated in 1909	1,452	91	75	137	1,101	106	639	94	636	150
5	Per cent of increase, 1909–1919	109.8	.....	.....	219.0	140.6	36.8	—6.4	.....	—8.2	85.3
	LAND AND FARM AREA.										
6	Approximate land area—acres	926,720	2,133,760	286,080	1,753,600	849,920	278,400	2,469,120	590,720	4,003,840	526,080
7	All land in farms—acres	706,308	1,377,536	117,109	869,781	576,812	144,751	565,235	60,667	537,396	408,288
8	Improved land in farms—acres	599,403	402,269	77,736	210,353	206,890	67,838	103,470	21,607	166,621	299,264
9	Area irrigated in 1919—acres	183,923	5,302	7,142	16,335	70,312	1,294	50,215	15,292	65,602	23,650
10	Per cent of improved land in farms	30.7	1.3	9.2	7.8	34.0	1.9	48.5	70.8	39.4	7.9
11	Area irrigated in 1909—acres	59,811	1,687	3,648	12,012	37,637	1,201	33,994	17,504	60,301	3,610
12	Per cent of increase, 1909–1919	207.5	214.3	95.8	36.0	86.8	7.7	52.1	—12.6	8.8	555.1
13	Area enterprises were capable of irrigating in 1920—acres	231,125	10,872	8,164	34,408	75,348	2,069	58,903	15,873	70,987	28,702
14	Area enterprises were capable of irrigating in 1910—acres	77,083	2,416	3,653	13,572	50,939	1,313	36,564	17,505	66,866	7,160
15	Per cent of increase, 1910–1920	199.8	350.0	123.5	153.5	47.9	57.6	61.1	—9.3	6.2	300.9
16	Area included in enterprises in 1920—acres	324,404	11,229	9,449	37,795	86,761	2,700	110,382	18,547	130,654	36,078
17	Area included in enterprises in 1910—acres	173,563	2,539	3,983	13,603	60,140	2,232	72,653	18,249	79,161	8,192
18	Per cent of increase, 1910–1920	86.9	342.3	137.2	177.8	44.3	21.0	51.9	1.6	65.0	340.4
19	Area of irrigated land reported as available for settlement—acres	.....	.....	.....	.....	.....	.....	15,000	.....	2,300	.....
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	1,233	128	206	275	1,561	67	326	70	455	251
21	Number, 1910	1,206	65	85	108	842	97	472	100	572	132
	Main ditches:										
22	Number, 1920	256	38	15	55	26	11	385	87	714	36
23	Number, 1910	298	51	57	76	458	81	446	119	595	20
24	Length, 1920—miles	1,089	20	7	31	30	2	550	80	850	45
25	Length, 1910—miles	308	42	58	75	228	41	678	150	688	22
26	Capacity, 1920—second-feet	2,609	53	13	312	328	7	3,970	282	4,255	111
27	Capacity, 1910—second-feet	5,415	84	458	140	1,511	161	3,150	2,304	2,576	101
	Laterals:										
28	Number, 1920	417	5	54	47	8	1	118	48	316	52
29	Number, 1910	49	5	.....	4	39	.....	130	4	172	.....
30	Length, 1920—miles	888	.....	.....	7	21	.....	151	15	109	35
31	Length, 1910—miles	192	3	.....	5	27	.....	81	1	41	.....
	Reservoirs:										
32	Number, 1920	25	15	157	83	8	10	12	1	29	4
33	Number, 1910	73	8	3	32	142	55	10	3	20	3
34	Capacity, 1920—acre-feet	36,037	21	1,244	14,052	21	38	6,312	.....	4,591	.....
35	Capacity, 1910—acre-feet	134,014	52	33	13	9	1,228	3,903	8	107	1
	Flowing wells:										
36	Number, 1920	3	19	17	33	80	1	3	.....	8	4
37	Number, 1910	.....	4	.....	7	438	2	2	.....	.....	.....
38	Capacity, 1920—gallons per minute	180	3,808	25,723	4,341	13,075	125	150	.....	1,350	.....
39	Capacity, 1910—gallons per minute	.....	70	.....	250	110,816	10	290	.....	.....	.....
	Pumped wells:										
40	Number, 1920	1,376	161	229	296	2,159	44	4	1	26	322
41	Number, 1910	1,618	12	40	113	800	58	34	.....	3	125
42	Capacity, 1920—gallons per minute	630,697	35,862	27,009	101,925	649,247	11,076	1,340	500	9,995	145,982
43	Capacity, 1910—gallons per minute	432,281	4,416	3,956	24,520	287,668	8,383	6,550	.....	250	70,338
	Pumping plants:										
44	Number, 1920	1,371	119	251	235	1,572	59	51	1	45	281
45	Number, 1910	1,304	31	59	65	587	70	61	.....	10	127
46	Engine capacity, 1920—horsepower	18,987	1,692	2,219	5,657	33,721	685	594	.....	2,903	4,547
47	Engine capacity, 1910—horsepower	7,582	155	421	1,442	9,404	384	418	.....	69	1,882
48	Pump capacity, 1920—gallons per minute	997,850	62,519	26,400	543,273	780,874	19,378	47,896	500	125,674	199,892
49	Pump capacity, 1910—gallons per minute	553,134	12,116	8,341	37,135	338,915	16,324	31,937	.....	1,217	100,715
50	Average lift, 1920—feet	28	25	78	51	56	42	17	6	40	34
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920—dollars	7,432,763	304,119	488,856	1,418,022	4,364,803	338,145	3,020,700	100,810	1,589,073	535,348
52	Capital invested to July 1, 1910—dollars	1,689,720	32,311	90,921	370,186	1,337,216	76,621	430,766	69,650	370,627	135,532
53	Per cent of increase, 1910–1920	339.9	841.2	437.7	283.1	226.4	406.6	601.2	44.7	328.8	295.0
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	32.16	27.97	59.88	41.21	57.93	187.60	51.28	6.35	22.39	18.65
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	21.92	13.37	24.89	27.23	26.25	58.36	11.78	3.98	5.54	18.93
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920—dollars	7,516,649	317,729	491,356	1,498,233	4,551,153	388,645	3,344,079	101,940	1,814,803	560,348
57	Estimated final cost of existing enterprises in 1910—dollars	3,324,720	32,311	90,921	370,186	1,337,216	76,621	440,766	69,650	370,627	135,532
58	Per cent of increase, 1910–1920	126.1	883.3	440.4	304.7	240.3	407.2	658.7	46.4	389.7	313.4
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	23.17	28.30	52.00	39.64	52.46	143.94	30.30	5.50	13.89	15.53
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	19.16	12.73	22.83	27.21	22.24	34.33	6.07	3.82	4.68	16.54

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		Sonoma.	Stanislaus.	Sutter.	Tehama.	Trinity.	Tulare.	Tuolumne.	Ventura.	Yolo.	Yuba.
1	Number of all farms in 1920	5,739	4,566	1,437	1,414	377	6,372	363	1,543	1,613	487
2	Number of farms irrigated in 1919	113	4,091	669	640	217	5,184	149	818	688	242
3	Per cent of all farms	2.0	89.6	46.6	45.3	57.6	81.4	41.0	53.0	42.7	49.7
4	Number of farms irrigated in 1909	38	1,911	39	366	201	3,048	157	489	333	112
5	Per cent of increase, 1909–1919	.....	114.1	.....	74.9	8.0	70.1	−5.1	67.3	106.6	116.1
	LAND AND FARM AREA.										
6	Approximate land area—acres	1,012,480	928,000	389,120	1,872,000	1,981,440	3,107,840	1,401,600	1,189,120	648,960	404,480
7	All land in farms—acres	748,147	748,678	288,940	1,124,502	130,290	1,084,234	220,730	384,865	398,165	228,797
8	Improved land in farms—acres	251,730	477,871	232,070	232,722	15,078	544,598	35,380	189,924	300,094	98,997
9	Area irrigated in 1919—acres	2,126	197,249	47,305	23,153	5,810	398,662	2,892	31,716	42,493	20,773
10	Per cent of improved land in farms	0.8	41.3	20.4	9.9	38.5	73.2	8.2	16.7	14.2	21.0
11	Area irrigated in 1909—acres	631	84,015	1,173	14,281	6,324	265,404	2,035	25,273	11,754	3,073
12	Per cent of increase, 1909–1919	236.9	134.8	.....	62.1	−8.1	50.2	42.1	25.5	261.5	576.0
13	Area enterprises were capable of irrigating in 1920—acres	3,091	309,362	96,984	39,415	9,041	658,386	2,943	35,875	65,440	24,049
14	Area enterprises were capable of irrigating in 1910—acres	761	141,785	1,361	23,167	7,127	337,938	2,083	49,407	14,697	6,401
15	Per cent of increase, 1910–1920	306.2	118.2	.....	70.1	26.9	94.8	41.3	−27.4	345.3	275.7
16	Area included in enterprises in 1920—acres	11,256	375,270	102,945	44,670	15,010	764,733	25,371	50,737	104,716	71,995
17	Area included in enterprises in 1910—acres	951	340,914	1,959	36,020	9,513	466,735	5,958	56,357	55,967	46,322
18	Per cent of increase, 1910–1920	.....	10.1	.....	24.0	57.8	63.8	325.8	−10.0	87.1	55.4
19	Area of irrigated land reported as available for settlement—acres	.....	77,833	.....	2,900	.....	2,700	.....	.....	20,906	6,720
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	93	106	487	333	222	3,570	53	130	254	78
21	Number, 1910	40	27	21	270	193	908	61	189	47	39
	Main ditches:										
22	Number, 1920	5	94	67	150	261	211	50	23	28	67
23	Number, 1910	32	23	13	136	208	752	62	148	8	36
24	Length, 1920—miles	2	607	100	193	245	770	63	42	139	188
25	Length, 1910—miles	21	153	6	164	228	1,033	153	177	87	128
26	Capacity, 1920—second-feet	6	6,159	1,168	1,111	1,536	8,018	251	169	1,641	786
27	Capacity, 1910—second-feet	14	3,074	27	1,325	802	6,526	245	627	214	398
	Laterals:										
28	Number, 1920	2	914	201	97	55	432	32	48	43	43
29	Number, 1910	.....	34	.....	41	41	577	11	53	8	13
30	Length, 1920—miles	.....	1,074	182	226	15	1,252	130	30	155	105
31	Length, 1910—miles	.....	274	.....	40	13	629	24	87	83	87
	Reservoirs:										
32	Number, 1920	4	4	4	14	41	527	15	23	3	9
33	Number, 1910	3	5	6	43	30	63	9	32	5	5
34	Capacity, 1920—acre-feet	.....	75,156	2	185	90,468	112,806	6,086	2,749	151	6,651
35	Capacity, 1910—acre-feet	1	30,016	1	311	427	1,326	10	80	2	80
	Flowing wells:										
36	Number, 1920	1	1	2	.....	.....	23	.....	42	.....	.....
37	Number, 1910	.....	.....	.....	1	.....	79	2	32	.....	.....
38	Capacity, 1920—gallons per minute	.....	400	800	.....	.....	7,173	.....	11,435	.....	.....
39	Capacity, 1910—gallons per minute	.....	.....	.....	8	.....	35,513	14	17,455	.....	.....
	Pumped wells:										
40	Number, 1920	78	100	742	281	5	4,515	2	149	285	49
41	Number, 1910	11	3	18	141	1	794	4	157	58	11
42	Capacity, 1920—gallons per minute	28,381	84,205	319,535	96,585	605	1,776,335	25	86,734	166,698	30,551
43	Capacity, 1910—gallons per minute	6,331	950	6,616	16,275	750	237,420	16	64,829	29,409	1,605
	Pumping plants:										
44	Number, 1920	98	114	628	261	12	3,758	4	105	276	41
45	Number, 1910	27	21	19	165	3	739	7	126	46	11
46	Engine capacity, 1920—horsepower	614	4,803	10,541	2,190	69	45,032	12	5,592	8,852	2,365
47	Engine capacity, 1910—horsepower	134	707	124	751	34	7,864	89	2,976	981	62
48	Pump capacity, 1920—gallons per minute	33,524	232,785	826,630	106,285	3,990	2,331,179	25	94,130	549,814	29,852
49	Pump capacity, 1910—gallons per minute	16,763	135,950	6,616	39,680	1,920	244,318	765	72,704	69,694	1,605
50	Average lift, 1920—feet	19	31	21	27	15	43	36	82	26	24
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920—dollars	107,314	9,639,519	2,931,118	1,048,959	206,875	12,529,432	965,667	2,691,027	2,003,591	1,486,598
52	Capital invested to July 1, 1910—dollars	13,801	4,051,870	18,800	263,055	173,414	5,634,379	180,474	2,262,205	311,660	198,268
53	Per cent of increase, 1910–1920	677.6	137.9	.....	298.8	19.3	122.4	435.1	19.0	542.9	649.8
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	34.72	31.16	30.22	26.61	22.88	19.03	328.12	75.01	30.62	61.82
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	18.14	28.58	13.81	11.35	24.33	16.67	86.64	45.79	21.21	30.97
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920—dollars	125,064	17,006,504	3,239,043	1,081,145	215,025	12,973,985	965,667	3,066,027	3,629,826	1,981,373
57	Estimated final cost of existing enterprises in 1910—dollars	13,801	5,326,870	18,800	342,555	173,414	5,643,379	180,474	2,317,205	311,660	198,268
58	Per cent of increase, 1910–1920	806.2	219.3	.....	215.6	24.0	129.9	435.1	32.3	.....	899.3
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	11.11	45.32	31.46	24.20	14.33	16.97	38.06	60.43	34.66	27.52
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	14.51	15.63	9.60	9.51	18.23	12.09	30.29	41.12	5.57	4.28

COLORADO.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Colorado collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

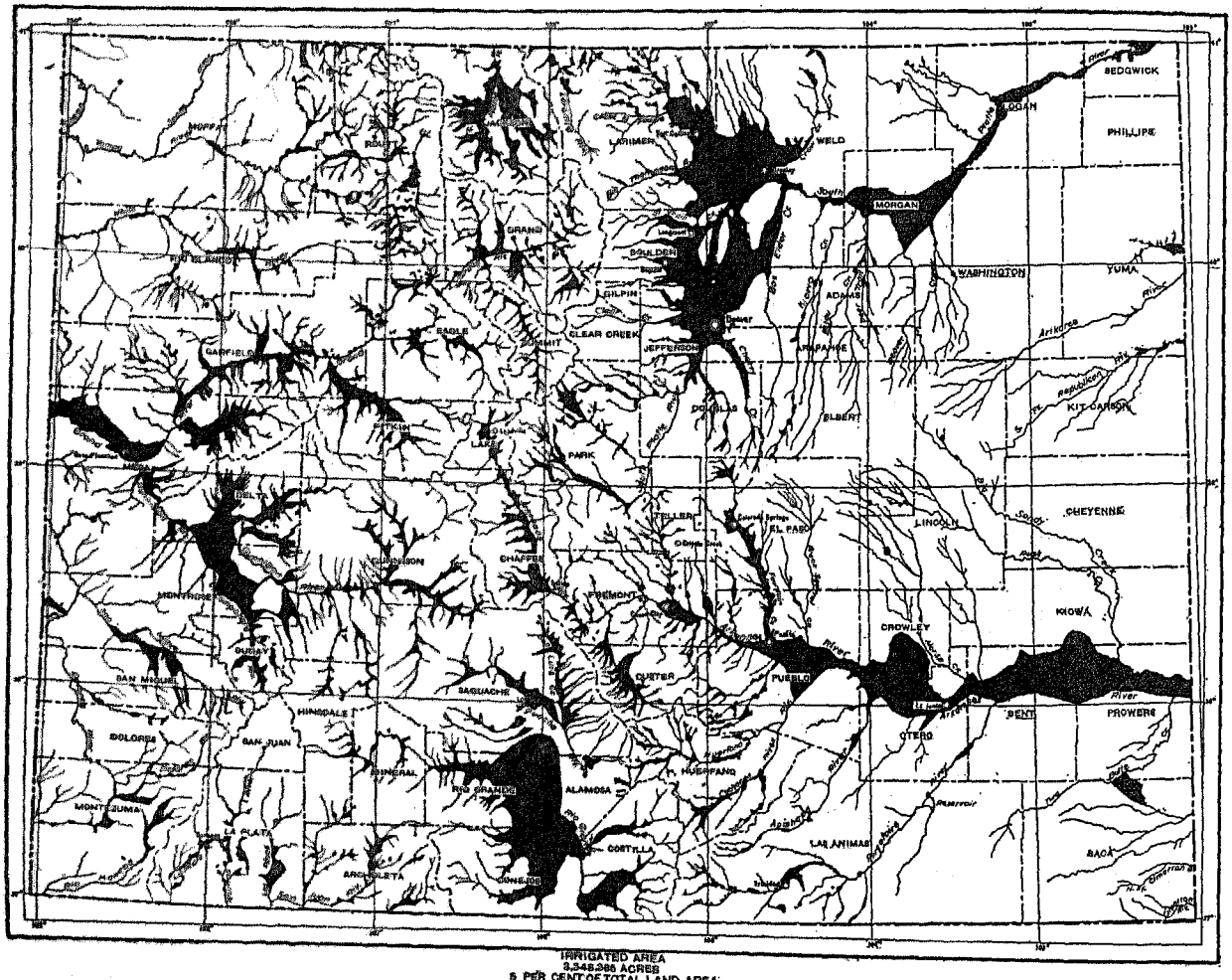
ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	59,934	46,170	13,764	29.8
Approximate land area of the state.....acres	66,341,120	66,341,120		
All land in farms.....acres	24,462,014	13,532,113	10,929,901	80.8
Improved land in farms.....acres	7,744,757	4,302,101	3,442,656	80.0
Number of farms irrigated	28,756	25,857	2,899	11.2
Area irrigated.....acres	3,348,385	2,792,032	556,353	19.9
Area enterprises were capable of irrigating.....acres	3,855,348	3,990,166	−134,818	−3.4
Area included in enterprises.....acres	5,220,588	5,917,457	−696,869	−11.8
Per cent irrigated:				
Number of all farms	48.0	56.0	−8.0	
Approximate land area of the state	5.0	4.2	0.8	
Land in farms	13.7	20.6	−6.9	
Improved land in farms	43.2	64.9	−21.7	
Excess of area enterprises were capable of irrigating over area irrigated.....acres	506,963	1,198,134	−691,171	−57.7
Excess of area included in enterprises over area irrigated.....acres	1,872,203	3,125,425	−1,253,222	−40.1
Area of irrigated land reported as available for settlement.....acres	274,282	(2)		
Capital invested	$88,302,442	$56,636,443	$31,665,999	55.9
Average per acre enterprises were capable of irrigating	$22.90	$14.19	$8.71	61.4
Estimated final cost of existing enterprises	$95,198,423	$76,443,239	$18,755,184	24.5
Average per acre included in enterprises	$18.24	$12.92	$5.32	41.2
Average cost of operation and maintenance per acre	$0.87	$0.75	$0.12	16.0
IRRIGATION WORKS.				
Number of enterprises	6,634	9,065	−2,431	−26.8
Number of main ditches	8,867	8,405	462	5.5
Length of main ditches.....miles	19,022	17,564	1,458	8.3
Capacity of main ditches.....second-feet	119,558	148,483	−28,925	−19.5
Number of lateral ditches	6,185	5,612	573	10.2
Length of lateral ditches.....miles	8,571	5,006	3,565	71.2
Number of reservoirs	979	1,084	−105	−9.7
Capacity of reservoirs.....acre-feet	2,406,372	2,646,593	−240,221	−9.1
Number of flowing wells	476	313	163	52.1
Capacity of flowing wells.....gallons per minute	20,139	41,989	−21,850	−52.0
Number of pumped wells	527	121	406	335.5
Capacity of pumped wells.....gallons per minute	210,094	53,564	156,530	292.2
Number of pumping plants	406	206	200	97.1
Engine capacity.....horsepower	8,635	7,969	666	8.4
Pump capacity.....gallons per minute	299,726	296,937	2,789	0.9
Average lift.....feet	23	(2)	23	

[1] A minus sign (−) denotes decrease.

[2] Not reported in 1910.

COLORADO

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

The main ranges of the Rocky Mountains divide the state of Colorado approximately in half, east and west. In the mountainous section, through the middle of the state, the precipitation is heavy. Both east and west of the mountains it decreases. That part of the state east of the mountains consists of high plains sloping to the east, with a divide running from the base of the mountains to the eastern line of the state. From this divide the land slopes to the north toward South Platte River and to the south toward Arkansas River. The precipitation drops abruptly near the base of the mountains and gradually increases toward the east, the normal precipitation on the plains being between 12 and 15 inches, being highest on the divide between the South Platte and the Arkansas and lowest in the stream valleys. The heaviest precipitation occurs in the summer months. In all of the plains section some crops are grown without irrigation, but irrigation is practiced wherever water is available. In this part of the state the area of land susceptible of irrigation is practically unlimited, but the water supply is sufficient for only a small part of the land.

To the west of the main ranges of mountains the country is very much broken by short ranges of mountains and hills, and precipitation varies greatly with altitude and exposure. The valleys of the western slope have the smallest annual precipitation in the state, the normal being but 7 or 8 inches in the valley of Grand River and in the northwestern part of the state. In these lower valleys crops can not be grown successfully without irrigation. In this western half of the state the tillable land is limited to the comparatively narrow valleys, most of the remainder of the land being too rough for cultivation.

In the south central part of the state, on the headwaters of the Rio Grande, lies the San Luis Valley, which contains a large area of level land. The altitude is high, the seasons are short, and the normal precipitation is less than 10 inches. Toward the base of the mountains that surround the valley the precipitation is heavier and crops are grown without irrigation.

In the north central part of the state is a similar high valley on the headwaters of the North Platte. This valley is not so extensive as the San Luis Valley, and the rainfall is slightly greater.

For the state as a whole the precipitation for 1919 was slightly above the normal, but it was considerably below normal in the South Platte Valley and considerably above normal in the Arkansas Valley. On the western slope it was about normal.

The state has a large percentage of sunshine with a low relative humidity, making very favorable climatic conditions for crop growing, when sufficient moisture is available, from either rainfall or irrigation.

WATER SUPPLY FOR IRRIGATION.

From the high mountain mass in central Colorado streams flow in all directions. To the east the South Platte and the Arkansas flow across the plains into Nebraska and Kansas, respectively; to the south the Rio Grande flows into and through New Mexico; to the west flow the Grand and other streams that unite to form the Colorado; and to the north flows the North Platte, into and through Wyoming. On all these streams there is more or less controversy between water users in Colorado and those in the lower states. These mountains receive a heavy snowfall in winter, and the melting snows supply most of the spring and summer flow of the streams, although the summer rains help to keep up stream flow. All of the streams heading in the mountains have high floods in the early summer, with much reduced flow during the late summer and autumn. The floods supply abundant water for grain and hay crops that mature in June and July, but the growing of crops that have a long growing season and mature in the fall, such as potatoes, beets, orchard fruits, and alfalfa, requires storage of the flood and winter flow of the streams.

In the valleys of the South Platte and the Arkansas many reservoirs have been built, and most of the flood and winter flow is stored. These streams are typical plains streams, and in their natural condition lost in the sands in their courses across the plains much of the water flowing in them as they left the mountains. The irrigation of the lands along these rivers has caused a large inflow by seepage from the watered lands, resulting in a much better supply of water along their courses than was available before irrigation began. The storage of flood waters and return seepage have made possible a large extension of the irrigated areas on the lower reaches of these rivers.

On account of the limited area on the western slope susceptible of irrigation and the large flow of the streams there has not been so much necessity for storage, and consequently, there are few reservoirs.

The existence of an abundant supply of water on the western slope and an unlimited area of irrigable land on the plains has led to the diversion of some water from the streams on the western side of the mountains to the streams flowing onto the plains and to the formulation of plans for diverting much larger volumes. On the other hand, there are plans for storing the surplus water on the western slope for use on lands in Arizona and California that can be reached by canals from Colorado River.

Up to the present time there has been little occasion to use underground water for irrigation. No doubt large quantities of water can be pumped from wells.

On the plains there are many drainage channels which carry water during storms or when local snows are melting, but their supply is so uncertain that they are of little value for irrigation.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.	Per cent of all farms.	Acres.	Per cent of increase.	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	28,756	11.2	48.0	3,348,385	19.9	5.0	13.7	43.2
1910	25,857	46.8	56.0	2,792,032	73.3	4.2	20.6	64.9
1900	17,613	82.3	71.3	1,611,271	80.9	2.4	17.0	70.9
1890	9,659	.....	58.9	890,735	.....	1.3	19.4	45.8

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	6,634	5,220,588	3,348,385	64.1	3,855,348
Before 1860	38	43,371	37,742	87.0	38,440
1860–1869	597	714,921	634,865	88.8	660,950
1870–1879	976	859,680	647,771	75.4	710,167
1880–1889	1,799	1,633,747	1,155,068	70.7	1,315,772
1890–1899	953	494,975	294,493	59.5	344,834
1900–1904	584	412,782	216,673	51.0	282,857
1905–1909	494	609,773	215,729	35.4	289,617
1910–1914	525	318,365	89,674	25.3	124,976
1915–1919	293	57,815	19,885	34.4	30,626
Not reported	365	75,149	51,465	68.5	57,109

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	3,348,385	2,792,032	556,353	19.9	3,855,348	5,220,588
Streams, gravity	3,028,787	2,745,035	283,752	10.3	3,465,037	4,499,303
Streams, pumped	12,747	13,248	−501	−3.8	20,256	26,699
Streams, pumped and gravity	9,430	(2)	9,430	.....	9,525	9,820
Wells, pumped	10,114	3,111	7,003	225.1	16,061	19,840
Wells, flowing	4,191	5,171	−980	−19.0	4,335	5,934
Wells, flowing and pumped	85	(2)	85	.....	160	2,045
Lakes, pumped	871	634	237	37.4	1,171	1,249
Lakes, gravity	2,967	422	2,445	579.4	3,589	5,247
Springs	10,856	8,320	2,536	30.5	13,677	18,711
Stored storm water	16,909	16,091	818	5.1	33,139	58,298
City water	11	(2)	11	.....	19	38
Sewage	195	(2)	195	.....	255	460
Streams, gravity, and pumped wells	16,258	(2)	16,258	.....	16,564	17,188
Streams, gravity, and flowing wells	67,880	(2)	67,880	.....	82,520	179,745
Other mixed	165,825	(2)	165,825	.....	187,157	413,973
Other and not reported	1,359	(2)	1,359	.....	1,923	2,038

[1] A minus sign (−) denotes decrease.
[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

The original irrigation district law in Colorado was enacted in 1901, and it has been amended from time to time since that date. Generally, irrigation districts have been organized to take over works already built, but in Colorado this form of organization has been utilized to a considerable extent for building new works. In some instances they have taken over cooperative or commercial enterprises, but the larger part of the acreage credited to districts in Table 5 represents enterprises originally undertaken by districts.

In addition to supplying water to lands in its own projects, as shown in Table 5, the United States Reclamation Service works delivered water to about 8,500 acres in other enterprises under the terms of the Warren Act (act of Congress, Feb. 21, 1911).

The state of Colorado accepted the conditions of the Federal Carey Act (act of Congress, Aug. 18, 1894) in 1895, and has amended this law from time to time, but very little has been accomplished under this law.

Colorado undertook the construction of irrigation works by the use of convict labor, but this policy was abandoned and the works that were begun were turned over to other agencies.

The small area credited to the state in Table 5 belongs to a state institution and does not represent a scheme of state construction.

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Acres.	Per cent.
ACREAGE IRRIGATED.				
Total	3,348,385	2,792,032	556,353	19.9
Individual and partnership	1,014,412	1,226,025	−211,613	−17.3
Cooperative	1,789,385	1,273,141	516,244	40.5
Irrigation district	248,409	115,304	133,105	115.4
Carey Act	2,430	485	1,945	401.0
Commercial	212,138	159,457	52,681	33.0
U. S. Reclamation Service	[2] 71,145	16,600	54,545	328.6
U. S. Indian Service	4,266	1,020	3,246	318.2
State	80	(3)	80	.....
City	5,825	(3)	5,825	.....
Not reported	295	(3)	295	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	3,855,348	3,990,166	−134,818	−3.4
Individual and partnership	1,194,422	1,581,941	−387,519	−24.5
Cooperative	1,993,361	1,870,447	122,914	6.6
Irrigation district	269,504	207,570	61,934	29.8
Carey Act	15,000	6,085	8,915	146.5
Commercial	226,641	292,103	−65,462	−22.4
U. S. Reclamation Service	[2] 135,265	30,000	105,265	350.9
U. S. Indian Service	14,900	2,020	12,880	637.6
State	80	(3)	80	.....
City	5,825	(3)	5,825	.....
Not reported	350	(3)	350	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total	5,220,588	5,917,457	−696,869	−11.8
Individual and partnership	1,730,635	2,039,533	−308,898	−15.1
Cooperative	2,419,267	2,436,367	−17,100	−0.7
Irrigation district	504,973	487,370	17,603	3.6
Carey Act	34,000	59,480	−25,480	−42.8
Commercial	358,243	681,687	−323,444	−47.4
U. S. Reclamation Service	[2] 150,515	193,000	−42,485	−22.0
U. S. Indian Service	16,100	20,020	−3,920	−19.6
State	80	(3)	80	.....
City	6,425	(3)	6,425	.....
Not reported	350	(3)	350	.....

[1] A minus sign (−) denotes decrease.
[2] Does not include about 8,500 acres to which water is supplied under the Warren Act.
[3] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The laws of Colorado relating to water rights are summarized in the following paragraphs:

The territory of Colorado was organized in 1861, and the first territorial legislature enacted a law declaring the right of persons holding land on the banks or margins or in the neighborhood of streams to use the water for purposes of irrigation, and providing for securing the right of way for ditches to lands not bordering the streams. The supreme court of the state has held that this is not a recognition of riparian rights, but rather of the right to take water away from the streams. (Crippen *v.* White, 28 Colo., p. 298.)

During the territorial period the legislature enacted many laws chartering ditch companies, and granting them the right to construct ditches and collect charges for supplying water, but it enacted no further general legislation.

The state of Colorado was admitted to the Union in 1876. The constitution of the state, adopted March 14, 1876, declared that "The water of every natural stream not heretofore appropriated within the state of Colorado is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided," and "The right to divert unappropriated waters of any natural stream for beneficial uses shall never be denied. Priority of appropriation shall give the better right as between those using the water for the same purpose."

In 1881 a law was enacted requiring parties building irrigation works to file in the county offices maps and statements describing their works and the intended use of water. This act was declared unconstitutional in 1899 (Lamar Canal Co. *v.* Amity Canal Co., 26 Colo., p. 370), but during the 18 years from its passage to 1899 many filings were made in the county offices throughout the state.

A law requiring the filing of maps and plans in the office of the state engineer was enacted in 1903, and this law, with various amendments, is still in force. This filing is not an application for permission to appropriate water, no such permits being required in Colorado.

Colorado was the pioneer state in providing a special procedure in the courts for defining rights to water. A law enacted in 1879 divided the state into districts, gave the district courts exclusive jurisdiction of water-right adjudications, and provided that on or before July 5, 1879, the district judges should appoint referees who were to bring actions to define all rights to water and formulate decrees. This law was superseded in 1881 by a law requiring all claimants to file statements of their claims with the clerks of the appropriate district courts on or before June 1, 1881, and providing that at any time after that date any one or more parties claiming water from any stream might petition the court having jurisdiction of the stream for an adjudication of all rights to water from that stream. This law, with provision for the defining of rights acquired after an adjudication, is still in force.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909
	Acres.	Per cent of total.	Per cent of total.
Total	3,348,385	100.0	100.0
Appropriation and use	114,616	3.4	9.3
Notice filed and posted	209,262	6.2	5.1
Adjudicated by court	2,918,383	87.2	84.4
Underground	14,558	0.4	(1)
Other and mixed	12,275	0.4	(1)
Not reported	79,291	2.4	(1)

[1] All land for which the class of rights was not reported was included in "Appropriation and use."

ACREAGE, BY DRAINAGE BASIN.

The report of a special census taken in 1902 presented all data by drainage basins rather than by counties. The results of the census of 1920 have been tabulated on the same basis, and the data for 1902 are presented for purposes of comparison. For no other census have the results been tabulated in this form. The acreage reported for each drainage basin in 1919 comprises all the irrigated land in that drainage basin, including that watered from springs and wells. In the 1902 results the acreages irrigated from springs and wells were not reported for the smaller tributary streams, but the acreages for the tributaries were included in those reported for the main streams. This area is so small, however, that the comparison of the areas reported for the tributary streams is not seriously affected.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
Total	3,348,385	1,754,761	90.8	5,220,588	3,855,348
South Platte River and tributaries	1,179,880	661,981	78.2	1,607,384	1,280,347
South Platte River direct	345,130	218,527	57.9	500,912	379,720
Bear Creek	8,778	11,174	−21.4	12,093	10,373
Clear Creek	79,172	76,259	3.8	84,450	79,940
St. Vrain Creek	244,831	96,583	153.5	281,467	265,731
Big Thompson Creek	96,678	68,806	40.5	105,673	98,711
Big Beaver Creek	6,429	17,100	−62.4	11,825	10,699
Cache la Poudre River	263,708	145,203	81.6	287,963	278,613
Lone Tree Creek	2,968	(2)	.....	122,466	5,362
Crow Creek	1,945	(2)	.....	7,450	2,250
Other tributaries of South Platte River	130,241	[3] 28,329	359.7	193,085	148,948
Republican River and tributaries	8,441	5,097	65.6	15,507	10,467
Smoky Hill River and tributaries	30	(2)	.....	30	30
Arkansas River and tributaries	641,476	300,115	113.7	938,533	709,068
Arkansas River direct	421,051	212,341	98.3	490,580	438,378
South Fork	10,401	5,422	91.8	12,374	10,430
Fountain River	20,405	13,870	47.5	39,224	24,964
St. Charles River	11,855	3,432	245.4	22,310	13,791
Huerfano River	55,528	14,078	294.4	103,554	64,474
Apishapa River	8,292	4,089	102.8	65,615	11,430
Purgatoire or Las Animas River	43,533	19,702	121.0	51,172	47,402
Other tributaries of Arkansas River	70,351	[3] 27,181	158.8	153,704	98,199
Rio Grande and tributaries	608,924	303,985	100.3	1,063,656	746,610
Rio Grande direct	326,688	187,837	73.9	508,127	420,140
Saguache River	38,032	11,730	224.2	41,447	39,363
San Luis River	51,329	3,679	.....	175,871	68,309
Alamosa River	35,601	15,753	126.0	72,528	40,551
La Jara River	10,627	(2)	.....	15,424	12,005
Conejos River	88,676	44,035	101.4	115,887	95,689
Trinchera River	12,485	3,768	231.3	59,699	19,319
Other tributaries of Rio Grande	45,486	[3] 37,183	22.3	74,673	51,243
San Juan River and tributaries	87,228	34,757	151.0	152,934	103,675
San Juan River direct	1,451	1,947	−25.5	2,989	1,634
Los Pinos River	28,762	6,130	369.2	52,946	40,773
Animas River	17,819	6,889	158.7	38,043	19,519
La Plata River	17,174	6,972	146.3	20,473	17,935
Mancos River	9,040	5,115	76.7	18,149	9,494
Other tributaries of San Juan River	12,982	[3] 7,704	68.5	20,334	14,320

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Included in "other tributaries" in 1902.
[3] Includes springs and wells.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902—Continued.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES). 1919	1902	Per cent of increase.[1]	Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
Grand River and tributaries	585,391	300,631	94.7	1,041,637	733,805
Grand River direct	71,958	37,878	90.0	125,422	101,249
Fraser River	9,331	2,676	248.7	27,010	10,795
Muddy Creek	5,050	4,105	23.0	7,255	5,075
Blue River	10,541	2,794	277.3	16,297	11,771
Eagle River	15,118	10,865	39.1	28,435	15,586
Roaring Fork	30,738	21,050	46.0	47,305	34,104
Plateau Creek	26,260	13,380	96.3	40,757	25,616
Gunnison River and tributaries	250,913	150,254	67.0	409,954	329,756
Gunnison River direct	16,813	9,000	86.8	21,649	19,909
Taylor River	560	12,018	—95.3	620	620
Tomichi Creek	21,752	10,152	114.3	30,298	23,068
North Fork River	31,606	17,174	80.5	57,189	33,891
Smith Fork River	15,314	5,954	157.2	31,340	25,600
Uncompahgre River	86,119	56,399	52.7	139,756	137,756
Other tributaries of Gunnison River	79,349	[2] 39,557	100.6	129,082	88,912
Rio Dolores	74,916	21,560	247.5	180,611	84,973
Other tributaries of Grand River	90,476	[2] 36,069	150.8	158,611	114,880
Green River and tributaries	94,003	82,451	14.0	165,279	115,921
Yampa River and tributaries	68,198	59,059	15.5	124,598	86,503
Yampa River direct	18,029	([3])	.....	28,221	18,532
Little Snake River	9,617	([3])	.....	16,342	12,449
Other tributaries of Yampa River	40,552	([3])	.....	80,135	55,222
White River	25,625	22,752	12.6	40,441	29,238
Other tributaries of Green River	180	[2] 640	—71.9	240	180
North Platte River and tributaries	143,102	65,744	117.7	235,628	155,485
North Platte River direct	2,520	([3])	.....	23,520	2,520
Laramie River	6,160	([3])	.....	6,425	6,160
Other tributaries of North Platte River	134,422	([3])	.....	205,683	146,805

[1] A minus sign (—) denotes decrease.
[2] Includes springs and wells.
[3] Included in "other tributaries" in 1902.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1890 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.	AVERAGE PER ACRE. Amount.	Per cent of increase.
1920	$88,302,442	55.9	$22.90	61.4
1910	56,636,443	381.7	14.19	94.4
1900	11,758,703	84.6	7.30	2.1
1890	6,368,755	.....	7.15	.....

TABLE 9.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$88,302,442	100.0	$22.90
Before 1860	265,669	0.3	6.91
1860–1869	14,410,087	16.3	21.80
1870–1879	8,150,179	9.2	11.48
1880–1889	17,150,419	19.4	13.03
1890–1899	7,043,088	8.0	20.43
1900–1904	14,101,894	16.0	56.90
1905–1909	14,192,932	16.1	49.01
1910–1914	11,479,877	13.0	95.68
1915–1919	550,890	0.6	17.99
Not reported	956,866	1.1	16.76

TABLE 10.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920. Amount.	Per cent of total.	Average per acre.	OPERATION AND MAINTENANCE, 1919. Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$88,302,442	100.0	$22.90	3,030,771	$0.87
Streams, gravity	68,852,489	78.0	19.87	2,729,530	0.82
Streams, pumped	2,490,900	2.8	122.97	11,617	9.49
Streams, pumped and gravity	397,392	0.4	41.72	9,430	2.34
Wells, pumped	375,277	0.4	23.37	9,350	4.54
Wells, flowing	55,251	0.1	12.75	3,847	0.52
Wells, flowing and pumped	5,300	([2])	33.12	85	4.78
Lakes, pumped	27,530	([2])	23.51	801	3.21
Lakes, gravity	84,935	0.1	23.67	1,751	1.14
Springs	188,920	0.2	13.81	7,695	1.20
Stored storm water	1,467,459	1.7	44.28	14,948	1.25
City water	97	([2])	5.11	11	1.82
Sewage	1,648	([2])	6.46	95	0.71
Streams, gravity, and pumped wells	190,454	0.2	11.50	15,913	0.75
Streams, gravity, and flowing wells	1,033,076	1.2	12.52	67,880	0.59
Other mixed	13,084,359	14.8	69.91	156,697	1.07
Other and not reported	47,355	0.1	25.15	1,121	1.69

[1] Based on area irrigated in 1919.
[2] Less than one-tenth of 1 per cent.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	INCREASE.[1] Amount.	Per cent.
Total	$88,302,442	$14,769,561	$73,532,881	497.9
South Platte River and tributaries	36,019,471	4,786,288	31,233,183	652.6
South Platte River direct	9,111,900	2,003,610	7,108,290	354.8
Bear Creek	137,240	76,635	60,605	79.1
Clear Creek	862,209	404,775	457,434	113.0
St. Vrains Creek	9,298,122	398,650	8,899,472	.....
Big Thompson Creek	1,102,316	600,166	502,150	83.7
Big Beaver Creek	52,600	98,000	—45,400	—46.3
Cache la Poudre River	7,907,593	1,065,357	6,842,236	642.2
Lone Tree Creek	2,731,100	([2])	2,731,100	.....
Crow Creek	51,700	([2])	51,700	.....
Other tributaries of South Platte River	4,764,691	[3] 139,095	4,625,596	.....
Republican River and tributaries	89,463	63,782	25,681	40.3
Smoky Hill River and tributaries	1,200	([4])	1,200	.....
Arkansas River and tributaries	19,710,289	3,626,670	16,083,619	443.5
Arkansas River direct	10,989,245	2,951,550	8,037,695	272.3
South Fork	69,000	24,785	44,215	178.4
Fountain River	965,287	106,240	859,047	808.6
St. Charles River	241,884	22,060	219,824	996.5
Huerfano River	3,204,519	72,690	3,131,829	.....
Apishapa River	1,190,695	4,970	1,185,725	.....
Purgatoire or Las Animas River	491,450	151,413	340,037	224.6
Other tributaries of Arkansas River	2,558,209	[3] 292,962	2,265,247	773.2
Rio Grande and tributaries	4,825,660	1,979,939	2,845,721	143.7
Rio Grande direct	1,526,753	1,717,395	—190,642	—11.1
Saguache River	103,048	16,165	86,883	537.5
San Luis River	184,312	4,220	180,092	.....
Alamosa River	556,909	27,080	529,829	.....
La Jara River	30,275	.....	30,275	.....
Conejos River	564,739	68,242	496,497	727.6
Trinchera River	659,890	23,650	636,240	.....
Other tributaries of Rio Grande	1,199,734	[3] 123,187	1,076,547	873.9
San Juan River and tributaries	1,166,170	238,990	927,180	388.0
San Juan River direct	25,200	14,925	10,275	68.8
Los Pinos River	521,590	80,030	441,560	551.7
Animas River	322,638	55,770	267,868	480.3
La Plata River	94,613	38,185	56,428	147.8
Mancos River	35,477	14,910	20,567	137.9
Other tributaries of San Juan River	165,652	[3] 35,170	130,482	371.0

[1] A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.
[2] Included in "other tributaries" in 1902.
[3] Includes springs and wells.
[4] None reported in 1902.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902—Continued.

DRAINAGE BASIN.	1920	1902	INCREASE.[1]	
			Amount.	Per cent.
Grand River and tributaries	$24,281,722	$3,547,697	$20,734,025	584.4
Grand River direct	5,923,462	477,950	5,445,512	.....
Fraser River	55,860	5,235	50,625	967.0
Muddy Creek	33,122	8,650	24,472	282.9
Blue River	116,608	21,359	95,249	445.9
Eagle River	109,012	75,570	33,442	44.3
Roaring Fork	407,266	163,170	244,096	149.6
Plateau Creek	341,755	60,035	281,720	469.3
Gunnison River and tributaries	10,745,767	1,351,906	9,393,861	694.9
Gunnison River direct	1,001,819	55,380	946,439	.....
Taylor River	6,900	64,985	−58,085	−89.4
Tomichi Creek	129,243	28,350	100,893	355.9
North Fork River	622,647	272,705	349,942	128.3
Smith Fork River	396,075	21,600	374,475	.....
Uncompahgre River	6,945,702	643,121	6,302,581	980.0
Other tributaries of Gunnison River	1,643,381	[2] 265,765	1,377,616	518.4
Rio Dolores	4,847,569	1,156,793	3,690,776	319.1
Other tributaries of Grand River	1,701,301	[2] 227,029	1,474,272	649.4
Green River and tributaries	1,372,889	382,895	989,994	258.6
Yampa River and tributaries	923,673	244,785	678,888	277.3
Yampa River direct	162,768	([3])	([3])	.....
Little Snake River	237,254	([3])	([3])	.....
Other tributaries of Yampa River	523,651	([3])	([3])	.....
White River	447,141	137,005	310,136	226.4
Other tributaries of Green River	2,075	[2] 1,105	970	87.8
North Platte River and tributaries	835,578	143,300	692,278	483.1
North Platte River direct	41,200	([3])	([3])	.....
Laramie River	51,800	([3])	([3])	.....
Other tributaries of North Platte River	742,578	([3])	([3])	.....

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.
[3] Main stream and tributaries shown as one item in 1902; consequently only increase for group as a whole can be shown.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$38,302,442	100.0	3,030,771	$0.87
Individual and partnership	11,599,883	13.1	854,213	0.70
Cooperative	42,911,035	48.6	1,634,568	0.75
Irrigation district	16,269,026	18.4	248,409	1.50
Carey Act	1,205,988	1.4	2,430	2.88
Commercial	5,711,887	6.5	212,135	1.11
U. S. Reclamation Service	10,253,231	11.6	71,145	2.59
U. S. Indian Service	220,979	0.3	3,766	0.67
State	3,994	([2])	80	7.50
City	117,665	0.1	4,025	3.17
Not reported	8,754	([2])	.....	.....

[1] Based on area irrigated in 1919.
[2] Less than one-tenth of 1 per cent.

In classifying capital invested by type of enterprise the average capital invested per acre is not presented, for the reason that it is not possible to compute this correctly. The United States Reclamation Service supplies water to enterprises controlled by agencies of other classes shown in the table and a part of its expenditure is properly chargeable to those lands; but the area so served varies from time to time, and consequently it is not possible to tell how much should be charged to such lands or how it should be distributed among the various classes.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	420
Acreage included in enterprises reporting land drained or needing drainage	1,526,311
Acreage for which drains have been installed	113,899
Additional acreage needing drainage	220,711
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	7.5
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	2.2
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	6.4

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 14. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume of water entering canals, second-feet	37,146	14,558	22,588
Area irrigated in 1919.....acres	2,174,612	1,373,031	801,581
Average number of acres per second-foot	59	94	35
Total quantity of water entering canals, acre-feet	13,877,292	4,848,103	9,029,189
Area irrigated in 1919.....acres	2,446,702	1,752,587	694,115
Average quantity per acre.....acre-feet	5.7	2.8	13.0
Total quantity of water delivered...acre-feet	3,233,531	1,832,530	1,401,001
Area irrigated in 1919.....acres	1,504,593	1,089,659	414,934
Average quantity per acre.....acre-feet	2.1	1.7	3.4

IRRIGATION WORKS.

TABLE 15.—IRRIGATION WORKS, *CLASSIFIED* BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES. Number.	MAIN DITCHES. Capacity (second-feet).	MAIN DITCHES. Length (miles).	LATERAL DITCHES. Number.	LATERAL DITCHES. Length (miles).	RESERVOIRS. Number.	RESERVOIRS. Capacity (acre-feet).
Total	3,647	803	8,867	119,558	19,022	6,185	8,571	979	2,406,372
Before 1860	35	2	47	1,275	137	55	53	1	938
1860–1869	562	61	704	15,006	2,233	914	1,509	60	217,180
1870–1879	769	84	1,614	17,903	3,232	710	1,340	109	252,248
1880–1889	1,035	179	2,593	35,600	5,472	1,920	2,509	196	402,018
1890–1899	380	147	1,204	12,981	2,511	859	643	187	153,435
1900–1904	226	68	740	12,389	1,599	521	713	98	304,827
1905–1909	294	112	631	13,065	1,799	379	962	142	868,305
1910–1914	183	79	557	5,161	1,007	421	423	109	107,673
1915–1919	78	39	350	4,662	325	184	60	41	27,570
Not reported	85	32	427	1,516	707	222	359	36	12,178

DATE OF BEGINNING.	Pipe lines, length (miles).	FLOWING WELLS. Number.	FLOWING WELLS. Capacity (gallons per minute).	PUMPED WELLS. Number.	PUMPED WELLS. Capacity (gallons per minute).	PUMPING PLANTS. Number.	PUMPING PLANTS. Engine capacity (horse-power).	PUMPING PLANTS. Pumps. Number.	PUMPING PLANTS. Pumps. Capacity (gallons per minute).
Total	217.3	476	20,139	527	210,094	406	8,635	435	299,726
Before 1860	0.5	.....	.....	1	700	1	10	1	700
1860–1869	30.5	.....	.....	4	2,100	5	68	5	3,100
1870–1879	3.1	22	599	1	.....	4	77	4	2,711
1880–1889	15.1	306	12,100	15	9,838	18	240	22	14,807
1890–1899	7.8	36	859	19	10,200	18	361	18	16,131
1900–1904	19.7	35	1,895	28	11,575	29	310	36	20,805
1905–1909	106.9	20	320	37	35,549	42	3,583	55	46,024
1910–1914	24.9	29	3,104	132	48,714	115	1,639	115	79,954
1915–1919	5.8	17	782	268	84,256	155	2,116	160	106,544
Not reported	3.0	11	480	22	7,162	19	231	19	8,950

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES. Number.	MAIN DITCHES. Capacity (second-feet).	MAIN DITCHES. Length (miles).	LATERAL DITCHES. Number.	LATERAL DITCHES. Length (miles).	RESERVOIRS. Number.	RESERVOIRS. Capacity (acre-feet).
Total	3,647	803	8,867	119,558	19,022	6,185	8,571	979	2,406,372
Individual and partnership	3,153	479	8,155	54,191	12,195	3,438	2,441	644	567,316
Cooperative	429	290	594	48,985	5,324	1,991	4,144	293	951,954
Irrigation district	23	18	48	5,678	681	266	354	25	277,101
Carey Act	2	2	4	520	42	5	23	3	57,000
Commercial	17	13	38	6,816	468	316	1,035	13	552,947
U. S. Reclamation Service	16	.....	11	2,898	217	144	518	.....	.....
U. S. Indian Service	1	.....	8	197	45	13	53	.....	.....
State	.....	.....	.....	.....	.....	10	2	.....	.....
City	6	1	7	232	48	.....	.....	1	24
Not reported	.....	.....	2	41	2	2	1	.....	.....

CLASS.	Pipe lines, length (miles).	FLOWING WELLS. Number.	FLOWING WELLS. Capacity (gallons per minute).	PUMPED WELLS. Number.	PUMPED WELLS. Capacity (gallons per minute).	PUMPING PLANTS. Number.	PUMPING PLANTS. Engine capacity (horse-power).	PUMPING PLANTS. Pumps. Number.	PUMPING PLANTS. Pumps. Capacity (gallons per minute).
Total	217.3	476	20,139	527	210,094	406	8,635	435	299,726
Individual and partnership	66.5	199	8,039	506	193,344	388	4,875	403	264,431
Cooperative	36.2	7	100	8	4,500	6	342	7	13,300
Irrigation district	10.5	300	12,000	.....	.....	4	2,525	11	3,500
Carey Act	41.2	.....	.....	.....	.....	.....	.....	.....	.....
Commercial	44.0	.....	.....	.....	.....	1	600	7	25
U. S. Reclamation Service	11.8	.....	.....	.....	.....	1	125	1	11,220
U. S. Indian Service	.....	.....	.....	.....	.....	.....	.....	.....	.....
State	.....	.....	.....	8	1,500	1	25	1	1,500
City	7.1	.....	.....	.....	.....	.....	.....	.....	.....
Not reported	.....	.....	.....	5	5,750	5	143	5	5,750

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	3,647	803	8,867	119,558	19,022	6,185	8,571	979	2,406,372
South Platte River and tributaries	831	294	1,327	36,837	4,860	1,109	2,230	301	916,770
South Platte River direct	103	14	201	12,674	1,259	286	466	22	421,292
Bear Creek	29	7	37	359	54	27	8	7	916
Clear Creek	81	5	60	1,806	177	65	94	12	6,767
St. Vrain Creek	171	83	195	5,600	1,649	219	356	69	123,395
Big Thompson Creek	33	23	42	2,810	241	64	146	20	44,617
Big Beaver Creek	4	1	8	226	27	1	.....	3	103
Cache la Poudre River	98	89	232	8,379	568	313	1,016	91	237,538
Lone Tree Creek	.....	1	5	7	3	1	.....	1	12
Crow Creek	6	9	6	105	8	5	9	9	4,200
Other tributaries of South Platte River	306	62	541	4,871	874	128	135	67	77,930
Republican River and tributaries	25	7	33	672	67	47	39	4	30
Smoky Hill River and tributaries	.....	1	1	5	1	.....	.....	1	5
Arkansas River and tributaries	919	154	2,022	28,647	3,529	2,440	2,529	245	1,075,580
Arkansas River direct	58	29	198	10,418	990	1,379	1,820	33	395,162
South Fork	30	.....	65	348	122	42	25	.....	.....
Fountain River	6	9	113	1,046	219	64	21	36	13,246
St. Charles River	87	12	114	757	162	42	24	14	3,418
Huerfano River	285	22	336	4,336	581	506	350	40	111,627
Apishapa River	39	15	62	1,806	103	21	32	15	54,321
Purgatoire or Las Animas River	101	9	147	2,606	356	38	30	18	403,099
Other tributaries of Arkansas River	313	58	997	7,330	996	348	227	89	94,207
Rio Grande and tributaries	566	23	1,031	14,754	1,971	556	1,166	33	265,170
Rio Grande direct	47	8	101	5,599	387	141	608	9	53,678
Saguache River	152	.....	251	752	176	88	73	11	202
San Luis River	40	2	252	1,670	349	50	70	2	179
Alamosa River	30	2	39	1,321	142	32	56	2	31,750
La Jara River	30	.....	31	390	69	9	12	.....	.....
Conejos River	103	2	105	3,188	317	52	72	2	3,001
Trinchera River	27	2	25	159	182	7	4	2	25,500
Other tributaries of Rio Grande	187	7	227	1,675	349	177	271	5	150,860
San Juan River and tributaries	73	6	417	2,775	894	259	148	13	3,430
San Juan River direct	.....	1	17	97	32	18	2	2	105
Los Pinos River	5	.....	63	821	192	24	69	.....	.....
Animas River	31	.....	121	771	250	40	9	4	.....
La Plata River	19	2	55	426	138	45	46	1	15
Mancos River	11	.....	38	285	87	11	12	1	150
Other tributaries of San Juan River	7	3	123	375	195	121	10	5	3,160
Grand River and tributaries	821	234	2,834	24,928	5,430	1,440	1,992	289	120,590
Grand River direct	9	5	69	2,541	361	264	283	4	475
Fraser River	14	2	61	352	112	2	1	2	10
Muddy Creek	49	10	50	254	64	.....	.....	10	1,727
Blue River	40	3	143	467	172	34	7	7	39
Eagle River	12	4	122	449	202	10	10	3	106
Roaring Fork	17	4	240	1,314	413	163	58	13	894
Plateau Creek	2	41	104	790	218	127	81	45	15,972
Gunnison River and tributaries	388	118	1,210	12,419	2,257	338	601	140	47,521
Gunnison River direct	14	1	63	1,168	151	35	19	1	120
Taylor River	.....	.....	4	15	6	.....	.....	.....	.....
Tomichi Creek	157	1	258	1,731	279	7	5	1	.....
North Fork River	19	17	138	1,154	306	87	76	26	11,134
Smith Fork River	5	9	46	562	119	21	38	9	1,265
Uncompahgre River	26	4	180	2,402	446	151	369	5	220
Other tributaries of Gunnison River	167	86	521	5,387	950	87	104	98	34,782
Rio Dolores	87	19	255	2,622	622	143	417	21	42,988
Other tributaries of Grand River	203	28	580	3,720	1,014	309	584	38	10,948
Green River and tributaries	144	73	809	5,333	1,428	302	413	83	9,563
Yampa River and tributaries	101	57	542	2,447	1,018	188	370	64	7,860
Yampa River direct	16	4	65	498	142	19	12	4	1,569
Little Snake River	2	6	77	584	138	13	6	6	888
Other tributaries of Yampa River	83	47	400	1,365	738	156	352	54	5,403
White River	43	16	265	2,883	408	114	43	19	1,703
Other tributaries of Green River	.....	.....	2	3	2	.....	.....	.....	.....
North Platte River and tributaries	268	11	393	5,607	842	32	54	10	15,234
North Platte River direct	3	2	5	310	16	.....	.....	2	2,700
Laramie River	32	1	38	478	63	11	11	1	75
Other tributaries of North Platte River	233	8	350	4,819	763	21	43	7	12,459

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920—Continued.

DRAINAGE BASIN.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.				
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.		Average lift (feet).
								Number.	Capacity (gallons per minute).	
Total	217.3	476	20,139	527	210,094	406	8,635	435	299,726	23
South Platte River and tributaries	46.8	4	230	283	124,338	226	3,103	241	166,263	22
South Platte River direct	9.7	3	170	90	42,452	76	1,096	78	50,812	22
Bear Creek	1.0					1	7	5		40
Clear Creek	0.1									
St. Vrain Creek	12.7			1		4	100	4	1,000	22
Big Thompson Creek	1.9			1	1,200	6	106	6	5,831	17
Big Beaver Creek				7	15,250	4	65	6	15,250	26
Cache la Poudre River	17.5	1	60	123	53,643	107	1,386	107	74,943	21
Lone Tree Creek	0.5			20	6,958	13	172	20	10,160	24
Other tributaries of South Platte River	3.4			41	4,825	15	171	15	8,267	26
Smoky Hill River and tributaries	0.1									
Arkansas River and tributaries	118.6	18	3,140	243	85,756	144	1,936	150	105,287	24
Arkansas River direct	13.8	2	315	167	66,235	98	1,564	104	83,836	23
Fountain River	11.7	3	30	19	7,700	8	126	8	8,200	21
St. Charles River	0.4			3	515	2	16	2	475	32
Huerfano River	4.5			11	2,070	6	36	6	2,045	40
Apishapa River	0.3			1	144	1	20	1	144	14
Purgatoire or Las Animas River	0.1					1	7	1	500	7
Other tributaries of Arkansas River	87.8	13	2,795	42	9,092	28	167	28	10,087	26
Rio Grande and tributaries	5.9	449	16,669	1		1		1		
Rio Grande direct		329	13,595							
Saguache River		83	2,672	1		1		1		
San Luis River	0.2	22	175							
Alamosa River	0.1	8	207							
Conejos River	0.1	1	20							
Trinchera River	4.0									
Other tributaries of Rio Grande	1.5	6								
San Juan River and tributaries	0.2	4	100			2	22	2	1,200	85
San Juan River direct	0.1					2	22	2	1,200	85
Los Pinos River	0.1									
Animas River		4	100							
Grand River and tributaries	45.3	1				28	3,516	36	22,876	32
Grand River direct	11.9					8	2,660	14	15,070	42
Muddy Creek	0.1									
Blue River	1.2									
Eagle River	5.2					2	33	2	1,000	58
Roaring Fork	0.3									
Plateau Creek	0.1									
Gunnison River and tributaries	18.1					17	822	19	6,806	22
Gunnison River direct	1.0					13	759	15	5,706	20
Tomichi Creek	0.4									
North Fork River	2.8					1	8	1	300	14
Smith Fork River	5.1									
Uncompahgre River	4.5					1	40	1		53
Other tributaries of Gunnison River	4.3					2	15	2	800	16
Rio Dolores	1.2					1	1	1		15
Other tributaries of Grand River	7.2	1								
Green River and tributaries	0.4					5	58	5	4,100	14
Yampa River and tributaries	0.2					4	48	4	3,200	15
Yampa River direct						4	48	4	3,200	15
Other tributaries of Yampa River	0.2									
White River	0.2					1	10	1	900	10

CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 AND 1909.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AREA HARVESTED.					QUANTITY HARVESTED.					
		1919		1909		Per cent of increase.[1]	Unit.	1919		1909		Per cent of increase.[1]
		Acres.	Per cent of total for state.	Acres.	Per cent of total for state.			Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	52,617	7.0	25,705	7.9	104.7	Bu.	1,316,478	13.0	567,151	11.6	132.1
2	Oats	97,618	56.0	192,311	69.7	−49.2	Bu.	3,037,305	67.0	6,235,979	81.6	−51.3
3	Winter wheat	112,548	10.9	174,116	51.1	44.6	Bu.	2,577,277	18.8	4,727,359	65.4	17.9
4	Spring wheat	139,214	46.9				Bu.	2,994,897	65.3			
5	Barley	58,125	38.0	48,775	68.3	19.2	Bu.	1,383,519	49.4	1,483,112	78.5	−6.7
6	Rye	2,757	2.1	898	5.7	207.0	Bu.	34,217	3.1	14,135	7.1	142.1
	Hay and forage:											
7	Timothy alone	33,588	75.4	45,029	87.4	−25.4	Tons	46,568	75.3	76,660	92.9	−39.3
8	Timothy and clover mixed	106,664	85.4	24,049	53.4	343.5	Tons	188,616	87.7	47,007	55.5	301.3
9	Clover alone	3,095	66.8	405	28.6	664.2	Tons	4,893	67.9	888	24.0	451.0
10	Alfalfa	659,912	84.4	480,586	94.4	37.3	Tons	1,568,038	88.1	1,222,790	96.6	28.2
11	Other tame grasses	46,110	36.6	52,844	51.3	−12.7	Tons	60,585	46.1	95,119	66.4	−36.3
12	Annual legumes cut for hay	9,386	73.5	48,171	64.2	−25.2	Tons	14,194	80.8	70,057	74.3	−25.1
13	Small grains cut for hay	26,630	20.2				Tons	38,250	30.5			
14	Wild, salt, or prairie grasses	290,693	70.7	299,755	75.9	−3.0	Tons	280,332	76.8	288,536	78.3	−2.8
15	Silage crops	18,015	33.9	[2]			Tons	119,656	50.2	[2]		
16	Corn cut for forage	14,547	8.2	[2]			Tons	34,234	17.9	[2]		
17	Kafir, sorghum, etc., for forage	12,123	3.5	[2]			Tons	24,349	5.5	[2]		
18	Root crops for forage	633	41.4	[2]			Tons	4,255	57.2	[2]		
	Vegetables:											
19	Potatoes	50,631	65.5	59,221	69.0	−14.5	Bu.	7,475,618	84.2	3,408,915	71.4	−11.1
20	Cabbages	2,791	74.0	[2]						[2]		
21	Cantaloupes	3,530	88.1	[2]						[2]		
22	Cucumbers	1,284	80.8	[2]						[2]		
23	Tomatoes	1,693	71.6	[2]						[2]		
	Fruits:											
24	Grapes	[3] 35,688	28.5	[2]			Lbs.	173,669	33.0	[2]		
25	Apples	[4] 879,087	49.4	[2]			Bu.	1,842,018	53.9	[2]		
26	Peaches	[4] 238,370	53.3	[2]			Bu.	460,404	63.8	[2]		
27	Pears	[4] 97,923	71.8	[2]			Bu.	210,944	78.3	[2]		
28	Plums and prunes	[4] 27,043	33.2	[2]			Bu.	19,264	42.9	[2]		
29	Cherries	[4] 194,612	55.7	[2]			Bu.	101,271	61.3	[2]		
	Miscellaneous:											
30	Sugar beets grown for sugar	137,329	82.8	106,905	99.0	28.5	Tons	1,409,560	85.0	1,224,466	99.5	15.1
31	Clover and alfalfa seed[5]	5,949	77.3	4,483	57.8	32.7	Bu.	21,363	78.4	9,628	53.4	121.9
32	Dry beans	10,627	16.0	2,504	49.7	324.4	Bu.	120,629	28.2	32,444	60.2	271.8
33	Dry peas	24,841	89.4	15,637	64.1	59.9	Bu.	265,449	89.8	199,945	77.4	32.8

	CROP.	AVERAGE YIELD PER ACRE: 1919.						VALUE.				
		Unit.	For state.	On non-irrigated land.	On irrigated land.			1919		1909		Per cent of increase.[1]
					Average.	Per cent of average for state.	Per cent of average on non-irrigated land.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	Bu.	13.4	12.6	25.0	186.6	198.4	$1,843,069	13.0	$370,400	13.9	397.6
2	Oats	Bu.	26.0	19.6	31.1	119.6	158.7	2,885,440	67.0	3,458,308	82.8	−16.6
3	Winter wheat	Bu.	13.3	12.1	22.9	172.2	189.3	5,309,191	18.8	4,352,823	67.3	163.7
4	Spring wheat	Bu.	15.4	10.1	21.5	139.6	212.9	6,169,488	65.3			
5	Barley	Bu.	18.3	14.9	23.8	130.1	159.7	1,798,575	49.4	897,849	81.6	100.3
6	Rye	Bu.	8.2	8.1	12.4	151.2	153.1	49,615	3.1	11,284	9.1	339.7
	Hay and forage:											
7	Timothy alone	Tons.	1.39	1.40	1.39	100.0	99.3	977,928	75.3	602,213	80.7	62.4
8	Timothy and clover mixed	Tons.	1.72	1.46	1.77	102.9	121.2	4,149,552	87.7	355,529	51.9	
9	Clover alone	Tons.	1.56	1.50	1.58	101.3	105.3	83,181	67.9	7,864	27.0	957.7
10	Alfalfa	Tons.	2.28	1.73	2.38	104.4	137.6	29,008,703	88.1	9,522,968	98.1	204.6
11	Other tame grasses	Tons.	1.04	0.89	1.31	126.0	147.2	969,360	46.1	751,436	66.4	29.0
12	Annual legumes cut for hay	Tons.	1.38	1.00	1.51	109.4	151.0	212,910	80.8	501,204	59.3	79.8
13	Small grains cut for hay	Tons.	0.95	0.82	1.44	151.6	175.6	688,500	30.5			
14	Wild, salt, or prairie grasses	Tons.	0.89	0.70	0.96	107.9	137.1	4,905,810	76.8	2,444,558	79.2	100.7
15	Silage crops	Tons.	4.25	3.20	6.29	148.0	196.6	1,196,560	50.2	[2]		
16	Corn cut for forage	Tons.	1.08	0.96	2.35	217.6	244.8	445,042	17.9	[2]		
17	Kafir, sorghum, etc., for forage	Tons.	1.29	1.26	2.01	155.8	159.5	316,537	5.5	[2]		
18	Root crops for forage	Tons.	4.86	3.55	6.72	138.3	189.3	55,315	57.2	[2]		
	Vegetables:											
19	Potatoes	Bu.	114.8	52.4	147.6	128.6	281.7	16,446,360	84.2	2,889,789	78.0	469.1
20	Cabbages							544,640	73.1	[2]		
21	Cantaloupes							616,437	89.2	[2]		
22	Cucumbers							198,241	83.2	[2]		
23	Tomatoes							234,779	67.8	[2]		
	Fruits:											
24	Grapes	Lbs.	[6] 4.2	[6] 3.9	[6] 4.9	116.7	125.6	13,894	33.0	[2]		
25	Apples	Bu.	[7] 1.9	[7] 1.8	[7] 2.1	110.5	116.7	3,039,330	53.9	[2]		
26	Peaches	Bu.	[7] 1.6	[7] 1.3	[7] 1.9	118.8	146.2	851,747	63.8	[2]		
27	Pears	Bu.	[7] 2.0	[7] 1.5	[7] 2.2	110.0	146.7	464,077	78.3	[2]		
28	Plums and prunes	Bu.	[7] 0.6	[7] 0.5	[7] 0.7	116.7	140.0	46,234	42.9	[2]		
29	Cherries	Bu.	[7] 0.5	[7] 0.4	[7] 0.5	100.0	125.0	329,131	61.3	[2]		
	Miscellaneous:											
30	Sugar beets grown for sugar	Tons.	10.00	8.72	10.26	102.6	117.7	14,800,380	85.0	6,055,382	99.9	144.4
31	Clover and alfalfa seed[5]	Bu.	3.5	3.4	3.6	102.9	105.9	491,349	78.4	83,070	60.5	491.5
32	Dry beans	Bu.	6.5	5.5	11.4	175.4	207.3	410,139	28.2	90,652	70.4	352.4
33	Dry peas	Bu.	10.6	10.2	10.7	100.9	104.9	663,622	89.8	282,095	71.0	135.2

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Not reported separately in 1909.
[3] Number of vines of bearing age.
[4] Number of trees of bearing age.
[5] Not including red clover seed.
[6] Yield per vine.
[7] Yield per tree.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		THE STATE.	Adams.[1]	Alamosa.[2]	Arapahoe.[1]	Archuleta.	Baca.	Bent.	Boulder.	Chaffee.
1	Number of all farms in 1920	59,234	1,753	302	1,025	420	1,858	1,056	1,420	326
2	Number of farms irrigated in 1919	28,756	740	281	477	185	23	438	1,200	313
3	Per cent of all farms	48.0	42.2	93.0	46.5	44.0	1.2	41.5	84.5	96.0
4	Number of farms irrigated in 1909	25,857	726	.....	493	206	8	404	1,118	212
5	Per cent of increase, 1909–1919	11.2	1.9	.....	−3.2	−10.2	.....	8.4	7.3	47.6
	LAND AND FARM AREA.									
6	Approximate land area.....acres	66,341,120	807,680	465,280	538,880	780,800	1,633,280	975,360	488,960	693,120
7	All land in farms.....acres	24,462,014	452,115	236,847	343,005	146,028	1,051,279	433,970	221,202	65,407
8	Improved land in farms.....acres	7,744,757	229,192	60,952	113,662	28,234	380,974	102,037	119,530	25,926
9	Area irrigated in 1919.....acres	3,348,385	66,407	89,805	25,674	11,933	2,287	128,712	159,781	29,623
10	Per cent of improved land in farms	43.2	29.0	147.3	22.6	42.3	0.6	126.1	133.7	114.3
11	Area irrigated in 1909.....acres	2,792,032	67,339	.....	26,341	15,008	211	59,497	112,724	16,142
12	Per cent of increase, 1909–1919	19.9	−1.4	.....	−2.5	−20.5	983.9	116.3	41.7	83.5
13	Area enterprises were capable of irrigating in 1920.....acres	3,855,348	68,065	168,625	26,137	13,289	12,020	133,372	174,736	30,113
14	Area enterprises were capable of irrigating in 1910.....acres	3,990,166	81,826	.....	35,997	23,230	351	69,497	169,040	32,383
15	Per cent of increase, 1910–1920	−3.4	−16.8	.....	−27.4	−42.8	.....	91.9	3.4	−7.0
16	Area included in enterprises in 1920.....acres	5,220,588	114,266	186,258	62,128	18,188	12,500	145,866	188,485	38,277
17	Area included in enterprises in 1910.....acres	5,917,457	103,065	.....	57,784	24,812	959	97,731	172,235	42,905
18	Per cent of increase, 1910–1920	−11.8	10.9	.....	7.5	−26.7	.....	49.3	9.4	−10.2
19	Area of irrigated land reported as available for settlement.....acres	274,282	.....	72,000	.....	.....	.....	6,540	.....	.....
	IRRIGATION WORKS.									
	Independent enterprises:									
20	Number, 1920	6,634	59	57	37	97	7	30	151	157
21	Number, 1910	9,065	89	.....	62	136	8	50	270	203
	Main ditches:									
22	Number, 1920	8,867	41	61	33	116	5	34	157	206
23	Number, 1910	8,405	70	.....	38	135	1	52	265	187
24	Length, 1920.....miles	19,022	238	182	105	179	8	280	1,147	392
25	Length, 1910.....miles	17,564	174	.....	196	211	2	240	570	311
26	Capacity, 1920.....second-feet	119,558	2,067	2,073	903	369	271	3,679	4,812	1,090
27	Capacity, 1910.....second-feet	148,483	3,453	.....	2,192	767	20	3,269	6,256	1,486
	Laterals:									
28	Number, 1920	6,185	63	41	32	128	32	450	205	95
29	Number, 1910	5,612	18	.....	8	31	.....	313	49	39
30	Length, 1920.....miles	8,571	128	173	113	6	19	830	320	47
31	Length, 1910.....miles	5,006	26	.....	11	28	.....	929	73	29
	Reservoirs:									
32	Number, 1920	979	11	2	6	5	4	17	44	3
33	Number, 1910	1,084	81	.....	18	4	.....	15	69	2
34	Capacity, 1920.....acre-feet	2,406,372	68,551	12,527	73,866	665	33,726	339,402	33,282	20
35	Capacity, 1910.....acre-feet	2,646,593	38,151	.....	796,094	627	.....	131,842	30,220	5
	Flowing wells:									
36	Number, 1920	476	1	119	2	.....	8	.....	.....	.....
37	Number, 1910	313	7	.....	2	.....	.....	.....	.....	.....
38	Capacity, 1920.....gallons per minute	20,139	40	5,085	130	.....	1,725	.....	.....	.....
39	Capacity, 1910.....gallons per minute	41,989	703	.....	36	.....	.....	.....	.....	.....
	Pumped wells:									
40	Number, 1920	527	28	.....	3	.....	4	11	1	.....
41	Number, 1910	121	10	.....	8	.....	10	.....	.....	.....
42	Capacity, 1920.....gallons per minute	210,094	8,217	.....	750	.....	52	8,250	.....	.....
43	Capacity, 1910.....gallons per minute	53,564	2,097	.....	2,425	.....	2,882	.....	.....	.....
	Pumping plants:									
44	Number, 1920	406	29	.....	3	2	3	8	2	.....
45	Number, 1910	206	10	.....	9	1	5	1	1	.....
46	Engine capacity, 1920.....horsepower	8,535	168	.....	22	22	.....	197	30	.....
47	Engine capacity, 1910.....horsepower	7,969	35	.....	145	2	50	10	3	.....
48	Pump capacity, 1920.....gallons per minute	299,726	8,217	.....	750	1,200	52	8,350	1,000	.....
49	Pump capacity, 1910.....gallons per minute	296,937	2,097	.....	8,375	128	2,882	470	200	.....
50	Average lift, 1920.....feet	23	27	.....	17	85	100	24	8	.....
	CAPITAL INVESTED.									
51	Capital invested to Jan. 1, 1920.....dollars	88,302,442	2,436,771	416,305	597,099	168,635	572,553	2,773,601	1,774,922	261,368
52	Capital invested to July 1, 1910.....dollars	56,636,443	1,211,609	.....	745,517	112,168	2,473	989,211	837,060	54,949
53	Per cent of increase, 1910–1920	55.9	101.1	.....	−19.9	50.3	.....	180.4	112.0	375.7
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	22.90	35.80	2.47	22.84	12.69	47.63	20.80	10.16	8.68
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	14.19	14.81	.....	20.71	4.83	7.05	14.23	4.95	1.76
	ESTIMATED FINAL COST.									
56	Estimated final cost of existing enterprises in 1920.....dollars	95,198,423	2,557,121	458,952	600,299	170,285	572,553	2,797,201	1,850,662	265,062
57	Estimated final cost of existing enterprises in 1910.....dollars	76,443,239	1,417,109	.....	745,517	112,168	2,473	989,211	901,143	54,949
58	Per cent of increase, 1910–1920	24.5	80.4	.....	−19.5	51.8	.....	182.8	105.4	382.4
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	18.24	22.38	2.46	9.66	9.36	45.80	19.18	9.82	6.93
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	12.92	13.75	.....	12.90	4.52	2.58	10.12	5.23	1.29

[1] Adams and Denver Counties organized from parts of Arapahoe County in 1902; parts of Adams and Arapahoe Counties annexed to Washington County and to Yuma County in 1903; and part of Denver County annexed to Adams County in 1909.
[2] Alamosa County organized from parts of Conejos and Costilla Counties in 1913.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		Conejos.[1]	Costilla.[1]	Crowley.[2]	Custer.	Delta.	Denver.[3]	Dolores.	Douglas.	Eagle.
1	Number of all farms in 1920	814	443	743	353	1,707	239	186	462	301
2	Number of farms irrigated in 1919	734	431	447	165	1,680	118	21	108	277
3	Per cent of all farms	90.2	97.3	60.2	46.7	98.4	49.4	11.3	23.4	92.0
4	Number of farms irrigated in 1909	737	350	.....	142	1,709	72	30	157	218
5	Per cent of increase, 1909–1919	.....	.....	.....	16.2	−1.7	.....	.....	−31.2	27.1
	LAND AND FARM AREA.									
6	Approximate land area—acres	801,280	758,400	517,120	478,080	768,640	37,120	667,520	540,800	1,036,800
7	All land in farms—acres	231,938	434,410	263,265	197,360	169,768	4,287	57,889	362,033	80,874
8	Improved land in farms—acres	128,018	46,598	130,645	36,896	74,473	3,672	7,278	56,701	28,507
9	Area irrigated in 1919—acres	139,504	36,771	57,789	24,241	93,509	4,000	1,023	8,696	30,025
10	Per cent of improved land in farms	109.0	78.9	44.2	65.7	125.6	108.9	14.1	15.3	105.3
11	Area irrigated in 1909—acres	138,788	57,882	.....	29,248	62,411	1,337	1,139	13,768	22,578
12	Per cent of increase, 1909–1919	.....	.....	.....	−17.1	49.8	199.2	−10.2	−36.8	33.0
13	Area enterprises were capable of irrigating in 1920—acres	152,346	43,906	58,735	33,548	127,469	4,000	2,361	10,391	31,073
14	Area enterprises were capable of irrigating in 1910—acres	262,040	106,745	.....	33,610	99,185	1,338	2,042	24,624	28,116
15	Per cent of increase, 1910–1920	.....	.....	.....	−0.2	28.5	199.0	15.6	−57.8	10.5
16	Area included in enterprises in 1920—acres	207,519	102,960	71,974	39,463	156,624	4,877	23,601	15,089	48,026
17	Area included in enterprises in 1910—acres	335,253	255,485	.....	34,610	174,330	1,338	2,052	25,405	32,925
18	Per cent of increase, 1910–1920	.....	.....	.....	14.0	−10.4	264.5	[4]	−40.6	45.9
19	Area of irrigated land reported as available for settlement—acres	.....	.....	5,000	.....	9,040	.....	20,000	.....	.....
	IRRIGATION WORKS.									
	Independent enterprises:									
20	Number, 1920	159	46	24	202	298	4	22	94	186
21	Number, 1910	312	70	.....	464	329	10	31	145	188
	Main ditches:									
22	Number, 1920	172	67	23	440	309	4	25	123	245
23	Number, 1910	236	71	.....	464	291	3	31	141	171
24	Length, 1920—miles	533	334	93	323	738	20	56	191	335
25	Length, 1910—miles	609	212	.....	415	819	6	33	186	300
26	Capacity, 1920—second-feet	5,000	997	2,059	784	3,245	70	298	554	885
27	Capacity, 1910—second-feet	8,542	2,681	.....	791	3,474	20	129	764	794
	Laterals:									
28	Number, 1920	99	17	93	32	222	.....	4	9	91
29	Number, 1910	93	47	.....	622	89	4	.....	8	97
30	Length, 1920—miles	150	203	119	15	259	.....	2	22	62
31	Length, 1910—miles	320	68	.....	106	175	1	.....	40	43
	Reservoirs:									
32	Number, 1920	5	6	18	1	115	.....	4	17	15
33	Number, 1910	10	6	.....	.....	123	2	1	14	5
34	Capacity, 1920—acre-feet	34,968	132,860	8,593	5	39,284	.....	19,630	4,287	1,468
35	Capacity, 1910—acre-feet	50,693	132,248	.....	.....	62,883	1	40	12,025	73
	Flowing wells:									
36	Number, 1920	2	.....	1	.....	.....	.....	.....	.....	1
37	Number, 1910	111	3	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1920—gallons per minute	70	.....	700	.....	.....	.....	.....	.....	.....
39	Capacity, 1910—gallons per minute	24,587	1,792	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:									
40	Number, 1920	.....	.....	48	.....	.....	.....	.....	3	.....
41	Number, 1910	.....	.....	.....	.....	.....	4	.....	1	.....
42	Capacity, 1920—gallons per minute	.....	.....	22,575	.....	.....	.....	.....	405	.....
43	Capacity, 1910—gallons per minute	.....	.....	.....	.....	.....	11	.....	100	.....
	Pumping plants:									
44	Number, 1920	.....	.....	25	.....	6	.....	.....	3	3
45	Number, 1910	.....	.....	.....	.....	21	4	.....	1	.....
46	Engine capacity, 1920—horsepower	.....	.....	299	.....	21	.....	.....	21	33
47	Engine capacity, 1910—horsepower	.....	.....	.....	.....	131	3	.....	20	.....
48	Pump capacity, 1920—gallons per minute	.....	.....	23,505	.....	881	.....	.....	412	1,000
49	Pump capacity, 1910—gallons per minute	.....	.....	.....	.....	15,242	11	.....	100	.....
50	Average lift, 1920—feet	.....	.....	28	.....	13	.....	.....	22	45
	CAPITAL INVESTED.									
51	Capital invested to Jan. 1, 1920—dollars	1,155,162	1,389,816	2,587,043	75,431	4,168,137	47,386	549,070	207,786	285,282
52	Capital invested to July 1, 1910—dollars	927,647	2,090,999	.....	137,565	1,568,770	21,581	12,671	581,214	133,956
53	Per cent of increase, 1910–1920	.....	.....	.....	−45.2	165.7	119.6	.....	−64.2	113.0
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	7.58	31.65	44.05	2.25	32.70	11.85	232.56	20.00	9.18
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	3.54	19.59	.....	4.09	15.82	16.13	6.21	23.60	4.76
	ESTIMATED FINAL COST.									
56	Estimated final cost of existing enterprises in 1920—dollars	1,156,632	1,403,066	2,593,508	76,596	4,320,091	47,386	729,020	208,286	307,432
57	Estimated final cost of existing enterprises in 1910—dollars	1,026,897	2,177,966	.....	137,565	2,261,610	21,581	12,671	589,878	133,956
58	Per cent of increase, 1910–1920	.....	.....	.....	−44.3	91.0	119.6	.....	−64.7	129.5
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	5.57	13.63	36.03	1.94	27.58	9.72	30.89	13.80	6.40
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	3.06	8.52	.....	3.97	12.94	16.13	6.17	23.22	4.07

[1] Parts of Conejos and Costilla Counties taken to form Alamosa County in 1913.
[2] Crowley County organized from part of Otero County in 1911.
[3] Organized from part of Arapahoe County in 1902. A part of Denver County annexed to Adams County in 1909.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		El Paso.	Elbert.	Fremont.	Garfield.	Grand.	Gunnison.	Hinsdale.	Huerfano.	Jackson.[1]	Jefferson.[2]
1	Number of all farms in 1920	1,571	1,308	1,014	930	265	376	40	954	182	1,446
2	Number of farms irrigated in 1919	143	12	827	829	237	335	29	418	156	1,141
3	Per cent of all farms	9.1	0.9	81.6	89.1	89.4	89.1	72.5	43.8	85.7	78.9
4	Number of farms irrigated in 1909	174	34	839	868	226	261	22	350	163	1,151
5	Per cent of increase, 1909–1919	−17.8	.....	−1.4	−4.5	4.9	28.4	.....	19.4	−4.3	−1.0
	LAND AND FARM AREA.										
6	Approximate land area—acres	1,357,440	1,188,480	996,480	1,988,480	1,194,240	2,034,560	621,440	960,000	1,044,480	517,120
7	All land in farms—acres	919,013	1,011,533	229,397	211,875	119,436	121,579	10,533	386,354	234,214	249,922
8	Improved land in farms—acres	208,517	206,021	31,454	74,214	32,766	49,351	3,742	59,130	93,468	69,625
9	Area irrigated in 1919—acres	18,143	1,175	29,884	73,473	39,857	48,280	3,675	29,081	136,942	70,788
10	Per cent of improved land in farms	8.7	0.6	94.9	99.0	121.6	97.8	98.2	49.2	146.5	101.7
11	Area irrigated in 1909—acres	21,354	7,628	24,737	61,617	42,194	55,843	2,924	26,598	151,850	57,336
12	Per cent of increase, 1909–1919	−15.0	−84.6	20.8	19.2	−5.5	−13.6	25.7	9.3	−9.8	23.5
13	Area enterprises were capable of irrigating in 1920—acres	22,047	1,790	35,697	93,814	43,092	52,467	3,880	32,119	149,325	73,635
14	Area enterprises were capable of irrigating in 1910—acres	28,214	11,286	37,136	95,281	77,672	59,700	3,354	35,690	199,467	142,286
15	Per cent of increase, 1910–1920	−21.9	−84.1	−3.9	−1.5	−44.5	−12.1	15.7	−10.0	−25.1	−48.2
16	Area included in enterprises in 1920—acres	35,450	6,720	44,059	117,618	85,504	67,925	4,065	43,274	229,203	77,937
17	Area included in enterprises in 1910—acres	41,438	20,361	42,414	133,321	98,299	73,895	5,220	66,878	244,967	293,163
18	Per cent of increase, 1910–1920	−14.5	−67.0	3.9	−11.8	−13.0	−8.1	−22.1	−35.3	−6.4	−73.4
19	Area of irrigated land reported as available for settlement—acres	2,200	1,800	4,550	6,000	800	.....	.....	2,520	27,640	.....
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	63	22	179	323	166	382	52	267	145	105
21	Number, 1910	99	37	413	440	328	507	41	263	328	163
	Main ditches:										
22	Number, 1920	72	30	267	392	314	523	52	321	355	133
23	Number, 1910	85	30	366	374	326	448	31	266	326	164
24	Length, 1920—miles	176	31	229	730	542	702	104	475	779	289
25	Length, 1910—miles	193	30	337	870	497	466	28	427	743	640
26	Capacity, 1920—second-feet	863	155	901	2,563	2,037	4,236	519	1,907	5,129	2,093
27	Capacity, 1910—second-feet	1,157	427	1,058	4,401	3,508	6,934	183	1,609	6,896	4,623
	Laterals:										
28	Number, 1920	44	24	190	283	39	80	.....	458	21	88
29	Number, 1910	24	60	363	89	173	41	6	187	142	31
30	Length, 1920—miles	17	31	101	512	37	34	.....	146	43	92
31	Length, 1910—miles	14	4	122	54	94	7	2	106	79	67
	Reservoirs:										
32	Number, 1920	29	5	31	26	25	6	2	34	9	25
33	Number, 1910	15	8	26	14	21	1	.....	37	6	79
34	Capacity, 1920—acre-feet	13,103	6,755	6,972	7,594	3,137	460	43,500	12,027	15,159	8,178
35	Capacity, 1910—acre-feet	12,247	1,456	18,879	5,049	3,344	125	.....	12,714	2,150	136,519
	Flowing wells:										
36	Number, 1920	3	.....	3	.....	.....	.....	.....	.....	.....	.....
37	Number, 1910	30	.....	60	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1920—gallons per minute	30	.....	115	.....	.....	.....	.....	.....	.....	.....
39	Capacity, 1910—gallons per minute	1,064	.....	1,371	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:										
40	Number, 1920	1	3	9	.....	.....	.....	.....	2	.....	3
41	Number, 1910	1	.....	5	.....	.....	.....	.....	1	.....	.....
42	Capacity, 1920—gallons per minute	.....	1,200	287	.....	.....	.....	.....	70	.....	.....
43	Capacity, 1910—gallons per minute	360	.....	1,109	.....	.....	.....	.....	1,200	.....	355
	Pumping plants:										
44	Number, 1920	1	3	10	2	.....	4	.....	4	.....	1
45	Number, 1910	1	.....	9	.....	.....	1	.....	1	.....	7
46	Engine capacity, 1920—horsepower	.....	12	309	10	.....	112	.....	11	.....	7
47	Engine capacity, 1910—horsepower	8	.....	225	.....	.....	56	.....	10	.....	26
48	Pump capacity, 1920—gallons per minute	.....	1,200	6,962	350	.....	3,800	.....	45	.....	.....
49	Pump capacity, 1910—gallons per minute	360	.....	8,921	.....	.....	3,600	.....	1,200	.....	929
50	Average lift, 1920—feet	.....	29	38	29	.....	18	.....	52	.....	40
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920—dollars	901,461	25,561	1,761,518	1,134,502	534,913	462,748	395,752	1,061,777	784,326	1,231,205
52	Capital invested to July 1, 1910—dollars	187,211	35,215	1,505,440	1,458,678	432,231	207,622	11,047	257,959	275,899	4,300,968
53	Per cent of increase, 1910–1920	381.5	−27.4	17.0	−22.2	23.8	122.9	.....	11.6	184.3	−71.4
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	40.89	14.28	49.35	12.09	12.41	8.82	102.00	33.06	5.25	16.72
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	6.64	3.12	40.54	15.31	5.56	3.48	3.29	7.23	1.38	30.23
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920—dollars	921,461	39,961	1,889,558	1,170,827	547,713	472,998	395,752	1,083,232	1,043,826	1,268,125
57	Estimated final cost of existing enterprises in 1910—dollars	187,211	35,215	1,588,971	1,498,678	504,654	207,622	11,047	273,959	275,899	5,170,968
58	Per cent of increase, 1910–1920	392.2	13.5	18.9	−21.9	8.5	127.8	.....	295.4	378.3	−75.5
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	25.99	5.95	42.89	9.95	6.41	6.96	97.36	25.03	4.55	16.27
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	4.52	1.73	37.46	11.24	5.13	2.81	2.12	4.10	1.13	17.64

[1] Jackson County organized from part of Larimer County in 1909.
[2] Part of Jefferson County annexed to Park County in 1908.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		Kiowa.	La Plata.	Lake.	Larimer.[1]	Las Animas.	Logan.	Mesa.	Mineral.	Moffat.[2]	Montezuma.
1	Number of all farms in 1920	668	1,069	30	1,921	2,286	1,874	2,207	34	1,023	904
2	Number of farms irrigated in 1919	12	860	29	1,486	530	397	2,060	28	103	616
3	Per cent of all farms	1.8	80.4	96.7	77.4	23.2	21.2	93.3	82.4	10.1	68.1
4	Number of farms irrigated in 1909	6	634	43	1,491	447	272	2,238	28	.....	516
5	Per cent of increase, 1909–1919	.....	35.6	.....	−0.3	18.6	46.0	−8.0	.....	.....	19.4
	LAND AND FARM AREA.										
6	Approximate land area—acres	1,150,720	1,184,640	237,440	1,682,560	3,077,760	1,166,080	2,024,320	554,240	2,981,120	1,312,640
7	All land in farms—acres	430,985	305,003	12,862	730,533	1,302,849	857,359	232,225	17,129	461,777	192,703
8	Improved land in farms—acres	61,782	76,019	5,151	192,976	133,084	416,120	99,582	5,458	75,225	57,904
9	Area irrigated in 1919—acres	418	63,755	6,397	169,356	40,400	85,079	102,607	6,865	17,439	44,083
10	Per cent of improved land in farms	0.7	83.9	124.2	87.8	30.4	20.4	103.0	125.8	23.2	76.1
11	Area irrigated in 1909—acres	1,460	40,840	10,967	170,600	26,093	63,166	71,942	7,762	.....	27,176
12	Per cent of increase, 1909–1919	−71.4	56.1	−41.7	−0.7	54.8	34.7	42.6	−11.6	.....	62.2
13	Area enterprises were capable of irrigating in 1920—acres	2,083	78,227	7,088	188,047	43,857	105,916	140,104	9,950	24,224	44,795
14	Area enterprises were capable of irrigating in 1910—acres	1,460	109,479	11,647	178,992	32,566	65,345	92,092	9,370	.....	62,757
15	Per cent of increase, 1910–1920	42.7	−28.5	−39.1	5.1	34.7	62.1	52.1	6.2	.....	−28.6
16	Area included in enterprises in 1920—acres	17,283	111,462	10,449	196,330	50,987	124,415	185,177	14,770	32,327	80,216
17	Area included in enterprises in 1910—acres	2,310	151,387	16,380	316,992	35,149	87,301	182,942	10,590	.....	67,538
18	Per cent of increase, 1910–1920	648.2	−26.4	−36.2	−38.1	45.1	42.5	1.2	39.5	.....	18.8
19	Area of irrigated land reported as available for settlement—acres	.....	7,907	.....	.....	.....	.....	39,200	.....	.....	13,000
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	6	211	30	171	176	39	213	42	127	102
21	Number, 1910	6	262	55	221	139	36	275	46	.....	141
	Main ditches:										
22	Number, 1920	3	239	59	228	184	39	239	45	135	123
23	Number, 1910	4	257	39	217	88	35	259	44	.....	150
24	Length, 1920—miles	18	580	52	564	373	386	686	60	362	265
25	Length, 1910—miles	7	489	71	758	161	215	592	47	.....	268
26	Capacity, 1920—second-feet	2,585	2,018	298	6,968	1,618	3,376	4,721	355	888	995
27	Capacity, 1910—second-feet	22	2,662	530	7,176	1,193	2,566	5,000	217	.....	1,590
	Laterals:										
28	Number, 1920	4	109	.....	238	41	105	398	59	113	39
29	Number, 1910	.....	52	9	136	16	8	62	12	.....	38
30	Length, 1920—miles	34	124	.....	418	28	125	326	22	334	159
31	Length, 1910—miles	.....	125	16	368	7	23	150	8	.....	158
	Reservoirs:										
32	Number, 1920	4	5	.....	69	21	7	60	2	18	9
33	Number, 1910	1	7	.....	84	7	4	42	0	.....	11
34	Capacity, 1920—acre-feet	32,118	15	.....	181,515	429,105	116,108	19,201	2,311	1,569	17,680
35	Capacity, 1910—acre-feet	1	7,456	.....	263,388	427	1,929	10,172	.....	.....	37,600
	Flowing wells:										
36	Number, 1920	.....	4	.....	1	.....	.....	.....	.....	.....	.....
37	Number, 1910	1	4	.....	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1920—gallons per minute	.....	100	.....	60	.....	.....	.....	.....	.....	.....
39	Capacity, 1910—gallons per minute	10	89	.....	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:										
40	Number, 1920	6	.....	.....	28	.....	40	.....	.....	.....	.....
41	Number, 1910	2	.....	.....	2	.....	1	2	.....	.....	.....
42	Capacity, 1920—gallons per minute	2,985	.....	.....	8,095	.....	6,600	.....	.....	.....	.....
43	Capacity, 1910—gallons per minute	4	.....	.....	857	.....	600	80	.....	.....	.....
	Pumping plants:										
44	Number, 1920	5	.....	.....	22	1	10	11	.....	4	.....
45	Number, 1910	2	2	.....	5	.....	1	31	.....	.....	.....
46	Engine capacity, 1920—horsepower	57	.....	.....	374	7	241	3,299	.....	48	.....
47	Engine capacity, 1910—horsepower	1	136	.....	80	.....	10	5,991	.....	.....	.....
48	Pump capacity, 1920—gallons per minute	2,985	.....	.....	14,376	500	11,600	16,845	.....	3,200	.....
49	Pump capacity, 1910—gallons per minute	4	2,716	.....	1,659	.....	600	178,273	.....	.....	.....
50	Average lift, 1920—feet	20	.....	.....	21	7	15	36	.....	15	.....
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920—dollars	251,500	938,864	33,696	6,236,866	401,720	3,593,889	7,319,055	81,683	366,301	1,846,679
52	Capital invested to July 1, 1910—dollars	7,975	688,774	46,196	5,576,639	155,583	388,862	3,024,019	19,514	.....	1,026,977
53	Per cent of increase, 1910–1920	.....	36.3	−27.1	11.8	158.2	824.2	142.0	318.6	.....	79.8
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	120.74	12.00	4.75	33.17	9.16	33.93	52.24	8.21	15.12	41.23
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	5.46	6.29	3.97	31.16	4.78	5.95	32.84	2.08	.....	16.36
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920—dollars	337,200	978,214	33,696	6,473,863	455,470	3,596,039	8,155,335	102,243	386,226	2,446,679
57	Estimated final cost of existing enterprises in 1910—dollars	7,975	855,311	46,196	9,026,639	155,583	388,862	6,745,382	19,514	.....	1,091,974
58	Per cent of increase, 1910–1920	.....	14.4	−27.1	−28.3	192.8	824.8	20.9	423.9	.....	124.1
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	19.51	8.78	3.22	32.97	8.93	28.90	44.04	6.92	11.95	30.50
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	3.45	5.65	2.82	28.48	4.43	4.45	36.87	1.84	.....	16.17

[1] Part of Larimer County taken to form Jackson County in 1909.
[2] Moffat County organized from part of Routt County in 1911.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (–) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		Montrose.	Morgan.	Otero.[1]	Ouray.[2]	Park.[3]	Pitkin.	Prowers.	Pueblo.	Rio Blanco.	Rio Grande.
1	Number of all farms in 1920	1,368	1,720	1,436	180	286	179	1,469	1,826	537	603
2	Number of farms irrigated in 1919	1,294	777	1,157	142	122	153	660	995	278	584
3	Per cent of all farms	94.6	45.2	77.9	78.9	42.7	85.5	44.9	54.5	51.8	96.8
4	Number of farms irrigated in 1909	1,042	561	1,310	184	162	182	546	753	285	517
5	Per cent of increase, 1909–1919	24.2	38.5	.....	.....	–24.7	–15.9	20.9	32.1	–2.5	13.0
	LAND AND FARM AREA.										
6	Approximate land area—acres	1,448,960	823,040	805,760	332,160	1,434,880	652,160	1,043,200	1,557,120	2,062,720	574,720
7	All land in farms—acres	218,255	555,899	334,293	73,010	239,862	49,389	669,262	993,226	223,649	199,231
8	Improved land in farms—acres	98,096	237,374	94,201	17,098	113,452	16,345	188,230	146,972	54,900	115,044
9	Area irrigated in 1919—acres	94,757	132,231	120,196	14,016	49,793	12,994	76,322	75,454	28,046	206,258
10	Per cent of improved land in farms	107.6	55.7	127.6	82.0	43.9	79.5	40.5	51.3	51.1	179.3
11	Area irrigated in 1909—acres	55,993	97,849	122,457	15,621	64,824	15,152	71,684	50,718	32,830	107,551
12	Per cent of increase, 1909–1919	69.2	35.1	.....	.....	–23.2	–14.2	6.5	48.8	–14.6	91.8
13	Area enterprises were capable of irrigating in 1920—acres	123,905	153,796	124,879	23,092	52,029	15,172	81,508	88,699	32,742	227,167
14	Area enterprises were capable of irrigating in 1910—acres	92,194	114,933	196,460	20,337	65,384	29,719	74,632	69,442	37,353	298,021
15	Per cent of increase, 1910–1920	34.4	33.8	.....	.....	–20.4	–48.9	9.2	27.7	–12.3	–23.8
16	Area included in enterprises in 1920—acres	173,162	166,670	183,077	24,017	55,449	21,295	99,213	142,594	45,579	293,162
17	Area included in enterprises in 1910—acres	254,132	259,590	250,766	25,462	68,969	39,497	130,596	174,518	53,169	353,637
18	Per cent of increase, 1910–1920	–31.9	–35.8	.....	.....	–19.6	–46.1	–24.0	–18.3	–14.3	–17.1
19	Area of irrigated land reported as available for settlement—acres	13,500	.....	.....	.....	.....	.....	.....	31,585	.....	.....
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	103	39	26	96	213	76	29	264	189	159
21	Number, 1910	200	49	47	137	282	165	25	190	202	213
	Main ditches:										
22	Number, 1920	113	34	27	124	359	96	27	273	299	198
23	Number, 1910	192	48	37	138	276	124	20	173	191	229
24	Length, 1920—miles	431	308	329	213	440	191	180	525	458	348
25	Length, 1910—miles	541	537	327	252	363	253	218	436	354	537
26	Capacity, 1920—second-feet	2,437	3,771	5,537	642	2,705	655	1,573	5,316	2,908	3,347
27	Capacity, 1910—second-feet	3,963	6,454	6,553	1,085	4,241	1,002	2,286	5,181	1,129	6,755
	Laterals:										
28	Number, 1920	187	89	404	4	53	74	153	370	113	184
29	Number, 1910	58	15	53	41	718	17	82	91	118	187
30	Length, 1920—miles	382	62	429	.....	20	37	309	371	48	373
31	Length, 1910—miles	164	42	123	15	185	5	148	109	70	398
	Reservoirs:										
32	Number, 1920	14	10	10	.....	1	3	5	61	24	4
33	Number, 1910	15	17	40	7	1	9	7	54	10	1
34	Capacity, 1920—acre-feet	8,335	86,680	26,659	.....	8	19	53,613	109,534	4,028	30,150
35	Capacity, 1910—acre-feet	119,381	181,673	130,504	441	1	1,874	183,381	106,307	384	261
	Flowing wells:										
36	Number, 1920	.....	.....	.....	.....	.....	.....	.....	3	.....	172
37	Number, 1910	.....	.....	.....	.....	.....	.....	.....	4	.....	33
38	Capacity, 1920—gallons per minute	.....	.....	.....	.....	.....	.....	.....	570	.....	6,666
39	Capacity, 1910—gallons per minute	.....	.....	.....	.....	.....	.....	.....	2,168	.....	7,672
	Pumped wells:										
40	Number, 1920	.....	23	12	.....	.....	.....	6	132	.....	.....
41	Number, 1910	1	3	14	.....	.....	1	.....	3	.....	.....
42	Capacity, 1920—gallons per minute	.....	26,590	11,088	.....	.....	.....	1,205	37,869	.....	.....
43	Capacity, 1910—gallons per minute	170	1,581	6,205	.....	.....	34	.....	145	.....	.....
	Pumping plants:										
44	Number, 1920	2	17	11	.....	.....	.....	7	66	1	.....
45	Number, 1910	1	3	15	.....	.....	1	.....	4	9	.....
46	Engine capacity, 1920—horsepower	41	344	188	.....	.....	.....	30	801	10	.....
47	Engine capacity, 1910—horsepower	3	25	87	.....	.....	1	.....	9	87	.....
48	Pump capacity, 1920—gallons per minute	.....	26,585	16,438	.....	.....	.....	1,470	49,505	900	.....
49	Pump capacity, 1910—gallons per minute	170	1,581	15,185	.....	.....	34	.....	165	4,329	.....
50	Average lift, 1920—feet	34	22	20	.....	.....	.....	18	21	10	.....
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920—dollars	6,788,758	2,600,735	4,157,535	197,089	175,670	208,324	1,160,422	3,645,462	355,617	981,136
52	Capital invested to July 1, 1910—dollars	4,769,186	4,821,813	3,197,415	159,091	213,233	237,523	1,453,019	1,511,694	269,479	1,356,578
53	Per cent of increase, 1910–1920	42.3	–46.1	.....	.....	–17.6	–12.3	–20.1	141.2	32.0	–27.7
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	54.79	16.91	33.29	8.56	3.38	13.73	14.24	41.10	10.86	4.32
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	51.73	41.95	16.11	7.82	3.26	7.99	19.47	21.77	7.21	4.55
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920—dollars	7,286,466	2,604,785	4,438,935	197,758	176,080	214,324	1,163,412	3,919,262	372,882	982,914
57	Estimated final cost of existing enterprises in 1910—dollars	9,751,675	6,004,613	3,631,587	159,091	213,233	252,554	1,453,019	1,698,321	269,479	1,400,313
58	Per cent of increase, 1910–1920	–25.3	–56.6	.....	.....	–17.4	–15.1	–19.9	131.5	38.4	–29.8
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	42.08	15.63	24.25	8.23	3.18	10.06	11.73	27.49	8.18	3.35
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	38.37	23.13	14.48	6.25	3.09	6.39	11.13	9.70	5.07	3.90

[1] Part of Otero County taken to form Crowley County in 1911.
[2] Part of San Miguel County annexed to Ouray County in 1917.
[3] Part of Jefferson County annexed to Park County in 1908.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		Routt.[1]	Saguache.	San Miguel.[2]	Sedgwick.	Summit.	Teller.	Washington.[3]	Weld.	Yuma.[3]	All other counties.
1	Number of all farms in 1920	923	432	334	487	72	250	2,057	5,765	2,179	4,268
2	Number of farms irrigated in 1919	428	390	154	130	67	26	51	3,398	29	35
3	Per cent of all farms	46.2	90.3	46.1	26.7	93.1	10.4	2.5	58.9	1.3	0.8
4	Number of farms irrigated in 1909	588	338	121	141	90	32	47	2,578	23	12
5	Per cent of increase, 1909–1919	.....	15.4	.....	−7.8	.....	.....	.....	31.8	.....	.....
	LAND AND FARM AREA.										
6	Approximate land area.....acres	1,477,760	2,005,120	824,320	339,840	415,360	350,080	1,613,440	2,574,080	1,514,880	5,228,160
7	All land in farms.....acres	360,787	436,024	128,492	234,537	26,155	122,631	1,088,706	1,756,973	1,203,781	2,758,803
8	Improved land in farms.....acres	94,896	139,856	21,344	139,243	8,150	16,632	531,234	878,520	591,605	726,651
9	Area irrigated in 1919.....acres	50,735	137,581	18,634	21,510	9,831	1,464	9,235	382,701	8,254	794
10	Per cent of improved land in farms	53.5	98.4	87.3	15.4	120.6	8.8	1.8	43.6	1.4	0.1
11	Area irrigated in 1909.....acres	62,427	145,874	14,712	22,023	8,402	1,370	5,595	395,514	3,890	1,041
12	Per cent of increase, 1909–1919	.....	−5.7	.....	−2.3	17.0	6.9	66.8	−3.2	112.2	−23.7
13	Area enterprises were capable of irrigating in 1920.....acres	61,123	153,391	22,811	23,050	10,986	1,540	10,095	395,444	10,182	1,394
14	Area enterprises were capable of irrigating in 1910.....acres	110,569	150,943	20,421	23,260	11,739	1,435	6,027	434,008	6,290	1,191
15	Per cent of increase, 1910–1920	.....	1.6	.....	−0.9	−6.4	7.3	67.5	−8.9	61.9	17.0
16	Area included in enterprises in 1920.....acres	92,148	271,932	44,749	24,050	15,222	1,944	10,095	567,392	15,242	2,324
17	Area included in enterprises in 1910.....acres	157,298	157,568	21,653	53,620	16,489	1,664	7,969	629,433	8,275	1,518
18	Per cent of increase, 1910–1920	.....	72.6	.....	−55.1	−7.7	16.8	26.7	−9.9	84.2	53.1
19	Area of irrigated land reported as available for settlement.....acres	.....	8,000	3,000	.....	.....	.....	.....	.....	.....	.....
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	310	212	67	7	79	25	8	238	26	17
21	Number, 1910	433	348	95	10	151	26	7	291	16	11
	Main ditches:										
22	Number, 1920	421	576	74	7	133	35	8	204	31	14
23	Number, 1910	417	328	94	10	154	21	4	263	12	9
24	Length, 1920.....miles	649	614	231	87	150	42	21	1,113	64	21
25	Length, 1910.....miles	899	414	179	139	174	18	5	752	32	11
26	Capacity, 1920.....second-feet	1,619	3,757	789	459	437	60	365	9,040	599	158
27	Capacity, 1910.....second-feet	4,502	2,597	773	1,934	571	38	85	12,611	210	103
	Laterals:										
28	Number, 1920	87	163	39	5	34	36	16	240	47	11
29	Number, 1910	171	888	2	20	26	2	2	250	.....	4
30	Length, 1920.....miles	38	249	182	7	7	41	39	877	39	10
31	Length, 1910.....miles	106	174	5	10	12	1	2	182	.....	2
	Reservoirs:										
32	Number, 1920	50	14	3	2	.....	1	3	103	4	7
33	Number, 1910	74	13	3	11	3	.....	2	100	1	3
34	Capacity, 1920.....acre-feet	5,432	8,854	5,066	27,219	.....	40	268	310,059	30	737
35	Capacity, 1910.....acre-feet	36,456	28	1,334	42,020	76	.....	290	73,766	3	55
	Flowing wells:										
36	Number, 1920	.....	156	.....	.....	.....	.....	.....	.....	.....	.....
37	Number, 1910	.....	58	.....	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1920.....gallons per minute	.....	4,848	.....	.....	.....	.....	.....	.....	.....	.....
39	Capacity, 1910.....gallons per minute	.....	2,497	.....	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:										
40	Number, 1920	.....	1	.....	1	.....	.....	4	149	.....	12
41	Number, 1910	.....	.....	.....	.....	.....	.....	.....	47	.....	2
42	Capacity, 1920.....gallons per minute	.....	.....	.....	250	.....	.....	1,920	70,311	.....	1,375
43	Capacity, 1910.....gallons per minute	.....	.....	.....	.....	.....	.....	.....	33,263	.....	26
	Pumping plants:										
44	Number, 1920	.....	1	.....	1	.....	.....	2	133	.....	3
45	Number, 1910	3	1	.....	.....	.....	.....	.....	54	.....	2
46	Engine capacity, 1920.....horsepower	.....	.....	.....	8	.....	.....	30	1,846	.....	37
47	Engine capacity, 1910.....horsepower	125	3	.....	.....	.....	.....	.....	686	.....	1
48	Pump capacity, 1920.....gallons per minute	.....	.....	.....	250	.....	.....	1,920	99,953	.....	1,475
49	Pump capacity, 1910.....gallons per minute	7,225	170	.....	.....	.....	.....	.....	40,285	.....	26
50	Average lift, 1920.....feet	.....	.....	.....	30	.....	.....	13	22	.....	14
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920.....dollars	572,873	450,609	676,100	716,215	103,581	12,141	78,966	16,417,224	83,908	89,094
52	Capital invested to July 1, 1910.....dollars	661,203	547,870	142,552	493,501	70,353	7,037	65,713	7,597,658	22,276	5,050
53	Per cent of increase, 1910–1920	.....	−17.8	.....	45.1	47.2	72.5	20.2	116.1	276.7	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	9.37	2.94	29.64	31.07	9.43	7.88	7.82	41.52	8.24	63.91
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	5.98	3.63	6.98	21.22	5.99	4.90	10.90	17.51	3.54	4.24
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920.....dollars	613,908	531,614	797,700	716,215	103,631	12,141	80,166	18,892,937	89,908	90,994
57	Estimated final cost of existing enterprises in 1910.....dollars	1,099,590	547,870	142,552	1,130,501	70,353	7,037	65,713	9,847,658	22,276	5,050
58	Per cent of increase, 1910–1920	.....	−3.0	.....	−36.6	47.3	72.5	22.0	91.9	303.6	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	6.66	1.95	17.83	29.78	6.81	6.25	7.94	33.30	5.11	39.15
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	6.99	3.48	6.58	21.08	4.27	4.23	8.25	15.64	2.69	3.33

[1] Part of Routt County taken to form Moffat County in 1911.
[2] Part of San Miguel County annexed to Ouray County in 1917.
[3] Parts of Adams and Arapahoe Counties annexed to Washington and Yuma Counties in 1903.

IDAHO.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Idaho collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

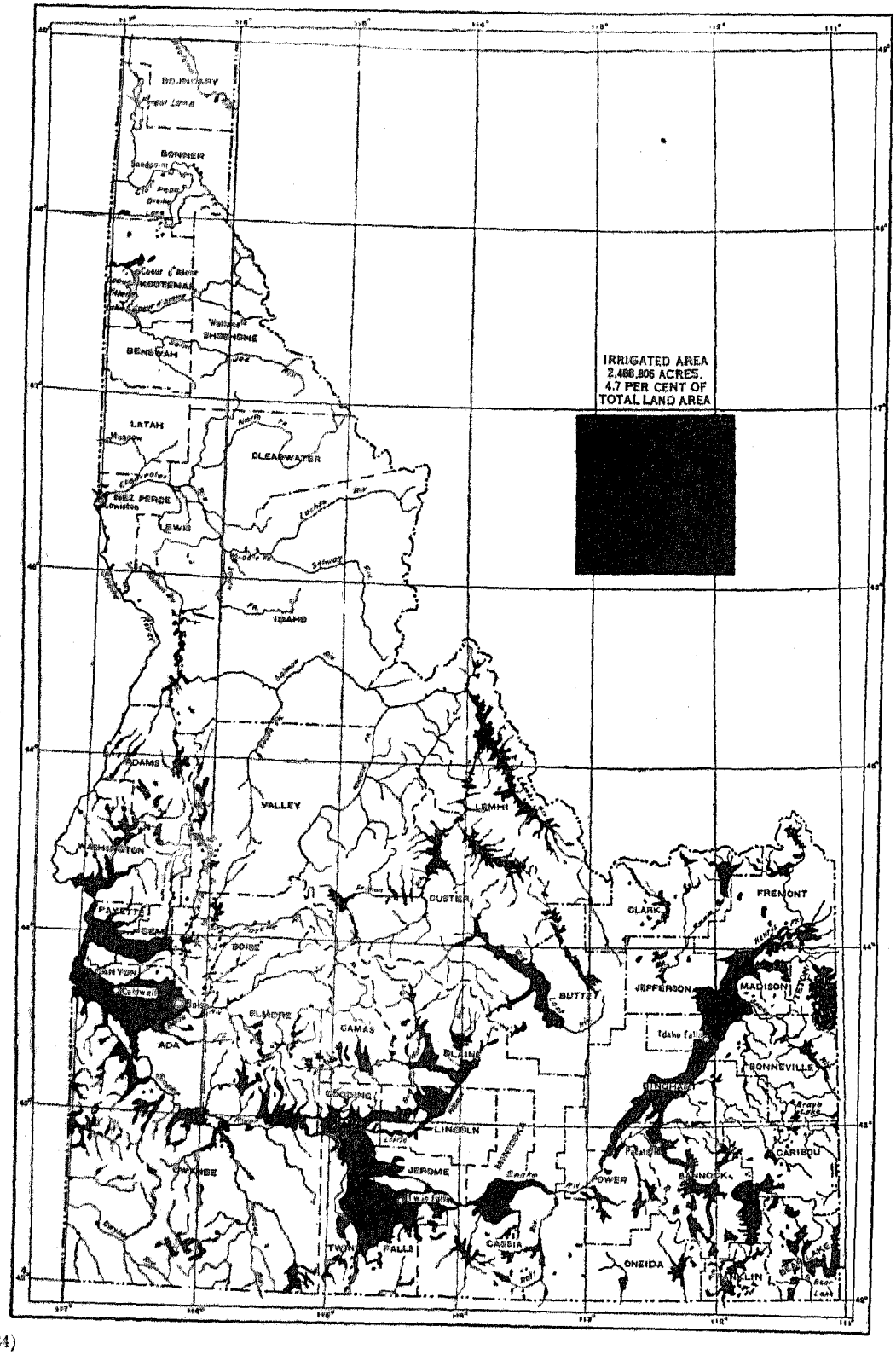
ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	42,106	30,807	11,299	36.7
Approximate land area of the state.....acres..	53,346,560	53,346,560	.....	.....
All land in farms.....acres..	8,375,873	5,283,604	3,092,269	58.5
Improved land in farms.....acres..	4,511,680	2,778,740	1,732,940	62.4
Number of farms irrigated	25,283	16,439	8,844	53.8
Area irrigated.....acres..	2,488,806	1,430,848	1,057,958	73.9
Area enterprises were capable of irrigating.....acres..	3,092,810	2,388,959	703,851	29.5
Area included in enterprises.....acres..	3,780,048	3,549,573	230,475	6.5
Per cent irrigated:				
Number of all farms	60.0	53.4	6.6	.....
Approximate land area of the state	4.7	2.7	2.0	.....
Land in farms	29.7	27.1	2.6	.....
Improved land in farms	55.2	51.5	3.7	.....
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	604,004	958,111	−354,107	−37.0
Excess of area included in enterprises over area irrigated.....acres..	1,291,242	2,118,725	−827,483	−39.1
Area of irrigated land reported as available for settlement.....acres..	118,334	(2)	.....	.....
Capital invested	$91,501,009	$40,977,688	$50,523,321	123.3
Average per acre enterprises were capable of irrigating	$29.59	$17.15	$12.44	72.5
Estimated final cost of existing enterprises	$97,019,717	$58,451,106	$38,568,611	66.0
Average per acre included in enterprises	$25.67	$16.47	$9.20	55.9
Average cost of operation and maintenance per acre	$1.17	$0.63	$0.54	85.7
IRRIGATION WORKS.				
Number of enterprises	3,629	3,092	537	17.4
Number of main ditches	4,553	3,209	1,344	41.9
Length of main ditches.....miles..	11,144	7,662	3,482	45.4
Capacity of main ditches.....second-feet..	86,273	80,458	5,815	7.2
Number of lateral ditches	5,265	3,359	1,906	56.7
Length of lateral ditches.....miles..	6,154	5,097	1,057	20.7
Number of reservoirs	249	243	6	2.5
Capacity of reservoirs.....acre-feet..	3,493,511	1,742,303	1,751,208	100.5
Number of flowing wells	142	62	80	129.0
Capacity of flowing wells.....gallons per minute..	15,133	7,200	7,933	110.2
Number of pumped wells	53	24	29	120.8
Capacity of pumped wells.....gallons per minute..	17,749	2,826	14,923	528.1
Number of pumping plants	143	58	85	146.6
Engine capacity.....horsepower..	28,364	7,065	21,299	301.5
Pump capacity.....gallons per minute..	1,397,681	278,569	1,119,112	401.7
Average lift.....feet..	29	(2)	29	.....

[1] A minus sign (−) denotes decrease.

[2] Not reported in 1910.

IDAHO

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

The climatic conditions determining the necessity for irrigation are the amount and the seasonal distribution of precipitation, especially rainfall. With reference to precipitation Idaho is divided into two quite distinct zones. The southern and southeastern parts of the state are dry, while the northern part is wet. Expressed in another way, the drainage basin of Snake River from the point where this river enters the state on the eastern border to the northern boundary of Washington County, on the western border of the state, is dry, while the remainder of the state, except for a small area on the headwaters of Salmon River, is wet. In Snake River Valley, the normal annual precipitation at the eastern border of the state is about 20 inches; it decreases to the westward, falling below 10 inches in the vicinity of Twin Falls, or about midway of the state, and remaining below 10 inches to the western border of the state. From the vicinity of Caldwell northward the rainfall increases, reaching 20 inches at about the northern boundary of Washington County. A second zone that receives less than 10 inches of annual precipitation extends from Snake River in the vicinity of American Falls northward into the valleys of the headwaters of Salmon River and reaches the mountains forming the boundary between Idaho and Montana. The region, thus described, that receives less than 20 inches of precipitation annually constitutes about two-thirds of the area of the state, and contains most of the irrigated land. Crops are grown without irrigation in this section, on the high lands away from the rivers, where the precipitation is heavier. Throughout this section the period of lowest precipitation is the growing season—June, July, August, and September.

The part of the state receiving more than 20 inches of precipitation annually comprises all of the northern part of the state and the mountainous section extending southward between the dry section in Snake River Valley and that in Salmon River Valley. Small areas are irrigated in this humid part of the state, but generally crops are grown without irrigation.

In 1919 there was a serious deficiency of precipitation during the growing season. There was a pronounced shortage in the spring and summer rains in all sections, and this drouth continued until October. The local representative of the United States Weather Bureau in his annual report speaks of this drouth as follows:

> It was without precedent both in duration and intensity and its destructive effects were apparent in the failure of dry farm crops and pastures; the drying up of the range; rapid and stubborn spread of forest fires; the failure of mountain streams, and the shortage, in some districts total failure, of irrigation water.

Aside from shortage of water the season was very favorable, and where water for irrigation was available unusually good crops were harvested.

WATER SUPPLY FOR IRRIGATION.

In the northern part of the state, where the precipitation is heavy and the acreage irrigated is small, the streams supply far more water than is needed for the irrigation of the small areas that are watered or for any additional areas on which irrigation is likely to be practiced.

With the exception of a small area in the southeast corner of the state, all the southern part of Idaho, from the eastern border to the western border, is watered by Snake River and its tributaries. The South Fork of Snake River rises in lakes in Yellowstone National Park, flows southward into Wyoming, where it passes through Jackson Lake, and continues southward for about 60 miles, then turns westward into Idaho. From that point Snake River forms a long loop extending first southwesterly and then northwesterly, entirely across the state, after which it flows in a northerly direction, forming the western boundary of Idaho for about 200 miles.

From the junction of the North and South Fork to the point where the Snake reaches the western boundary of the state there are no important tributaries from the north. Numerous streams head in the mountains to the north of the river, but their waters are lost before reaching the river. There are, however, large springs discharging into the river from the north, producing quite an increase in the flow of the river. From the south, on the other hand, there are tributaries reaching the river at intervals throughout its course across the state. The most important of these, in order from east to west, are Blackfoot, Port Neuf, Raft, Salmon Falls, Bruneau, and Owyhee Rivers.

Entering Snake River from the east, in that section where it forms the western boundary of the state, are the Boise, Payette, and Weiser Rivers. All of the tributaries are used for irrigation, but the larger part of the irrigated land is supplied with water from Snake River itself.

Water for use in Idaho is stored in Jackson Lake in Wyoming and to some extent in reservoirs in the valley in Idaho. Any large extension of irrigation from Snake River in Idaho will require storage, and plans for such storage are being investigated by the United States Reclamation Service and other agencies.

Large storage reservoirs have been built on the Boise River by the United States Reclamation Service, from which water is supplied to lands in Oregon as well as in Idaho. There is storage on other tributaries also.

The southeastern corner of the state is watered from Bear River and its tributaries. The normal flow of this stream is largely utilized, and large increase in irrigation will require storage. Rights to water from Bear River are in conflict with rights in Utah, and the rights in the two states have been involved in litigation for many years.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.	Per cent of all farms.	Acres.	Per cent of increase.	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	25,283	53.8	60.0	2,488,806	73.9	4.7	29.7	55.2
1910	16,430	73.9	53.4	1,430,848	135.1	2.7	27.1	51.5
1900	9,188	112.5	52.6	608,718	180.5	1.1	19.0	43.1
1890	4,323	.....	68.5	217,005	.....	0.4	16.7	35.8

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	3,629	3,780,048	2,488,806	65.8	3,092,810
Before 1880	10	2,374	931	39.2	1,271
1880–1889	26	69,496	48,536	69.8	51,143
1870–1879	277	183,670	144,031	78.4	157,504
1880–1889	1,013	998,737	755,533	75.6	880,378
1890–1899	618	857,955	583,053	67.4	520,789
1900–1904	420	775,464	619,677	79.9	716,405
1905–1909	368	727,786	354,143	48.7	544,265
1910–1914	372	206,879	90,870	43.9	116,582
1915–1919	216	202,003	60,355	29.9	67,599
Not reported	149	45,684	31,677	69.3	36,774

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Acres.	Per cent.		
Total	2,488,806	1,430,848	1,057,958	73.9	3,092,810	3,780,048
Streams, gravity	2,274,959	1,283,718	891,241	64.4	2,900,479	3,351,426
Streams, pumped	107,181	18,685	88,496	473.6	131,559	158,026
Streams, pumped and gravity	1,870	(2)	1,870	.....	4,470	5,670
Wells, pumped	414	705	−291	−41.3	513	903
Wells, flowing	1,131	1,172	−41	−3.5	1,241	3,492
Lakes, gravity	2,492	4,622	−2,130	−46.1	4,030	33,773
Lakes, pumped	4,912	1,535	3,377	220.0	9,206	11,991
Springs	33,337	19,679	13,658	69.4	48,461	80,566
Stored storm water	2,590	732	1,858	253.8	4,420	9,480
Sewage	80	(2)	80	.....	150	150
Streams, gravity, and pumped wells	357	(2)	357	.....	358	383
Streams, gravity, and flowing wells	1,927	(2)	1,927	.....	1,967	2,388
Other mixed	54,601	(2)	54,601	.....	82,906	118,590
Other and not reported	2,955	(2)	2,955	.....	3,050	3,210

[1] A minus sign (−) denotes decrease. [2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

The original irrigation district law in Idaho was enacted in 1895, and it has been amended from time to time since that date. Generally, in Idaho, irrigation districts have not built irrigation works, but have been organized to take over works built by other agencies. Some of the larger commercial enterprises reported in 1910 have been taken over by districts, and this accounts for the decrease in the acreage reported for commercial enterprises. Much of the land served by the United States Reclamation Service has been organized into districts, but the acreage is credited to the Reclamation Service because the Government constructed the works and still controls them to a large extent. The Reclamation Service also supplies stored water to about 650,000 acres of land in other enterprises under the terms of the Warren Act (act of Congress, Feb. 21, 1911) and other special arrangements.

The state of Idaho accepted the terms of the Federal Carey Act (act of Congress, Aug. 18, 1894) in 1895, and this law has been amended from time to time. Some enterprises originally begun under this act have been reorganized in other forms and are reported under these in Table 5.

The small acreage credited to the state belongs to a state institution, and does not represent a scheme of state construction of irrigation works.

TABLE 5.—ACREAGE CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Acres.	Percent.
ACREAGE IRRIGATED.				
Total	2,488,806	1,430,848	1,057,958	73.9
Individual and partnership	513,350	403,600	109,750	27.2
Cooperative	938,421	628,102	310,319	49.4
Irrigation district	355,995	140,930	215,065	152.6
Carey Act	383,833	162,418	221,415	136.3
Commercial	6,503	44,872	−38,369	−85.5
U. S. Reclamation Service	[2] 253,759	47,500	206,259	434.2
U. S. Indian Service	36,775	3,426	33,349	973.4
State	10	(3)	10	.....
City	160	(3)	160	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	3,092,810	2,388,959	703,851	29.5
Individual and partnership	639,002	483,946	155,056	32.0
Cooperative	1,190,422	782,603	407,819	52.1
Irrigation district	400,382	177,900	222,482	125.1
Carey Act	523,090	742,618	−219,528	−29.6
Commercial	7,747	67,352	−59,605	−88.5
U. S. Reclamation Service	[2] 289,992	113,000	176,992	156.6
U. S. Indian Service	42,005	21,540	20,465	95.0
State	10	(3)	10	.....
City	160	(3)	160	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total	3,780,048	3,549,573	230,475	6.5
Individual and partnership	850,215	676,508	173,707	25.7
Cooperative	1,442,477	993,746	448,731	45.2
Irrigation district	463,839	329,796	134,043	40.6
Carey Act	604,404	1,098,661	−434,257	−39.5
Commercial	8,551	104,322	−95,771	−91.8
U. S. Reclamation Service	[2] 295,992	295,000	992	0.3
U. S. Indian Service	54,240	51,540	2,700	5.2
State	10	(3)	10	.....
City	320	(3)	320	.....

[1] A minus sign (−) denotes decrease.
[2] Does not include about 650,000 acres to which stored water is supplied under Warren Act.
[3] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The territory of Idaho was organized under the act of March 3, 1863, and the state was admitted to the Union in 1890.

Rights to water from streams and other sources are subject to control by the state. The laws of Idaho

relating to water rights are summarized in the following paragraphs:

During the territorial period, in 1881, a law was passed recognizing the right to take or "appropriate" water from streams for useful or beneficial purposes, and providing that the appropriator must post a notice of the intended appropriation at the point of diversion and must file a copy of the notice in the county records. Laws passed in 1895 and 1899 retained this provision for posting and filing, and the act of 1899 provided further that all claimants to water must file statements of their claims within six months after the passage of the act. These provisions were in effect until 1903.

The act of March 11, 1903, provided that any party wishing to acquire a right to water must apply to the state engineer for a permit, and must, later, submit proof of having built works and put the water to use in accordance with the terms of the permit, and that, if the applicant complied with the terms of the permit the state engineer should issue a certificate of completion of works, and a license defining the rights acquired. This law is still in effect.

The act of March 11, 1903, provided, further, for the appointment of state officials to distribute water to those entitled to its use, and for the bringing of suits by these officials for the defining of rights to water, that is for adjudication of rights by the courts. The latter provision of the law was declared unconstitutional (Bear Lake *v.* Budge, 9 Idaho, 703). Rights are adjudicated in ordinary suits between claimants, but these can be begun only by claimants.

Article 15 of the state constitution, adopted August 6, 1889, provides that "the right to divert and appropriate the unappropriated waters of any natural stream to beneficial uses shall never be denied."

Riparian rights are not recognized in Idaho.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909, per cent of total.
	Acres.	Per cent of total.	
Total	2,488,806	100.0	100.0
Appropriation and use	130,774	5.3	18.9
Notice filed and posted	238,037	9.6	25.4
Adjudicated by court	1,104,607	44.4	36.9
Permit from state	490,979	19.6	18.6
Certificate or license from state	338,958	13.6	0.1
Riparian rights	18,389	0.6	0.1
Underground	1,834	(1)	(2)
Other and mixed	55,595	2.3	(2)
Not reported	109,033	4.6	(2)

[1] Less than one-tenth of 1 per cent.
[2] All land for which the class of water rights was not reported was included in "Appropriation and use."

ACREAGE, BY DRAINAGE BASIN.

The report of a special census taken in 1902 presented all data by drainage basins rather than by counties. The results of the census of 1920 have been tabulated on the same basis, and the data for 1902 are presented for purposes of comparison. For no other census have the results been tabulated in this form. The acreage reported for each drainage basin in 1919 comprises all the irrigated land in that drainage basin, including that watered from springs and wells. In the 1902 results the acreages irrigated from springs and wells were not reported for the smaller tributary streams, but the acreages for the tributaries were included in those reported for the main streams. This area is so small, however, that the comparison of the areas reported for the tributary streams is not seriously affected.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
Total	2,488,806	713,595	248.8	3,780,048	3,092,810
Bear River and tributaries	214,106	99,691	114.8	321,804	247,166
Bear River direct	107,063	15,912	572.8	149,901	127,642
Thomas Fork	8,905	6,116	45.6	8,929	8,905
Mill Creek	2,973	6,561	−54.7	10,028	5,238
Little Malad Creek	16,679	9,024	84.8	43,404	17,128
Other tributaries of Bear River	78,486	[2] 62,078	26.4	109,542	88,253
Snake River and tributaries	2,163,892	569,286	280.1	3,102,573	2,660,929
Snake River direct	716,908	64,832	.....	889,892	849,610
Henrys Fork	208,534	85,793	143.1	325,114	286,514
South Fork of Snake River	151,597	52,326	189.7	207,292	192,473
Blackfoot River	53,910	9,035	496.7	77,255	60,225
Port Neuf River	37,996	18,528	105.1	75,923	59,270
Raft River	23,020	23,793	−0.7	42,906	26,436
Salmon Falls River	41,330	(3)	.....	87,260	49,920
Little Wood River	30,153	(3)	.....	97,867	55,475
Big Wood River	117,748	33,901	246.7	203,795	178,497
Bruneau River	21,301	12,865	65.6	35,043	23,511
Owyhee River	10,903	(3)	.....	17,241	11,760
Boise River	328,395	84,438	288.9	388,313	368,854
Payette River	123,072	50,893	141.8	165,142	117,011
Weiser River	58,869	26,769	119.9	79,925	69,718
Salmon River	115,108	46,243	148.9	224,527	163,036
Clearwater River	4,623	1,944	137.8	5,777	5,545
Coeur d'Alene Lake and River	4,161	(3)	.....	10,469	5,681
Other tributaries of Snake River	115,664	[2] 57,866	99.9	168,832	137,393
Other tributaries of Columbia River	895	[2] 607	47.4	2,420	1,904
Independent streams	109,913	44,011	149.7	353,251	182,811
Camas Creek	17,490	4,107	325.9	95,199	46,190
Beaver Creek	1,502	2,330	−35.5	2,590	1,970
Medicine Lodge	5,019	3,225	55.6	12,445	8,390
Little Lost River	11,552	6,825	69.3	31,452	18,732
Big Lost River	72,788	23,547	209.1	204,845	105,727
Other independent streams	1,562	[2] 3,977	−60.7	6,720	1,802

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.
[3] Not reported separately in 1902.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1890 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.[1]
1920	$91,501,009	123.3	$29.59	72.5
1910	40,977,688	700.3	17.15	352.5
1900	5,120,399	397.6	3.79	−20.0
1890	1,029,000	.....	4.74	.....

[1] A minus sign (−) denotes decrease.

TABLE 9.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$91,501,009	100.0	$29.59
Before 1860	3,137	(1)	2.47
1860–1869	881,963	1.0	17.25
1870–1879	1,024,629	1.1	6.50
1880–1889	13,791,700	15.1	15.67
1890–1899	9,088,738	9.9	17.45
1900–1904	25,892,006	28.3	36.14
1905–1909	34,081,217	37.3	62.62
1910–1914	3,795,869	4.1	32.56
1915–1919	2,227,426	2.4	32.95
Not reported	714,324	0.8	19.42

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

TABLE 10.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$91,501,009	100.0	$29.59	2,105,336	$1.17
Streams, gravity	81,823,379	89.4	29.22	1,920,057	1.02
Streams, pumped	5,108,912	5.6	38.83	99,378	3.43
Streams, pumped and gravity	168,200	0.2	27.63	1,320	8.30
Wells, pumped	24,935	(2)	48.61	250	5.35
Wells, flowing	33,652	(2)	27.12	271	0.55
Lakes, pumped	544,981	0.6	59.20	3,412	6.72
Lakes, gravity	276,837	0.3	68.69	2,162	1.76
Springs	980,189	1.1	20.23	24,339	0.80
Stored storm water	246,257	0.3	55.71	2,245	0.89
Sewage	200	(2)	1.33	90	0.31
Streams, gravity and pumped wells	59,700	0.1	166.76	4	1.00
Streams, gravity and flowing wells	39,150	(2)	19.90	1,745	0.47
Other mixed	2,181,887	2.4	26.32	46,668	1.99
Other and not reported	12,730	(2)	4.17	2,855	0.41

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	INCREASE.[1]	
			Amount.	Per cent.
Total	$91,501,009	$6,190,971	$85,310,038	
Bear River and tributaries	3,328,007	504,511	2,823,496	559.7
Bear River direct	2,066,991	98,080	1,968,911	
Thomas Fork	25,389	16,210	9,179	56.6
Mill Creek	21,012	18,640	2,372	12.7
Little Malad Creek	332,175	30,945	301,230	973.4
Other tributaries of Bear River	882,440	[2] 340,636	541,804	159.1
Snake River and tributaries	84,317,216	5,529,005	78,788,211	
Snake River direct	35,847,491	553,796	35,293,695	
Henrys Fork	2,001,841	428,430	1,573,411	367.3
South Fork of Snake River	6,193,701	633,698	5,560,003	877.4
Blackfoot River	1,022,276	43,690	978,586	
Port Neuf River	1,141,528	58,255	1,083,273	
Raft River	100,928	46,635	54,293	116.4
Salmon Falls River	4,152,745	(3)	4,152,745	
Little Wood River	1,016,699	(3)	1,016,699	
Big Wood River	5,395,133	239,228	5,155,905	
Brmeau River	532,745	234,250	298,495	127.4
Owyhee River	64,467	(3)	64,467	
Boise River	16,013,734	1,674,583	14,339,151	856.3
Payette River	2,915,780	685,232	2,230,548	325.5
Weiser River	2,018,450	116,601	1,901,849	
Salmon River	1,175,362	212,668	962,694	452.7
Clearwater River	298,755	90,585	208,170	229.8
Coeur d'Alene Lake and River	576,674	(3)	576,674	
Other tributaries of Snake River	3,848,907	[2] 511,354	3,337,553	652.7
Other tributaries of Columbia River	27,180	5,395	21,785	403.8
Independent streams	3,828,606	151,160	3,677,446	
Camas Creek	578,627	6,263	572,364	
Beaver Creek	7,259	4,290	2,969	69.2
Medicine Lodge	31,690	3,800	27,890	773.9
Little Lost River	474,465	32,710	441,755	
Big Lost River	2,709,698	79,717	2,629,981	
Other independent streams	26,867	[2] 24,380	2,487	10.2

[1] Per cent not shown when more than 1,000.
[2] Includes springs and wells.
[3] Not reported separately in 1902.

In classifying capital invested by type of enterprise (Table 12) the average capital invested per acre is not presented, for the reason that it is not possible to compute this correctly. The United States Reclamation Service supplies stored water to enterprises controlled by agencies of most of the other classes shown in the table and a part of its expenditure is properly chargeable to those lands; but it is not possible to tell how much should be so charged or how it should be distributed among the various classes.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$91,501,009	100.0	2,105,336	$1.17
Individual and partnership	5,747,004	6.3	383,430	0.75
Cooperative	36,576,664	40.0	780,006	0.72
Irrigation district	11,954,046	13.1	287,415	2.11
Commercial	698,179	0.8	5,503	2.68
Carey Act	17,772,590	19.4	360,063	1.23
U. S. Reclamation Service	17,804,839	19.6	253,759	1.98
U. S. Indian Service	932,387	0.8	35,000	1.55
City	14,300	(2)	100	1.56
State	1,000	(2)		

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	206
Acreage included in enterprises reporting land drained or needing drainage	734,405
Acreage for which drains have been installed	81,187
Additional acreage needing drainage	94,934
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	11.1
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	2.1
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	4.7

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 14. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume entering canals..second-feet..	43,481	35,669	7,812
Area irrigated in 1919.....acres..	1,750,265	1,472,586	277,679
Average number of acres per second-foot..	40	41	36
Total quantity entering canals.....acre-feet..	11,142,792	9,571,753	1,571,039
Area irrigated in 1919.....acres..	1,724,581	1,465,482	259,099
Average quantity per acre.....acre-feet..	6.5	6.5	6.1
Total quantity delivered.....acre-feet..	2,269,233	2,045,769	223,464
Area irrigated in 1919.....acres..	936,689	841,667	95,022
Average quantity per acre.....acre-feet..	2.4	2.4	2.4

IRRIGATION WORKS.

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	2,872	288	4,553	86,273	11,144	5,265	6,154	249	3,493,511
Before 1860	5	2	10	33	13	29	7	8	551
1860–1869	144	22	147	1,863	279	98	119	2	1,206
1870–1879	268	10	376	4,348	666	245	208	15	5,278
1880–1889	917	46	1,304	28,264	3,267	1,141	1,188	25	34,526
1890–1899	490	38	850	16,320	2,099	688	855	32	213,783
1900–1904	282	43	507	14,326	1,423	291	1,555	39	1,540,723
1905–1909	270	49	447	13,412	1,816	2,130	1,843	55	1,408,309
1910–1914	226	38	452	4,498	859	325	237	41	104,507
1915–1919	179	36	287	2,276	470	247	95	25	184,604
Not reported	91	4	173	933	252	71	47	7	25

DATE OF BEGINNING.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	180.6	142	15,133	53	17,749	143	28,364	232	1,397,681
Before 1860		2	150						
1860–1869	21.4	4	186			1	5	1	450
1870–1879	0.3	34	5,115			1	10	1	600
1880–1889	7.8	8	1,090			7	786	7	30,000
1890–1899	7.2	16	2,276	2	125	7	64	9	2,435
1900–1904	31.3	15	2,909	1	27	10	9,505	43	850,812
1905–1909	35.9	9	1,206	4	1,290	28	3,276	43	170,909
1910–1914	25.7	20	211	18	11,250	33	12,880	61	206,651
1915–1919	16.8	28	1,900	27	5,057	49	1,544	60	128,822
Not reported	34.2	6	90	1		7	294	7	7,002

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	2,872	288	4,553	86,273	11,144	5,265	6,154	249	3,493,511
Individual and partnership	2,445	187	3,945	23,946	5,505	2,198	821	164	41,247
Cooperative	341	70	481	37,081	3,251	1,249	2,181	56	1,076,464
Irrigation district	48	10	79	10,051	927	186	698	9	169,500
Carey Act	27	12	31	10,802	1,047	221	1,655	9	479,600
Commercial	5	3	6	144	18	56	35	3	33,000
U. S. Reclamation Service	4	5	6	3,487	336	1,290	604	6	1,493,700
U. S. Indian Service	1	1	3	728	57	40	150	2	200,000
State									
Other and not reported	1		2	34	3	25	10		

CLASS.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	180.6	142	15,133	53	17,749	143	28,364	232	1,397,681
Individual and partnership	67.1	135	12,682	50	8,689	96	1,297	104	124,982
Cooperative	52.3	7	2,451			22	4,621	46	162,220
Irrigation district	38.8			2	9,000	21	13,190	44	260,319
Carey Act	8.9					1	746	25	
Commercial	1.7								
U. S. Reclamation Service	8.9					2	8,500	12	850,000
U. S. Indian Service	0.8								
State	0.1			1	60	1	10	1	160
Other and not reported	2.0								

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	2,872	288	4,553	86,273	11,144	5,265	6,154	219	3,493,511
Bear River and tributaries	498	80	429	5,030	1,697	375	379	33	28,358
Bear River direct	59	6	80	2,094	245	122	199	9	3,659
Thomas Fork	25	.....	29	203	63	.....	.....	.....	.....
Mill Creek	4	.....	8	27	38	4	2	.....	.....
Little Malad Creek	190	58	12	400	788	49	49	4	12,788
Other tributaries of Bear River	220	16	300	2,306	563	200	129	20	11,911
Snake River and tributaries	2,055	190	3,676	74,625	8,571	4,350	5,483	201	3,320,425
Snake River direct	58	9	132	18,257	845	1,253	2,431	6	1,790,000
Henrys Fork	226	25	274	12,693	750	340	437	20	8,462
South Fork of Snake River	112	7	146	8,609	431	161	620	7	15,332
Blackfoot River	43	3	45	1,214	182	136	172	3	200,060
Port Neuf River	101	7	149	1,274	345	58	76	10	59,226
Raft River	101	2	99	642	133	42	30	.....	.....
Salmon Falls River	40	6	48	1,857	102	56	250	6	206,600
Little Wood River	83	9	107	1,893	234	22	7	2	40,000
Big Wood River	138	15	234	4,758	421	108	443	13	191,993
Bruneau River	110	17	132	771	172	133	56	11	10,722
Owyhee River	71	7	105	428	92	10	5	9	7,100
Boise River	70	14	198	6,669	801	744	191	18	573,203
Payette River	51	12	267	4,450	645	63	140	17	63,284
Weiser River	30	9	134	1,822	389	81	89	10	95,796
Salmon River	363	12	980	4,747	1,423	898	270	14	2,183
Clearwater River	2	2	13	69	23	8	1	6	4
Coeur d'Alene Lake and River	19	3	15	110	19	18	22	5	600
Other tributaries of Snake River	387	31	598	4,355	1,564	219	243	44	55,860
Other tributaries of Columbia River	16	1	19	190	9	50	4	1	416
Independent streams	303	17	429	6,428	867	490	288	14	144,312
Camas Creek	81	6	97	3,042	165	159	112	5	65,179
Beaver Creek	27	1	34	72	23	2	4	1	35
Medicine Lodge	62	1	72	266	61	127	44	2	412
Little Lost River	33	2	59	774	101	15	7	2	22,000
Big Lost River	98	7	160	2,237	491	183	119	4	56,686
Other independent streams	2	.....	7	37	26	4	2	.....	.....

DRAINAGE BASIN.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	180.6	142	15,133	53	17,749	143	28,364	232	1,397,681
Bear River and tributaries	4.6	57	7,468	.....	.....	7	573	8	14,915
Bear River direct	4.5	.....	.....	.....	.....	3	530	3	5,180
Little Malad Creek	.....	57	7,468	.....	.....	.....	.....	.....	.....
Other tributaries of Bear River	0.1	.....	.....	.....	.....	4	43	5	9,735
Snake River and tributaries	168.4	85	7,665	53	17,749	127	27,465	215	1,286,516
Snake River direct	33.4	10	860	5	840	38	23,909	107	1,122,012
Henrys Fork	0.8	.....	.....	.....	.....	.....	.....	.....	.....
Blackfoot River	1.1	.....	.....	.....	.....	.....	.....	.....	.....
Port Neuf River	2.8	.....	.....	.....	.....	.....	.....	.....	.....
Salmon Falls River	0.1	3	1,900	.....	.....	1	18	1	.....
Little Wood River	0.2	.....	.....	1	2,500	1	6	1	440
Big Wood River	7.0	.....	.....	.....	.....	1	2	1	50
Bruneau River	0.2	38	1,628	1	27	4	30	4	4,000
Boise River	30.5	8	75	2	900	6	457	7	27,465
Payette River	5.2	1	36	3	9,000	9	324	10	9,650
Weiser River	15.1	.....	.....	.....	.....	11	668	13	18,256
Salmon River	1.9	.....	.....	.....	.....	3	820	5	31,100
Clearwater River	35.9	.....	.....	28	2,750	2	38	2	10,875
Coeur d'Alene Lake and River	30.8	.....	.....	.....	.....	33	394	36	9,945
Other tributaries of Snake River	3.4	25	3,166	13	1,732	6	992	11	50,041
Other tributaries of Columbia River	5.2	.....	.....	.....	.....	12	67	17	2,682
Independent streams	2.4	.....	.....	.....	.....	9	326	9	96,250
Camas Creek	.....	.....	.....	.....	.....	9	326	9	96,250
Medicine Lodge	0.4	.....	.....	.....	.....	.....	.....	.....	.....
Little Lost River	1.9	.....	.....	.....	.....	.....	.....	.....	.....
Big Lost River	0.1	.....	.....	.....	.....	.....	.....	.....	.....

DRAINAGE BASIN.	Average lift (feet).
Total	29
Bear River and tributaries	10
Bear River direct	9
Little Malad Creek	.....
Other tributaries of Bear River	10
Snake River and tributaries	32
Snake River direct	42
Henrys Fork	.....
Blackfoot River	.....
Port Neuf River	.....
Salmon Falls River	20
Little Wood River	15
Big Wood River	10
Bruneau River	19
Boise River	24
Payette River	30
Weiser River	28
Salmon River	76
Clearwater River	56
Coeur d'Alene Lake and River	21
Other tributaries of Snake River	51
Other tributaries of Columbia River	17
Independent streams	8
Camas Creek	8
Medicine Lodge	.....
Little Lost River	.....
Big Lost River	.....

CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 AND 1909.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AREA HARVESTED.					QUANTITY HARVESTED.					
		1919		1909				1919		1909		
		Acres.	Per cent of total for state.	Acres.	Per cent of total for state.	Per cent of increase.[1]	Unit.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	Per cent of increase.[1]
	Cereals:											
1	Corn	10,994	47.2	2,041	22.2	438.7	Bu.	383,740	59.9	68,490	21.5	460.3
2	Oats	42,487	30.0	147,827	48.8	−71.3	Bu.	1,232,895	40.2	5,667,718	50.0	−78.2
3	Winter wheat	20,306	4.6	106,923	26.8	199.0	Bu.	360,211	5.8	2,860,076	27.9	170.0
4	Spring wheat	299,360	42.5				Bu.	7,304,943	63.1			
5	Barley	19,667	29.0	13,287	10.0	48.0	Bu.	540,749	40.1	428,775	9.3	26.1
6	Rye	2,414	20.2	365	11.1	561.4	Bu.	19,751	24.1	4,688	11.6	321.3
	Other grains and seeds:											
7	Red clover seed	14,859	87.2	[2]			Bu.	57,195	91.1	[2]		
8	Other clover and alfalfa seed	8,955	66.8	[2]			Bu.	33,442	74.9	[2]		
9	Timothy seed	537	16.6	215	14.3	149.8	Bu.	1,286	11.4	1,387	13.9	−7.3
10	Dry beans, navy, etc	10,150	29.9	298	15.6		Bu.	188,086	54.6	2,983	8.8	
11	Dry peas, Canada	8,443	47.9	68	29.1		Bu.	153,017	60.9	1,850	37.9	
	Hay and forage:											
12	Timothy alone	17,686	21.4	24,842	24.2	−28.8	Tons	22,360	30.8	47,386	33.8	−52.8
13	Timothy and clover mixed	48,603	47.6	33,418	61.9	45.4	Tons	62,010	52.2	63,068	63.2	−1.7
14	Clover alone	14,715	72.2	6,978	79.0	110.9	Tons	23,743	78.2	18,697	89.3	27.0
15	Alfalfa	515,301	79.1	276,460	89.5	86.4	Tons	1,510,380	86.7	903,291	93.6	67.2
16	Other tame grasses	8,762	41.5	18,803	47.3	−53.4	Tons	13,066	52.0	39,739	55.2	−67.1
17	Small grains cut for hay	13,402	8.0	7,395	7.6	81.2	Tons	17,056	12.2	8,857	6.3	92.6
18	Wild, salt, or prairie grasses	53,371	44.1	80,329	71.7	−38.2	Tons	53,515	46.0	108,869	76.7	−50.8
19	Corn cut for forage	1,527	18.6	[2]			Tons	4,969	29.9	[2]		
20	Silage crops	4,453	52.2	[2]			Tons	37,908	68.6	[2]		
21	Annual legumes cut for hay	544	14.0	[2]			Tons	762	21.8	[2]		
	Miscellaneous:											
22	Potatoes	32,044	74.2	1,011	87.8		Bu.	5,409,108	85.8	66,351	68.3	
23	Sugar beets grown for sugar	32,270	86.4	4,123	92.8	682.7	Tons	222,128	85.3	47,175	95.1	370.9
	Fruits:											
24	Grapes	[3] 10,809	14.6	[2]			Lbs.	104,156	20.0	[2]		
25	Apples	[4] 852,307	35.8	[2]			Bu.	1,211,790	33.2	[2]		
26	Peaches	[4] 71,890	40.3	[2]			Bu.	138,442	49.6	[2]		
27	Pears	[4] 20,200	26.9	[2]			Bu.	15,455	32.3	[2]		
28	Plums and prunes	[4] 273,303	49.5	[2]			Bu.	291,495	60.1	[2]		
29	Cherries	[4] 31,136	26.5	[2]			Bu.	19,769	22.0	[2]		

	CROP.	AVERAGE YIELD PER ACRE, 1919.						VALUE.				
					On irrigated land.			1919		1909		
		Unit.	For state.	On non-irrigated land.	Average.	Per cent of average for state.	Per cent of average on nonirrigated land.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	Per cent of increase.[1]
	Cereals:											
1	Corn	Bu.	27.5	20.9	34.9	126.9	167.0	$652,358	59.9	$53,548	28.0	
2	Oats	Bu.	21.7	18.5	29.0	133.6	156.8	1,294,540	40.2	2,728,882	53.9	−52.6
3	Winter wheat	Bu.	14.2	14.0	17.7	124.6	126.4	738,433	5.8	2,377,367	28.3	566.1
4	Spring wheat	Bu.	16.6	10.6	24.6	148.2	232.1	15,098,133	63.1			
5	Barley	Bu.	19.9	16.8	27.5	138.2	163.7	811,124	40.1	252,388	10.9	221.4
6	Rye	Bu.	6.9	6.5	8.2	118.8	126.2	36,539	24.1	3,046	10.5	
	Other grains and seeds:											
7	Red clover seed	Bu.	3.7	2.5	3.9	104.9	153.8	1,544,265	91.1	[2]		
8	Other clover and alfalfa seed	Bu.	3.3	2.5	3.7	112.0	148.0	769,166	74.9	[2]		
9	Timothy seed	Bu.	3.5	3.7	2.4	68.7	64.6	7,459	11.4	3,135	14.4	137.9
10	Dry beans, navy, etc	Bu.	10.1	6.6	18.5	183.2	280.3	658,301	54.6	8,074	10.6	
11	Dry peas, Canada	Bu.	14.3	12.0	16.2	113.3	135.0	719,180	60.9	3,992	43.6	
	Hay and forage:											
12	Timothy alone	Tons.	0.88	0.78	1.26	143.2	161.5	648,440	30.8	370,488	23.6	75.0
13	Timothy and clover mixed	Tons.	1.16	1.06	1.28	110.3	120.8	1,612,260	52.2	541,229	56.8	197.9
14	Clover alone	Tons.	1.49	1.17	1.61	108.1	137.6	474,860	78.2	130,069	85.5	265.1
15	Alfalfa	Tons.	2.67	1.70	2.93	109.7	172.4	32,473,170	86.7	6,237,450	94.2	420.6
16	Other tame grasses	Tons.	1.19	0.98	1.49	125.2	152.0	274,386	52.0	288,200	59.5	−4.8
17	Small grains cut for hay	Tons.	0.83	0.80	1.27	153.0	158.8	469,040	12.2	88,874	6.2	427.8
18	Wild, salt, or prairie grasses	Tons.	0.96	0.93	1.00	104.2	107.5	1,016,804	46.0	672,562	78.7	51.2
19	Corn cut for forage	Tons.	2.03	1.74	3.25	160.1	186.8	54,659	29.9	[2]		
20	Silage crops	Tons.	6.48	4.26	8.51	131.3	199.8	379,080	68.6	[2]		
21	Annual legumes cut for hay	Tons.	0.90	0.82	1.40	155.6	170.7	16,002	21.8	[2]		
	Miscellaneous:											
22	Potatoes	Bu.	145.9	80.0	168.8	115.8	211.2	11,629,582	85.8	74,885	76.0	
23	Sugar beets grown for sugar	Tons.	6.97	7.54	6.88	98.7	91.2	2,332,344	85.3	226,367	95.6	930.9
	Fruits:											
24	Grapes	Lbs.	[5] 0.1	[5] 0.1	[5] 0.1	142.9	142.9	7,291	20.0	[2]		
25	Apples	Bu.	[6] 1.5	[6] 1.6	[5] 1.4	92.8	89.3	2,120,632	33.2	[2]		
26	Peaches	Bu.	[6] 1.6	[6] 1.3	[5] 1.9	123.7	146.2	249,196	49.6	[2]		
27	Pears	Bu.	[6] 0.6	[6] 0.6	[6] 0.8	120.6	128.8	34,001	32.3	[2]		
28	Plums and prunes	Bu.	[6] 0.9	[6] 0.7	[6] 1.1	121.6	155.1	641,289	60.1	[2]		
29	Cherries	Bu.	[6] 0.8	[6] 0.8	[6] 0.6	81.8	77.8	68,203	22.0	[2]		

[1] A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.
[2] Not reported separately in 1909.
[3] Number of vines of bearing age.
[4] Number of trees of bearing age.
[5] Yield per vine.
[6] Yield per tree.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (—) denotes decrease.]

		THE STATE.	Ada.	Adams.[1]	Bannock.[2]	Bear Lake.	Bingham.[3]	Blaine.[4]
1	Number of all farms in 1920	42,106	2,198	484	1,719	825	2,144	473
2	Number of farms irrigated in 1919	25,283	1,938	267	1,095	635	1,831	347
3	Per cent of all farms	60.0	88.2	55.2	63.7	77.0	85.4	73.4
4	Number of farms irrigated in 1909	16,439	1,315	.....	981	679	1,883	550
5	Per cent of increase, 1909–1919	53.8	47.4	.....	.....	—6.5	.....	.....
	LAND AND FARM AREA.							
6	Approximate land area, acres	53,346,560	738,560	874,240	1,175,680	627,200	1,897,760	1,790,080
7	All land in farms, acres	5,375,873	209,651	156,849	453,710	202,800	284,924	134,100
8	Improved land in farms, acres	4,511,680	131,464	53,984	270,179	108,466	169,103	55,491
9	Area irrigated in 1919, acres	2,488,806	121,493	30,900	137,266	67,202	177,296	52,090
10	Per cent of improved land in farms	55.2	92.4	57.2	50.8	62.0	104.8	93.9
11	Area irrigated in 1909, acres	1,430,845	86,494	.....	86,648	58,731	193,741	68,112
12	Per cent of increase, 1909–1919	73.9	40.5	.....	.....	14.4	.....	.....
13	Area enterprises were capable of irrigating in 1920, acres	3,092,810	133,768	32,676	185,316	72,893	217,200	77,391
14	Area enterprises were capable of irrigating in 1910, acres	2,388,959	87,511	.....	112,288	59,829	310,903	87,689
15	Per cent of increase, 1910–1920	29.5	52.9	.....	.....	21.8	.....	.....
16	Area included in enterprises in 1920, acres	3,780,048	136,790	42,786	227,586	83,890	232,923	97,801
17	Area included in enterprises in 1910, acres	3,549,573	147,330	.....	156,037	74,427	362,034	203,592
18	Per cent of increase, 1910–1920	6.5	—7.2	.....	.....	12.7	.....	.....
19	Area of irrigated land reported as available for settlement, acres	118,334	800	.....	16,000	.....	12,688	500
	IRRIGATION WORKS.							
	Independent enterprises:							
20	Number, 1920	3,629	50	121	242	95	68	129
21	Number, 1910	3,092	46	.....	261	112	116	254
	Main ditches:							
22	Number, 1920	4,553	54	147	303	158	53	155
23	Number, 1910	3,209	43	.....	252	131	124	257
24	Length, 1920, miles	11,144	255	206	654	343	416	271
25	Length, 1910, miles	7,662	213	.....	631	394	591	620
26	Capacity, 1920, second-feet	86,273	2,567	1,015	3,038	1,522	5,688	2,716
27	Capacity, 1910, second-feet	80,458	4,257	.....	4,036	2,192	10,383	4,363
	Laterals:							
28	Number, 1920	5,265	264	50	127	161	95	.....
29	Number, 1910	3,359	121	.....	137	37	205	256
30	Length, 1920, miles	6,154	43	57	294	57	176	.....
31	Length, 1910, miles	5,097	199	.....	261	29	351	376
	Reservoirs:							
32	Number, 1920	249	10	3	17	13	6	1
33	Number, 1910	243	5	.....	14	14	8	14
34	Capacity, 1920, acre-feet	3,493,511	150,536	1,205	141,216	5,677	123,610	.....
35	Capacity, 1910, acre-feet	1,742,303	8,089	.....	176,259	1,158	4,409	205,835
	Flowing wells:							
36	Number, 1920	142	7	.....	.....	.....	.....	.....
37	Number, 1910	62	9	.....	1	.....	.....	2
38	Capacity, 1920, gallons per minute	15,133	45	.....	.....	.....	.....	.....
39	Capacity, 1910, gallons per minute	7,200	370	.....	30	.....	.....	75
	Pumped wells:							
40	Number, 1920	53	2	.....	.....	.....	1	.....
41	Number, 1910	24	.....	.....	.....	.....	.....	1
42	Capacity, 1920, gallons per minute	17,749	900	.....	.....	.....	440	.....
43	Capacity, 1910, gallons per minute	2,826	.....	.....	.....	.....	.....	600
	Pumping plants:							
44	Number, 1920	143	6	.....	2	.....	2	.....
45	Number, 1910	58	2	.....	.....	.....	.....	1
46	Engine capacity, 1920, horsepower	28,364	168	.....	23	.....	10	.....
47	Engine capacity, 1910, horsepower	7,065	10	.....	.....	.....	.....	4
48	Pump capacity, 1920, gallons per minute	1,397,681	2,250	.....	.....	.....	1,440	.....
49	Pump capacity, 1910, gallons per minute	278,569	308	.....	.....	.....	.....	600
50	Average lift, 1920, feet	29	32	.....	14	.....	18	.....
	CAPITAL INVESTED.							
51	Capital invested to Jan. 1, 1920, dollars	91,501,009	5,669,338	394,060	3,106,000	397,393	3,201,889	736,713
52	Capital invested to July 1, 1910, dollars	40,977,688	2,404,008	.....	806,960	301,672	3,001,533	2,058,383
53	Per cent of increase, 1910–1920	123.3	135.8	.....	.....	31.7	.....	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920, dollars	29.59	42.38	12.06	16.76	5.45	14.74	9.52
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910, dollars	17.15	27.47	.....	7.19	5.04	9.65	23.47
	ESTIMATED FINAL COST.							
56	Estimated final cost of existing enterprises in 1920, dollars	97,019,717	5,669,338	395,910	3,573,940	430,093	3,654,189	1,120,113
57	Estimated final cost of existing enterprises in 1910, dollars	58,451,106	5,349,208	.....	903,812	304,162	3,088,885	3,797,813
58	Per cent of increase, 1910–1920	66.0	6.0	.....	.....	41.4	.....	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920, dollars	25.67	41.45	9.25	15.70	5.13	15.69	11.45
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910, dollars	16.47	36.31	.....	5.79	4.09	8.53	18.65

[1] Organized from part of Washington in 1911.
[2] Part annexed to Franklin in 1918; part taken to form Caribou in 1919.
[3] Part annexed to Fremont in 1905; part taken to form Bonneville in 1911; part taken to form part of Power in 1913; part taken to form part of Butte in 1917.
[4] Part annexed to Elmore in 1911; part taken to form part of Power in 1913; parts taken to form Camas and part of Butte in 1917.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease.]

		Boise.[1]	Bonneville.[2]	Butte.[3]	Camas.[4]	Canyon.[5]	Caribou.[6]	Cassia.[7]	Clark.[8]
1	Number of all farms in 1920	238	1,480	432	354	2,660	368	1,568	398
2	Number of farms irrigated in 1919	143	1,080	327	97	2,477	91	1,257	99
3	Per cent of all farms	60.1	73.0	75.7	27.4	93.1	24.7	80.2	24.9
4	Number of farms irrigated in 1909	242	.....	.....	.....	2,238	.....	582	.....
5	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	.....	.....	.....
	LAND AND FARM AREA.								
6	Approximate land area—acres	1,177,600	1,218,560	1,310,720	684,800	378,880	808,320	1,660,800	1,137,920
7	All land in farms—acres	81,636	286,877	80,851	132,963	199,427	122,803	285,214	183,006
8	Improved land in farms—acres	16,452	176,091	50,911	72,308	157,486	52,783	178,879	55,673
9	Area irrigated in 1919—acres	7,608	110,953	39,563	13,272	201,718	23,825	113,537	18,851
10	Per cent of improved land in farms	46.2	63.0	77.7	18.4	128.1	45.1	63.5	33.9
11	Area irrigated in 1909—acres	25,052	.....	.....	.....	133,046	.....	59,510	.....
12	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	.....	.....	.....
13	Area enterprises were capable of irrigating in 1920—acres	8,569	123,043	66,140	14,516	228,032	25,908	129,619	26,467
14	Area enterprises were capable of irrigating in 1910—acres	32,359	.....	.....	.....	182,585	.....	94,244	.....
15	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....
16	Area included in enterprises in 1920—acres	14,239	135,021	184,858	21,284	234,582	29,102	149,035	45,794
17	Area included in enterprises in 1910—acres	41,488	.....	.....	.....	356,722	.....	163,561	.....
18	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....
19	Area of irrigated land reported as available for settlement—acres	193	.....	.....	.....	.....	.....	3,181	3,120
	IRRIGATION WORKS.								
	Independent enterprises:								
20	Number, 1920	111	85	76	58	29	61	157	100
21	Number, 1910	180	.....	.....	.....	109	.....	171	.....
	Main ditches:								
22	Number, 1920	172	115	107	105	30	91	201	190
23	Number, 1910	202	.....	.....	.....	103	.....	178	.....
24	Length, 1920—miles	224	352	296	71	388	150	411	200
25	Length, 1910—miles	251	.....	.....	.....	533	.....	286	.....
26	Capacity, 1920—second-feet	508	4,553	1,509	196	3,619	1,139	2,039	2,160
27	Capacity, 1910—second-feet	933	.....	.....	.....	7,159	.....	3,085	.....
	Laterals:								
28	Number, 1920	14	49	132	12	462	154	378	287
29	Number, 1910	76	.....	.....	.....	247	.....	354	.....
30	Length, 1920—miles	6	259	72	1	144	48	385	133
31	Length, 1910—miles	34	.....	.....	.....	427	.....	424	.....
	Reservoirs:								
32	Number, 1920	10	6	5	6	1	5	5	5
33	Number, 1910	18	.....	.....	.....	13	.....	7	.....
34	Capacity, 1920—acre-feet	27	147	103,680	708	422,257	163	442,767	36,947
35	Capacity, 1910—acre-feet	80	.....	.....	.....	186,244	.....	73,055	.....
	Flowing wells:								
36	Number, 1920	.....	.....	.....	.....	1	.....	11	.....
37	Number, 1910	1	.....	.....	.....	12	.....	.....	.....
38	Capacity, 1920—gallons per minute	.....	.....	.....	.....	30	.....	2,700	.....
39	Capacity, 1910—gallons per minute	42	.....	.....	.....	276	.....	.....	.....
	Pumped wells:								
40	Number, 1920	.....	.....	.....	.....	.....	.....	.....	.....
41	Number, 1910	.....	.....	.....	.....	2	.....	.....	.....
42	Capacity, 1920—gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....
43	Capacity, 1910—gallons per minute	.....	.....	.....	.....	60	.....	.....	.....
	Pumping plants:								
44	Number, 1920	1	.....	.....	.....	3	.....	1	.....
45	Number, 1910	.....	.....	.....	.....	4	.....	1	.....
46	Engine capacity, 1920—horsepower	2	.....	.....	.....	156	.....	3,300	.....
47	Engine capacity, 1910—horsepower	.....	.....	.....	.....	17	.....	5,400	.....
48	Pump capacity, 1920—gallons per minute	.....	.....	.....	.....	7,400	.....	330,000	.....
49	Pump capacity, 1910—gallons per minute	.....	.....	.....	.....	185	.....	225,000	.....
50	Average lift, 1920—feet	15	.....	.....	.....	27	.....	14	.....
	CAPITAL INVESTED.								
51	Capital invested to Jan. 1, 1920—dollars	148,484	3,045,291	3,034,313	117,177	10,223,513	236,538	4,610,590	138,592
52	Capital invested to July 1, 1910—dollars	160,487	.....	.....	.....	4,507,866	.....	2,403,581	.....
53	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	17.33	24.75	45.88	8.07	44.83	9.13	35.57	5.24
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	4.96	.....	.....	.....	24.69	.....	25.50	.....
	ESTIMATED FINAL COST.								
56	Estimated final cost of existing enterprises in 1920—dollars	150,519	3,130,091	4,846,413	117,777	10,223,513	238,188	4,618,640	140,318
57	Estimated final cost of existing enterprises in 1910—dollars	160,487	.....	.....	.....	8,855,666	.....	4,074,824	.....
58	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	10.57	23.18	26.22	5.53	43.58	8.18	30.99	3.06
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	3.87	.....	.....	.....	24.83	.....	24.91	.....

[1] Part taken to form part of Gem in 1915; part taken to form part of Valley in 1917.
[2] Organized from part of Bingham in 1911.
[3] Organized from parts of Bingham, Blaine, and Jefferson in 1917.
[4] Organized from part of Blaine in 1917.
[5] Part taken to form part of Gem in 1915; part taken to form Payette in 1917.
[6] Organized from part of Bannock in 1919.
[7] Part taken to form Twin Falls in 1907; part taken to form part of Power in 1913.
[8] Organized from part of Fremont in 1919.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease.]

		Custer.	Elmore.[1]	Franklin.[2]	Fremont.[3]	Gem.[4]	Gooding.[5]	Idaho.[6]	Jefferson.[7]
1	Number of all farms in 1920	379	502	910	1,101	770	874	1,667	1,071
2	Number of farms irrigated in 1919	349	313	737	635	599	81.	85	888
3	Per cent of all farms	92.1	62.4	81.0	57.7	77.8	93.7	5.1	82.9
4	Number of farms irrigated in 1909	277	276	.....	2,221	.....	.....	129	.....
5	Per cent of increase, 1909–1919	26.0	.....	.....	.....	.....	.....	.....	.....
	LAND AND FARM AREA.								
6	Approximate land area.....acres	3,149,440	1,797,120	355,840	1,183,360	362,880	473,600	5,464,960	700,160
7	All land in farms.....acres	99,365	121,830	173,790	278,768	143,144	104,491	604,468	160,948
8	Improved land in farms.....acres	49,461	38,958	104,241	172,073	56,134	75,379	218,562	99,744
9	Area irrigated in 1919.....acres	80,141	28,844	37,460	130,044	51,007	45,408	2,593	149,151
10	Per cent of improved land in farms	162.0	74.0	35.9	75.6	90.9	60.2	1.2	149.5
11	Area irrigated in 1909.....acres	41,889	17,751	.....	303,163	.....	.....	3,372	.....
12	Per cent of increase, 1909–1919	91.3	.....	.....	.....	.....	.....	.....	.....
13	Area enterprises were capable of irrigating in 1920.....acres	112,244	37,641	39,279	191,572	55,836	83,662	3,103	211,515
14	Area enterprises were capable of irrigating in 1910.....acres	54,505	27,403	.....	409,757	.....	.....	3,990	.....
15	Per cent of increase, 1910–1920	105.9	.....	.....	.....	.....	.....	.....	.....
16	Area included in enterprises in 1920.....acres	144,041	60,252	54,967	222,235	59,852	91,523	3,843	258,608
17	Area included in enterprises in 1910.....acres	75,788	105,683	.....	466,112	.....	.....	5,546	.....
18	Per cent of increase, 1910–1920	90.1	.....	.....	.....	.....	.....	.....	.....
19	Area of irrigated land reported as available for settlement..acres	1,475	2,185	.....	.....	.....	.....	.....	12,225
	IRRIGATION WORKS.								
	Independent enterprises:								
20	Number, 1920	284	128	77	108	42	79	86	72
21	Number, 1910	192	134	.....	384	.....	.....	122	.....
	Main ditches:								
22	Number, 1920	331	150	79	143	37	55	119	62
23	Number, 1910	215	134	.....	410	.....	.....	126	.....
24	Length, 1920.....miles	735	283	212	527	135	167	103	344
25	Length, 1910.....miles	549	266	.....	1,071	.....	.....	116	.....
26	Capacity, 1920.....second-feet	3,202	1,117	859	9,597	2,109	2,756	151	8,364
27	Capacity, 1910.....second-feet	2,112	838	.....	21,720	.....	.....	281	.....
	Laterals:								
28	Number, 1920	358	217	40	106	31	150	3	198
29	Number, 1910	160	119	.....	291	.....	.....	29	.....
30	Length, 1920.....miles	78	108	89	252	119	282	.....	591
31	Length, 1910.....miles	112	38	.....	428	.....	.....	8	.....
	Reservoirs:								
32	Number, 1920	7	18	6	19	1	5	5	6
33	Number, 1910	13	22	.....	32	.....	.....	.....	.....
34	Capacity, 1920.....acre-feet	16,708	35,109	7,903	8,422	3	6,405	79	35,874
35	Capacity, 1910.....acre-feet	3,417	51,053	.....	41,535	.....	.....	.....	.....
	Flowing wells:								
36	Number, 1920	.....	1	.....	.....	1	.....	.....	.....
37	Number, 1910	.....	11	.....	.....	.....	.....	.....	.....
38	Capacity, 1920.....gallons per minute	.....	.....	.....	.....	36	.....	.....	.....
39	Capacity, 1910.....gallons per minute	.....	1,470	.....	.....	.....	.....	.....	.....
	Pumped wells:								
40	Number, 1920	.....	17	.....	.....	.....	.....	.....	.....
41	Number, 1910	.....	5	.....	.....	.....	.....	.....	.....
42	Capacity, 1920.....gallons per minute	.....	2,132	.....	.....	.....	.....	.....	.....
43	Capacity, 1910.....gallons per minute	.....	690	.....	.....	.....	.....	.....	.....
	Pumping plants:								
44	Number, 1920	1	22	6	.....	.....	3	.....	11
45	Number, 1910	.....	12	.....	1	.....	.....	1	.....
46	Engine capacity, 1920.....horsepower	33	2,397	568	.....	.....	706	.....	626
47	Engine capacity, 1910.....horsepower	.....	9	.....	200	.....	.....	25	.....
48	Pump capacity, 1920.....gallons per minute	10,800	13,966	14,915	.....	.....	33,794	.....	96,250
49	Pump capacity, 1910.....gallons per minute	.....	1,045	.....	1,000	.....	.....	225	.....
50	Average lift, 1920.....feet	94	23	10	.....	.....	50	.....	11
	CAPITAL INVESTED.								
51	Capital invested to Jan. 1, 1920.....dollars	778,843	1,606,335	822,981	1,712,611	1,492,559	6,960,473	109,506	6,308,032
52	Capital invested to July 1, 1910.....dollars	305,140	1,008,403	.....	1,759,082	.....	.....	74,316	.....
53	Per cent of increase, 1910–1920	155.2	.....	.....	.....	.....	.....	.....	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	6.94	42.68	20.95	8.94	26.73	83.20	35.29	29.82
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	5.60	36.80	.....	4.29	.....	.....	18.63	.....
	ESTIMATED FINAL COST.								
56	Estimated final cost of existing enterprises in 1920.....dollars	813,843	1,876,777	834,781	1,964,211	1,695,559	7,028,095	109,506	6,463,412
57	Estimated final cost of existing enterprises in 1910.....dollars	308,340	1,503,403	.....	1,791,082	.....	.....	74,316	.....
58	Per cent of increase, 1910–1920	163.9	.....	.....	.....	.....	.....	.....	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	5.65	31.15	15.19	8.84	28.33	76.79	28.49	.....
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	4.07	14.27	.....	3.84	.....	.....	13.40	24.99

[1] Part of Blaine annexed in 1911.
[2] Organized from part of Oneida in 1913; part of Bannock annexed in 1918.
[3] Parts taken to form Jefferson and Madison in 1914; part taken to form Clark in 1919.
[4] Organized from parts of Boise and Canyon in 1915.
[5] Organized from part of Lincoln in 1913; part taken to form part of Jerome in 1919.
[6] Boundary between Idaho and Lemhi changed in 1911; part of Idaho taken to form part of Valley in 1917.
[7] Organized from part of Fremont in 1914; part taken to form part of Butte in 1917.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease.]

		Jerome.[1]	Kootenai.[2]	Lemhi.[3]	Lincoln.[4]	Madison.[5]	Minidoka.[6]	Nez Perce.[7]	Oneida.[8]
1	Number of all farms in 1920	685	1,396	535	418	928	1,024	1,291	1,041
2	Number of farms irrigated in 1919	652	195	509	397	665	901	184	415
3	Per cent of all farms	95.2	14.0	95.1	95.0	71.7	88.0	14.3	39.9
4	Number of farms irrigated in 1909	.....	185	317	1,433	.....	.....	99	836
5	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	.....	.....	.....
	LAND AND FARM AREA.								
6	Approximate land area.....acres	387,840	801,920	2,942,080	760,320	307,840	483,840	544,640	773,760
7	All land in farms.....acres	76,488	221,151	159,192	64,784	217,591	91,028	417,461	308,414
8	Improved land in farms.....acres	62,229	79,017	77,423	42,899	155,145	68,051	190,875	176,774
9	Area irrigated in 1919.....acres	85,000	4,000	66,905	69,620	54,637	55,259	5,018	20,314
10	Per cent of improved land in farms	136.6	5.1	86.4	162.3	35.2	81.2	2.6	11.5
11	Area irrigated in 1909.....acres	.....	2,984	37,916	82,684	.....	.....	5,360	43,855
12	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	.....	.....	.....
13	Area enterprises were capable of irrigating in 1920.....acres	110,000	5,495	96,451	121,304	60,784	65,228	5,901	21,625
14	Area enterprises were capable of irrigating in 1910.....acres	.....	10,126	41,108	456,852	.....	.....	9,317	45,282
15	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....
16	Area included in enterprises in 1920.....acres	110,000	10,214	136,052	125,376	68,257	65,228	6,135	48,782
17	Area included in enterprises in 1910.....acres	.....	18,125	61,677	514,955	.....	.....	29,896	93,023
18	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....
19	Area of irrigated land reported as available for settlement..acres	17,647	.....	3,650	26,250	.....	176	.....	.....
	IRRIGATION WORKS.								
	Independent enterprises:								
20	Number, 1920	1	19	404	44	37	1	59	68
21	Number, 1910	.....	20	247	100	.....	.....	50	106
	Main ditches:								
22	Number, 1920	1	13	584	42	44	2	31	18
23	Number, 1910	.....	17	272	105	.....	.....	49	104
24	Length, 1920.....miles	22	15	825	170	132	29	33	1,391
25	Length, 1910.....miles	.....	33	411	407	.....	.....	42	340
26	Capacity, 1920.....second-feet	2,072	98	2,691	3,027	2,768	480	75	1,000
27	Capacity, 1910.....second-feet	.....	129	1,363	7,000	.....	.....	127	1,323
	Laterals:								
28	Number, 1920	220	18	596	73	51	330	15	74
29	Number, 1910	.....	28	64	645	.....	.....	12	53
30	Length, 1920.....miles	485	22	244	406	87	309	3	59
31	Length, 1910.....miles	.....	32	32	1,293	.....	.....	33	102
	Reservoirs:								
32	Number, 1920	1	1	4	1	1	2	6	10
33	Number, 1910	.....	2	1	8	.....	.....	11	25
34	Capacity, 1920.....acre-feet	850,000	600	397	190,000	8,000	499,733	4	19,391
35	Capacity, 1910.....acre-feet	.....	.....	1	379,024	.....	.....	30,033	26,006
	Flowing wells:								
36	Number, 1920	.....	.....	.....	.....	.....	.....	.....	57
37	Number, 1910	.....	.....	.....	.....	.....	.....	3	9
38	Capacity, 1920.....gallons per minute	.....	.....	.....	.....	.....	.....	.....	7,468
39	Capacity, 1910.....gallons per minute	.....	.....	.....	.....	.....	.....	400	1,487
	Pumped wells:								
40	Number, 1920	.....	.....	.....	1	.....	.....	27	.....
41	Number, 1910	.....	2	.....	.....	.....	.....	12	2
42	Capacity, 1920.....gallons per minute	.....	.....	.....	2,500	.....	.....	2,690	.....
43	Capacity, 1910.....gallons per minute	.....	180	.....	.....	.....	.....	1,290	6
	Pumping plants:								
44	Number, 1920	3	6	1	1	.....	1	33	.....
45	Number, 1910	.....	10	1	.....	.....	.....	14	2
46	Engine capacity, 1920.....horsepower	1,290	992	5	2	.....	5,200	404	.....
47	Engine capacity, 1910.....horsepower	.....	979	139	.....	.....	.....	59	2
48	Pump capacity, 1920.....gallons per minute	62,956	50,041	75	50	.....	520,000	9,935	.....
49	Pump capacity, 1910.....gallons per minute	.....	34,270	5,400	.....	.....	.....	1,410	6
50	Average lift, 1920.....feet	50	51	19	10	.....	16	22	.....
	CAPITAL INVESTED.								
51	Capital invested to Jan. 1, 1920.....dollars	11,663,236	561,842	720,647	4,258,895	667,126	3,090,849	313,781	471,910
52	Capital invested to July 1, 1910.....dollars	.....	771,904	199,731	10,265,589	.....	.....	837,603	1,585,759
53	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	106.03	102.25	7.47	35.11	10.98	47.39	53.17	21.82
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	.....	76.23	4.86	22.47	.....	.....	89.90	35.02
	ESTIMATED FINAL COST.								
56	Estimated final cost of existing enterprises in 1920.....dollars	11,663,236	811,842	744,797	4,259,215	699,726	3,090,849	717,171	471,910
57	Estimated final cost of existing enterprises in 1910.....dollars	.....	771,904	203,216	11,776,546	.....	.....	1,614,603	1,817,103
58	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	106.03	79.48	5.47	33.97	10.25	47.39	116.90	9.67
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	.....	42.59	3.29	22.87	.....	.....	54.01	19.53

[1] Organized from parts of Gooding, Lincoln, and Minidoka in 1919.
[2] Part taken to form Bonner in 1907; part taken to form Benewah in 1915.
[3] Boundary between Lemhi and Idaho changed in 1911.
[4] Parts taken to form Gooding and Minidoka in 1913; part taken to form part of Jerome in 1919.
[5] Organized from part of Fremont in 1914; part taken to form Teton in 1915.
[6] Organized from part of Lincoln in 1913; part taken to form part of Jerome in 1919.
[7] Part of Shoshone annexed in 1905; parts of Nez Perce taken to form Clearwater and Lewis in 1911.
[8] Part taken to form Franklin in 1913; part taken to form part of Power in 1913; part annexed to Power in 1916.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100.]

		Owyhee.	Payette.[1]	Power.[2]	Teton.[3]	Twin Falls.	Valley.[4]	Washington.[5]	Other counties.
1	Number of all farms in 1920	785	763	784	541	2,746	309	1,119	5,126
2	Number of farms irrigated in 1919	642	700	179	318	2,609	107	610	91
3	Per cent of all farms	81.8	91.7	22.8	58.8	95.0	34.6	54.5	1.8
4	Number of farms irrigated in 1909	247	.....	.....	.....	1,203	.....	716	30
5	Per cent of increase, 1909–1919	159.9	.....	.....	.....	116.9	.....	.....	.....
	LAND AND FARM AREA.								
6	Approximate land area ..... acres	5,991,840	264,960	890,240	296,320	1,252,480	2,418,560	946,560	6,714,880
7	All land in farms ..... acres	140,464	72,254	311,571	130,756	276,179	87,038	299,526	1,006,271
8	Improved land in farms ..... acres	64,662	41,054	217,046	84,354	232,533	49,278	122,633	483,865
9	Area irrigated in 1919 ..... acres	62,933	52,428	11,264	41,385	261,622	15,591	41,423	1,185
10	Per cent of improved land in farms	97.3	127.7	5.2	49.1	112.5	31.6	33.8	0.2
11	Area irrigated in 1909 ..... acres	21,771	.....	.....	.....	100,545	.....	57,299	895
12	Per cent of increase, 1909–1919	189.1	.....	.....	.....	160.2	.....	.....	.....
13	Area enterprises were capable of irrigating in 1920 ..... acres	74,494	30,653	17,186	57,422	271,443	24,148	52,065	2,221
14	Area enterprises were capable of irrigating in 1910 ..... acres	44,240	.....	.....	.....	246,625	.....	71,445	901
15	Per cent of increase, 1910–1920	68.4	.....	.....	.....	10.1	.....	.....	.....
16	Area included in enterprises in 1920 ..... acres	119,061	71,455	19,496	62,459	312,121	31,984	59,610	2,806
17	Area included in enterprises in 1910 ..... acres	162,111	.....	.....	.....	384,590	.....	124,964	1,907
18	Per cent of increase, 1910–1920	—26.6	.....	.....	.....	—18.8	.....	.....	.....
19	Area of irrigated land reported as available for settlement ..... acres	3,958	5,356	.....	.....	7,430	.....	1,500	.....
	IRRIGATION WORKS.								
	Independent enterprises:								
20	Number, 1920	259	40	53	99	85	73	89	30
21	Number, 1910	146	.....	.....	.....	37	.....	286	19
	Main ditches:								
22	Number, 1920	426	41	57	103	182	79	97	26
23	Number, 1910	137	.....	.....	.....	32	.....	299	21
24	Length, 1920 ..... miles	583	268	97	154	219	120	326	17
25	Length, 1910 ..... miles	302	.....	.....	.....	172	.....	423	11
26	Capacity, 1920 ..... second-feet	2,238	1,497	325	1,498	6,046	572	1,158	204
27	Capacity, 1910 ..... second-feet	2,249	.....	.....	.....	4,924	.....	1,818	166
	Laterals:								
28	Number, 1920	193	9	31	200	72	9	36	50
29	Number, 1910	158	.....	.....	.....	257	.....	99	11
30	Length, 1920 ..... miles	142	13	27	129	993	2	35	4
31	Length, 1910 ..... miles	66	.....	.....	.....	762	.....	86	4
	Reservoirs:								
32	Number, 1920	22	7	12	1	6	2	8	5
33	Number, 1910	14	.....	.....	.....	2	.....	12	8
34	Capacity, 1920 ..... acre-feet	20,324	63,050	712	40	206,600	205	94,596	416
35	Capacity, 1910 ..... acre-feet	59,779	.....	.....	.....	492,000	.....	13,354	2
	Flowing wells:								
36	Number, 1920	61	.....	.....	.....	3	.....	.....	.....
37	Number, 1910	9	.....	.....	.....	5	.....	.....	.....
38	Capacity, 1920 ..... gallons per minute	2,954	.....	.....	.....	1,900	.....	.....	.....
39	Capacity, 1910 ..... gallons per minute	80	.....	.....	.....	2,970	.....	.....	.....
	Pumped wells:								
40	Number, 1920	1	3	.....	.....	.....	.....	.....	1
41	Number, 1910	.....	.....	.....	.....	.....	.....	.....	.....
42	Capacity, 1920 ..... gallons per minute	27	9,000	.....	.....	.....	.....	.....	60
43	Capacity, 1910 ..... gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:								
44	Number, 1920	18	10	1	.....	4	.....	6	1
45	Number, 1910	5	.....	.....	.....	.....	.....	4	.....
46	Engine capacity, 1920 ..... horsepower	9,526	606	40	.....	1,552	.....	748	10
47	Engine capacity, 1910 ..... horsepower	118	.....	.....	.....	.....	.....	103	.....
48	Pump capacity, 1920 ..... gallons per minute	169,213	18,256	110	.....	23,840	.....	32,230	160
49	Pump capacity, 1910 ..... gallons per minute	4,615	.....	.....	.....	.....	.....	4,505	.....
50	Average lift, 1920 ..... feet	45	30	40	.....	39	.....	56	50
	CAPITAL INVESTED.								
51	Capital invested to Jan. 1, 1920 ..... dollars	2,309,967	1,209,175	270,888	157,976	8,984,389	147,110	1,774,135	47,847
52	Capital invested to July 1, 1910 ..... dollars	1,274,833	.....	.....	.....	6,653,172	.....	581,099	16,567
53	Per cent of increase, 1910–1920	81.2	.....	.....	.....	35.0	.....	.....	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920 ..... dollars	31.01	39.45	15.76	2.75	33.10	6.09	34.08	21.54
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910 ..... dollars	28.82	.....	.....	.....	26.98	.....	8.13	.....
	ESTIMATED FINAL COST.								
56	Estimated final cost of existing enterprises in 1920 ..... dollars	2,535,156	1,209,375	287,138	163,176	9,106,578	177,160	1,874,135	53,022
57	Estimated final cost of existing enterprises in 1910 ..... dollars	4,034,943	.....	.....	.....	7,415,142	.....	584,084	16,567
58	Per cent of increase, 1910–1920	—37.2	.....	.....	.....	23.6	.....	.....	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920 ..... dollars	21.29	16.92	14.73	2.61	29.37	5.54	31.44	18.90
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910 ..... dollars	24.89	.....	.....	.....	19.28	.....	4.67	8.69

[1] Organized from part of Canyon in 1917.
[2] Organized from parts of Bingham, Blaine, Cassia, and Oneida in 1913; part of Oneida annexed in 1916.
[3] Organized from part of Madison in 1915.
[4] Organized from parts of Boise and Idaho in 1917.
[5] Part taken to form Adams in 1911.

KANSAS.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Kansas collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

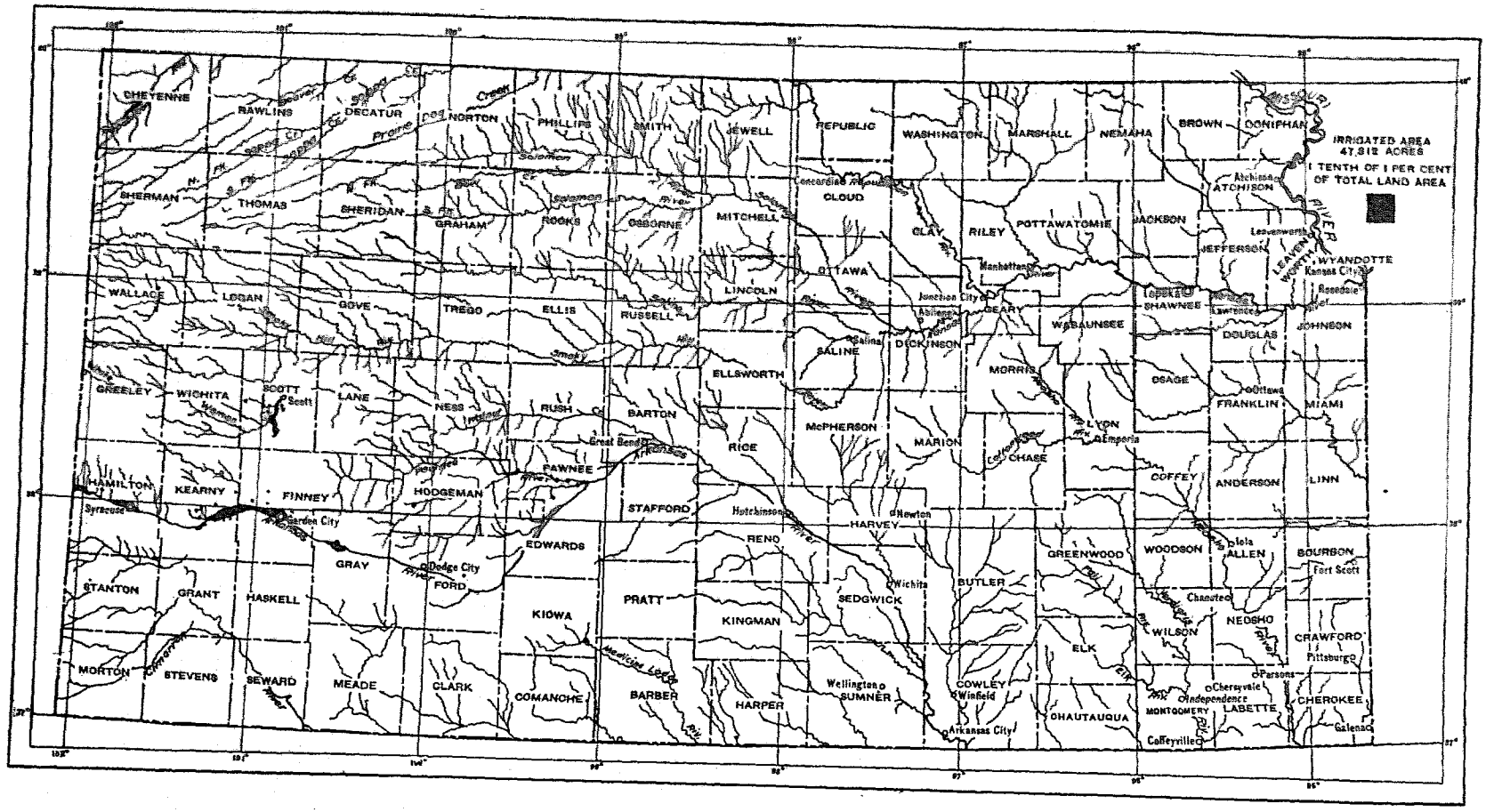
TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	165,286	177,841	−12,555	−7.1
Approximate land area of the state.....acres..	52,335,360	52,335,360		
All land in farms.....acres..	45,425,179	43,384,799	2,040,380	4.7
Improved land in farms.....acres..	30,600,760	29,904,067	696,693	2.3
Number of farms irrigated	504	1,006	−502	−49.9
Area irrigated.....acres..	47,312	37,479	9,833	26.2
Area enterprises were capable of irrigating.....acres..	67,853	139,995	−72,142	−51.5
Area included in enterprises.....acres..	102,562	161,300	−58,738	−36.4
Per cent irrigated:				
Number of all farms	0.3	0.6	−0.3	
Approximate land area of the state	0.1	0.1		
Land in farms	0.1	0.1		
Improved land in farms	0.2	0.1	0.1	
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	20,541	102,516	−81,975	−80.0
Excess of area included in enterprises over area irrigated.....acres..	55,250	123,821	−68,571	−55.4
Capital invested	$2,067,381	$1,365,563	$701,818	51.4
Average per acre enterprises were capable of irrigating	$30.47	$9.75	$20.72	212.5
Estimated final cost of existing enterprises	$2,195,981	$1,365,563	$830,418	60.8
Average per acre included in enterprises	$21.41	$8.47	$12.94	152.8
Average cost of operation and maintenance per acre	$3.29	$1.59	$1.70	106.9
IRRIGATION WORKS.				
Number of enterprises	209	716	−507	−70.8
Number of main ditches	139	89	50	56.2
Length of main ditches.....miles..	271	274	−3	−1.1
Capacity of main ditches.....second-feet..	1,667	2,600	−933	−35.9
Number of lateral ditches	374	39	335	859.0
Length of lateral ditches.....miles..	147	42	105	250.0
Number of reservoirs	36	42	−6	−14.3
Capacity of reservoirs.....acre-feet..	391	31,024	−30,633	−98.7
Number of flowing wells	6	3	3	100.0
Capacity of flowing wells.....gallons per minute..	500	30	470	(2)
Number of pumped wells	710	939	−229	−24.4
Capacity of pumped wells.....gallons per minute..	266,797	73,362	193,435	263.7
Number of pumping plants	198	698	−500	−71.6
Engine capacity.....horsepower..	6,946	1,517	5,429	357.9
Pump capacity.....gallons per minute..	297,975	128,276	169,699	132.3
Average lift.....feet..	30	(3)	30	

[1] A minus sign (−) denotes decrease. [2] Per cent not shown when more than 1,000. [3] Not reported in 1910.

KANSAS

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

The usual climatic conditions determining the necessity for irrigation are the amount and the seasonal distribution of precipitation. In Kansas the wind movement also must be taken into consideration, because of its effect on evaporation.

Precipitation decreases with remarkable regularity from 42 inches in the southeastern counties of the state to just a little more than 15 inches at the Colorado line.

About 75 per cent of the annual precipitation falls during the six crop-growing months, April to September. In the western part of the state, during the late summer, the large amount of sunshine and the hot drying winds cause a rapid evaporation that increases the water requirements of vegetation and the necessity for irrigation.

The precipitation in the western part of the state in 1919 was above the normal and it is probable that some land was not irrigated that would be in a drier season.

WATER SUPPLY FOR IRRIGATION.

In the eastern part of Kansas the rainfall is sufficient for the growing of crops, and the streams carry an abundance of water. In the western part of the state the streams, with the exception of the Arkansas River, rise on the plains, and depend mostly on local precipitation for their summer flow, consequently they carry little water except during storms.

The Arkansas River rises in the main range of the Rocky Mountains and receives water from melting snows, but losses from evaporation and seepage and diversions in Colorado exhaust the summer flow of the river, except such as comes from local precipitation and seepage from irrigated land in Colorado. None of the streams in the part of the state where irrigation is needed affords any large supply of water during the summer, but the streams afford a good supply in the spring. There is opportunity for storage of the winter and flood flow, but little storage has been provided.

In the stream valleys there is abundant ground water at shallow depths, and more than one-fourth of the land irrigated in the state is supplied from this source. On the high plains there is ground water, but it occurs at such great depths that the cost of pumping is too great to permit of a large use of water from wells.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.[1]	Per cent of all farms.	Acres.	Per cent of increase.	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	504	−49.9	0.3	47,312	26.2	0.1	0.1	0.2
1910	1,006	8.3	0.6	37,479	58.7	0.1	0.1	0.1
1900	929	79.0	0.5	23,620	13.5	(2)	0.1	0.1
1890	519	.....	(2)	20,818	.....	(2)	0.1	0.1

[1] A minus sign (−) denotes decrease. [2] Less than one-tenth of 1 per cent.

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	209	102,562	47,312	46.1	67,853
1870-1879	2	145	80	55.2	145
1880-1889	7	23,386	15,413	65.9	23,386
1890-1899	7	15,786	13,226	83.8	15,786
1905-1909	30	13,103	3,617	27.6	5,317
1910-1914	62	7,027	3,719	52.9	6,485
1915-1919	78	37,452	7,109	18.5	11,405
Not reported	23	5,663	4,148	73.2	5,329

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	47,312	37,479	9,833	26.2	67,853	102,562
Streams, gravity	30,807	35,469	−4,662	−13.1	41,603	41,435
Streams, pumped	730	20	710	.....	1,541	2,105
Streams, pumped and gravity	600	.....	600	.....	850	850
Wells, pumped	13,235	1,959	11,276	575.6	20,519	54,974
Wells, flowing and pumped	50	2	48	.....	60	60
Lakes, pumped	.....	.....	.....	.....	100	100
Springs	.....	27	−27	.....	.....	.....
Stored storm water	.....	2	−2	.....	.....	.....
Streams, gravity, and pumped wells	1,540	.....	1,540	.....	2,330	2,618
Other mixed	350	.....	350	.....	350	420

[1] A minus sign (−) denotes decrease. Per cent not shown when base is less than 100.

ACREAGE, BY CHARACTER OF ENTERPRISE.

Kansas enacted an irrigation district law in 1891 but no districts are reported in the state.

The state has never accepted the conditions of the Federal Carey Act (act of Aug. 18, 1894).

The United States Reclamation Service undertook one project in Kansas, but this has been disposed of.

The small acreage credited to the state in Table 5 belongs to a state institution, and does not represent a scheme of state construction.

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Acres.	Per cent.
ACREAGE IRRIGATED.				
Total	47,312	37,479	9,833	26.2
Individual and partnership	14,546	3,154	11,392	361.2
Cooperative	32,516	27,372	5,144	18.8
Commercial	150	.....	150	.....
U. S. Reclamation Service	.....	6,953	−6,953	.....
State	100	(2)	100	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	67,853	139,995	−72,142	−51.5
Individual and partnership	26,614	4,795	21,819	455.0
Cooperative	40,719	135,200	−94,481	−69.9
Commercial	320	.....	320	.....
U. S. Reclamation Service	.....	.....	.....	.....
State	200	(2)	200	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total	102,362	161,300	−58,738	−36.4
Individual and partnership	36,643	6,423	30,220	470.5
Cooperative	65,399	144,200	−78,801	−54.6
Commercial	320	.....	320	.....
U. S. Reclamation Service	.....	10,677	−10,677	.....
State	200	(2)	200	.....

[1] A minus sign (−) denotes decrease. [2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The laws of the state of Kansas relating to water rights are summarized in the following paragraphs:

The state of Kansas enacted in 1886 a law declaring that rights to the use of water may be acquired by appropriation, and that between appropriations the first in time is the first in right. This law required any party wishing to appropriate water to post a notice at the point of intended diversion and file a copy of the notice with the county clerk.

A law enacted in 1891 contained the following sections relating to water rights:

"In all that portion of the state of Kansas situated west of the ninety-ninth meridian, all natural waters, whether standing or running, and whether surface or subterranean, shall be devoted, first, to purposes of irrigation in aid of agriculture, subject to ordinary domestic uses, and secondly to other industrial purposes, and may be diverted from natural beds, basins, or channels for such purposes and uses. *Provided*, That no such diversion shall interfere with, diminish, or divest any prior vested right of appropriation for the same or a higher purpose than that for which such diversion is sought to be made, without due legal condemnation of, and compensation for the same; and natural lakes and ponds of surface water having no outlets shall be deemed parcel of the lands wherein the same may be situated, and only the proprietors of such land shall be entitled to draw off the same.

"Waters flowing in well-defined subterranean channels and courses, or flowing or standing in subterranean sheets, shall be subject to appropriation with the same effect as water of superficial channels."

This law prescribes no procedure for acquiring rights, or for recording them, and the law of 1886 requiring posting and filing of claims is still in effect.

Conflicting rights are defined in ordinary suits between rival claimants.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909, per cent of total.
	Acres.	Per cent of total.	
Total	47,312	100.0	100.0
Appropriation and use	26,435	55.9	73.6
Notice filed and posted	4,218	8.9	26.3
Adjudicated by court	458	0.9	.....
Riparian rights	30	0.1	0.1
Underground	13,480	28.5	(1)
Other and mixed	938	2.0	(1)
Not reported	1,753	3.7	(1)

[1] All land for which the class of water rights was not reported was included in "Appropriation and use."

ACREAGE, BY DRAINAGE BASIN.

The report of a special census taken in 1902 presented all data by drainage basins rather than by counties. The results of the census of 1920 have been tabulated on the same basis, and the data for 1902 are presented for purposes of comparison. For no other census have the results been tabulated in this form. The acreage reported for each drainage basin in 1919 comprises all the irrigated land in that drainage basin, including that watered from springs and wells. In the 1902 results the acreages irrigated from springs and wells were not reported for the smaller tributary streams, but the acreages for the tributaries were included in those reported for the main streams. This area is so small, however, that the comparison of the areas reported for the tributary streams is not seriously affected.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
Total	47,312	28,922	63.6	102,562	67,853
Tributaries of Kansas River	773	2,792	−72.3	3,580	3,396
Republican River	510	1,470	−65.3	2,090	2,090
Smoky Hill River	248	770	−67.8	1,420	1,236
Other tributaries of Kansas River	15	552	−97.3	70	70
Arkansas River and tributaries	46,539	[2] 26,130	78.1	98,982	64,457
Arkansas River direct	30,130	22,253	35.4	38,533	38,533
Cimarron River	.....	1,910	.....	210	210
Other tributaries of Arkansas River	16,409	[2] 1,967	734.2	60,239	25,714

[1] A minus sign (−) denotes decrease. [2] Includes springs and wells.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1890 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.[1]
1920	$2,067,381	51.4	$30.47	212.5
1910	1,365,563	157.8	9.75	−56.5
1900	529,755	525.2	22.43	451.1
1890	84,729	.....	4.07	.....

[1] A minus sign (−) denotes decrease.

TABLE 9.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$2,067,381	100.0	$30.47
1870-1879	736	0.1	5.08
1880-1889	1,058,982	51.2	45.28
1890-1899	88,719	4.3	5.62
1905-1909	200,085	9.7	37.63
1910-1914	176,286	8.5	27.18
1915-1919	407,876	19.7	35.76
Not reported	134,697	6.5	25.28

TABLE 10.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$2,067,381	100.0	$30.47	28,583	$3.29
Streams, gravity	1,184,674	57.3	28.48	17,957	0.92
Streams, pumped	22,142	1.1	14.37	645	7.57
Streams, pumped and gravity	50,000	2.4	58.82	600	20.00
Wells, pumped	741,583	35.9	36.14	8,481	6.96
Wells, flowing and pumped	4,000	0.2	66.67	.....	.....
Lakes, gravity	1,000	(2)	10.00	50	1.00
Streams, gravity, and pumped wells	50,532	2.4	17.86	620	1.55
Other mixed	13,450	0.7	38.43	230	1.83

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	INCREASE.[1]	
			Amount.	Per cent.
Total	$2,067,381	$599,098	$1,468,283	245.1
Tributaries of Kansas River	50,311	139,742	−89,431	−64.0
Republican River	15,816	107,450	−91,634	−85.3
Smoky Hill River	33,753	3,410	30,343	889.8
Other tributaries of Kansas River	742	28,882	−28,140	−97.4
Arkansas River and tributaries	2,017,070	[2] 459,356	1,557,714	339.1
Arkansas River direct	1,153,205	368,775	784,430	212.7
Cimarron River	15,000	21,100	−6,100	−28.9
Other tributaries of Arkansas River	848,865	[2] 69,481	779,384	.....

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$2,067,381	100.0	28,583	$3.29
Individual and partnership	775,095	37.5	8,817	6.07
Cooperative	1,289,737	62.4	19,666	1.99
Commercial	1,549	0.1	.....	.....
State	1,000	(2)	100	12.00

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	5
Acreage included in enterprises reporting land drained or needing drainage	3,610
Acreage for which drains have been installed	250
Additional acreage needing drainage	1,320
Per cent that area for which drains have been installed is of total area included in enterprises reporting drainage	6.9
Per cent that area for which drains have been installed is of total area included in irrigation enterprises in the state	0.2
Per cent that area for which drains have been installed plus that needing drainage is of total area included in irrigation enterprises in the state	1.5

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 14. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume entering canals.....second-feet..	455	354	101
Area irrigated in 1919.....acres..	20,900	19,925	975
Average number of acres per second-foot.....	45.9	56.3	8.8
Total quantity of water entering canals....acre-feet..	35,139	18,402	16,737
Area irrigated in 1919.....acres..	21,210	20,235	975
Average quantity per acre.....acre-feet..	1.7	0.9	17.2
Total quantity of water delivered.....acre-feet..	14,275	13,718	557
Area irrigated in 1919.....acres..	20,855	20,055	800
Average quantity per acre.....acre-feet..	0.7	0.7	0.7

IRRIGATION WORKS.

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	10	13	139	1,667	271	374	147	36	391
1870–1879	2	1	2	2	2	8	1	.....	.....
1880–1889	3	.....	7	489	107	48	45	.....	.....
1890–1899	3	1	7	326	51	12	3	2	40
1905–1909	.....	.....	15	271	34	52	4	10	24
1910–1914	.....	5	55	202	36	134	61	11	122
1915–1919	2	6	51	368	26	114	32	12	205
Not reported	.....	.....	2	9	15	6	1	1	.....

DATE OF BEGINNING.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	28	6	500	710	266,797	198	6,946	288	297,975
1890–1899	.....	.....	.....	1	.....	1	.....	2	.....
1905–1909	0.3	6	500	116	28,665	29	1,483	67	30,635
1910–1914	0.2	.....	.....	158	60,854	65	1,701	85	78,409
1915–1919	0.4	.....	.....	313	104,742	79	3,222	108	114,825
Not reported	1.8	.....	.....	122	74,506	24	540	26	74,106

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	10	13	139	1,667	271	374	147	36	391
Individual and partnership	7	6	129	817	112	288	81	30	386
Cooperative	3	6	8	774	154	71	58	6	5
Commercial	.....	.....	1	6	1	.....	.....	.....	.....
State	.....	1	1	70	4	15	8	.....	.....

CLASS.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	2.8	6	500	710	266,797	198	6,946	288	297,975
Individual and partnership	2.7	6	500	687	245,297	194	5,411	269	272,275
Cooperative	.....	.....	.....	17	19,000	2	1,450	17	19,000
Commercial	.....	.....	.....	.....	.....	1	25	1	2,500
State	0.1	.....	.....	6	2,500	1	60	1	4,200

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	10	13	139	1,667	271	374	147	36	391
Tributaries of Kansas River	5	1	14	50	18	14	1	.....	.....
Republican River	.....	.....	4	34	12	.....	.....	.....	.....
Smoky Hill River	5	1	9	15	6	14	1	.....	.....
Other tributaries of Kansas River	.....	.....	1	1	.....	.....	.....	.....	.....
Arkansas River and tributaries	5	12	125	1,617	253	360	146	36	391
Arkansas River direct	3	.....	8	774	154	54	48	.....	.....
Cimarron River	.....	1	18	8	6	.....	.....	2	3
Other tributaries of Arkansas River	2	11	99	835	93	306	98	34	388

DRAINAGE BASIN.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.				
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.		Average lift (feet).
								Number.	Capacity (gallons per minute).	
Total	2.8	6	500	710	266,797	198	6,946	288	297,975	30
Tributaries of Kansas River	.....	.....	.....	32	2,600	8	383	23	6,700	37
Republican River	.....	.....	.....	1	500	1	60	1	500	100
Smoky Hill River	.....	.....	.....	31	2,100	6	303	21	5,350	29
Other tributaries of Kansas River	.....	.....	.....	.....	.....	1	20	1	850	25
Arkansas River and tributaries	2.8	6	500	678	264,197	190	6,563	265	291,275	29
Arkansas River direct	.....	.....	.....	1	.....	1	10	1	.....	12
Cimarron River	.....	6	500	5	2,800	3	156	3	2,800	12
Other tributaries of Arkansas River	2.8	.....	.....	672	261,397	186	6,397	261	288,475	30

CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 AND 1909.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AREA HARVESTED.					QUANTITY HARVESTED.					
		1919		1909		Per cent of increase.[1]	Unit.	1919		1909		Per cent of increase.[1]
		Acres.	Per cent of total for state.	Acres.	Per cent of total for state.			Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	238	[2]	745	[2]	−68.1	Bu.	4,090	[2]	16,892	[2]	−75.8
2	Oats	1,238	0.1	487	0.1	154.2	Bu.	24,022	0.1	10,525	[2]	128.2
3	Winter wheat	4,629	[2]	930	[2]	358.4	Bu.	45,340	[2]	19,121	[2]	150.7
4	Spring wheat	234	1.0				Bu.	2,592	1.3			
5	Barley	1,370	0.3	356	0.2	284.8	Bu.	18,483	0.2	6,145	0.3	200.8
	Hay and forage:											
6	Alfalfa	14,962	1.1	10,470	1.1	42.9	Tons	30,397	1.2	21,699	1.1	40.1
7	Wild, salt, or prairie grasses	615	0.1	541	[2]	13.7	Tons	1,146	0.1	527	[2]	117.5
8	Silage crops	491	0.2	[3]	.....	.....	Tons	2,668	0.2	[3]	.....	.....
9	Corn cut for forage	186	[2]	[3]	.....	.....	Tons	500	[2]	[3]	.....	.....
10	Kafir, sorghum, etc., for forage	1,238	0.1	[3]	.....	.....	Tons	3,033	0.2	[3]	.....	.....
	Seeds:											
11	Kafir, milo, feterita, durra	2,050	0.4	[3]	.....	.....	Bu.	36,835	0.5	[3]	.....	.....
	Miscellaneous:											
12	Sugar beets grown for sugar	851	50.6	5,638	96.4	−84.9	Tons	4,036	50.8	45,346	89.4	−91.1

	CROP.	AVERAGE YIELD PER ACRE, 1919.						VALUE.				
		Unit.	For state.	On non-irrigated land.	On irrigated land.			1919		1909		Per cent of increase.[1]
					Average.	Per cent of average for state.	Per cent of average for non-irrigated land.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	Bu.	16.2	16.2	17.2	106.2	106.2	$5,930	[2]	$9,748	[2]	−39.2
2	Oats	Bu.	26.0	26.0	19.4	74.6	74.6	19,218	0.1	4,942	0.1	288.9
3	Winter wheat	Bu.	13.2	13.2	11.3	85.6	85.6	97,934	[2]	17,708	[2]	484.7
4	Spring wheat	Bu.	8.5	8.5	11.1	130.6	130.6	5,599	1.3			
5	Barley	Bu.	21.0	21.1	13.5	64.3	64.0	19,407	0.2	3,281	0.3	491.5
	Hay and forage:											
6	Alfalfa	Tons	1.89	1.89	2.03	107.4	107.4	531,948	1.2	153,250	1.1	247.1
7	Wild, salt, or prairie grasses	Tons	1.06	1.06	1.86	175.5	175.5	14,325	0.1	3,099	.....	362.2
8	Silage crops	Tons	4.21	4.21	5.43	129.0	129.0	21,344	0.2	[3]	.....	.....
9	Corn cut for forage	Tons	1.50	1.50	2.69	179.3	179.3	4,000	[2]	[3]	.....	.....
10	Kafir, sorghum, etc., for forage	Tons	1.86	1.86	2.45	131.7	131.7	30,330	0.2	[3]	.....	.....
	Seeds:											
11	Kafir, milo, feterita, durra	Bu.	13.9	13.9	18.0	129.5	129.5	49,727	0.5	[3]	.....	.....
	Miscellaneous:											
12	Sugar beets grown for sugar	Tons	4.72	4.70	4.74	100.4	100.9	42,399	50.8	226,931	88.6	−81.3

[1] A minus sign (−) denotes decrease. [2] Less than one-tenth of 1 per cent. [3] Not reported separately in 1909.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		THE STATE.	Cheyenne.	Finney.	Gray.	Hamilton.	Kearny.	Pawnee.	Scott.	Wallace.	Other counties.
1	Number of all farms in 1920	165,286	974	717	733	326	359	1,144	428	341	160,264
2	Number of farms irrigated in 1919	504	7	206	16	23	81	18	100	8	45
3	Per cent of all farms	0.3	0.7	28.7	2.2	7.1	22.6	1.6	23.4	2.3	.....
4	Number of farms irrigated in 1909	1,006	10	173	.....	54	121	.....	.....	.....	648
5	Per cent of increase, 1909–1919	—49.9	.....	19.1	.....	.....	—33.1	.....	.....	.....	—93.1
	LAND AND FARM AREA.										
6	Approximate land area.....acres	52,335,360	645,120	816,640	548,480	629,760	545,920	474,880	456,960	589,440	47,628,160
7	All land in farms.....acres	45,425,179	570,222	629,119	423,068	262,213	213,685	456,771	335,360	336,271	42,198,470
8	Improved land in farms.....acres	30,600,760	407,959	158,264	228,277	54,261	80,723	407,567	150,808	101,383	29,011,518
9	Area irrigated in 1919.....acres	47,312	500	15,221	825	3,463	21,976	1,117	3,047	213	950
10	Per cent of improved land in farms	0.2	0.1	9.6	0.4	6.4	27.2	0.3	2.0	0.2	(1)
11	Area irrigated in 1909.....acres	37,479	1,515	17,285	60	2,366	15,168	.....	.....	251	834
12	Per cent of increase, 1909–1919	26.2	—67.0	—11.9	.....	46.4	44.9	.....	.....	—15.1	13.9
13	Area enterprises were capable of irrigating in 1920.....acres	67,853	2,080	18,655	1,000	6,266	29,367	2,366	5,045	1,018	2,056
14	Area enterprises were capable of irrigating in 1910.....acres	139,995	3,025	96,287	60	10,606	28,445	.....	240	466	866
15	Per cent of increase, 1910–1920	—51.5	—31.2	—80.6	.....	—40.9	3.2	.....	.....	118.5	137.4
16	Area included in enterprises in 1920.....acres	102,562	2,080	19,209	1,000	6,266	37,897	2,630	30,163	1,018	2,299
17	Area included in enterprises in 1910.....acres	161,300	4,500	109,376	110	16,754	28,581	.....	480	621	878
18	Per cent of increase, 1910–1920	—36.4	—53.8	—82.4	900.0	—62.6	32.6	.....	.....	63.9	161.8
	IRRIGATION WORKS.										
	Independent enterprises:										
19	Number, 1920	209	3	85	1	9	31	16	12	7	45
20	Number, 1910	716	6	39	.....	11	10	.....	.....	.....	650
	Main ditches:										
21	Number, 1920	139	3	72	1	4	6	15	2	7	29
22	Number, 1910	89	4	32	.....	8	5	.....	1	8	31
23	Length, 1920.....miles	271	12	48	50	28	90	21	1	6	15
24	Length, 1910.....miles	274	27	100	.....	33	65	.....	1	10	38
25	Capacity, 1920.....second-feet	1,667	34	666	24	1	742	118	2	12	68
26	Capacity, 1910.....second-feet	2,600	125	1,400	.....	492	493	.....	6	14	70
	Laterals:										
27	Number, 1920	374	.....	179	30	16	2	101	17	14	15
28	Number, 1910	39	1	11	.....	4	10	.....	.....	13	.....
29	Length, 1920.....miles	147	.....	43	18	6	8	49	10	1	12
30	Length, 1910.....miles	42	1	29	.....	5	3	.....	.....	4	.....
	Reservoirs:										
31	Number, 1920	36	.....	13	.....	2	1	3	7	.....	10
32	Number, 1910	42	.....	31	.....	4	3	.....	.....	1	3
33	Capacity, 1920.....acre-feet	391	.....	237	.....	41	.....	101	9	.....	3
34	Capacity, 1910.....acre-feet	31,024	.....	31,019	.....	1	2	.....	.....	1	1
	Flowing wells:										
35	Number, 1920	6	.....	.....	.....	.....	.....	.....	.....	.....	6
36	Number, 1910	3	.....	.....	.....	.....	.....	.....	.....	1	2
37	Capacity, 1920.....gallons per minute	500	.....	.....	.....	.....	.....	.....	.....	.....	500
38	Capacity, 1910.....gallons per minute	30	.....	.....	.....	.....	.....	.....	.....	10	20
	Pumped wells:										
39	Number, 1920	710	.....	368	.....	11	165	7	54	24	81
40	Number, 1910	939	.....	252	3	7	75	.....	1	.....	601
41	Capacity, 1920.....gallons per minute	266,797	.....	102,611	.....	8,500	98,515	4,590	32,050	450	20,081
42	Capacity, 1910.....gallons per minute	73,362	.....	30,613	1,600	4,384	33,325	.....	3,000	.....	440
	Pumping plants:										
43	Number, 1920	198	.....	81	.....	6	30	17	13	3	48
44	Number, 1910	698	.....	61	2	9	19	.....	1	.....	606
45	Engine capacity, 1920.....horsepower	6,946	.....	1,493	.....	126	2,085	397	1,930	75	840
46	Engine capacity, 1910.....horsepower	1,517	.....	992	30	66	225	.....	35	.....	169
47	Pump capacity, 1920.....gallons per minute	297,975	.....	107,311	.....	9,200	97,615	21,390	32,350	3,300	26,809
48	Pump capacity, 1910.....gallons per minute	128,276	.....	80,113	1,600	6,384	33,725	.....	3,000	.....	3,454
49	Average lift, 1920.....feet	30	.....	26	.....	20	32	27	67	40	26
	CAPITAL INVESTED.										
50	Capital invested to Jan. 1, 1920.....dollars	2,067,381	11,816	237,064	1,000,040	38,065	296,700	32,450	299,500	19,503	132,243
51	Capital invested to July 1, 1910.....dollars	1,365,563	6,384	1,089,048	5,500	25,908	218,694	.....	6,000	1,805	12,224
52	Per cent of increase, 1910–1920	51.4	85.1	—78.2	.....	46.9	35.7	.....	.....	980.5	981.8
53	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	30.47	5.68	12.71	1,000.04	6.07	10.10	13.72	59.37	19.16	64.32
54	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	9.75	2.11	11.31	91.67	2.44	7.69	.....	25.00	3.87	14.12
	ESTIMATED FINAL COST.										
55	Estimated final cost of existing enterprises in 1920.dollars	2,195,981	11,816	237,064	1,005,040	38,065	296,700	35,750	416,000	19,503	136,043
56	Estimated final cost of existing enterprises in 1910.dollars	1,365,563	6,384	1,089,048	5,900	25,908	218,694	.....	6,000	3,357	10,272
57	Per cent of increase, 1910–1920	60.8	85.1	—78.2	.....	46.9	35.7	.....	.....	481.0	.....
58	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	21.41	5.68	12.34	1,005.04	6.07	7.83	13.59	13.79	19.16	59.17
59	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	8.47	1.42	9.96	53.64	1.55	7.65	.....	12.50	5.41	11.70

1 Less than one-tenth of 1 per cent.

LOUISIANA.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Louisiana collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

Rice is the only crop grown under irrigation in Louisiana, and small areas of rice are grown without irrigation, although in general the crop is irrigated. For the state the acreage of rice harvested in 1919 was 456,726 acres, the quantity produced was 16,005,936 bushels, and the value $42,735,849.

TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

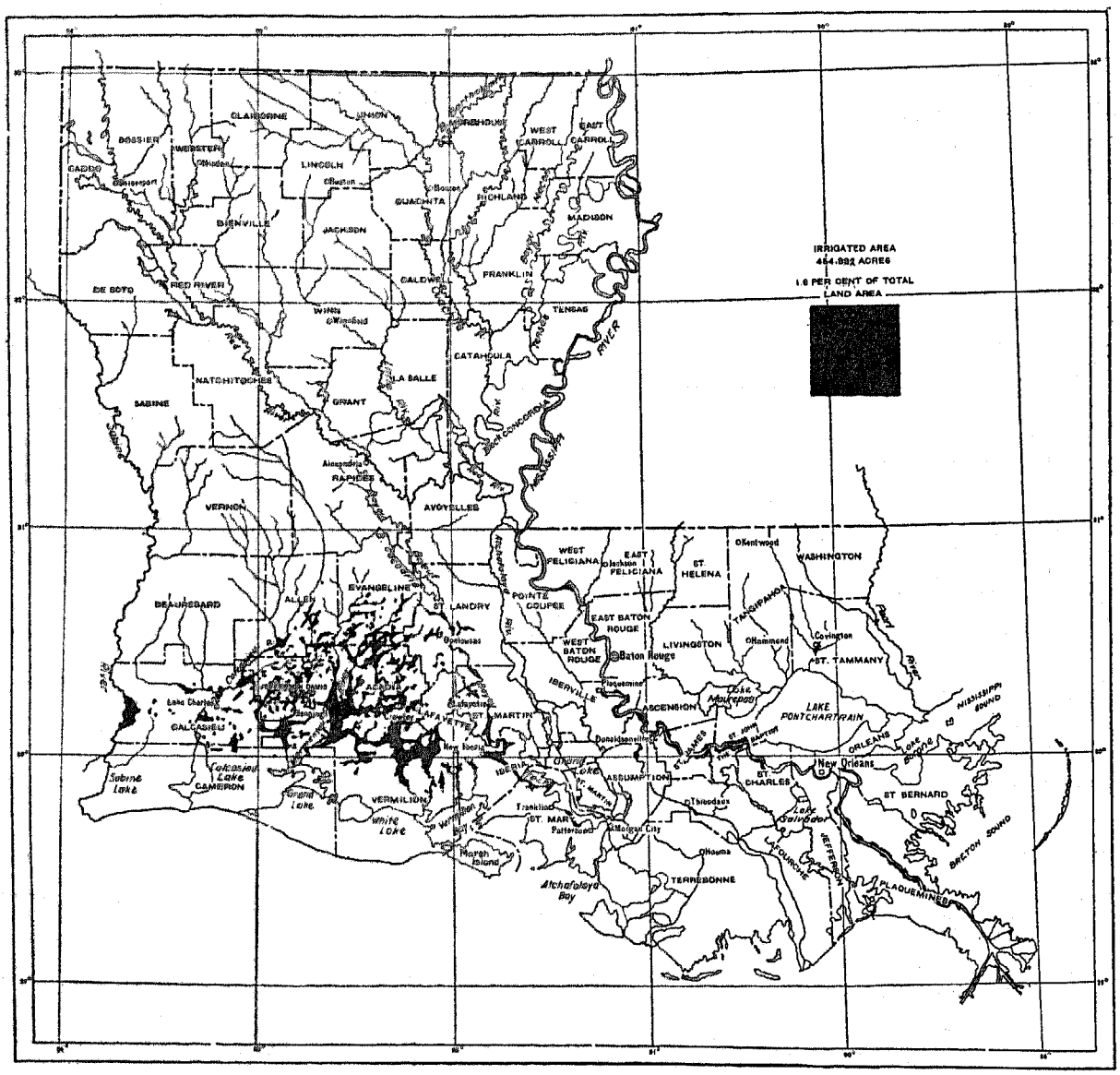
ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	135,463	120,546	14,917	12.4
Approximate land area of the state—acres	29,061,760	29,061,760		
All land in farms—acres	10,019,822	10,439,481	−419,659	−4.0
Improved land in farms—acres	5,626,226	5,276,016	350,210	6.6
Number of farms irrigated	6,471	2,690	3,781	140.6
Area irrigated—acres	454,882	380,200	74,682	19.6
Area enterprises were capable of irrigating—acres	728,742	553,220	175,522	31.7
Area included in enterprises—acres	851,211	581,965	269,246	46.3
Per cent irrigated:				
Number of all farms	4.8	2.2	2.6	
Approximate land area of the state	1.6	1.3	0.3	
Land in farms	4.5	3.6	0.9	
Improved land in farms	8.1	7.2	0.9	
Excess of area enterprises were capable of irrigating over area irrigated—acres	273,860	173,020	100,840	58.3
Excess of area included in enterprises over area irrigated—acres	396,329	201,765	194,564	96.4
Capital invested	$14,063,181	$6,859,166	$7,204,015	105.0
Average per acre enterprises were capable of irrigating	$19.30	$12.40	$6.90	55.6
Estimated final cost of existing enterprises	$14,264,178	$6,914,166	$7,350,012	106.3
Average per acre included in enterprises	$16.76	$11.88	$4.88	41.1
Average cost of operation and maintenance per acre	$7.01	(2)		
IRRIGATION WORKS.				
Number of enterprises	1,373	1,237	136	11.0
Number of main ditches	1,298	515	783	152.0
Length of main ditches—miles	1,584	729	855	117.3
Capacity of main ditches—second-feet	11,889	(2)	11,889	
Number of lateral ditches	3,908	180	3,728	
Length of lateral ditches—miles	1,659	439	1,220	277.9
Number of reservoirs	74	104	−30	−28.8
Capacity of reservoirs—acre-feet	7,632	19,482	−11,850	−60.8
Number of flowing wells	9	(2)	9	
Capacity of flowing wells—gallons per minute	6,255	(2)	6,255	
Number of pumped wells	812	606	206	34.0
Capacity of pumped wells—gallons per minute	1,607,637	1,108,236	499,401	45.1
Number of pumping plants	1,250	1,007	243	24.1
Engine capacity—horsepower	85,628	57,426	28,202	49.1
Pump capacity—gallons per minute	4,968,686	5,064,173	−95,487	1.9
Average lift—feet	32	(2)	32	

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.

[2] Not reported in 1910.

LOUISIANA

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

In Louisiana the normal rainfall is sufficient for the growing of general farm crops, the average annual rainfall for the state being about 54 inches. The rainfall in 1919 was far above the normal, the average for the state being about 69 inches.

Rice is the only crop irrigated, and some rice is grown without irrigation, although the area of rice grown in this way is small.

WATER SUPPLY FOR IRRIGATION.

The larger part of the land irrigated for rice growing in Louisiana consists of level prairie land located in the southwestern part of the state, near the coast of the Gulf of Mexico. In this section the principal sources of water supply are the streams flowing to the Gulf and wells, from both of which the water is pumped. The streams are but little, if any, above the level of the Gulf, and water is pumped to the level lands lying between the streams. Usually the supply of fresh water is sufficient for the land irrigated, but at times the draft upon the streams is so heavy as to exhaust the supply of fresh water and salt water backs into the streams from the Gulf. At such times it is necessary to stop pumping until the fresh water coming from higher levels forces the salt water out of the streams, and occasionally crops suffer from shortage of water or from the use of salt water. Usually the pumping plants and canals are operated by commercial companies furnishing water to farmers for some form of crop rental.

About one-third of the area of irrigated land in the state is supplied with water pumped from wells. Usually these are owned by individual farmers, who supply water to their own farms only.

A small part of the rice is grown on lands along Mississippi River, which lie below the level of the water in the river at ordinary stages. Water for these lands is taken from the river by siphons passing over the levees. When the water is too low to siphon over the levees, it is pumped from the river to small basins made on the water side of the levees, high enough to permit of its being siphoned over.

The area of land available for rice growing and the water supply are ample to permit of a large extension of the area devoted to this crop. Other conditions limit the area.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.[1]	Per cent of all farms.	Acres.	Per cent of increase.	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	6,471	140.6	4.8	454,882	19.6	1.6	4.5	8.1
1910	2,690	−40.6	2.2	380,200	88.5	1.3	3.6	7.2
1900	4,531	.....	3.9	201,685	139.0	0.7	1.8	4.3
1890	(2)	.....	.....	84,377	.....	0.3	0.9	2.2

[1] A minus sign (−) denotes decrease. [2] Not reported.

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	1,373	851,211	454,882	53.4	728,742
1870–1879	1	160	40	25.0	160
1880–1889	6	4,018	2,050	51.0	2,260
1890–1899	37	320,400	151,983	47.4	294,465
1900–1904	112	92,361	50,263	54.4	75,862
1905–1909	137	68,605	34,631	50.5	47,224
1910–1914	294	108,290	59,919	55.3	92,539
1915–1919	638	212,410	126,831	59.7	177,238
Not reported	148	44,967	20,165	64.9	38,994

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	454,882	380,200	74,682	19.6	728,742	851,211
Streams, gravity	10,226	1,012	9,214	910.5	12,393	15,225
Streams, pumped	248,306	211,959	36,347	17.1	437,475	483,611
Streams, pumped and gravity	12,620	.....	12,620	.....	27,675	30,800
Wells, pumped	154,304	109,547	44,757	40.9	209,698	258,680
Wells, flowing	196	.....	196	.....	292	292
Wells, flowing and pumped	1,075	(2)	1,075	.....	1,325	2,175
Lakes, gravity	3,225	1,347	1,878	139.4	4,616	5,095
Lakes, pumped	6,966	5,202	1,764	33.9	10,140	11,100
Stored storm water	84	7,054	−6,970	−98.8	229	229
Streams, gravity, and pumped wells	10,045	(2)	10,045	.....	12,994	25,984
Other mixed	7,835	44,079	−36,244	−82.2	11,905	13,020

[1] A minus sign (−) denotes decrease. [2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

Neither the Federal Carey Act (act of Aug. 18, 1894) nor the reclamation act (act of June 17, 1902) applies to the state of Louisiana, and the state has no laws relating to organization for supplying water for irrigation.

The commercial enterprises, reported in Table 5, are usually corporations that put in pumping plants and canals to supply water to farmers for crop rentals. Many of them own lands also and supply both land and water for a share of the crop.

The cooperative enterprises are unimportant, since they supply water to less than 3 per cent of the land.

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.	
	1920	1910	Amount.	Per cent.
ACREAGE IRRIGATED.				
Total	454,882	380,200	74,682	19.6
Individual and partnership	259,673	222,049	37,624	16.9
Cooperative	10,635	.....	10,635	.....
Commercial	184,574	158,151	26,423	16.7
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	728,742	553,220	175,522	31.7
Individual and partnership	375,917	267,620	108,297	40.5
Cooperative	20,325	.....	20,325	.....
Commercial	332,500	285,600	46,900	16.4
ACREAGE INCLUDED IN ENTERPRISES.				
Total	851,211	581,965	269,246	46.3
Individual and partnership	468,126	283,965	184,161	64.9
Cooperative	20,685	.....	20,685	.....
Commercial	362,400	298,000	64,400	21.6

ACREAGE, BY DRAINAGE BASIN.

For no previous census have the results for Louisiana been tabulated by drainage basins; consequently no comparative figures can be included in Table 6.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919.

DRAINAGE BASIN.	Area irrigated in 1919 (acres).	Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
Total	454,882	851,211	728,742
Sabine River and tributaries	13,035	20,850	20,850
Calcasieu Lake, River, and tributaries	54,318	169,193	137,178
Mermentau River and tributaries	268,840	458,463	382,755
Vermilion River and tributaries	74,034	138,056	126,649
Atchafalaya River and tributaries	23,342	31,920	30,885
Mississippi River direct	17,416	24,070	23,755
Tributaries of Mississippi River	2,853	5,358	3,473
Other Gulf streams	1,044	3,291	3,197

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 7.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1900 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.[1]
1920	$14,063,181	105.0	$19.30	55.6
1910	6,859,166	171.2	12.40	—1.1
1900	2,529,319	.....	12.54	.....

[1] A minus sign (—) denotes decrease.

TABLE 8.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$14,063,181	100.0	$19.30
1870–1879	1,000	(1)	6.25
1880–1889	24,800	0.2	10.97
1890–1899	5,487,222	39.0	18.63
1900–1904	1,347,322	9.6	17.76
1905–1909	1,171,166	8.3	24.80
1910–1914	1,502,682	10.7	16.24
1915–1919	3,848,822	27.4	21.72
Not reported	680,167	4.8	17.44

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

TABLE 9.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$14,063,181	100.0	$19.30	431,413	$7.01
Streams, gravity	318,934	2.3	25.74	9,937	3.69
Streams, pumped	7,338,954	52.2	16.78	242,282	7.76
Streams, pumped and gravity	172,000	1.2	6.21	12,550	6.06
Wells, pumped	5,366,948	38.2	25.59	140,659	5.95
Wells, flowing	5,000	(2)	17.12	189	2.25
Wells, flowing and pumped	22,500	0.2	16.98	1,075	4.19
Lakes, pumped	356,960	2.5	35.20	6,716	9.17
Lakes, gravity	112,740	0.8	24.42	2,480	3.21
Stored storm water	1,500	(2)	6.55	10	5.00
Streams, gravity, and pumped wells	247,595	1.8	19.05	9,115	10.69
Other mixed	120,050	0.9	10.08	6,400	3.67

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

TABLE 10.—CAPITAL INVESTED, 1920, CLASSIFIED BY DRAINAGE BASIN.

DRAINAGE BASIN.	1920
Total	$14,063,181
Sabine River and tributaries	328,000
Calcasieu Lake, River, and tributaries	1,816,380
Mermentau River and tributaries	7,713,797
Vermilion River and tributaries	3,355,327
Atchafalaya River and tributaries	407,956
Mississippi River direct	302,385
Tributaries of Mississippi River	28,686
Other Gulf streams	110,650

TABLE 11.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$14,063,181	100.0	431,413	$7.01
Individual and partnership	7,943,252	56.5	236,504	6.84
Cooperative	161,658	1.1	10,635	4.81
Commercial	5,958,271	42.4	184,274	7.35

[1] Based on area irrigated in 1919.

DRAINAGE OF IRRIGATED LAND.

TABLE 12.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	406
Acreage included in enterprises reporting land drained or needing drainage	283,470
Acreage for which drains have been installed	167,138
Additional acreage needing drainage	21,202
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	59.0
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	19.6
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	22.1

The acreages reported in Table 12 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 13. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 13.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume of water entering canals.....second-feet..	5,042	34	5,008
Area irrigated in 1919.....acres..	20,782	780	20,002
Average number of acres per second-foot..	4	23	4
Total quantity of water entering canals.....acre-feet..	198,942	7,022	191,920
Area irrigated in 1919.....acres..	65,424	780	64,644
Average quantity per acre.....acre-feet..	3.0	9.0	3.0
Total quantity of water delivered.....acre-feet..	16,497	.....	16,497
Area irrigated in 1919.....acres..	7,994	.....	7,944
Average quantity per acre.....acre-feet..	2.1	.....	2.1

IRRIGATION WORKS.

TABLE 14.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	419	63	1,298	11,889	1,584	3,908	1,659	74	7,632
1870-1879	.....	1	.....	.....	.....	.....	.....	1	400
1880-1889	.....	.....	7	33	9	1	1	1	60
1890-1899	11	3	37	3,008	411	1,493	1,011	1	6
1900-1904	68	2	100	1,515	166	336	113	3	85
1905-1909	57	2	146	675	131	363	92	4	30
1910-1914	77	14	283	2,633	248	495	124	17	2,275
1915-1919	198	38	648	3,767	535	1,145	290	38	4,776
Not reported	8	3	77	258	84	75	28	9	.....

DATE OF BEGINNING.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps. Number.	Pumps. Capacity (gallons per minute).
Total	50.1	9	6,255	812	1,607,637	1,250	85,628	1,941	4,968,686
1870-1879	.....	.....	.....	.....	.....	.....	.....	.....	.....
1880-1889	.....	.....	.....	1	7,000	5	280	5	21,000
1890-1899	0.2	.....	.....	9	96,200	37	18,390	85	2,124,715
1900-1904	2.9	.....	.....	64	132,850	90	6,755	146	477,200
1905-1909	1.0	.....	.....	117	199,100	128	7,985	193	352,250
1910-1914	0.9	2	2,500	179	338,550	268	17,052	494	605,808
1915-1919	44.9	5	3,330	339	688,320	576	29,135	790	1,178,993
Not reported	0.2	2	425	103	145,617	146	6,031	228	208,720

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	419	63	1,298	11,889	1,584	3,908	1,659	74	7,632
Individual and partnership	419	62	1,264	8,773	1,110	2,383	522	74	7,632
Cooperative			6	35	19	35	33		
Commercial		1	28	3,081	455	1,490	1,104		

CLASS.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	50.1	9	6,255	812	1,607,637	1,250	85,628	1,941	4,908,686
Individual and partnership	50.1	9	6,255	805	1,588,837	1,212	62,658	1,855	2,611,886
Cooperative				2	7,500	10	1,205	12	106,500
Commercial				5	11,300	28	21,765	74	2,250,300

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	419	63	1,298	11,889	1,584	3,908	1,659	74	7,632
Sabine River and tributaries		2	1	111	40	25	25	1	
Calcasieu Lake, River, and tributaries	4	4	84	1,700	159	92	168	3	490
Marmentau River and tributaries	14	47	771	6,067	863	1,032	568	61	5,058
Vermilion River and tributaries			68	1,099	202	1,071	667	1	
Atchafalaya River and tributaries	17	1	91	728	109	62	42	1	2,041
Mississippi River direct	340		241	869	174	1,553	182	6	43
Tributaries of Mississippi River	39		37	707	29	53	2		
Other Gulf streams	5	9	5	8	8	15	5	1	

DRAINAGE BASIN.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.				
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.		Average lift (feet).
								Number.	Capacity (gallons per minute).	
Total	50.1	9	6,255	812	1,607,637	1,250	85,628	1,941	4,908,686	32
Sabine River and tributaries				2	27,500	3	1,050	6	54,500	41
Calcasieu Lake, River, and tributaries	0.4	5	5,800	92	243,400	128	13,933	161	937,294	30
Marmentau River and tributaries	0.1			594	1,209,750	800	56,300	1,293	2,927,213	35
Vermilion River and tributaries		2	425	82	67,007	136	7,052	222	694,044	29
Atchafalaya River and tributaries	42.2	1		42	59,980	105	4,070	171	230,675	13
Mississippi River direct	6.2					67	2,846	74	102,500	12
Tributaries of Mississippi River	0.8					5	285	5	22,300	15
Other Gulf streams	0.4	1	30			6	92	9	160	8

PARISH TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100.]

		THE STATE.	Acadia.	Allen.[1]	Ascension.	Assumption.	Calcasieu.[2]	Cameron.
1	Number of all farms in 1920	135,463	3,088	753	1,630	438	922	620
2	Number of farms reporting irrigation for rice growing in 1919	6,471	1,678	165	74	13	377	192
3	Per cent of all farms	4.8	54.3	21.9	4.5	3.0	40.9	31.0
4	Number of farms reporting irrigation for rice growing in 1909	2,690	1,002	.....	16	.....	815	21
5	Per cent of increase, 1909–1919	140.6	67.5	.....	.....	.....	.....	.....
	LAND AND FARM AREA.							
6	Approximate land area—acres	29,061,760	414,080	424,320	186,240	309,760	695,040	960,640
7	All land in farms—acres	10,019,822	322,061	94,659	108,982	79,282	145,591	132,513
8	Improved land in farms—acres	5,626,226	278,939	42,328	72,530	53,856	104,197	33,264
9	Area irrigated for rice growing in 1919—acres	454,882	134,710	15,805	2,080	1,130	47,056	725
10	Per cent of improved land in farms	8.1	48.3	37.3	2.9	2.1	45.2	2.2
11	Area irrigated for rice growing in 1909—acres	380,200	107,466	.....	4,233	.....	131,208	7,226
12	Per cent of increase, 1909–1919	19.6	25.4	.....	—50.9	.....	.....	—90.0
13	Area enterprises were capable of irrigating in 1920—acres	728,742	186,218	28,590	2,635	1,530	121,612	4,230
14	Area enterprises were capable of irrigating in 1910—acres	553,220	167,869	.....	4,233	.....	191,752	11,180
15	Per cent of increase, 1910–1920	31.7	10.9	.....	—37.8	.....	.....	—62.2
16	Area included in enterprises in 1920—acres	851,211	208,799	30,705	2,635	1,530	147,115	4,310
17	Area included in enterprises in 1910—acres	581,965	171,917	.....	4,233	.....	208,404	12,280
18	Per cent of increase, 1910–1920	46.3	21.5	.....	—37.8	.....	.....	—64.9
	IRRIGATION WORKS.							
	Independent enterprises:							
19	Number, 1920	1,373	328	32	6	2	56	5
20	Number, 1910	1,237	272	.....	7	.....	358	8
	Main ditches:							
21	Number, 1920	1,298	340	37	8	1	33	5
22	Number, 1910	515	110	.....	4	.....	101	4
23	Length, 1920—miles	1,584	428	36	7	1	160	5
24	Length, 1910—miles	729	220	.....	3	.....	243	14
25	Capacity, 1920—second-feet	11,889	1,934	36	16	4	1,580	8
26	Capacity, 1910—second-feet	(3)	.....	.....	.....	.....	.....	.....
	Laterals:							
27	Number, 1920	3,908	604	19	1	.....	77	12
28	Number, 1910	180	82	.....	.....	.....	81	3
29	Length, 1920—miles	1,659	390	41	1	.....	145	5
30	Length, 1910—miles	439	187	.....	.....	.....	194	4
	Reservoirs:							
31	Number, 1920	74	11	.....	.....	.....	3	.....
32	Number, 1910	104	.....	.....	1	.....	9	1
33	Capacity, 1920—acre-feet	7,632	2,170	.....	.....	.....	460	.....
34	Capacity, 1910—acre-feet	19,482	.....	.....	2	.....	4,571	1,800
	Flowing wells:							
35	Number, 1920	9	.....	.....	.....	.....	5	.....
36	Number, 1910	(3)	.....	.....	.....	.....	.....	.....
37	Capacity, 1920—gallons per minute	6,255	.....	.....	.....	.....	5,800	.....
38	Capacity, 1910—gallons per minute	(3)	.....	.....	.....	.....	.....	.....
	Pumped wells:							
39	Number, 1920	312	280	32	.....	.....	28	1
40	Number, 1910	606	180	.....	.....	.....	323	5
41	Capacity, 1920—gallons per minute	1,607,637	426,300	89,700	.....	.....	106,800	2,600
42	Capacity, 1910—gallons per minute	1,108,236	313,727	.....	.....	.....	585,470	12,000
	Pumping plants:							
43	Number, 1920	1,250	347	45	7	2	57	5
44	Number, 1910	1,007	283	.....	7	.....	362	8
45	Engine capacity, 1920—horsepower	85,628	27,279	5,580	375	155	7,947	187
46	Engine capacity, 1910—horsepower	57,426	16,907	.....	473	.....	22,014	643
47	Pump capacity, 1920—gallons per minute	4,968,686	1,509,335	161,100	9,500	11,000	745,200	93,094
48	Pump capacity, 1910—gallons per minute	5,064,173	1,465,612	.....	31,213	.....	2,040,052	144,190
49	Average lift, 1920—feet	32	37	36	15	22	21	17
	CAPITAL INVESTED.							
50	Capital invested to Jan. 1, 1920—dollars	14,063,181	3,732,648	309,450	44,100	12,500	1,607,236	59,570
51	Capital invested to July 1, 1910—dollars	6,859,166	2,098,121	.....	21,025	.....	2,904,063	129,320
52	Per cent of increase, 1910–1920	105.0	77.9	.....	109.8	.....	.....	—53.9
53	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	19.30	20.04	10.82	16.74	8.17	13.71	14.08
54	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	12.40	12.50	.....	4.97	.....	15.14	11.57
	ESTIMATED FINAL COST.							
55	Estimated final cost of existing enterprises in 1920—dollars	14,264,178	3,795,013	310,950	44,100	12,500	1,669,936	59,570
56	Estimated final cost of existing enterprises in 1910—dollars	6,914,166	2,098,121	.....	21,025	.....	2,959,063	129,320
57	Per cent of increase, 1910–1920	106.3	80.9	.....	109.8	.....	.....	—53.9
58	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	16.76	18.13	10.13	16.74	8.17	11.35	13.82
59	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	11.88	12.20	.....	4.97	.....	14.20	10.53

[1] Formed from part of Calcasieu Parish in 1913.
[2] Parts taken to form *Allen, Beauregard, and Jefferson Davis Parishes* in 1913.
[3] Not reported in 1910.

PARISH TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100.]

		Evangeline.[1]	Iberia.	Iberville.	Jefferson Davis.[2]	Lafayette.	Plaquemines.	Pointe Coupee.	St. Charles.
1	Number of all farms in 1920	3,550	1,481	669	1,163	3,048	571	3,303	258
2	Number of farms reporting irrigation for rice growing in 1919	601	197	35	776	104	159	2	34
3	Per cent of all farms	16.9	13.3	5.2	66.7	3.4	27.8	0.1	13.2
4	Number of farms reporting irrigation for rice growing in 1909	.....	29	13	.....	23	150	10	39
5	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	6.0	.....	.....
	LAND AND FARM AREA.								
6	Approximate land area.....acres	616,960	376,960	373,760	466,560	178,560	644,480	368,640	188,800
7	All land in farms.....acres	179,229	110,646	113,802	264,063	141,154	69,348	194,964	49,908
8	Improved land in farms.....acres	140,959	95,037	72,434	231,970	128,526	22,419	120,536	24,740
9	Area irrigated for rice growing in 1919.....acres	12,058	11,801	2,275	99,534	4,485	4,813	500	1,086
10	Per cent of improved land in farms	8.6	12.4	3.1	42.9	3.5	21.5	0.4	4.4
11	Area irrigated for rice growing in 1909.....acres	.....	3,865	7,922	.....	2,212	6,375	3,205	4,878
12	Per cent of increase, 1909–1919	.....	205.3	—71.3	.....	102.8	—24.5	—84.4	—77.7
13	Area enterprises were capable of irrigating in 1920.....acres	17,502	11,505	2,475	139,730	5,625	7,338	1,200	1,500
14	Area enterprises were capable of irrigating in 1910.....acres	.....	4,090	7,845	.....	2,562	10,481	3,830	5,586
15	Per cent of increase, 1910–1920	.....	181.3	—68.5	.....	119.6	—30.0	—68.7	—73.1
16	Area included in enterprises in 1920.....acres	18,812	12,035	2,540	191,889	5,725	9,473	1,200	1,500
17	Area included in enterprises in 1910.....acres	.....	4,090	7,845	.....	3,402	12,516	3,830	5,706
18	Per cent of increase, 1910–1920	.....	194.3	—67.6	.....	68.3	—24.3	—68.7	—73.7
	IRRIGATION WORKS.								
	Independent enterprises:								
19	Number, 1920	83	43	7	269	14	157	1	6
20	Number, 1910	.....	16	20	.....	15	109	7	25
	Main ditches:								
21	Number, 1920	59	37	1	231	19	231	.....	1
22	Number, 1910	.....	13	14	.....	3	84	4	19
23	Length, 1920.....miles	35	42	.....	303	12	150	.....	.....
24	Length, 1910.....miles	.....	5	5	.....	4	23	3	9
25	Capacity, 1920.....second-feet	127	381	9	1,850	53	726	.....	12
26	Capacity, 1910.....second-feet	.....	.....	.....	.....	.....	.....	.....	.....
	Laterals:								
27	Number, 1920	70	35	.....	184	32	1,551	.....	.....
28	Number, 1910	.....	.....	.....	.....	.....	.....	.....	.....
29	Length, 1920.....miles	21	25	.....	110	12	159	.....	.....
30	Length, 1910.....miles	.....	.....	.....	.....	.....	.....	.....	.....
	Reservoirs:								
31	Number, 1920	10	1	2	4	.....	.....	.....	.....
32	Number, 1910	.....	.....	2	.....	.....	.....	5	.....
33	Capacity, 1920.....acre-feet	255	2,041	43	55	.....	.....	.....	.....
34	Capacity, 1910.....acre-feet	.....	.....	2	.....	.....	.....	30	.....
	Flowing wells:								
35	Number, 1920	.....	1	.....	.....	.....	.....	.....	.....
36	Number, 1910	.....	.....	.....	.....	.....	.....	.....	.....
37	Capacity, 1920.....gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1910.....gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:								
39	Number, 1920	26	35	.....	259	15	.....	.....	.....
40	Number, 1910	.....	.....	.....	.....	15	.....	.....	.....
41	Capacity, 1920.....gallons per minute	59,150	40,580	.....	631,700	28,900	.....	.....	.....
42	Capacity, 1910.....gallons per minute	.....	.....	.....	.....	29,074	.....	.....	.....
	Pumping plants:								
43	Number, 1920	57	46	9	282	14	14	2	6
44	Number, 1910	.....	16	22	.....	15	5	8	20
45	Engine capacity, 1920.....horsepower	2,451	1,826	435	21,565	880	169	225	230
46	Engine capacity, 1910.....horsepower	.....	775	1,190	.....	547	102	394	714
47	Pump capacity, 1920.....gallons per minute	71,070	99,275	25,900	1,093,050	28,900	3,300	21,000	5,500
48	Pump capacity, 1910.....gallons per minute	.....	41,982	71,585	.....	29,074	6,135	34,450	56,562
49	Average lift, 1920.....feet	34	19	13	38	36	5	25	10
	CAPITAL INVESTED.								
50	Capital invested to Jan. 1, 1920.....dollars	487,977	201,626	25,200	2,868,348	144,000	66,628	12,960	16,400
51	Capital invested to July 1, 1910.....dollars	.....	29,971	53,638	.....	39,112	26,891	15,483	23,872
52	Per cent of increase, 1910–1920	.....	572.7	—53.0	.....	268.2	147.8	—16.3	—31.3
53	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	27.88	17.53	10.18	20.53	25.60	9.08	10.80	10.93
54	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	.....	7.33	6.84	.....	15.27	2.57	4.04	4.27
	ESTIMATED FINAL COST.								
55	Estimated final cost of existing enterprises in 1920.....dollars	521,652	201,626	25,200	2,902,520	144,000	66,763	12,960	16,400
56	Estimated final cost of existing enterprises in 1910.....dollars	.....	29,971	53,638	.....	39,112	26,891	15,483	23,872
57	Per cent of increase, 1910–1920	.....	572.7	—53.0	.....	268.2	148.3	—16.3	—31.3
58	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	27.73	16.75	9.92	15.13	25.15	7.05	10.80	10.93
59	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	.....	7.33	6.84	.....	11.50	2.15	4.04	4.18

[1] Formed from part of St. Landry Parish in 1911.

[2] Formed from part of Calcasieu Parish in 1913.

PARISH TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		St. James.	St. John the Baptist.	St. Landry.[1]	St. Martin.	St. Mary.	Vermilion.	All other parishes.
1	Number of all farms in 1920	289	227	6,575	2,006	410	2,958	101,504
2	Number of farms reporting irrigation for rice growing in 1919	86	52	198	203	28	1,461	36
3	Per cent of all farms	29.8	22.9	3.0	10.1	6.8	49.4	(2)
4	Number of farms reporting irrigation for rice growing in 1909	59	42	119	.....	.....	272	80
5	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	437.1	.....
	LAND AND FARM AREA.							
6	Approximate land area—acres	162,560	147,840	435,840	336,000	404,480	776,320	20,593,920
7	All land in farms—acres	54,324	31,610	302,175	103,673	122,944	258,103	7,140,791
8	Improved land in farms—acres	39,747	21,813	228,315	81,370	70,774	201,001	3,561,471
9	Area irrigated for rice growing in 1919—acres	5,221	3,214	10,258	6,267	3,040	87,830	994
10	Per cent of improved land in farms	13.1	14.7	4.5	7.7	4.3	43.7	(2)
11	Area irrigated for rice growing in 1909—acres	8,140	6,124	9,387	520	525	52,196	24,718
12	Per cent of increase, 1909–1919	—35.9	—47.5	.....	.....	479.0	68.3	—96.0
13	Area enterprises were capable of irrigating in 1920—acres	6,103	4,497	21,022	10,475	4,340	147,468	3,147
14	Area enterprises were capable of irrigating in 1910—acres	8,215	6,292	12,756	520	725	79,866	35,418
15	Per cent of increase, 1910–1920	—25.7	—28.5	.....	.....	498.6	84.6	—91.1
16	Area included in enterprises in 1920—acres	6,103	4,497	23,611	10,575	4,340	160,576	3,241
17	Area included in enterprises in 1910—acres	8,215	6,292	12,916	520	725	81,581	37,493
18	Per cent of increase, 1910–1920	—25.7	—28.5	.....	.....	498.6	96.8	—91.4
	IRRIGATION WORKS.							
	Independent enterprises:							
19	Number, 1920	21	11	116	32	13	165	6
20	Number, 1910	36	24	157	.....	.....	93	90
	Main ditches:							
21	Number, 1920	28	9	122	29	13	85	4
22	Number, 1910	28	21	28	.....	2	38	42
23	Length, 1920—miles	35	9	70	46	11	225	9
24	Length, 1910—miles	24	16	11	.....	1	95	53
25	Capacity, 1920—second-feet	101	701	2,309	232	28	1,767	15
26	Capacity, 1910—second-feet	.....	.....	.....	.....	.....	.....	.....
	Laterals:							
27	Number, 1920	71	3	123	12	5	1,109	.....
28	Number, 1910	.....	.....	.....	.....	.....	14	.....
29	Length, 1920—miles	25	4	22	2	5	692	.....
30	Length, 1910—miles	.....	.....	.....	.....	.....	54	.....
	Reservoirs:							
31	Number, 1920	.....	4	38	.....	.....	.....	1
32	Number, 1910	4	3	69	.....	.....	.....	10
33	Capacity, 1920—acre-feet	.....	.....	2,608	.....	.....	.....	.....
34	Capacity, 1910—acre-feet	3	12	12,736	.....	.....	.....	326
	Flowing wells:							
35	Number, 1920	.....	.....	.....	.....	.....	2	1
36	Number, 1910	.....	.....	.....	.....	.....	.....	.....
37	Capacity, 1920—gallons per minute	.....	.....	.....	.....	.....	425	30
38	Capacity, 1910—gallons per minute	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:							
39	Number, 1920	.....	.....	28	4	.....	104	.....
40	Number, 1910	.....	.....	10	1	.....	65	7
41	Capacity, 1920—gallons per minute	.....	.....	51,600	15,000	.....	155,307	.....
42	Capacity, 1910—gallons per minute	.....	.....	17,900	330	.....	130,910	18,825
	Pumping plants:							
43	Number, 1920	21	11	87	32	15	185	6
44	Number, 1910	28	20	40	3	2	92	76
45	Engine capacity, 1920—horsepower	990	572	4,320	1,236	470	8,664	72
46	Engine capacity, 1910—horsepower	958	742	1,003	74	95	5,506	5,289
47	Pump capacity, 1920—gallons per minute	44,800	800	124,200	96,100	12,900	809,502	3,160
48	Pump capacity, 1910—gallons per minute	57,301	66,135	76,230	5,720	5,250	528,719	403,963
49	Average lift, 1920—feet	13	14	56	20	15	19	9
	CAPITAL INVESTED.							
50	Capital invested to Jan. 1, 1920—dollars	52,132	68,850	530,222	119,310	55,650	3,477,876	110,498
51	Capital invested to July 1, 1910—dollars	40,895	37,686	73,065	6,198	2,250	1,075,561	282,015
52	Per cent of increase, 1910–1920	27.5	82.7	.....	.....	.....	223.4	—60.8
53	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	8.54	15.31	25.22	11.39	12.82	23.58	35.11
54	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	4.98	5.99	5.73	11.92	3.10	13.47	7.96
	ESTIMATED FINAL COST.							
55	Estimated final cost of existing enterprises in 1920—dollars	52,132	68,850	548,022	120,810	55,650	3,479,026	156,498
56	Estimated final cost of existing enterprises in 1910—dollars	40,895	37,686	73,065	6,198	2,250	1,075,561	282,015
57	Per cent of increase, 1910–1920	27.5	82.7	.....	.....	.....	223.5	—44.5
58	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	8.54	15.31	23.21	11.42	12.82	21.67	48.29
59	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	4.98	5.99	5.66	11.92	3.10	13.18	7.52

[1] Part taken to form Evangeline Parish in 1911.

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

MONTANA.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Montana collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

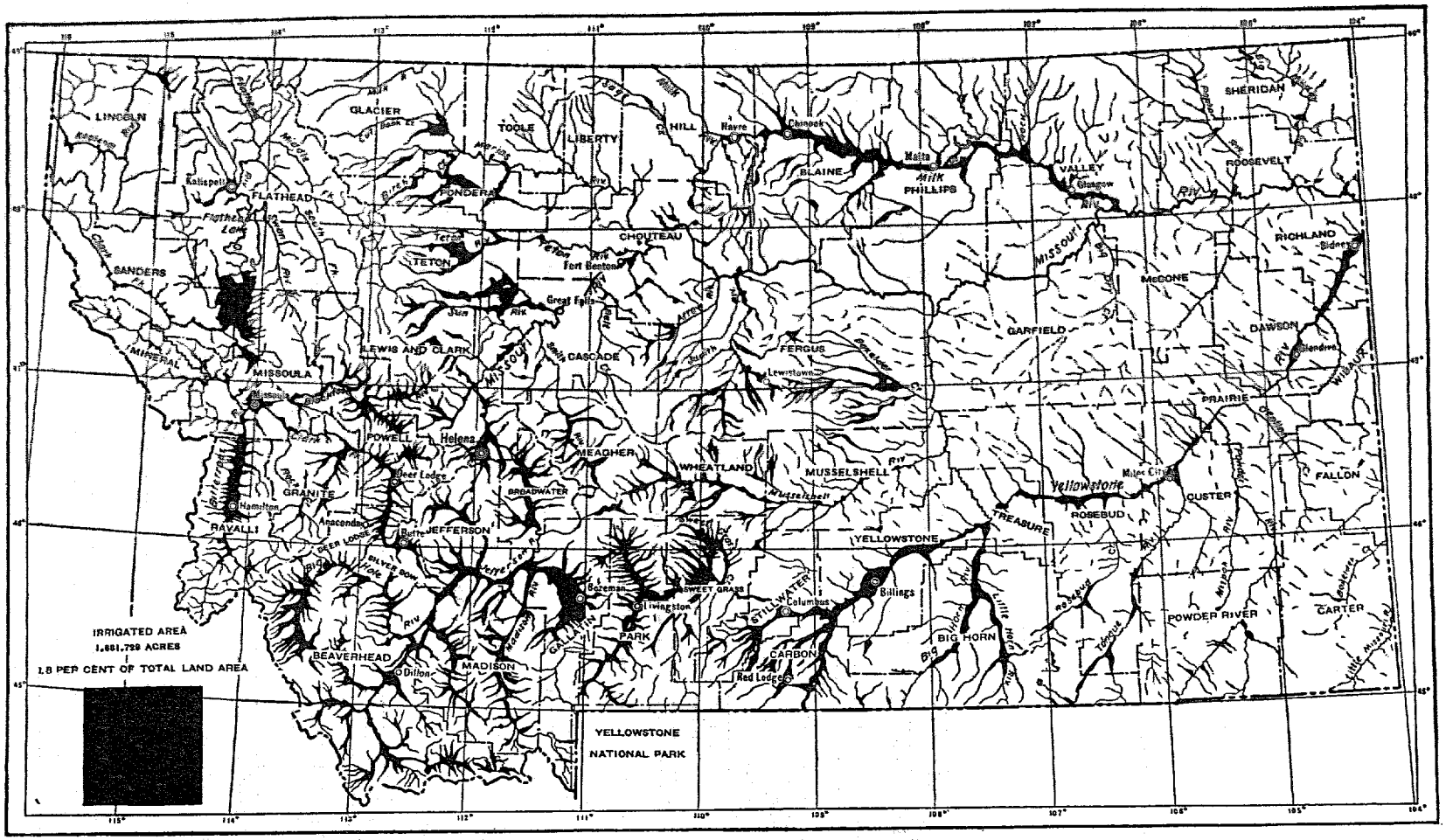
TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	57,677	26,214	31,463	120.0
Approximate land area of the state—acres	93,523,840	93,568,640	[2] −44,800	([3])
All land in farms—acres	35,070,656	13,545,603	21,525,053	158.9
Improved land in farms—acres	11,007,278	3,640,309	7,366,969	202.4
Number of farms irrigated	10,807	8,970	1,837	20.5
Area irrigated—acres	1,681,729	1,679,084	2,645	0.2
Area enterprises were capable of irrigating—acres	2,753,498	2,205,155	548,343	24.9
Area included in enterprises—acres	4,329,148	3,515,602	813,546	23.1
Per cent irrigated:				
Number of all farms	18.7	34.2	−15.5	
Approximate land area of the state	1.8	1.8		
Land in farms	4.8	12.4	−7.6	
Improved land in farms	15.3	46.1	−30.8	
Excess of area enterprises were capable of irrigating over area irrigated—acres	1,071,769	526,071	545,698	103.7
Excess of area included in enterprises over area irrigated—acres	2,647,419	1,836,518	810,901	44.2
Area of irrigated land reported as available for settlement—acres	207,530	([4])		
Capital invested	$52,143,363	$22,970,958	$29,172,405	127.0
Average per acre enterprises were capable of irrigating	$18.94	$10.42	$8.52	81.8
Estimated final cost of existing enterprises	$70,079,028	$32,382,077	$37,696,951	116.4
Average per acre included in enterprises	$16.19	$9.21	$6.98	75.8
Average cost of operation and maintenance per acre	$1.26	$0.89	$0.37	41.6
IRRIGATION WORKS.				
Number of enterprises	6,035	5,534	501	9.1
Number of main ditches	8,819	6,673	2,146	32.2
Length of main ditches—miles	16,411	12,990	3,421	26.3
Capacity of main ditches—second-feet	94,429	83,849	10,580	12.6
Number of lateral ditches	10,680	8,307	2,373	28.6
Length of lateral ditches—miles	6,085	5,944	141	2.4
Number of reservoirs	468	827	−359	−43.4
Capacity of reservoirs—acre-feet	1,571,720	580,261	991,459	170.9
Number of flowing wells	41	15	26	173.3
Capacity of flowing wells—gallons per minute	4,608	22,185	−17,577	−79.2
Number of pumped wells	22	10	12	120.0
Capacity of pumped wells—gallons per minute	11,085	5,263	5,822	110.6
Number of pumping plants	253	125	128	102.4
Engine capacity—horsepower	10,341	3,511	6,830	94.5
Pump capacity—gallons per minute	453,231	281,199	172,032	61.2
Average lift—feet	20	([4])	20	

[1] A minus sign (−) denotes decrease.
[2] Decrease due to the building of several reservoirs in connection with irrigation projects.
[3] Less than one-tenth of 1 per cent decrease.
[4] Not reported in 1910.

MONTANA

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

The climatic conditions having the greatest influence in determining the necessity for irrigation are the amount and seasonal distribution of precipitation, especially rainfall. Temperature and wind movement also have an influence through their effect on evaporation from soil and plants.

The surface of Montana is divided approximately equally between the plains and the mountainous sections, the eastern part of the state consisting of high, rolling prairies and the western part of mountains and intervening valleys. The main range of the Rocky Mountains forms the boundary between Montana and Idaho for a considerable distance, then turns to the east and again to the north, leaving the northwestern part of the state on the Pacific slope, while all the rest of the state is in the drainage basin of the Missouri River and slopes to the east.

In the mountainous section the precipitation varies greatly with the altitude, the normal annual precipitation varying from about 10 inches in the lower portion of the Jefferson River drainage basin and along the Missouri, immediately below the point where this stream is formed by the confluence of the Madison, Jefferson, and Gallatin Rivers, to 20 inches in the vicinity of Yellowstone National Park and to 25 inches or more in the northwest corner of the state. In most of the valleys of this part of the state crops are grown without irrigation near the base of the mountains, while irrigation is practiced in the central portions. The mountain ranges prevent strong winds and tend to decrease the water requirements of plants. As a rule the precipitation is lightest in the autumn and winter, and the wettest season is from April to June, when water is most needed for grain crops.

On the plains the precipitation is lighter, the normal annual precipitation being from 12 to 15 inches, and the heat and wind velocity during the growing season are much greater than in the mountainous part of the state. In this section the demand for moisture is greater and the supply is smaller.

The year 1919 was the third in succession in which the precipitation was below normal, the summer season being drier than either of the two preceding. This condition not only brought about a general failure of "dry-farm" crops, but decreased greatly the supply of water available for irrigation, particularly from streams originating on the plains, which are not fed by melting snows in the mountains. As a result much land covered by irrigation ditches and ordinarily irrigated was not watered in 1919, and to that extent the figures for that year do not correctly represent the status of irrigation development in the state.

WATER SUPPLY FOR IRRIGATION.

In the mountains of western Montana the precipitation is heavy, while the area of irrigable land is limited to the comparatively narrow valleys. Consequently there is an abundant supply of water for irrigation. The northwestern part of the state is drained by the Kootenai River and the Clark Fork of the Columbia and their tributaries. Both of these streams carry large volumes of water from the state.

The southwestern part of the state is drained by the headwaters of the Missouri. The Beaverhead and the Big Hole, which unite to form the Jefferson, drain the northern and eastern slopes of the main range of the Rocky Mountains, and the Madison and the Gallatin rise in Yellowstone National Park and flow north to their junction with the Jefferson to form the Missouri. From its head the Missouri flows northward through mountain valleys for slightly more than 100 miles and then turns to the east and flows to the eastern border of the state, roughly paralleling the northern line at distances varying between 60 and 100 miles.

Between the Missouri and the Canadian border are the Sun, Teton, Marias, and Milk Rivers, which rise in the main range of the Rocky Mountains and flow eastward to their junctions with the Missouri.

South of the Missouri is the Yellowstone, which rises in Yellowstone Lake in Yellowstone National Park. It flows northward for about 50 miles and from that point flows northeastward across the state to its confluence with the Missouri, just east of the Montana-North Dakota line. Between the Missouri and the Yellowstone there are many smaller streams, tributary to one or the other of these rivers. From the south the Yellowstone receives several large tributaries, which rise in Wyoming and flow northward into Montana, and many small tributaries rising on the plains. The principal tributaries of the Yellowstone are Clark Fork, Big Horn, Tongue, and Powder Rivers.

The streams rising in the mountains receive their water from melting snows and maintain a summer flow, while most of those rising on the plains become dry, or nearly so, in the summer. In the larger streams which rise in the mountains the water supply is generally sufficient for the land in their valleys. The supply would not be sufficient to water the great areas of arable land on the plains between the large rivers, but crops are grown on these lands without irrigation and there is no great demand for their irrigation.

As previously stated, the succession of dry years, of which 1919 was the third, decreased the supply of water to such an extent that much land ordinarily irrigated was not watered in 1919.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.	Per cent of all farms.	Acres.	Per cent of increase.	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	10,807	20.5	18.7	1,681,729	0.2	1.8	4.8	15.3
1910	8,970	11.5	34.2	1,679,084	76.5	1.8	12.4	46.1
1900	8,043	117.0	60.2	951,154	171.3	1.0	8.0	54.8
1890	3,706	.....	66.1	350,582	.....	0.4	17.8	38.3

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	6,035	4,329,148	1,681,729	38.8	2,753,498
Before 1860	10	5,755	4,586	79.7	5,585
1860–1869	503	252,161	110,225	43.7	179,832
1870–1879	516	283,961	114,804	40.4	185,018
1880–1889	1,343	966,530	470,529	48.7	697,811
1890–1899	1,195	765,658	361,563	47.2	580,515
1900–1904	667	321,645	148,075	46.0	228,249
1905–1909	487	937,065	272,239	29.1	506,853
1910–1914	416	302,991	59,280	19.6	123,847
1915–1919	367	294,323	38,556	13.1	105,278
Not reported	531	196,066	101,872	51.2	140,510

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	1,681,729	1,679,084	2,645	0.2	2,753,498	4,329,148
Streams, gravity	1,515,212	1,624,656	−109,444	−6.7	2,451,190	3,901,211
Streams, pumped	15,743	7,963	7,780	97.7	36,766	47,178
Streams, pumped and gravity	19,872	(2)	19,872	.....	33,599	34,149
Wells, pumped	139	55	84	.....	153	193
Wells, flowing	212	207	5	2.4	403	724
Lakes, gravity	16,653	5,617	11,036	196.5	22,512	24,840
Lakes, pumped	79	5	74	.....	189	351
Springs	14,945	17,967	−3,022	−16.8	22,695	37,337
Stored storm water	3,280	22,614	−19,334	−85.5	12,182	22,261
City water	15	(2)	15	.....	15	20
Sewage	245	(2)	245	.....	820	983
Streams, gravity, and pumped wells	155	(2)	155	.....	170	170
Streams, gravity, and flowing wells	6,068	(2)	6,068	.....	12,063	12,443
Other mixed	89,070	(2)	89,070	.....	150,603	237,120
Other and not reported	41	(2)	41	.....	168	168

[1] A minus sign (−) denotes decrease. Per cent not shown when base is less than 100.
[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

Montana enacted an irrigation district law in 1907, and has amended this law from time to time since that date. Generally, in Montana irrigation districts have not built irrigation works, but have been organized to take over works built by other agencies.

The state of Montana accepted the terms of the Federal Carey Act (act of Congress, Aug. 18, 1894) in 1895, and at first undertook construction of irrigation works by direct state action. The law has been amended from time to time, and state construction has been abandoned for the contract system common to the Western states.

The small area reported under "State" in Table 5 belongs to a State institution and does not represent a scheme of state construction.

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Acres.	Per cent.
ACREAGE IRRIGATED.				
Total	1,681,729	1,679,084	2,645	0.2
Individual and partnership	976,615	1,191,060	−214,445	−18.0
Cooperative	393,257	333,926	59,331	17.8
Irrigation district	35,153	412	34,741	.....
Carey Act	54,771	9,648	45,123	467.7
Commercial	34,115	62,544	−28,429	−45.5
U. S. Reclamation Service	88,291	14,077	74,214	527.2
U. S. Indian Service	98,887	67,417	31,470	46.7
State	20	(2)	20	.....
City	320	(2)	320	.....
Other	300	(2)	300	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	2,753,498	2,205,155	548,343	24.9
Individual and partnership	1,617,617	1,495,513	122,104	8.2
Cooperative	553,952	373,022	180,930	48.5
Irrigation district	70,650	6,640	64,010	964.0
Carey Act	83,913	49,500	34,413	69.5
Commercial	38,215	80,895	−42,680	−52.8
U. S. Reclamation Service	172,206	85,245	86,961	102.0
U. S. Indian Service	215,940	114,340	101,600	88.9
State	50	(2)	50	.....
City	390	(2)	390	.....
Other	565	(2)	565	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total	4,329,148	3,515,602	813,546	23.1
Individual and partnership	2,372,086	1,982,220	389,866	19.7
Cooperative	699,310	518,209	181,101	34.9
Irrigation district	71,687	6,640	65,047	979.6
Carey Act	181,873	306,997	−125,124	−40.8
Commercial	39,160	146,852	−107,692	−73.3
U. S. Reclamation Service	436,982	113,744	323,238	284.2
U. S. Indian Service	526,690	440,940	85,750	19.4
State	100	(2)	100	.....
City	530	(2)	530	.....
Other	730	(2)	730	.....

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The laws of Montana relating to water rights are summarized in the following paragraphs:

In 1865 the territory of Montana enacted a law recognizing the right of any person holding land bordering on or in the neighborhood of a stream to take water from the stream for irrigation, and providing for obtaining the right of way for ditches over the land of others.

This law was repealed in 1870 by one extending the right to take water for irrigation to the holder of land anywhere in the territory and recognizing priority among users.

In 1885 a more comprehensive law was enacted. This provided that rights might be acquired by "appropriation"; that the appropriation must be for a useful or beneficial purpose; that the place of use might be changed; and that "among appropriations the first in time is the first in right." This law provided also that persons desiring to appropriate water must post notices stating their claims, and must file copies of these claims with the county recorders; and, further, that persons who had acquired rights prior to the passage of the act should file with the proper county recorders declarations of their claims. The law provided also that controversies regarding water rights should be settled in the courts.

This law is still in effect, the state never having provided for applications for permits to appropriate water, as has been done in most of the Western states.

The constitution of the state, ratified in 1889, contains the following section relating to irrigation:

"The use of all water now appropriated, or that may hereafter be appropriated for sale, rental, distribution or other beneficial use and right of way over the lands of others for all ditches, drains, flumes, canals and aqueducts, necessarily used in connection therewith, as well as the sites for reservoirs necessary for collecting and storing the same shall be held to be a public use." (Art. 3, sec. 15.)

Under the rulings of the courts riparian rights are recognized in Montana to a limited extent.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909, per cent of total.
	Acres.	Per cent of total.	
Total	1,681,729	100.0	[1] 100.0
Appropriation and use	229,887	13.7	15.0
Notice filed and posted	666,305	39.6	44.4
Adjudicated by court	701,015	41.7	38.0
Permit from state	595	[2]	.....
Riparian rights	5,500	0.3	.....
Underground	482	[2]	[3]
Other and mixed	8,561	0.5	[3]
Not reported	69,384	4.1	[3]

[1] Small areas were incorrectly reported in some classes in 1910. These are not included here.
[2] Less than one-tenth of 1 per cent.
[3] All land for which the class of water rights was not reported was included in "Appropriation and use."

ACREAGE, BY DRAINAGE BASIN.

The report of a special census taken in 1902 presented all data by drainage basins rather than by counties. The results of the census of 1920 have been tabulated on the same basis, and the data for 1902 are presented for purposes of comparison. For no other census have the results been tabulated in this form. The acreage reported for each drainage basin in 1919 comprises all the irrigated land in that drainage basin, including that watered from springs and wells. In the 1902 results the acreages irrigated from springs and wells were not reported for the smaller tributary streams, but the acreages for the tributaries were included in those reported for the main streams. This area is so small, however, that the comparison of the areas reported for the tributary streams is not seriously affected.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 and 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
Total	1,681,729	1,140,694	47.4	4,329,148	2,753,498
Missouri River and tributaries	1,389,763	908,243	53.0	3,713,068	2,299,910
Missouri River direct	15,635	11,390	37.3	34,194	28,174
Jefferson River and tributaries	425,685	231,788	83.7	831,898	574,672
Jefferson River direct	21,276	15,721	35.3	40,347	34,894
Beaverhead River	145,673	99,014	47.1	296,079	199,797
Big Hole River	184,655	67,422	173.9	306,885	227,920
Boulder River	7,265	9,333	−22.2	40,677	13,297
Ruby River	34,474	21,101	63.4	76,107	48,036
Other tributaries of Jefferson River	32,342	[2] 19,197	68.5	71,803	50,728
Madison River	34,425	20,338	69.3	88,524	62,065
Gallatin River	95,063	58,004	63.9	228,056	152,515
Smith River	16,861	18,677	−9.7	38,369	29,691
Sun River	31,785	32,927	−3.5	244,071	95,522
Teton River	44,945	34,961	28.6	146,468	82,241
Marias River	63,758	22,188	187.4	308,158	122,431
Judith River	15,173	44,672	−66.0	40,993	35,459
Musselshell River	45,559	87,233	−47.8	141,363	113,964
Milk River and tributaries	108,555	56,597	91.8	349,716	179,063
Milk River direct	19,766	24,305	−18.7	26,358	23,443
Sage Creek	.....	4,947	.....	2,850	1,759
Snake River	910	2,135	−57.4	3,130	2,275
Other tributaries of Milk River	87,879	[2] 25,210	248.6	317,378	151,595
Yellowstone River and tributaries	440,354	209,137	110.6	858,817	668,355
Yellowstone River direct	189,453	40,015	373.5	279,211	262,801
Shields River	25,940	19,836	30.8	94,238	53,062
Stillwater River	23,561	13,572	73.6	34,278	29,664
Clark Fork	68,839	64,628	6.5	125,367	116,506
Big Horn River	51,103	1,645	.....	92,036	66,206
Rosebud River	365	13,618	−97.3	1,365	1,305
Tongue River	11,170	12,622	−11.5	31,396	21,403
Powder River	728	2,390	−69.5	5,871	4,841
Other tributaries of Yellowstone River	69,195	[2] 40,811	69.5	195,055	112,567
Little Missouri River	380	2,865	−86.7	3,205	1,480
Other tributaries of Missouri River	51,585	[2] 77,466	−33.4	399,236	154,278
Tributaries of Columbia River	291,966	232,451	25.6	616,080	453,588
Clark Fork and tributaries	285,984	229,851	24.4	601,657	443,864
Clark Fork direct	2,882	[2] 8,808	−67.3	14,403	4,722
Missoula River and tributaries	238,769	221,043	8.0	433,021	325,992
Missoula River direct	2,550	1,181	115.9	8,322	5,777
Hellgate River	77,381	78,139	−1.0	165,391	108,161
Big Blackfoot River	40,604	36,622	10.9	83,716	61,476
Bitter Root River	112,622	98,965	13.8	158,241	139,481
Other tributaries of Missoula River	5,612	[2] 6,136	−8.5	17,351	11,097
Flathead River	44,333	[4]	.....	154,233	113,150
Kootenai River	5,982	2,600	130.1	14,423	9,724

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.
[3] Includes springs and wells and all sources in the Columbia River drainage basin, exclusive of the Missoula and Kootenai Rivers.
[4] Not reported separately in 1902.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1890 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.
1920	$52,143,363	127.0	$18.94	81.8
1910	22,970,958	390.5	10.42	111.8
1900	4,683,073	188.5	4.92	6.3
1890	1,623,195	.....	4.63	.....

TABLE 9.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$52,143,363	100.0	$18.94
Before 1860	55,527	0.1	9.94
1860-1869	1,323,315	2.5	7.36
1870-1879	2,063,841	3.9	11.15
1880-1889	5,085,794	9.8	7.29
1890-1899	7,045,284	13.5	12.14
1900-1904	3,005,519	5.8	13.17
1905-1909	25,592,156	49.1	50.49
1910-1914	2,756,019	5.3	22.25
1915-1919	3,631,564	7.0	34.49
Not reported	1,584,344	3.0	11.28

TABLE 10.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$52,143,363	100.0	$18.94	1,369,651	$1.26
Streams, gravity	47,016,339	90.2	19.18	1,249,390	1.18
Streams, pumped	900,216	1.7	24.49	11,414	5.63
Streams, pumped and gravity	1,612,316	3.1	47.99	19,372	1.77
Wells, pumped	16,285	(2)	106.44	49	5.41
Wells, flowing	10,007	(2)	24.83	154	7.24
Lakes, pumped	8,250	(2)	43.65	41	11.07
Lakes, gravity	271,760	0.5	12.07	8,063	5.46
Springs	247,094	0.5	10.39	7,821	1.57
Stored storm water	298,392	0.6	24.55	1,957	5.74
Sewage	6,724	(2)	8.20	.....	.....
Streams, gravity, and pumped wells	3,000	(2)	17.65	150	6.67
Streams, gravity, and flowing wells	433,000	0.9	35.80	6,065	1.41
Other mixed	1,318,598	2.5	8.21	64,675	0.99
Other and not reported	1,382	(2)	8.23	.....	.....

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	INCREASE.[1]	
			Amount.	Per cent.
Total	$52,143,363	$5,576,975	$46,566,388	835.0
Missouri River and tributaries	43,507,296	4,254,950	39,252,346	922.5
Missouri River direct	440,345	81,162	359,183	442.6
Jefferson River and tributaries	5,370,454	760,328	4,610,126	606.3
Jefferson River direct	587,388	115,995	471,393	406.4
Beaverhead River	1,723,746	255,779	1,467,967	573.9
Big Hole River	1,669,767	135,609	1,534,158	.....
Boulder River	149,655	43,510	106,145	244.0
Ruby River	559,000	122,658	436,342	355.7
Other tributaries of Jefferson River	680,898	[2] 86,777	594,121	684.7
Madison River	460,523	92,986	367,537	395.6
Gallatin River	977,786	454,845	522,941	115.0
Smith River	190,836	64,777	126,059	194.6
Sun River	4,709,303	173,399	4,535,904	.....
Teton River	1,251,130	111,990	1,139,140	.....
Marias River	5,502,770	142,443	5,360,327	.....
Judith River	281,842	124,513	157,329	126.4
Musselshell River	986,755	285,868	700,887	245.2
Milk River and tributaries	7,271,098	263,698	7,007,400	.....
Milk River direct	154,208	119,200	35,008	29.4
Sage Creek	2,400,248	16,127	2,384,121	.....
Snake River	8,600	9,935	−1,335	−13.4
Other tributaries of Milk River	4,708,042	[1] 118,436	4,589,606	.....
Yellowstone River and tributaries	13,762,337	1,306,338	12,455,499	953.1
Yellowstone River direct	7,508,390	303,888	7,204,502	.....
Shields River	424,103	109,074	315,029	288.8
Stillwater River	298,570	51,502	247,068	479.7
Clark Fork	1,108,191	295,302	812,889	275.3
Big Horn River	2,339,457	3,425	2,336,032	.....
Rosebud River	9,303	61,708	−52,405	−84.9
Tongue River	608,504	211,870	396,634	187.2

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902—Continued.

DRAINAGE BASIN.	1920	1902	INCREASE.[1]	
			Amount.	Per cent.
Missouri River and tributaries—Continued.				
Yellowstone River and tributaries—Continued.				
Powder River	$35,402	$12,500	$22,902	183.2
Other tributaries of Yellowstone River	1,430,417	[2] 257,569	1,172,848	455.4
Little Missouri River	15,064	33,747	−18,683	−55.4
Other tributaries of Missouri River	2,286,753	358,356	1,928,397	538.1
Tributaries of Columbia River	8,636,067	1,322,025	7,314,042	553.2
Clark Fork and tributaries	8,414,091	1,308,486	7,105,605	543.0
Clark Fork direct	202,256	[3] 64,591	137,665	213.1
Missoula River and tributaries	3,474,524	1,243,895	2,230,629	179.3
Missoula River direct	159,771	27,367	132,404	483.8
Hellgate River	1,349,403	392,065	957,338	244.2
Big Blackfoot River	624,291	114,450	509,841	445.5
Bitter Root River	1,138,329	674,130	464,199	68.9
Other tributaries of Missoula River	202,730	[2] 35,883	166,847	465.0
Flathead River	4,737,311	(4)	.....	.....
Kootenai River	221,976	13,539	208,437	.....

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.
[3] Includes springs and wells and all sources in the Columbia River drainage basin exclusive of the Missoula and Kootenai Rivers.
[4] Not reported separately in 1902.

In classifying capital invested by type of enterprise (Table 12) the average capital invested per acre is not presented, for the reason that it is not possible to compute this correctly. The United States Reclamation Service supplies stored water to enterprises controlled by agencies of most of the other classes shown in the table and a part of its expenditure is properly chargeable to those lands; but it is not possible to tell how much should be so charged or how it should be distributed among the various classes.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$52,143,363	100.0	1,369,651	$1.26
Individual and partnership	15,543,287	29.8	747,131	1.07
Cooperative	6,692,877	12.8	349,499	0.86
Irrigation district	1,708,851	3.3	34,983	0.98
Carey Act	4,834,407	9.3	54,748	1.76
Commercial	676,535	1.3	34,115	2.14
U. S. Reclamation Service	14,381,318	27.6	45,786	2.09
U. S. Indian Service	8,193,390	15.7	103,309	3.01
State	100	(2)	20	0.75
City	105,538	0.2	.....	.....
Other	7,060	(2)	60	2.67

[1] Based on acreage irrigated in 1919. [2] Less than one-tenth of 1 per cent.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	276
Acreage included in enterprises reporting land drained or needing drainage	751,274
Acreage for which drains have been installed	62,872
Additional acreage needing drainage	50,901
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	8.4
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	1.5
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	2.6

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 14. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume of water entering canals, second-feet	22,808	10,176	12,632
Area irrigated in 1919.....acres	794,762	425,618	369,144
Average number of acres per second-foot	35	42	29
Total quantity of water entering canals, acre-feet	4,103,486	1,802,871	2,300,615
Area irrigated in 1919.....acres	745,925	424,712	321,213
Average quantity per acre.....acre-feet	5.5	4.2	7.2
Total quantity of water delivered.....acre-feet	968,991	409,939	559,052
Area irrigated in 1919.....acres	290,884	181,430	109,454
Average quantity per acre.....acre-feet	3.3	2.3	5.1

IRRIGATION WORKS.

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	3,545	523	8,819	94,429	16,411	10,680	6,085	468	1,571,720
Before 1860	5	1	15	89	10	3	3	.....	.....
1860-1869	238	22	798	4,614	1,259	240	146	21	6,209
1870-1879	373	10	876	6,284	1,516	876	370	7	40
1880-1889	1,064	58	2,222	19,259	3,995	2,538	865	43	55,430
1890-1899	763	91	1,861	16,702	3,429	3,070	1,554	79	52,572
1900-1904	339	95	870	12,275	1,596	892	421	88	43,666
1905-1909	272	97	615	22,983	1,968	1,581	1,887	81	555,349
1910-1914	197	87	484	4,672	896	579	245	84	758,984
1915-1919	163	38	407	3,241	808	395	402	43	95,791
Not reported	131	24	671	4,310	934	506	192	22	3,679

DATE OF BEGINNING.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	48.0	41	4,608	22	11,085	253	10,341	299	453,231
Before 1860	.....	.....	.....	1	.....	1	2	1	.....
1860-1869	0.2	2	.....	.....	.....	1	.....	1	.....
1870-1879	2.9	4	2,257	.....	.....	2	30	2	1,000
1880-1889	2.0	1	.....	4	905	6	38	7	1,905
1890-1899	6.9	1	50	.....	.....	15	479	24	28,311
1900-1904	3.3	5	51	6	5,010	36	932	37	62,760
1905-1909	14.6	7	1,032	2	10	37	2,368	48	76,105
1910-1914	11.5	5	109	1	.....	54	4,539	73	121,635
1915-1919	4.7	13	1,109	5	2,090	84	1,714	89	145,394
Not reported	1.9	3	.....	3	3,070	17	239	17	16,121

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	3,545	523	8,819	94,429	16,411	10,680	6,085	468	1,571,720
Individual and partnership	3,352	454	8,378	68,461	13,513	8,949	2,813	397	300,131
Cooperative	136	32	324	16,191	1,723	747	770	38	334,555
Irrigation district	10	5	24	1,680	212	50	62	4	30,313
Carey Act	3	6	8	1,977	82	250	588	4	18,000
Commercial	4	4	19	514	134	136	27	4	656,720
U. S. Reclamation Service	8	6	12	3,155	337	192	367	6	102,878
U. S. Indian Service	30	15	45	2,338	396	349	1,453	14	128,995
State	2	.....	1	19	2	3	2	.....	.....
City	.....	.....	1	68	5	1	1	.....	.....
Other	.....	1	7	26	7	3	2	1	128

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920—Continued.

CLASS.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	48.0	41	4,608	22	11,085	253	10,341	299	453,231
Individual and partnership	33.8	37	3,608	22	11,085	243	5,630	272	315,031
Cooperative	2.0	4	1,000			1	36	1	50
Irrigation district	1.9					4	260	10	61,650
Carey Act	1.3								
Commercial	4.8					2	3,680	11	73,500
U. S. Reclamation Service	1.5					2	710	4	
U. S. Indian Service	0.2					1	25	1	3,000
State									
City									
Other	2.5								

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	3,545	523	8,819	94,429	16,411	10,680	6,085	468	1,571,720
Missouri River and tributaries	2,805	414	6,672	78,815	13,194	8,893	4,956	396	1,477,741
Missouri River direct	19	11	73	778	456	178	55	13	870,709
Jefferson River and tributaries	1,174	45	2,106	25,319	3,422	3,468	890	59	165,003
Jefferson River direct	23	2	52	1,331	189	18	39		
Beaverhead River	516	15	805	5,340	1,120	954	253	16	130,275
Big Hole River	442	8	726	7,171	1,132	2,231	480	10	6,171
Boulder River	48	3	105	649	185	83	2	3	11
Ruby River	54	7	184	1,456	298	101	61	18	19,676
Other tributaries of Jefferson River	91	10	234	9,372	498	81	55	12	8,870
Madison River	100	10	251	2,709	560	129	112	12	4,602
Gallatin River	88	5	410	4,243	885	146	228	2	1,200
Smith River	66	4	285	983	325	600	124	7	181
Sun River	91	14	109	2,467	313	166	199	16	854
Teton River	21	7	76	2,566	266	74	112	7	145,742
Marias River	38	15	76	2,634	227	260	719	15	22,926
Judith River	147	5	214	1,479	311	252	84	7	85
Musselshell River	192	35	443	4,277	866	806	286	16	34,479
Milk River and tributaries	201	104	301	7,416	692	895	554	94	146,041
Milk River direct	5		7	200	31	9	2	1	16
Sage Creek	5	6	8	11	12	16	15	5	2,089
Snake River	13	6	17	72	23	86	38	4	158
Other tributaries of Milk River	178	92	269	7,133	626	784	499	84	143,778
Yellowstone River and tributaries	449	86	1,463	19,605	3,435	1,332	1,248	70	31,388
Yellowstone River direct	14	11	102	5,508	720	279	447	11	2,519
Shields River	88	1	208	1,620	457	210	75	5	9,016
Stillwater River	5		128	1,284	279	40	46	2	2
Clark Fork	101	5	300	3,139	707	397	217	1	91
Big Horn River	45	1	51	1,675	198	24	218		
Rosebud River	11	2	17	73	21	6		2	18
Tongue River	23	12	59	974	130	78	28	9	150
Powder River	17	13	34	111	23	17	3	10	50
Other tributaries of Yellowstone River	145	41	564	5,221	900	281	214	30	19,542
Little Missouri River	12	7	19	70	16	35	13	14	1,513
Other tributaries of Missouri River	207	66	846	4,269	1,420	552	332	64	53,018
Tributaries of Columbia River	740	109	2,147	15,614	3,217	1,787	1,129	72	93,979
Clark Fork (of Columbia) and tributaries	710	102	2,083	14,519	3,124	1,746	1,103	59	93,655
Clark Fork direct	1		64	1,300	73	9	1		
Missoula River and tributaries	609	79	1,863	11,998	2,655	1,217	367	46	8,640
Missoula River direct	5	1	15	200	116	11		1	
Hellgate River	246	27	777	4,623	1,195	455	142	24	527
Big Blackfoot River	137	10	310	2,378	364	193	48	3	200
Bitter Root River	173	37	644	4,073	870	424	158	10	7,634
Other tributaries of Missoula River	48	4	117	724	110	134	19	8	279
Flathead River	100	23	156	1,221	396	520	735	13	85,015
Kootenai River	30	7	64	1,095	93	41	26	13	324

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920—Continued.

DRAINAGE BASIN.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.				
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.		Average lift (feet).
								Number.	Capacity (gallons per minute).	
Total	48.0	41	4,608	22	11,085	253	10,341	299	453,231	20
Missouri River and tributaries	17.6	28	1,245	19	11,005	225	10,058	271	440,779	19
Missouri River direct	4.0					26	4,494	34	115,975	24
Jefferson River and tributaries	0.1	2	2			3	135	4	4,968	25
Jefferson River direct	0.1					2	25	2	1,968	24
Beaverhead River		1								
Boulder River						1	110	2	3,000	24
Other tributaries of Jefferson River		1	2							
Gallatin River	0.5					4	70	4	5,329	16
Smith River						1	18	1	6,000	9
Sun River	1.2					15	326	20	20,210	15
Teton River	0.5	3	1,000	1	10	8	130	8	13,410	17
Marias River	1.6			3	8,000	22	623	22	37,165	15
Judith River	2.4			1	1,500	8	72	16	10,600	11
Musselshell River						10	178	12	16,250	19
Milk River and tributaries	1.2	1	50			22	377	23	24,345	16
Milk River direct						4	70	4	2,570	18
Other tributaries of Milk River	1.2	1	50			18	307	19	21,775	16
Yellowstone River and tributaries	2.7	18	188	2	50	75	3,173	90	166,553	19
Yellowstone River direct	2.0	3	69			35	2,501	45	127,662	24
Shields River				1	40					
Clark Fork						2	10	2	470	8
Big Horn River	0.1					2	38	3	1,850	17
Tongue River	0.1					16	286	16	14,575	15
Powder River		15	119	1	10	9	221	13	13,365	15
Other tributaries of Yellowstone River	0.5					11	117	11	8,631	12
Other tributaries of Missouri River	3.4	4	5	12	1,445	31	462	37	19,974	18
Tributaries of Columbia River	30.4	13	3,363	3	80	28	283	28	12,452	31
Clark Fork (of Columbia) and tributaries	26.8	11	3,333	3	80	27	283	27	12,447	8
Clark Fork direct	1.5									8
Missoula River and tributaries	17.2	1	2,250	3	80	11	106	11	3,282	24
Missoula River direct	3.8			2		6	52	6	1,096	29
Hellgate River	3.2	1	2,250	1	80	2	10	2	130	29
Big Blackfoot River	0.4					1	16	1	650	12
Bitter Root River	3.4					1	12	1	1,406	7
Other tributaries of Missoula River	6.4					1	16	1		
Flathead River	8.1	10	1,083			16	177	16	9,165	37
Kootenai River	3.6	2	30			1		1	5	10

CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 AND 1909.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AREA HARVESTED.					QUANTITY HARVESTED.				
		1919		1909		Per cent of increase.[1]	Unit.	1919		1909		Per cent of increase.[1]
		Acres.	Per cent of total for state.	Acres.	Per cent of total for state.			Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	2,436	13.0	1,640	17.2	48.5	Bu.	34,132	21.4	51,488	18.8	−33.7
2	Oats	45,153	23.6	159,658	47.9	−71.7	Bu.	1,183,068	45.8	6,965,254	50.5	−83.0
3	Winter wheat	39,396	7.3	45,568	17.6	253.8	Bu.	331,668	11.9	1,236,137	19.8	52.4
4	Spring wheat	121,804	10.5				Bu.	1,551,685	31.0			
5	Barley	10,286	35.1	9,271	34.0	10.9	Bu.	185,866	53.6	273,827	36.4	−32.1
6	Rye	1,370	1.8	867	14.4	58.0	Bu.	6,826	3.0	15,438	13.9	−55.8
	Hay and forage:											
7	Timothy alone	35,781	44.3	48,868	41.5	−26.8	Tons.	35,613	56.8	76,230	44.6	−53.3
8	Timothy and clover mixed	91,912	65.3	60,437	66.8	52.1	Tons.	105,845	70.4	102,660	65.8	3.1
9	Clover alone	5,576	42.4	8,433	72.9	−33.9	Tons.	6,967	51.0	17,350	72.0	−59.8
10	Alfalfa	220,281	58.9	183,264	81.7	20.2	Tons.	408,903	69.7	514,803	85.8	−20.6
11	Other tame grasses	39,254	52.0	22,195	37.5	76.9	Tons.	39,523	61.6	37,424	47.6	5.6
12	Annual legumes cut for hay	770	12.1	5,988	13.0	336.2	Tons.	1,184	25.4	10,418	14.8	86.0
13	Small grains cut for hay	25,349	5.4				Tons.	18,194	10.6			
14	Wild, salt, or prairie grasses	177,385	39.3	329,579	56.4	−46.2	Tons.	131,652	46.8	339,821	57.6	−61.3
15	Silage crops	620	32.3	(2)			Tons.	3,357	43.2	(2)		
	Vegetables:											
16	Potatoes	4,903	22.1	11,137	53.8	−56.0	Bu.	568,008	34.2	1,938,677	59.8	−70.7
	Fruits:											
17	Apples	[3] 761,904	71.9	(2)			Bu.	477,796	70.9	(2)		
18	Cherries	[3] 47,600	72.5	(2)			Bu.	9,595	65.0	(2)		
	Miscellaneous:											
19	Sugar beets grown for sugar	7,686	89.4	7,551	86.7	1.8	Tons.	67,297	91.2	91,509	84.1	−26.5
20	Clover and alfalfa seed [4]	3,330	34.6	1,527	41.3	118.1	Bu.	8,824	37.8	4,817	46.4	83.2
21	Dry beans	1,022	44.5				Bu.	14,576	55.8	(2)		
22	Dry peas	12,070	81.2	951	80.3		Bu.	143,042	85.9	19,966	92.1	616.4
23	Flaxseed	3,740	2.9	(2)			Bu.	22,534	6.9	(2)		
24	Sugar-beet seed	965	56.3	(2)			Lbs.	508,385	52.0	(2)		

	CROP.	AVERAGE YIELD PER ACRE, 1919.						VALUE.				
		Unit.	For state.	On non-irrigated land.	On irrigated land.			1919		1909		Per cent of increase.[1]
					Average.	Per cent of average for state.	Per cent of average on non-irrigated land.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	Bu.	8.5	7.7	14.0	164.7	181.8	$58,024	21.4	$38,613	20.8	50.3
2	Oats	Bu.	13.5	9.6	26.2	194.1	272.9	1,183,068	45.8	3,273,203	53.2	−63.9
3	Winter wheat	Bu.	5.2	4.9	8.4	161.5	171.4	792,687	11.9	1,064,794	20.0	322.7
4	Spring wheat	Bu.	4.3	3.3	12.7	295.3	384.8	3,708,527	31.0			
5	Barley	Bu.	11.8	8.5	18.1	153.4	212.9	278,799	53.6	189,952	39.7	46.8
6	Rye	Bu.	3.0	3.0	5.0	166.7	166.7	11,263	3.0	10,985	13.3	2.5
	Hay and forage:											
7	Timothy alone	Tons.	0.78	0.60	1.00	128.2	166.7	1,050,584	56.8	736,041	46.2	42.7
8	Timothy and clover mixed	Tons.	1.07	0.91	1.15	107.5	126.4	3,175,350	70.4	952,118	65.3	233.5
9	Clover alone	Tons.	1.04	0.88	1.25	120.2	142.0	205,526	51.0	126,659	71.8	62.3
10	Alfalfa	Tons.	1.57	1.15	1.86	118.5	161.7	11,247,308	69.7	3,188,918	84.1	252.7
11	Other tame grasses	Tons.	0.85	0.68	1.01	118.8	148.5	1,047,360	61.6	318,494	55.0	228.8
12	Annual legumes cut for hay	Tons.	0.73	0.62	1.54	211.0	248.4	28,416	25.4	81,597	13.8	470.0
13	Small grains cut for hay	Tons.	0.37	0.35	0.72	194.6	205.7	436,656	10.6			
14	Wild, salt, or prairie grasses	Tons.	0.62	0.55	0.74	119.4	134.5	3,093,822	46.8	2,392,486	57.9	29.3
15	Silage crops	Tons.	4.05	3.40	5.41	133.6	159.1	40,284	43.2	(2)		
	Vegetables:											
16	Potatoes	Bu.	74.8	63.2	115.8	154.8	183.2	1,334,819	34.2	755,968	58.2	76.9
	Fruits:											
17	Apples	Bu.	[5] 0.6	[5] 0.7	[5] 0.6	100.0	85.7	788,363	70.9	(2)		
18	Cherries	Bu.	[5] 0.2	[5] 0.3	[5] 0.2	100.0	66.7	39,819	65.0	(2)		
	Miscellaneous:											
19	Sugar beets grown for sugar	Tons.	8.58	7.14	8.76	102.1	122.7	740,267	91.2	461,208	84.9	60.5
20	Clover and alfalfa seed [4]	Bu.	2.4	2.3	2.6	108.3	113.0	211,776	37.8	36,007	40.7	488.2
21	Dry beans	Bu.	11.4	9.1	14.3	125.4	157.1	61,219	55.8	(2)		
22	Dry peas	Bu.	11.2	8.4	11.9	106.2	141.7	443,430	85.9	31,824	84.3	
23	Flaxseed	Bu.	2.5	2.4	6.0	240.0	250.0	100,276	6.9	(2)		
24	Sugar-beet seed	Lbs.	571.1	628.2	526.8	92.2	83.9	305,031	52.0	(2)		

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Not reported separately in 1910.
[3] Number of trees of bearing age.
[4] Not including red clover seed.
[5] Yield per tree.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (—) denotes decrease.]

		THE STATE.	Beaverhead.[1]	Big Horn.[2]	Blaine.[3]	Broadwater.	Carbon.[4]	Carter.[5]	Cascade.	Chouteau.[6]	Custer.[7]
1	Number of all farms in 1920	[8] 57,677	642	791	1,761	466	1,353	855	1,703	2,573	941
2	Number of farms irrigated in 1919	10,807	479	341	162	196	768	13	218	32	112
3	Per cent of all farms	18.7	74.6	43.1	9.2	42.1	56.8	1.5	12.8	1.2	11.9
4	Number of farms irrigated in 1909	8,970	480	.....	.....	231	912	.....	194	354	129
5	Per cent of increase, 1909–1919	20.5	.....	.....	.....	—15.2	.....	.....	12.4	.....	.....
	LAND AND FARM AREA.										
6	Approximate land area—acres	[8] 93,523,840	3,620,480	3,178,240	2,706,560	771,840	1,318,400	2,160,000	2,183,040	2,696,320	2,394,240
7	All land in farms—acres	[8] 35,070,656	637,009	748,749	1,159,056	304,483	446,386	557,495	1,252,282	1,508,898	997,169
8	Improved land in farms—acres	[8] 11,007,278	270,603	158,363	291,431	110,566	178,503	83,763	378,035	599,542	121,688
9	Area irrigated in 1919—acres	1,681,729	302,375	48,306	59,119	25,733	99,336	380	14,864	6,029	8,469
10	Per cent of improved land in farms	15.3	111.7	30.5	20.3	23.3	55.6	0.5	3.9	1.0	7.0
11	Area irrigated in 1909—acres	1,679,084	221,716	.....	.....	39,612	121,174	.....	25,063	110,291	19,399
12	Per cent of increase, 1909–1919	0.2	.....	.....	.....	—35.0	.....	.....	—40.7	.....	.....
13	Area enterprises were capable of irrigating in 1920—acres	2,753,498	385,619	60,591	99,764	61,175	147,195	1,320	53,163	18,790	21,960
14	Area enterprises were capable of irrigating in 1910—acres	2,205,155	238,267	.....	.....	50,870	129,922	.....	50,334	138,063	32,872
15	Per cent of increase, 1910–1920	24.9	.....	.....	.....	20.3	.....	.....	5.6	.....	.....
16	Area included in enterprises in 1920—acres	4,329,148	525,181	87,765	190,347	109,435	156,675	3,045	144,376	40,244	25,872
17	Area included in enterprises in 1910—acres	3,515,602	347,877	.....	.....	72,436	135,509	.....	81,279	193,849	57,191
18	Per cent of increase, 1910–1920	23.1	.....	.....	.....	51.1	.....	.....	77.6	.....	.....
19	Area of irrigated land reported as available for settlement—acres	207,530	1,800	.....	47,597	450	.....	.....	168	150	.....
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	6,035	521	38	87	211	258	10	100	98	44
21	Number, 1910	5,534	446	.....	.....	180	288	.....	93	247	89
	Main ditches:										
22	Number, 1920	8,819	1,318	67	165	299	343	18	127	134	41
23	Number, 1910	6,673	901	.....	.....	221	284	.....	100	306	78
24	Length, 1920—miles	16,411	2,004	209	358	591	831	15	213	491	88
25	Length, 1910—miles	12,990	1,415	.....	.....	417	805	.....	217	747	169
26	Capacity, 1920—second-feet	94,429	10,119	1,540	2,110	1,883	3,772	70	1,264	972	882
27	Capacity, 1910—second-feet	83,849	8,596	.....	.....	1,938	4,112	.....	1,019	5,392	1,143
	Laterals:										
28	Number, 1920	10,680	2,931	18	271	96	406	33	122	318	13
29	Number, 1910	8,307	1,163	.....	.....	93	401	.....	192	630	110
30	Length, 1920—miles	6,085	669	204	299	49	230	11	47	201	4
31	Length, 1910—miles	5,944	555	.....	.....	61	335	.....	156	344	76
	Reservoirs:										
32	Number, 1920	468	25	8	45	4	1	13	15	27	18
33	Number, 1910	827	27	.....	.....	14	8	.....	62	137	76
34	Capacity, 1920—acre-feet	1,571,720	136,446	128	15,671	211	91	1,513	218,086	3,124	844
35	Capacity, 1910—acre-feet	580,261	158,772	.....	.....	490	467	.....	30,772	44,146	7,728
	Flowing wells:										
36	Number, 1920	41	1	.....	.....	.....	.....	.....	.....	.....	1
37	Number, 1910	15	.....	.....	.....	.....	1	.....	.....	.....	4
38	Capacity, 1920—gallons per minute	4,608	.....	.....	.....	.....	.....	.....	.....	.....	1
39	Capacity, 1910—gallons per minute	22,185	.....	.....	.....	.....	2,138	.....	.....	.....	42
	Pumped wells:										
40	Number, 1920	22	.....	.....	.....	5	.....	.....	.....	1	.....
41	Number, 1910	10	.....	.....	.....	3	.....	.....	.....	.....	.....
42	Capacity, 1920—gallons per minute	11,085	.....	.....	.....	.....	.....	.....	.....	10	.....
43	Capacity, 1910—gallons per minute	5,263	.....	.....	.....	195	.....	.....	.....	.....	.....
	Pumping plants:										
44	Number, 1920	253	.....	9	7	8	4	.....	22	26	12
45	Number, 1910	125	.....	.....	.....	4	4	.....	11	21	8
46	Engine capacity, 1920—horsepower	10,341	.....	172	136	94	26	.....	565	577	375
47	Engine capacity, 1910—horsepower	3,511	.....	.....	.....	16	59	.....	377	709	588
48	Pump capacity, 1920—gallons per minute	453,231	.....	10,225	8,785	2,688	1,741	.....	32,310	42,260	23,250
49	Pump capacity, 1910—gallons per minute	281,199	.....	.....	.....	1,438	1,182	.....	29,225	51,244	42,925
50	Average lift, 1920—feet	20	.....	14	20	16	10	.....	18	18	14
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920—dollars	52,143,363	2,385,045	2,311,418	2,549,735	476,675	1,456,985	14,095	2,555,503	640,656	299,355
52	Capital invested to July 1, 1910—dollars	22,970,958	4,003,286	.....	.....	379,681	546,864	.....	832,204	849,450	375,414
53	Per cent of increase, 1910–1920	127.0	.....	.....	.....	25.5	.....	.....	207.1	.....	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	18.94	6.18	38.15	25.56	7.79	9.90	10.68	48.07	34.10	13.63
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	10.42	16.80	.....	.....	7.46	4.21	.....	16.53	6.15	11.42
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920—dollars	70,079,028	2,433,395	2,686,470	2,737,185	482,625	1,463,610	18,095	5,120,595	1,051,398	376,180
57	Estimated final cost of existing enterprises in 1910—dollars	32,382,077	4,003,286	.....	.....	379,681	546,864	.....	912,194	890,801	379,409
58	Per cent of increase, 1910–1920	116.4	.....	.....	.....	27.1	.....	.....	461.3	.....	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	16.19	4.63	30.61	14.38	4.41	9.34	5.94	35.47	26.13	14.54
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	9.21	11.51	.....	.....	5.24	3.30	.....	11.22	4.60	6.63

[1] Part of Madison annexed in 1911.
[2] Organized from parts of Rosebud and Yellowstone in 1913.
[3] Organized from part of Chouteau in 1912; part taken to form part of Phillips in 1915.
[4] Part taken to form part of Stillwater in 1913; part annexed to Yellowstone and part of Yellowstone annexed in 1919.
[5] Organized from part of Fallon in 1917.
[6] Parts taken to form Blaine and Hill in 1912, and parts of Pondera and Liberty in 1919.
[7] Part, including Northern Cheyenne Indian Reservation and part of Crow Indian Reservation, taken to form Rosebud in 1901; parts taken to form Fallon in 1913, part of Prairie in 1915, and Powder River in 1919.
[8] Includes Liberty and McCone Counties and that part of Yellowstone National Park which is in Montana, for which no irrigation is reported in 1919.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease.]

		Dawson.[1]	Deer Lodge.[2]	Fallon.[3]	Fergus.[4]	Flathead.[5]	Gallatin.	Garfield.[6]	Glacier.[7]	Granite.	Hill.[8]
1	Number of all farms in 1920	1,195	202	758	4,226	1,923	1,349	1,530	372	354	2,257
2	Number of farms irrigated in 1919	14	120	2	154	247	782	3	19	189	34
3	Per cent of all farms	1.2	59.4	0.3	3.6	12.8	58.0	0.2	5.1	53.4	1.5
4	Number of farms irrigated in 1909	100	170	.....	191	63	802	.....	.....	175	.....
5	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	—2.5	.....	.....	8.0	.....
	LAND AND FARM AREA.										
6	Approximate land area.....acres	1,509,760	476,800	1,029,120	4,573,440	3,909,760	1,604,480	3,095,680	1,907,840	1,098,880	1,850,880
7	All land in farms.....acres	747,993	58,484	576,754	2,573,981	470,283	783,189	874,129	545,256	254,148	1,107,399
8	Improved land in farms.....acres	298,620	24,210	171,815	1,037,819	179,201	350,776	136,554	168,338	72,336	491,358
9	Area irrigated in 1919.....acres	1,674	13,474	.....	33,499	11,244	103,975	370	9,767	31,177	2,528
10	Per cent of improved land in farms	0.6	55.7	.....	3.2	6.3	29.6	0.3	5.8	43.1	0.5
11	Area irrigated in 1909.....acres	11,158	29,881	.....	48,232	14,527	127,449	.....	.....	24,107	.....
12	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	—18.4	.....	.....	29.3	.....
13	Area enterprises were capable of irrigating in 1920.....acres	6,860	24,271	260	82,521	24,642	174,906	390	25,600	38,500	12,033
14	Area enterprises were capable of irrigating in 1910.....acres	46,741	39,949	.....	84,558	19,908	139,050	.....	.....	28,350	.....
15	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	25.8	.....	.....	35.8	.....
16	Area included in enterprises in 1920.....acres	7,663	40,125	260	96,690	33,787	287,590	4,090	118,500	58,394	14,824
17	Area included in enterprises in 1910.....acres	73,061	45,358	.....	100,364	86,287	169,926	.....	.....	33,916	.....
18	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	69.2	.....	.....	72.2	.....
19	Area of irrigated land reported as available for settlement.....acres	793	560	.....	2,480	.....	3,270	.....	.....	.....	.....
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	14	90	2	232	129	463	2	2	170	42
21	Number, 1910	30	161	.....	206	42	389	.....	.....	151	.....
	Main ditches:										
22	Number, 1920	11	142	2	360	109	531	5	6	277	67
23	Number, 1910	27	200	.....	253	40	384	.....	.....	172	.....
24	Length, 1920.....miles	10	285	2	580	283	1,127	15	114	272	95
25	Length, 1910.....miles	108	341	.....	536	82	770	.....	.....	231	.....
26	Capacity, 1920.....second-feet	83	1,304	2	3,283	1,292	5,315	3	341	1,822	235
27	Capacity, 1910.....second-feet	1,275	1,677	.....	2,847	454	5,552	.....	.....	1,177	.....
	Laterals:										
28	Number, 1920	37	399	6	472	162	204	.....	.....	143	282
29	Number, 1910	56	155	.....	309	48	479	.....	.....	94	.....
30	Length, 1920.....miles	10	65	2	195	139	209	.....	.....	44	91
31	Length, 1910.....miles	143	79	.....	191	46	362	.....	.....	41	.....
	Reservoirs:										
32	Number, 1920	2	9	2	16	11	4	.....	3	2	31
33	Number, 1910	16	20	.....	31	7	12	.....	.....	16	.....
34	Capacity, 1920.....acre-feet	2	109	80	31,638	38,101	2,199	.....	95,000	330	7,205
35	Capacity, 1910.....acre-feet	1,119	143	.....	655	12,281	1,420	.....	.....	68	.....
	Flowing wells:										
36	Number, 1920	.....	1	.....	.....	9	.....	.....	.....	.....	1
37	Number, 1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1920.....gallons per minute	.....	2,250	.....	.....	1,083	.....	.....	.....	.....	50
39	Capacity, 1910.....gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:										
40	Number, 1920	.....	.....	.....	1	.....	.....	.....	.....	.....	1
41	Number, 1910	2	.....	.....	.....	.....	1	.....	.....	.....	.....
42	Capacity, 1920.....gallons per minute	.....	.....	.....	1,500	.....	.....	.....	.....	.....	3,000
43	Capacity, 1910.....gallons per minute	4,550	.....	.....	.....	.....	135	.....	.....	.....	.....
	Pumping plants:										
44	Number, 1920	4	.....	.....	14	15	6	.....	.....	.....	12
45	Number, 1910	12	.....	.....	2	.....	3	.....	.....	.....	.....
46	Engine capacity, 1920.....horsepower	487	.....	.....	204	170	115	.....	.....	.....	352
47	Engine capacity, 1910.....horsepower	205	.....	.....	35	.....	24	.....	.....	.....	.....
48	Pump capacity, 1920.....gallons per minute	7,750	.....	.....	16,180	9,165	6,729	.....	.....	.....	21,335
49	Pump capacity, 1910.....gallons per minute	23,942	.....	.....	3,350	.....	785	.....	.....	.....	.....
50	Average lift, 1920.....feet	41	.....	.....	14	38	14	.....	.....	.....	16
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920.....dollars	154,334	354,148	2,900	729,436	836,723	1,176,492	50,385	3,545,069	344,544	188,822
52	Capital invested to July 1, 1910.....dollars	2,819,774	139,766	.....	375,025	239,589	1,017,474	.....	.....	76,500	.....
53	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	15.6	.....	.....	350.4	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920..dollars	22.50	14.59	11.15	8.84	33.96	6.73	129.19	138.48	8.95	15.69
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910..dollars	60.33	3.50	.....	4.44	12.03	7.32	.....	.....	2.70	.....
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920.....dollars	189,070	356,338	2,900	743,186	1,234,620	1,211,747	50,885	7,219,059	355,744	208,222
57	Estimated final cost of existing enterprises in 1910.....dollars	3,158,950	139,766	.....	375,025	2,371,947	1,017,474	.....	.....	76,500	.....
58	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	19.1	.....	.....	365.0	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920..dollars	24.67	8.88	11.15	7.69	36.54	4.21	12.44	60.92	6.09	14.05
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910..dollars	43.24	3.05	.....	3.74	27.49	5.99	.....	.....	2.26	.....

[1] Parts taken to form Richland and part of Wibaux in 1914, part of Prairie in 1915, and Garfield and part of McCone in 1919; part annexed to Wibaux in 1917.
[2] Parts taken to form Powell in 1901; part of Silver Bow annexed in 1903; and part annexed to Silver Bow in 1917.
[3] Organized from part of Custer in 1913; parts taken to form part of Wibaux in 1914, part of Prairie in 1915, and Carter in 1917.
[4] Part annexed to Meagher and part taken to form part of Musselshell in 1911.
[5] Part taken to form Lincoln in 1909; part annexed to Missoula in 1917.
[6] Organized from part of Dawson in 1919.
[7] Organized from part of Teton in 1919.
[8] Organized from part of Chouteau in 1912; parts taken to form part of Toole in 1914 and part of Liberty in 1919.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (−) denotes decrease.]

		Jefferson.	Lewis and Clark.	Lincoln.[1]	Madison.[2]	Meagher.[3]	Mineral.[4]	Missoula.[5]	Musselshell.[6]	Park.	Phillips.[7]
1	Number of all farms in 1920	555	855	341	901	447	95	1,323	1,604	756	1,914
2	Number of farms irrigated in 1919	227	109	81	614	122	28	854	49	402	137
3	Per cent of all farms	40.9	12.7	23.8	68.1	27.3	29.5	64.6	3.1	53.2	7.2
4	Number of farms irrigated in 1909	188	295	54	592	176	.....	333	.....	463	.....
5	Per cent of increase, 1909–1919	20.7	−63.1	.....	.....	.....	.....	.....	.....	−13.2	.....
	LAND AND FARM AREA.										
6	Approximate land area—acres	1,044,480	2,206,080	2,319,360	2,318,080	1,516,160	787,200	2,030,720	1,857,920	1,703,040	3,313,920
7	All land in farms—acres	281,494	754,135	65,050	564,516	801,801	20,209	388,408	999,389	613,597	1,084,725
8	Improved land in farms—acres	80,933	132,576	16,894	168,635	136,839	5,160	173,031	382,159	168,679	227,811
9	Area irrigated in 1919—acres	24,946	33,226	5,923	115,598	25,075	967	50,237	4,138	52,854	28,047
10	Per cent of improved land in farms	30.8	25.1	35.1	68.5	18.3	18.7	29.0	1.1	31.3	12.3
11	Area irrigated in 1909—acres	23,314	38,391	2,105	102,179	102,090	.....	42,689	.....	78,722	.....
12	Per cent of increase, 1909–1919	7.0	−13.5	181.4	.....	.....	.....	.....	.....	−32.9	.....
13	Area enterprises were capable of irrigating in 1920—acres	45,553	69,907	9,353	172,083	48,175	2,105	120,456	11,659	88,940	43,748
14	Area enterprises were capable of irrigating in 1910—acres	26,373	55,317	3,081	118,115	128,209	.....	47,917	.....	99,862	.....
15	Per cent of increase, 1910–1920	72.7	26.4	203.6	.....	.....	.....	.....	.....	−10.9	.....
16	Area included in enterprises in 1920—acres	86,086	94,133	13,737	265,103	60,348	6,690	156,883	19,255	125,767	85,132
17	Area included in enterprises in 1910—acres	37,494	107,789	4,281	191,230	146,373	.....	127,779	.....	149,533	.....
18	Per cent of increase, 1910–1920	129.6	−12.7	220.9	.....	.....	.....	.....	.....	−15.9	.....
19	Area of irrigated land reported as available for settlement—acres	800	.....	.....	3,489	.....	110	.....	610	.....	34,555
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	175	311	64	517	137	57	253	47	314	36
21	Number, 1910	149	251	32	446	290	.....	252	.....	363	.....
	Main ditches:										
22	Number, 1920	226	423	56	627	376	55	257	73	382	47
23	Number, 1910	159	313	30	493	481	.....	268	.....	361	.....
24	Length 1920—miles	440	635	33	1,304	490	36	507	126	756	124
25	Length, 1910—miles	259	518	30	938	792	.....	351	.....	729	.....
26	Capacity, 1920—second-feet	9,547	2,356	577	6,290	1,546	239	2,404	671	3,180	852
27	Capacity, 1910—second-feet	1,267	2,334	187	7,855	4,464	.....	2,316	.....	3,665	.....
	Laterals:										
28	Number, 1920	123	268	35	349	577	69	437	227	315	176
29	Number, 1910	137	273	38	752	378	.....	78	.....	635	.....
30	Length, 1920—miles	52	107	22	257	127	7	682	78	122	120
31	Length, 1910—miles	67	180	20	487	170	.....	45	.....	435	.....
	Reservoirs:										
32	Number, 1920	11	31	10	37	7	6	8	2	7	8
33	Number, 1910	15	38	3	39	14	.....	12	.....	41	.....
34	Capacity, 1920—acre-feet	8,288	651,071	313	24,879	181	129	43,297	129	8,029	48,221
35	Capacity, 1910—acre-feet	587	1,482	1	5,927	3,807	.....	1,732	.....	5,747	.....
	Flowing wells:										
36	Number, 1920	.....	4	2	.....	.....	.....	.....	.....	.....	.....
37	Number, 1910	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
38	Capacity, 1920—gallons per minute	.....	5	30	.....	.....	.....	.....	.....	.....	.....
39	Capacity, 1910—gallons per minute	.....	.....	.....	.....	.....	.....	5	.....	.....	.....
	Pumped wells:										
40	Number, 1920	.....	7	.....	.....	.....	.....	2	.....	1	.....
41	Number, 1910	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
42	Capacity, 1920—gallons per minute	.....	1,445	.....	.....	.....	.....	.....	.....	40	.....
43	Capacity, 1910—gallons per minute	.....	.....	30	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:										
44	Number, 1920	1	14	1	.....	.....	3	5	5	1	6
45	Number, 1910	1	.....	2	.....	.....	.....	3	.....	1	.....
46	Engine capacity, 1920—horsepower	10	3,884	.....	.....	.....	48	32	86	15	154
47	Engine capacity, 1910—horsepower	5	.....	4	.....	.....	.....	45	.....	1	.....
48	Pump capacity, 1920—gallons per minute	280	77,949	5	.....	.....	361	2,141	11,970	.....	10,420
49	Pump capacity, 1910—gallons per minute	550	.....	90	.....	.....	.....	2,932	.....	64	.....
50	Average lift, 1920—feet	33	45	10	.....	.....	28	22	20	18	18
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920—dollars	685,014	784,413	195,752	2,566,017	346,257	41,481	3,975,483	155,259	672,677	1,417,559
52	Capital invested to July 1, 1910—dollars	148,684	711,000	21,526	1,101,329	490,092	.....	332,442	.....	470,173	.....
53	Per cent of increase, 1910–1920	360.7	10.3	809.4	.....	.....	.....	.....	.....	43.1	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	15.04	11.22	20.93	14.91	7.19	19.71	33.00	13.32	7.56	32.40
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	5.64	12.85	6.99	9.32	3.82	.....	6.94	.....	4.71	.....
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920—dollars	699,764	819,113	197,902	2,587,647	363,507	47,646	5,909,973	160,209	691,027	1,430,709
57	Estimated final cost of existing enterprises in 1910—dollars	148,684	896,000	21,526	1,101,329	490,092	.....	2,498,292	.....	470,173	.....
58	Per cent of increase, 1910–1920	370.6	−8.6	819.4	.....	.....	.....	.....	.....	47.0	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	8.13	8.70	14.41	9.76	6.02	7.12	37.67	8.32	5.49	16.81
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	3.97	8.31	5.03	5.76	3.35	.....	19.55	.....	3.14	.....

[1] Organized from part of Flathead in 1909.
[2] Part annexed to Beaverhead in 1911.
[3] Part of Fergus annexed in 1911; parts taken to form part of Musselshell in 1911 and part of Wheatland in 1917.
[4] Organized from part of Missoula in 1914.
[5] Parts taken to form Sanders in 1906, and Mineral in 1914; part of Powell annexed in 1915. Parts of Flathead and Powell annexed in 1917.
[6] Organized from parts of Fergus, Meagher, and Yellowstone in 1911.
[7] Organized from parts of Blaine and Valley in 1915.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100, or when per cent is more than 1,000.]

		Pondera.[1]	Powder River.[2]	Powell.[3]	Prairie.[4]	Ravalli.	Richland.[5]	Roosevelt.[6]	Rosebud.[7]	Sanders.[8]	Sheridan.[9]
1	Number of all farms in 1920	1,060	833	476	673	1,231	1,577	1,215	1,136	667	2,408
2	Number of farms irrigated in 1919	427	11	219	8	1,096	200	7	61	123	16
3	Per cent of all farms	40.3	1.3	46.0	1.2	89.0	12.7	0.6	5.4	18.4	0.7
4	Number of farms irrigated in 1909	.....	.....	278	.....	975	.....	.....	179	62	.....
5	Per cent of increase, 1909–1919	.....	.....	.....	.....	12.4	.....	.....	.....	.....	.....
	LAND AND FARM AREA.										
6	Approximate land area, acres	1,061,120	2,135,680	1,490,560	1,114,880	1,530,240	1,345,920	1,505,920	3,195,520	1,831,040	1,719,040
7	All land in farms, acres	629,955	597,056	520,065	548,989	245,965	812,194	673,936	1,608,235	175,088	1,155,859
8	Improved land in farms, acres	266,150	75,240	125,924	126,134	114,473	311,006	302,519	226,113	42,425	570,955
9	Area irrigated in 1919, acres	55,754	800	64,045	486	107,028	15,450	1,190	20,814	6,373	3,879
10	Per cent of improved land in farms	20.9	1.1	50.9	0.4	93.5	5.0	0.4	9.2	15.0	0.7
11	Area irrigated in 1909, acres	.....	.....	51,373	.....	93,441	.....	.....	33,271	3,101	.....
12	Per cent of increase, 1909–1919	.....	.....	.....	.....	14.5	.....	.....	.....	105.5	.....
13	Area enterprises were capable of irrigating in 1920, acres	103,411	3,785	93,120	834	126,401	35,835	7,537	29,070	13,291	10,355
14	Area enterprises were capable of irrigating in 1910, acres	.....	.....	60,643	.....	118,984	.....	.....	64,452	4,101	.....
15	Per cent of increase, 1910–1920	.....	.....	.....	.....	6.2	.....	.....	.....	224.1	.....
16	Area included in enterprises in 1920, acres	212,743	3,785	134,742	834	143,892	41,385	115,955	36,733	26,537	16,499
17	Area included in enterprises in 1910, acres	.....	.....	81,360	.....	202,296	.....	.....	92,217	9,812	.....
18	Per cent of increase, 1910–1920	.....	.....	.....	.....	−28.9	.....	.....	.....	.....	.....
19	Area of irrigated land reported as available for settlement, acres	27,198	.....	600	.....	.....	23,535	.....	200	.....	.....
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	30	23	272	10	449	9	8	36	83	28
21	Number, 1910	.....	.....	302	.....	350	.....	.....	90	61	.....
	Main ditches:										
22	Number, 1920	44	31	526	7	578	13	6	44	73	28
23	Number, 1910	.....	.....	368	.....	364	.....	.....	102	62	.....
24	Length, 1920, miles	143	17	809	9	762	60	48	110	87	48
25	Length, 1910, miles	.....	.....	563	.....	682	.....	.....	284	66	.....
26	Capacity, 1920, second-feet	3,184	89	3,233	55	3,430	672	287	1,540	1,343	419
27	Capacity, 1910, second-feet	.....	.....	2,563	.....	4,235	.....	.....	1,921	184	.....
	Laterals:										
28	Number, 1920	232	17	200	3	428	57	63	95	91	21
29	Number, 1910	.....	.....	290	.....	295	.....	.....	89	79	.....
30	Length, 1920, miles	499	3	62	.....	130	78	63	28	71	12
31	Length, 1910, miles	.....	.....	137	.....	264	.....	.....	71	24	.....
	Reservoirs:										
32	Number, 1920	6	8	8	3	10	4	6	1	1	5
33	Number, 1910	.....	.....	40	.....	46	.....	.....	17	.....	.....
34	Capacity, 1920, acre-feet	62,900	50	276	8	7,634	395	50,095	40	3,778	468
35	Capacity, 1910, acre-feet	.....	.....	5,502	.....	57,450	.....	.....	778	.....	.....
	Flowing wells:										
36	Number, 1920	3	12	.....	5	.....	.....	.....	.....	1	.....
37	Number, 1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1920, gallons per minute	1,000	83	.....	104	.....	.....	.....	.....	.....	.....
39	Capacity, 1910, gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:										
40	Number, 1920	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
41	Number, 1910	.....	.....	.....	.....	.....	.....	.....	1	2	.....
42	Capacity, 1920, gallons per minute	.....	10	.....	.....	.....	.....	.....	.....	.....	.....
43	Capacity, 1910, gallons per minute	.....	.....	.....	.....	.....	.....	.....	176	177	.....
	Pumping plants:										
44	Number, 1920	.....	4	1	3	.....	3	1	10	1	14
45	Number, 1910	.....	.....	.....	.....	.....	.....	.....	18	3	.....
46	Engine capacity, 1920, horsepower	.....	56	16	462	.....	125	50	269	7	183
47	Engine capacity, 1910, horsepower	.....	.....	.....	.....	.....	.....	.....	566	5	.....
48	Pump capacity, 1920, gallons per minute	.....	4,750	650	19,015	.....	9,750	4,500	13,100	.....	11,700
49	Pump capacity, 1910, gallons per minute	.....	.....	.....	.....	.....	.....	.....	38,507	197	.....
50	Average lift, 1920, feet	.....	12	12	24	.....	20	22	16	10	12
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920, dollars	4,919,860	20,435	877,108	66,866	994,246	2,442,376	713,197	1,024,981	595,212	91,808
52	Capital invested to July 1, 1910, dollars	.....	.....	306,173	.....	960,144	.....	.....	1,007,778	27,869	.....
53	Per cent of increase, 1910–1920	.....	.....	.....	.....	3.6	.....	.....	.....	.....	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920, dollars	47.58	5.40	9.42	80.18	7.87	68.16	94.63	34.55	44.78	8.87
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910, dollars	.....	.....	5.05	.....	8.07	.....	.....	15.64	6.80	.....
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920, dollars	5,264,860	37,835	929,633	66,866	998,607	2,664,392	4,327,335	1,040,341	854,850	227,102
57	Estimated final cost of existing enterprises in 1910, dollars	.....	.....	306,173	.....	1,185,094	.....	.....	1,286,565	27,869	.....
58	Per cent of increase, 1910–1920	.....	.....	.....	.....	−15.7	.....	.....	.....	.....	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920, dollars	24.75	10.00	6.90	80.18	6.94	64.38	37.32	28.32	32.21	13.76
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910, dollars	.....	.....	3.76	.....	5.86	.....	.....	13.95	2.84	.....

[1] Organized from parts of Chouteau and Teton in 1919.
[2] Organized from part of Custer in 1919.
[3] Organized from part of Deer Lodge in 1901; part annexed to Missoula in 1917.
[4] Organized from parts of Custer, Dawson, and Fallon in 1915.
[5] Organized from part of Dawson in 1914; parts taken to form part of Wibaux in 1914 and part of McCone in 1919.
[6] Organized from part of Sheridan in 1919.
[7] Organized from part of Custer County, including Northern Cheyenne Indian Reservation and part of Crow Indian Reservation in 1901; parts taken to form part of Big Horn in 1913 and Treasure in 1919.
[8] Organized from part of Missoula in 1906.
[9] Organized from part of Valley in 1913; part taken to form Roosevelt in 1919.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

		Silver Bow.[1]	Still-water.[2]	Sweet Grass.[3]	Teton.[4]	Toole.[5]	Treasure.[6]	Valley.[7]	Wheat-land.[8]	Wiba ux.[9]	Yellow-stone.[10]
1	Number of all farms in 1920	331	1,370	863	1,135	933	330	2,169	688	530	2,211
2	Number of farms irrigated in 1919	107	291	261	178	3	98	43	54	1	1,095
3	Per cent of all farms	32.3	21.2	30.2	15.7	0.3	29.7	2.0	7.8	0.2	49.5
4	Number of farms irrigated in 1909	84	.....	332	179	.....	.....	179	.....	.....	800
5	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	LAND AND FARM AREA.										
6	Approximate land area ..... acres	464,040	1,137,280	1,260,160	1,308,160	1,253,120	614,400	3,486,080	903,040	565,120	1,071,040
7	All land in farms ..... acres	100,170	660,996	645,120	613,506	570,163	237,133	1,126,872	589,827	338,107	1,007,425
8	Improved land in farms ..... acres	28,238	278,040	138,530	234,833	153,852	44,933	344,335	205,076	140,299	333,174
9	Area irrigated in 1919 ..... acres	11,519	33,039	47,306	55,433	839	7,788	20,800	14,478	.....	101,378
10	Per cent of improved land in farms	40.8	11.9	34.1	23.6	0.5	17.3	6.0	7.1	.....	30.4
11	Area irrigated in 1909 ..... acres	7,385	.....	58,963	99,711	.....	.....	52,320	.....	.....	97,420
12	Per cent of increase, 1909–1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13	Area enterprises were capable of irrigating in 1920 ..... acres	15,521	44,926	79,069	119,323	976	21,017	36,336	36,946	100	123,506
14	Area enterprises were capable of irrigating in 1910 ..... acres	8,646	.....	82,978	140,444	.....	.....	64,261	.....	.....	182,888
15	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16	Area included in enterprises in 1920 ..... acres	20,386	49,432	146,265	222,521	1,291	21,462	93,308	48,091	100	135,190
17	Area included in enterprises in 1910 ..... acres	10,059	.....	142,178	362,186	.....	.....	203,256	.....	.....	220,206
18	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	Area of irrigated land reported as available for settlement ..... acres	.....	.....	10,000	27,000	.....	.....	18,848	.....	.....	3,317
	IRRIGATION WORKS.										
	Independent enterprises:										
20	Number, 1920	144	128	164	62	10	15	30	61	1	48
21	Number, 1910	79	.....	232	118	.....	.....	126	.....	.....	71
	Main ditches:										
22	Number, 1920	211	134	283	78	8	9	32	115	1	54
23	Number, 1910	97	.....	249	135	.....	.....	123	.....	.....	102
24	Length, 1920 ..... miles	220	300	547	328	11	30	96	283	2	417
25	Length, 1910 ..... miles	109	.....	644	468	.....	.....	203	.....	.....	516
26	Capacity, 1920 ..... second-feet	720	1,600	3,173	2,239	46	397	4,324	1,179	.....	2,545
27	Capacity, 1910 ..... second-feet	436	.....	3,795	3,693	.....	.....	5,081	.....	.....	4,671
	Laterals:										
28	Number, 1920	26	65	148	93	14	74	116	362	.....	86
29	Number, 1910	73	.....	766	406	.....	.....	83	.....	.....	205
30	Length, 1920 ..... miles	36	64	159	199	6	44	79	108	.....	341
31	Length, 1910 ..... miles	37	.....	384	848	.....	.....	53	.....	.....	333
	Reservoirs:										
32	Number, 1920	6	3	9	6	7	.....	13	5	1	3
33	Number, 1910	19	.....	12	25	.....	.....	63	.....	.....	17
34	Capacity, 1920 ..... acre-feet	12	2	18,153	85,718	60	.....	1,546	2,803	58	2,509
35	Capacity, 1910 ..... acre-feet	162	.....	17,767	174,261	.....	.....	46,823	.....	.....	174
	Flowing wells:										
36	Number, 1920	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
37	Number, 1910	.....	.....	.....	9	.....	.....	.....	.....	.....	.....
38	Capacity, 1920 ..... gallons per minute	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
39	Capacity, 1910 ..... gallons per minute	.....	.....	.....	20,000	.....	.....	.....	.....	.....	.....
	Pumped wells:										
40	Number, 1920	1	.....	.....	.....	2	.....	.....	.....	.....	.....
41	Number, 1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
42	Capacity, 1920 ..... gallons per minute	80	.....	.....	.....	5,000	.....	.....	.....	.....	.....
43	Capacity, 1910 ..... gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:										
44	Number, 1920	2	1	.....	.....	5	14	7	1	.....	11
45	Number, 1910	1	.....	1	.....	.....	.....	24	.....	.....	6
46	Engine capacity, 1920 ..... horsepower	10	45	.....	.....	258	434	137	20	.....	767
47	Engine capacity, 1910 ..... horsepower	6	.....	10	.....	.....	.....	514	.....	.....	342
48	Pump capacity, 1920 ..... gallons per minute	130	.....	.....	.....	12,100	71,870	9,020	1,000	.....	5,102
49	Pump capacity, 1910 ..... gallons per minute	200	.....	1,350	.....	.....	.....	52,320	.....	.....	30,898
50	Average lift, 1920 ..... feet	58	63	.....	.....	16	18	14	30	.....	26
	CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920 ..... dollars	292,302	402,941	1,032,451	2,698,814	26,231	483,790	1,006,823	234,750	3,000	3,303,880
52	Capital invested to July 1, 1910 ..... dollars	80,435	.....	834,057	1,221,220	.....	.....	508,449	.....	.....	3,094,560
53	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920 ... dollars	18.83	8.97	13.06	22.62	26.88	23.02	27.71	6.35	30.00	26.75
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910 ... dollars	9.30	.....	10.05	8.70	.....	.....	7.91	.....	.....	16.92
	ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920 ..... dollars	296,827	407,541	1,032,951	4,731,005	26,731	485,340	2,097,253	246,350	3,000	3,491,298
57	Estimated final cost of existing enterprises in 1910 ..... dollars	80,435	.....	834,057	2,984,220	.....	.....	2,621,041	.....	.....	3,178,630
58	Per cent of increase, 1910–1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920 .. dollars	14.56	8.24	7.06	21.26	20.71	22.61	22.48	5.12	30.00	25.83
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910 ... dollars	8.00	.....	5.87	8.24	.....	.....	12.90	.....	.....	14.43

[1] Part annexed to Deer Lodge in 1903; part of Deer Lodge annexed in 1917.
[2] Organized from parts of Carbon, Sweet Grass, and Yellowstone in 1913. Part annexed to Sweet Grass in 1915.
[3] Parts taken to form part of Stillwater in 1913 and part of Wheatland in 1917. Part of Stillwater annexed in 1915.
[4] Part taken to form part of Toole in 1914; parts taken to form Glacier and part of Pondera in 1919.
[5] Organized from parts of Hill and Teton in 1914.
[6] Organized from part of Rosebud in 1919.
[7] Parts taken to form Sheridan in 1913 and part of Phillips in 1915.
[8] Organized from parts of Meagher and Sweet Grass in 1917.
[9] Organized from parts of Dawson, Fallon, and Richland in 1914; part of Dawson annexed in 1917.
[10] Parts taken to form part of Musselshell in 1911 and parts of Big Horn and Stillwater in 1913; part annexed to Carbon and part of Carbon annexed in 1919.

NEBRASKA.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Nebraska collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

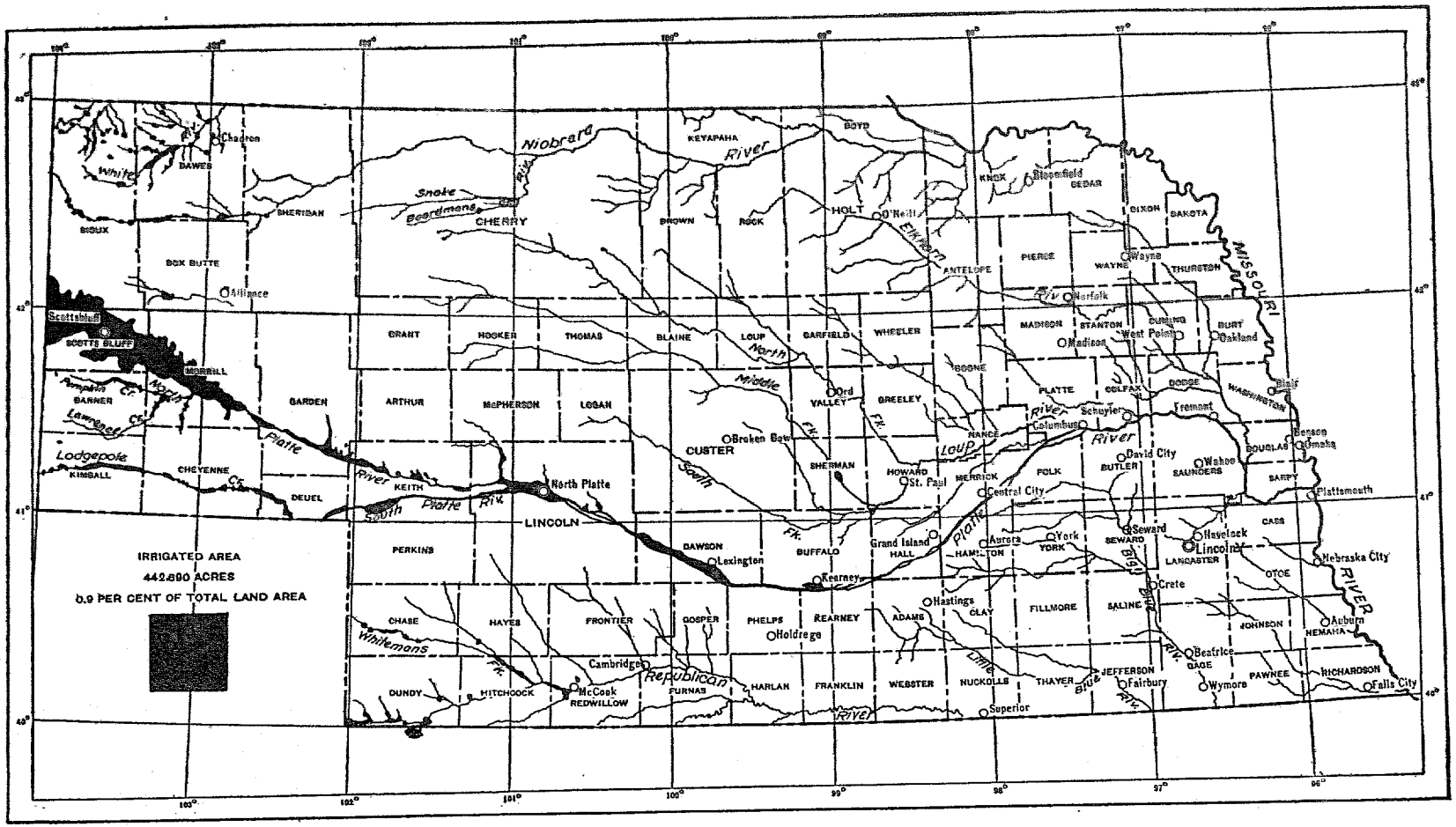
TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	124,417	129,678	−5,261	−4.1
Approximate land area of the state.....acres..	49,157,120	49,157,120		
All land in farms.....acres..	42,225,475	38,622,021	3,603,454	9.3
Improved land in farms.....acres..	23,109,624	24,382,577	−1,272,953	−5.2
Number of farms irrigated	3,021	1,852	1,169	63.1
Area irrigated.....acres..	442,690	255,950	186,740	73.0
Area enterprises were capable of irrigating.....acres..	562,468	429,225	133,243	31.0
Area included in enterprises.....acres..	766,768	680,133	86,635	12.7
Per cent irrigated:				
Number of all farms	2.4	1.4	1.0	
Approximate land area of the state	0.9	0.5	0.4	
Land in farms	1.0	0.7	0.3	
Improved land in farms	1.9	1.0	0.9	
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	119,778	173,275	−53,497	−30.9
Excess of area included in enterprises over area irrigated.....acres..	324,078	424,183	−100,105	−23.6
Capital invested	$13,909,185	$7,798,310	$6,110,875	78.4
Average per acre enterprises were capable of irrigating	$24.73	$18.17	$6.56	36.1
Estimated final cost of existing enterprises	$18,030,154	$9,485,231	$8,544,923	90.1
Average per acre included in enterprises	$23.51	$13.95	$9.56	68.5
Average cost of operation and maintenance per acre	$1.48	$1.09	$0.39	35.8
IRRIGATION WORKS.				
Number of enterprises	470	474	−4	−0.8
Number of main ditches	513	420	93	22.1
Length of main ditches.....miles..	1,780	1,459	321	22.0
Capacity of main ditches.....second-feet..	11,665	9,378	2,287	24.4
Number of lateral ditches	913	1,038	−125	−12.0
Length of lateral ditches.....miles..	1,545	1,269	276	21.7
Number of reservoirs	59	44	15	
Capacity of reservoirs.....acre-feet..	197,890	2,098	195,792	
Number of flowing wells	[2]	[3]		
Capacity of flowing wells.....gallons per minute..	[2]	[3]		
Number of pumped wells	34	66	−32	
Capacity of pumped wells.....gallons per minute..	24,701	3,363	21,338	634.5
Number of pumping plants	51	75	−24	
Engine capacity.....horsepower..	959	140	819	585.0
Pump capacity.....gallons per minute..	73,686	5,366	68,320	
Average lift.....feet..	24	[3]	24	

[1] A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000. [2] Not reported in 1920. [3] Not reported in 1910.

NEBRASKA

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

Nebraska lies in the semiarid region. The eastern part of the state receives sufficient rainfall for the growth of crops in most seasons; while the extreme western part receives so little rainfall that irrigation is generally practiced where water is available, although crops are grown without irrigation.

The normal annual precipitation is about 30 inches at the eastern line of the state, and decreases very regularly to the westward to about 15 inches at the Nebraska-Wyoming line. About three-fourths of the annual precipitation occurs within the growing season, the spring and early summer rains being general while the late summer precipitation occurs in local and irregular showers.

In the western part of the state in summer the relative humidity is low, and temperatures and wind velocities are high, and these conditions result in heavy demands for moisture to maintain plant growth.

The line of 20-inch normal annual precipitation follows approximately the one-hundredth meridian of longitude, and this marks approximately the eastern extension of the general practice of irrigation.

For the state as a whole the precipitation in 1919 was slightly above the normal but the excess occurred in the winter, and in the western part of the state there was a marked deficiency in May and August, with no excess in June and July.

WATER SUPPLY FOR IRRIGATION.

Western Nebraska consists of high, rolling prairies cut by the valleys of the North Platte, the South Platte, the Niobrara, and the Republican Rivers. The streams named, and their tributaries, and the main Platte River, below the junction of the north and south branches, supply water to almost all of the land irrigated.

The North Platte and its tributaries supplied water to nearly 85 per cent of the land irrigated in 1919. This river rises in the mountains of northern Colorado, flows through Wyoming and then into Nebraska, and is used for irrigation in all three states. The flow of the river in eastern Wyoming and in Nebraska is regulated by the Pathfinder Reservoir of the United States Reclamation Service, and stored water is furnished to lands along the main Platte as well as to those along the North Platte. The supply is usually ample for the lands under existing canals, and a large extension of the North Platte project of the United States Reclamation Service, covering land in both Wyoming and Nebraska, is under construction. Stored water from Pathfinder Reservoir also serves a large area under numerous private canals, mainly in Nebraska. Before the construction of the Pathfinder Reservoir the North Platte in Nebraska carried very heavy flood discharges in the spring and very little water in the late summer.

The South Platte also rises in the mountains in Colorado, and is used extensively for irrigation in that state, the area irrigated from the stream and its tributaries in Colorado in 1919 being more than 1,000,000 acres. The South Platte is a typical plains stream, having its source in the mountains, being subject to heavy floods in the early summer with the melting of the snows, and having a greatly reduced flow in the late summer, and the summer flow is largely lost in its sandy bed and by evaporation. This natural condition has been much changed by the storage of flood waters and the use of water in Colorado. The storage of flood waters has greatly reduced the flood flow in Nebraska, while return seepage from the irrigated lands in Colorado has tended to increase the regular flow of the stream in both summer and winter. No storage has been provided on this stream in Nebraska, although there is a large quantity of water available for storage.

The Platte River is formed by the uniting of the north and south forks, and is of the same character as its branches—it has a large flood flow in spring and early summer, and is very low in late summer, sometimes having no visible flow. The regulation of the North Platte and return seepage to that stream are increasing the summer flow, and stored water from the Pathfinder Reservoir is available for canals taking water from the main stream.

The Niobrara, which rises in Wyoming and flows along the northern border of Nebraska, is a plains stream but a considerable part of its drainage area is composed of sand hills which absorb the rains and snows. As a consequence the water drains into the stream gradually, and it has a remarkably uniform flow, giving rise to its original name, "The river which flows."

The Republican River rises on the plains in Colorado, enters Nebraska near the southwest corner of the state, flows eastward near the southern line of the state for about 275 miles, and crosses the line into Kansas. During the spring the river is subject to heavy floods and it is very low in summer. It is used to some extent for irrigation in both Colorado and Nebraska, although in both states crops are grown in its drainage basin without irrigation. Very little provision for storing flood water has been made.

In the stream valleys water for irrigation can be obtained from wells with low lifts but on the high plains the ground water is at such great depths that the cost of pumping is prohibitive.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.[1]	Per cent of all farms.	Acres.	Per cent of increase.	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	3,021	63.1	2.4	442,690	73.0	0.9	1.0	1.9
1910	1,852	—4.1	1.4	255,950	72.3	0.5	0.7	1.0
1900	1,932	802.8	1.6	148,538	.....	0.3	0.5	0.8
1890	214	.....	0.2	11,744	.....	.....	0.1	0.1

[1] A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	470	766,768	442,690	57.7	562,468
Before 1860	1	30	30	100.0	30
1870–1879	4	1,515	1,090	71.9	1,115
1880–1889	61	117,177	104,100	88.8	105,817
1890–1899	191	375,191	191,229	51.0	258,341
1900–1904	58	33,808	21,380	63.8	40,979
1905–1909	26	192,288	98,704	51.2	124,540
1910–1914	62	27,184	19,788	72.8	23,241
1915–1919	36	6,103	2,746	45.0	3,784
Not reported	31	12,872	3,423	26.6	4,621

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.			
			Amount.	Per cent.[1]		
Total	442,690	255,950	186,740	73.0	562,468	766,768
Streams, gravity	435,567	254,105	181,462	71.4	560,491	750,931
Streams, pumped	1,115	18	1,097	.....	2,468	2,755
Streams, pumped and gravity	850	(2)	850	.....	1,140	1,140
Wells, pumped	546	139	407	292.8	1,148	1,228
Lake, gravity	.....	.....	.....	.....	30	30
Springs	2,050	686	1,364	198.8	3,141	4,546
Stored storm water	1,200	1,002	198	19.8	1,870	1,900
City water	7	(2)	7	.....	7	7
Sewage	120	(2)	120	.....	120	120
Streams, gravity, and pumped wells	115	(2)	115	.....	230	320
Streams, gravity, and flowing wells	.....	(2)	.....	.....	160	160
Other mixed	1,120	(2)	1,120	.....	1,663	3,631

[1] Per cent not shown when base is less than 100.
[2] Not included in 1909 classification.

ACREAGE, BY CHARACTER OF ENTERPRISE.

The provisions of law relating to internal improvements were extended to irrigation canals by a law of 1877. This empowered canal companies to issue bonds and to condemn rights of way for canals.

Nebraska enacted an irrigation district law in 1895. This law has been amended from time to time, and is still in force. Very few districts have been organized to develop new enterprises, but many have been organized to take over works already built, many cooperative enterprises having been organized into districts. The land watered by such enterprises is reported under districts in Table 5.

Nebraska has not accepted the conditions of the Federal Carey Act (act of Aug. 18, 1894).

In addition to the area credited to the United States Reclamation Service in Table 5, that service supplies water to a large but varying area under the Warren Act and special contracts providing for supplying water to lands that receive their principal supply from other sources.

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Acres.	Per cent.
ACREAGE IRRIGATED.				
Total	442,690	255,950	186,740	73.0
Individual and partnership	68,140	45,227	22,913	50.7
Cooperative	55,408	78,605	—23,197	—29.5
Irrigation district	206,206	76,448	129,758	169.7
Commercial	25,335	24,834	501	2.0
U. S. Reclamation Service	[2] 87,558	30,536	57,022	186.7
U. S. Indian Service	.....	300	—300	.....
Other	43	(3)	43	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	562,468	429,225	133,243	31.0
Individual and partnership	96,465	64,472	31,993	49.6
Cooperative	102,242	168,260	—66,018	—39.2
Irrigation district	220,859	77,228	143,631	186.0
Commercial	27,332	52,724	—25,392	—48.2
U. S. Reclamation Service	[2] 115,487	66,241	49,246	74.3
U. S. Indian Service	.....	300	—300	.....
Other	83	(3)	83	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total	766,768	680,133	86,635	12.7
Individual and partnership	124,098	86,305	37,793	43.8
Cooperative	145,444	240,009	—94,565	—39.4
Irrigation district	244,383	91,076	153,307	168.3
Commercial	76,925	154,623	—77,698	—50.2
U. S. Reclamation Service	[2] 175,820	107,520	68,300	63.5
U. S. Indian Service	.....	600	—600	.....
Other	98	(3)	98	.....

[1] A minus sign (—) denotes decrease.
[2] Does not include land supplied with stored water under the Warren Act.
[3] Not included in 1910 classification.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The laws of Nebraska relating to water rights are summarized in the following paragraphs:

Upon its organization the territory of Nebraska adopted the common law of England, so far as it was applicable and not inconsistent with the Constitution of the United States, with the organic law of the territory, or with any law passed by the legislature. The supreme court of the state held that this included the common law rule as to riparian rights, and that this rule held until abrogated by statute.

In 1889 a law was enacted providing that rights to the use of water for beneficial or useful purpose might be acquired by appropriation, and the court has held that this law abrogated the common law of riparian rights (Crawford Company *v.* Hathaway, 93 N. W., 791). This law provided for the posting and filing of notices of intended diversions, but did not require the filing of claims for rights previously acquired.

In 1895 the state board of irrigation was created, and from that time parties wishing to acquire rights have been required to apply to the board for permits to appropriate water, and to submit proof of the completion of works in accordance with the permits. Certificates defining rights acquired are issued by the board.

The board was given the power to adjudicate rights to water, the procedure being left to the board.

In 1919 the functions of the board of irrigation were assigned to a new department of public works, but the general features of the system of water rights were not changed.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909, per cent of total.
	Acres.	Per cent of total.	
Total	442,690	100.0	100.0
Appropriation and use	42,141	9.5	8.8
Notice filed and posted	16,517	3.7	9.9
Adjudicated by court	9,280	2.1	18.8
Permit from state	234,806	53.0	59.6
Certificate or license from state	117,960	26.6	2.7
Riparian rights	618	0.1	.....
Underground	546	0.1	(1)
Other and mixed	13	(2)	(1)
Not reported	20,809	4.7	(1)

[1] All land for which the class of water rights was not reported was included in "Appropriation and use."
[2] Less than one-tenth of 1 per cent.

ACREAGE, BY DRAINAGE BASIN.

The report of a special census taken in 1902 presented all data by drainage basins rather than by counties. The results of the census of 1920 have been tabulated on the same basis, and the data for 1902 are presented for purposes of comparison. For no other census have the results been tabulated in this form.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
Total	442,690	245,910	80.0	766,768	562,468
Hat Creek	2,938	[2] 2,649	10.9	3,755	3,705
White River	8,008	[2] 9,706	−17.5	21,922	16,939
Niobrara River	5,693	[2] 7,210	−21.0	28,511	9,820
Platte River and tributaries	400,623	211,890	89.1	678,053	501,435
Platte River direct	37,532	30,887	21.5	151,377	68,732
North Platte River and tributaries	326,045	146,197	123.0	479,258	389,140
North Platte River direct	291,736	130,900	122.9	436,013	349,766
Blue River	7,376	4,929	49.6	7,391	7,391
Pumpkin Creek	7,273	2,314	214.3	10,554	9,168
Other tributaries of North Platte River	19,660	[2] 8,054	144.1	25,300	22,815
South Platte River and tributaries	35,290	19,473	81.2	42,262	40,542
South Platte River direct	17,061	10,861	57.1	18,623	18,590
Lodgepole Creek	18,229	8,612	111.7	23,639	21,952
Loup River	1,177	12,872	−90.9	4,512	2,377
Other tributaries of Platte River	579	[2] 2,461	−76.5	644	644
Kansas River and tributaries	25,428	14,455	75.9	34,527	30,569
Big Blue River	19	(3)	.....	44	44
Republican River	25,409	(3)	.....	34,483	30,525

[1] A minus sign (−) denotes decrease.
[2] Includes springs and wells.
[3] Main stream and tributaries shown as one item in 1902.

The acreage reported for each drainage basin in 1919 comprises all the irrigated land in that drainage basin, including that watered from springs and wells. In the 1902 results the acreages irrigated from springs and wells were not reported for the smaller tributary streams, but the acreages for the tributaries were included in those reported for the main streams. This area is so small, however, that the comparison of the areas reported for the tributary streams is not seriously affected.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1890 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.[1]	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.
1920	$13,909,185	78.4	$24.73	36.1
1910	7,798,310	495.0	18.17	106.0
1900	1,310,698	.....	8.82	116.7
1890	[2] 47,798	.....	[3] 4.07	.....

[1] Per cent not shown when more than 1,000.
[2] Based on average for "subhumid" region. Average for Nebraska not shown separately in 1890.
[3] Average for "subhumid" region.

TABLE 9.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$13,909,185	100.0	$24.73
Before 1860	500	(1)	16.67
1870–1879	21,583	0.2	19.36
1880–1889	1,659,094	11.9	15.68
1890–1899	2,075,677	14.9	8.03
1900–1904	321,927	2.3	7.86
1905–1909	8,685,843	62.4	69.74
1910–1914	444,144	3.2	19.11
1915–1919	180,314	1.3	47.65
Not reported	520,103	3.7	112.55

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

TABLE 10.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$13,909,185	100.0	$24.73	394,392	$1.48
Streams, gravity	13,619,775	97.9	24.74	389,699	1.48
Streams, pumped	39,581	0.3	16.04	572	2.86
Streams, pumped and gravity	18,700	0.1	16.40	850	1.04
Wells, pumped	23,250	0.2	20.25	436	5.16
Lake, gravity	[2] 100,300	0.7	[2] 10.00	.....	.....
Springs	24,497	0.2	7.80	1,700	1.14
Stored storm water	40,429	0.3	21.62	895	0.36
City water	1,000	(3)	142.86	.....	.....
Sewage	313	(3)	2.61	.....	.....
Streams, gravity, and pumped wells	5,035	(3)	21.89	10	3.00
Streams, gravity, and flowing wells	6,902	(3)	43.14	.....	.....
Other mixed	29,403	0.2	17.68	230	2.63

[1] Based on area irrigated in 1919.
[2] Capital invested includes $100,000 for which no acreage is reported and not included in computing average capital per acre.
[3] Less than one-tenth of 1 per cent.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	INCREASE.[1]	
			Amount.	Per cent.
Total	$12,909,185	$2,463,748	$11,445,437	464.6
Hat Creek	85,243	[2] 19,090	66,153	346.5
White River	183,349	[2] 155,924	27,425	17.6
Niobrara River	349,874	[2] 72,900	276,974	379.9
Platte River and tributaries	12,894,068	1,982,149	10,911,939	550.5
Platte River direct	488,642	565,470	−76,828	−13.6
North Platte River and tributaries	11,934,733	967,110	10,967,623	.....
North Platte River direct	11,661,937	891,875	10,770,062	.....
Blue River	31,050	22,620	8,430	37.3
Pumpkin Creek	92,060	19,925	72,135	362.0
Other tributaries of North Platte River	149,686	[2] 32,090	116,996	357.9
South Platte River and tributaries	444,413	101,240	343,173	339.0
South Platte River direct	87,712	53,600	34,112	63.6
Lodgepole Creek	356,701	47,640	309,061	648.7
Loup River	21,300	320,615	−299,315	−93.4
Other tributaries of Platte River	5,000	[2] 27,714	−22,714	−82.0
Kansas River and tributaries	396,631	233,695	162,946	69.7
Big Blue River	1,625	(3)	.....	.....
Republican River	395,006	(3)	.....	.....

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.
[3] Main stream and tributaries shown as one item in 1902.

In classifying capital invested by type of enterprise (Table 12) the average capital invested per acre is not presented, for the reason that it is difficult to arrive at a correct figure.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$13,909,185	100.0	394,392	$1.48
Individual and partnership	1,146,227	8.2	47,530	1.42
Cooperative	547,104	3.9	54,298	0.95
Irrigation district	2,811,474	20.2	187,186	1.24
Commercial	726,560	5.2	25,335	1.10
U. S. Reclamation Service	8,674,250	62.4	80,000	2.54
Other	3,570	(2)	43	11.86

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

The United States Reclamation Service supplies stored water to enterprises controlled by agencies of most of the other classes shown in the table and a part of its expenditure is properly chargeable to those lands; but it is not possible to tell how much should be so charged or how it should be distributed among the various classes since the area served varies from season to season.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	24
Acreage included in enterprises reporting land drained or needing drainage	376,518
Acreage for which drains have been installed	10,793
Additional acreage needing drainage	26,606
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	2.9
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	1.4
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	4.9

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 14. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume of water entering canals, second-feet	2,655	2,154	501
Area irrigated in 1919.....acres..	171,080	135,500	35,580
Average number of acres per second-foot.....	64	63	71
Total quantity of water entering canals...acre-feet..	975,071	894,316	80,755
Area irrigated in 1919.....acres..	232,620	199,650	32,970
Average quantity of water per acre....acre-feet..	4.2	4.5	2.4
Total quantity of water delivered.....acre-feet..	445,585	188,089	257,496
Area irrigated in 1919.....acres..	185,795	76,987	108,808
Average quantity delivered per acre...acre-feet..	2.4	2.4	2.4

IRRIGATION WORKS.

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.		Pipe lines, length (miles).	PUMPED WELLS.		PUMPING PLANTS.			
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).		Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.	
															Number.	Capacity (gallons per minute).
Total	260	73	513	11,665	1,780	913	1,545	59	197,890	3.8	34	24,701	51	959	54	73,686
Before 1860	5	2	2	39	4	3	3	1	3	.....	.....	.....	.....	.....	.....	.....
1870-1879	5	.....	6	12	10	9	7	.....	.....	.....	.....	.....	.....	.....	.....	.....
1880-1889	42	2	71	2,748	284	105	370	2	70	0.4	.....	.....	.....	.....	.....	.....
1890-1899	91	22	215	4,814	904	489	438	19	14,244	0.8	2	3,480	4	69	4	7,480
1900-1904	45	11	63	479	115	82	64	10	75,928	0.3	1	300	3	75	3	5,800
1905-1909	14	7	28	2,825	227	138	599	7	212	.....	1	2,100	4	38	4	3,097
1910-1914	26	15	56	488	126	37	41	9	6,764	2.0	18	11,950	19	480	21	35,199
1915-1919	15	8	38	152	48	22	13	3	100,300	0.3	12	6,871	20	290	21	21,210
Not reported	17	6	34	108	62	28	10	8	369	.....	.....	.....	1	7	1	900

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.		Pipe lines, length (miles).	PUMPED WELLS.		PUMPING PLANTS.			
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).		Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.	
															Number.	Capacity (gallons per minute).
Total	260	73	513	11,665	1,780	913	1,545	59	197,890	3.8	34	24,701	51	959	54	73,686
Individual and partnership	223	61	434	1,892	697	470	268	46	3,467	3.3	33	23,601	47	926	50	72,271
Cooperative	11	4	32	1,276	222	52	79	1	13,000	.....	.....	.....	.....	.....	.....	.....
Irrigation district	11	3	28	4,878	551	251	569	1	6,000	0.4	.....	.....	.....	.....	.....	.....
Commercial	12	2	14	928	124	29	59	5	100,256	0.1	.....	.....	.....	.....	.....	.....
U. S. Reclamation Service	3	3	3	2,690	185	111	570	6	75,167	.....	.....	.....	.....	.....	.....	.....
Other	.....	.....	2	1	1	.....	.....	.....	.....	.....	1	1,100	4	33	4	1,415

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.		Pipe lines, length (miles)	PUMPED WELLS.		PUMPING PLANTS.				
			Number.	Capacity (second-feet).	Length (miles)	Number.	Length (miles)	Number.	Capacity (acre-feet).		Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower)	Pumps.		Average lift (feet).
															Number.	Capacity (gallons per minute).	
Total	260	73	513	11,665	1,780	913	1,545	59	197,890	3.8	34	24,701	51	959	54	73,686	24
Hat Creek	11	2	40	25	44	1	1	6	109	.....	.....	.....	.....	.....	.....	.....	.....
White River	63	23	81	237	131	104	66	17	1,302	0.4	2	2,200	3	53	3	4,000	35
Niobrara River	27	10	44	204	88	92	36	1	13,005	0.1	.....	.....	1	8	1	480	8
Platte River and tributaries	131	29	309	10,593	1,379	661	1,412	31	183,312	0.9	19	14,501	33	437	36	36,003	27
Platte River direct	4	1	26	1,776	207	36	137	1	1	.....	14	10,551	13	180	14	14,580	31
North Platte River and tributaries	66	17	178	7,769	978	418	1,169	13	175,235	0.5	.....	.....	5	81	6	7,000	15
North Platte River direct	25	5	71	7,052	782	315	1,087	9	175,169	0.5	.....	.....	4	71	5	6,490	8
Blue River	3	.....	5	139	27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pumpkin Creek	13	7	43	209	71	44	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other tributaries of North Platte River	25	5	59	369	98	59	59	4	66	.....	.....	.....	1	10	1	600	35
South Platte River and tributaries	57	5	96	949	175	202	100	12	7,156	0.1	5	3,950	5	106	5	9,682	17
South Platte River direct	3	.....	6	598	39	95	18	.....	.....	0.1	4	1,850	2	36	2	1,850	25
Lodgepole Creek	54	5	90	351	136	107	82	12	7,156	.....	1	2,100	3	70	3	7,832	11
Loup River	3	5	7	91	16	5	6	3	60	.....	.....	.....	7	49	7	4,280	17
Other tributaries of Platte River	1	1	2	8	3	.....	.....	2	860	0.3	.....	.....	3	21	4	461	30
Kansas River and tributaries	28	9	39	606	138	55	30	4	162	2.4	13	8,000	14	461	14	33,203	26
Big Blue River	.....	.....	2	5	1	.....	.....	.....	.....	0.4	.....	.....	2	30	2	1,000	18
Republican River	28	9	37	601	137	55	30	4	162	2.0	13	8,000	12	431	12	32,203	27

CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 AND 1909.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AREA HARVESTED.					QUANTITY HARVESTED.					
		1919		1909		Per cent of increase.[1]	Unit.	1919		1909		Per cent of increase.[1]
		Acres.	Per cent of total for state.	Acres.	Per cent of total for state.			Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	26,796	0.4	21,552	0.3	24.3	Bu.	626,064	0.4	563,857	0.3	11.0
2	Oats	12,875	0.6	18,794	0.8	−31.5	Bu.	364,083	0.6	555,048	1.0	−34.4
3	Winter wheat	15,321	0.4	9,015	0.3	178.1	Bu.	321,419	0.6	170,952	0.4	180.7
4	Spring wheat	9,748	1.8				Bu.	158,405	3.9			
5	Barley	3,610	1.7	3,495	3.1	3.3	Bu.	105,958	2.4	90,308	4.5	17.3
6	Rye	1,493	0.4	427	0.7	228.6	Bu.	17,630	0.5	7,475	1.1	135.9
	Hay and forage:											
7	Alfalfa	60,476	5.0	31,842	4.6	89.9	Tons	135,942	6.1	81,225	5.3	67.4
8	Other tame or cultivated grasses	1,265	0.8	(2)			Tons	1,506	0.7	(2)		
9	Wild, salt, or prairie grasses	14,956	0.5	37,019	1.2	−59.6	Tons	12,797	0.5	38,796	1.3	−67.0
10	Small grains cut for hay	942	1.2	(2)			Tons	867	1.1	(2)		
11	Corn cut for forage	1,459	0.5	(2)			Tons	2,923	0.7	(2)		
12	Kafir, sorghum, etc., for forage	1,392	0.5	(2)			Tons	3,385	0.6	(2)		
	Vegetables:											
13	Potatoes	6,671	7.1	6,077	5.5	9.8	Bu.	720,833	16.2	888,766	10.9	−18.9
	Miscellaneous:											
14	Sugar beets grown for sugar	42,959	78.8	3,114	74.5		Tons	445,521	80.3	36,849	92.7	

	CROP.	AVERAGE YIELD PER ACRE, 1919.						VALUE.				
		Unit.	For state.	On nonirrigated land.	On irrigated land.			1919		1909		Per cent of increase.[1]
					Average.	Per cent of average for state.	Per cent of average on nonirrigated land.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	Bu.	23.9	23.9	23.4	97.9	97.9	$845,186	0.4	$290,241	0.3	191.2
2	Oats	Bu.	29.5	29.5	28.3	95.9	95.9	273,062	0.6	219,389	1.1	24.5
3	Winter wheat	Bu.	14.3	14.3	21.0	146.9	146.9	691,050	0.6	135,554	0.3	661.0
4	Spring wheat	Bu.	7.7	7.6	16.3	214.5	217.3	340,571	3.9			
5	Barley	Bu.	20.9	20.7	29.4	140.7	142.0	116,554	2.4	40,801	4.7	185.7
6	Rye	Bu.	9.1	9.0	12.6	138.5	140.0	24,682	0.5	4,624	1.2	433.8
	Hay and forage:											
7	Alfalfa	Tons	1.93	1.81	2.25	123.0	124.3	2,582,898	6.1	497,656	4.6	419.0
8	Other tame or cultivated grasses	Tons	1.38	1.39	1.25	90.6	89.9	18,825	0.7	(2)		
9	Wild, salt, or prairie grasses	Tons	0.80	0.80	0.86	107.5	107.5	172,760	0.5	254,216	1.8	−32.0
10	Small grains cut for hay	Tons	1.02	1.02	0.92	90.2	90.2	11,271	1.1	(2)		
11	Corn cut for forage	Tons	1.63	1.63	2.00	122.7	122.7	30,692	0.7	(2)		
12	Kafir, sorghum, etc., for forage	Tons	2.10	2.10	2.43	115.7	115.7	32,158	0.6	(2)		
	Vegetables:											
13	Potatoes	Bu.	47.2	42.6	108.1	229.0	253.8	1,729,999	16.2	274,910	7.3	529.3
	Miscellaneous:											
14	Sugar beets grown for sugar	Tons	10.18	9.47	10.37	101.9	109.5	4,677,971	80.3	152,310	84.8	

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.

[2] Not reported separately in 1909.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100, or when per cent is more than 1,000.]

		THE STATE.	Banner.	Box Butte.	Buffalo.	Chase.	Cherry.	Cheyenne.
1	Number of all farms in 1920	124,417	301	641	2,376	705	1,664	854
2	Number of farms irrigated in 1919	3,021	6	5	29	15	5	8
3	Per cent of all farms	2.4	2.0	0.8	1.2	2.1	0.3	0.9
4	Number of farms irrigated in 1909	1,852	10	7	1	14	18	33
5	Per cent of increase, 1909–1919	63.1	.....	.....	.....	.....	.....	.....
	LAND AND FARM AREA.							
6	Approximate land area—acres	49,157,120	474,880	688,640	604,800	575,360	3,826,560	764,160
7	All land in farms—acres	42,225,475	447,629	646,509	570,881	571,027	2,981,685	513,414
8	Improved land in farms—acres	23,109,624	136,669	129,438	433,371	173,346	591,881	262,395
9	Area irrigated in 1919—acres	442,690	2,703	2,162	3,019	2,292	501	5,247
10	Per cent of improved land in farms	1.9	2.0	1.7	0.7	1.3	0.1	2.0
11	Area irrigated in 1909—acres	255,950	1,915	1,171	2	3,226	546	3,635
12	Per cent of increase, 1909–1919	73.0	41.1	84.6	.....	—29.0	—8.2	44.3
13	Area enterprises were capable of irrigating in 1920—acres	562,468	3,283	3,062	3,059	4,311	1,301	5,778
14	Area enterprises were capable of irrigating in 1910—acres	429,225	1,965	1,173	2	4,767	1,046	3,995
15	Per cent of increase, 1910–1920	31.0	67.1	161.0	.....	—9.6	24.4	44.6
16	Area included in enterprises in 1920—acres	766,768	4,299	3,802	6,419	4,491	1,373	5,958
17	Area included in enterprises in 1910—acres	680,133	2,110	1,373	4	6,187	1,046	4,345
18	Per cent of increase, 1910–1920	12.7	103.7	176.9	.....	—27.4	31.3	37.1
	IRRIGATION WORKS.							
	Independent enterprises:							
19	Number, 1920	470	15	5	4	13	5	36
20	Number, 1910	474	16	6	1	6	13	25
	Main ditches:							
21	Number, 1920	513	18	6	1	13	4	47
22	Number, 1910	420	16	6	1	6	3	37
23	Length, 1920—miles	1,780	31	19	16	36	7	46
24	Length, 1910—miles	1,459	18	13	1	24	9	33
25	Capacity, 1920—second-feet	11,665	76	86	160	107	15	78
26	Capacity, 1910—second-feet	9,378	39	24	1	86	30	95
	Laterals:							
27	Number, 1920	913	29	9	.....	15	.....	57
28	Number, 1910	1,038	2	3	.....	9	.....	41
29	Length, 1920—miles	1,545	13	6	.....	4	.....	48
30	Length, 1910—miles	1,269	1	2	.....	3	.....	15
	Reservoirs:							
31	Number, 1920	59	1	.....	2	2	.....	4
32	Number, 1910	44	1	.....	.....	1	1	8
33	Capacity, 1920—acre-feet	197,890	40	.....	860	152	.....	95
34	Capacity, 1910—acre-feet	2,098	240	.....	.....	1	13	40
	Flowing wells:							
35	Number, 1920	.....	.....	.....	.....	.....	.....	.....
36	Number, 1910	.....	.....	.....	.....	.....	.....	.....
37	Capacity, 1920—gallons per minute	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1910—gallons per minute	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:							
39	Number, 1920	34	.....	.....	1	1	.....	.....
40	Number, 1910	66	8	2	.....	.....	13	.....
41	Capacity, 1920—gallons per minute	24,701	.....	.....	450	300	.....	.....
42	Capacity, 1910—gallons per minute	3,363	30	30	.....	.....	80	.....
	Pumping plants:							
43	Number, 1920	51	.....	.....	3	2	1	.....
44	Number, 1910	75	8	2	1	.....	13	.....
45	Engine capacity, 1920—horsepower	959	.....	.....	18	40	8	.....
46	Engine capacity, 1910—horsepower	140	8	3	4	.....	8	.....
47	Pump capacity, 1920—gallons per minute	73,686	.....	.....	836	6,300	480	.....
48	Pump capacity, 1910—gallons per minute	5,366	30	30	20	.....	80	.....
49	Average lift, 1920—feet	24	.....	.....	23	19	8	.....
	CAPITAL INVESTED.							
50	Capital invested to Jan. 1, 1920—dollars	13,909,185	47,760	32,410	301,750	39,095	6,310	49,137
51	Capital invested to July 1, 1910—dollars	7,798,310	13,754	6,115	205	28,273	2,493	19,388
52	Per cent of increase, 1910–1920	78.4	247.2	430.0	.....	38.3	153.1	153.4
53	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	24.73	14.55	10.58	98.64	9.07	4.85	8.50
54	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	18.17	7.00	5.21	102.50	5.93	2.38	4.85
	ESTIMATED FINAL COST.							
55	Estimated final cost of existing enterprises in 1920—dollars	18,030,154	49,260	32,410	301,750	41,095	6,310	49,437
56	Estimated final cost of existing enterprises in 1910—dollars	9,485,231	13,754	6,115	205	28,273	2,493	19,388
57	Per cent of increase, 1910–1920	90.1	258.2	430.0	.....	45.4	153.1	155.0
58	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	23.51	11.46	8.52	47.01	9.15	4.60	8.30
59	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	13.95	6.52	4.45	51.25	4.57	2.38	4.46

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100.]

		Dawes.	Dawson.	Deuel.	Dundy.	Garden.[1]	Hitchcock.	Keith.
1	Number of all farms in 1920	728	1,934	384	661	714	776	673
2	Number of farms irrigated in 1919	58	330	40	27	97	96	111
3	Per cent of all farms	8.0	17.1	10.4	4.1	13.6	12.4	16.5
4	Number of farms irrigated in 1909	67	109	31	28	70	102	98
5	Per cent of increase, 1909–1919	.....	202.8	.....	.....	.....	—5.9	.....
	LAND AND FARM AREA.							
6	Approximate land area.....acres	897,280	630,400	280,960	593,280	1,079,680	463,360	683,520
7	All land in farms.....acres	822,158	570,874	202,689	474,055	884,328	413,283	614,842
8	Improved land in farms.....acres	136,939	377,185	98,194	179,082	226,316	202,767	218,703
9	Area irrigated in 1919.....acres	9,005	33,700	10,317	9,045	20,488	9,786	25,832
10	Per cent of improved land in farms	6.6	8.9	10.5	5.1	9.1	4.8	11.8
11	Area irrigated in 1909.....acres	7,029	12,742	4,745	3,069	16,164	12,210	13,140
12	Per cent of increase, 1909–1919	28.1	164.5	117.4	194.7	.....	—19.9	96.6
13	Area enterprises were capable of irrigating in 1920.....acres	19,052	64,725	11,755	10,918	25,554	10,226	31,466
14	Area enterprises were capable of irrigating in 1910.....acres	12,389	30,933	4,660	6,006	21,604	12,850	19,581
15	Per cent of increase, 1910–1920	53.8	109.2	152.3	81.8	.....	—20.4	60.7
16	Area included in enterprises in 1920.....acres	24,326	141,610	13,155	14,118	26,714	10,576	33,974
17	Area included in enterprises in 1910.....acres	12,896	126,809	9,568	6,121	47,429	21,250	36,160
18	Per cent of increase, 1910–1920	88.6	11.7	37.5	130.6	.....	—50.2	—6.0
	IRRIGATION WORKS.							
	Independent enterprises:							
19	Number, 1920	88	13	21	12	31	3	35
20	Number, 1910	73	8	7	16	33	5	26
	Main ditches:							
21	Number, 1920	90	19	25	11	34	3	38
22	Number, 1910	75	3	5	12	34	5	24
23	Length, 1920.....miles	149	152	39	46	128	33	111
24	Length, 1910.....miles	113	67	16	45	119	56	93
25	Capacity, 1920.....second-feet	282	1,145	296	203	480	160	722
26	Capacity, 1910.....second-feet	232	600	72	161	816	217	410
	Laterals:							
27	Number, 1920	132	17	49	18	37	1	114
28	Number, 1910	99	8	6	8	38	1	13
29	Length, 1920.....miles	82	39	35	16	37	.....	40
30	Length, 1910.....miles	32	71	8	5	17	2	20
	Reservoirs:							
31	Number, 1920	17	.....	2	.....	2	.....	1
32	Number, 1910	7	1	.....	2	1	.....	2
33	Capacity, 1920.....acre-feet	1,302	.....	3	.....	100,000	.....	5
34	Capacity, 1910.....acre-feet	220	1	.....	12	2	.....	2
	Flowing wells:							
35	Number, 1920	.....	.....	.....	.....	.....	.....	.....
36	Number, 1910	.....	.....	.....	.....	.....	.....	.....
37	Capacity, 1920.....gallons per minute	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1910.....gallons per minute	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:							
39	Number, 1920	2	8	2	.....	.....	.....	3
40	Number, 1910	1	5	.....	.....	4	.....	2
41	Capacity, 1920.....gallons per minute	2,200	3,901	2,450	.....	.....	.....	1,500
42	Capacity, 1910.....gallons per minute	10	80	.....	.....	100	.....	5
	Pumping plants:							
43	Number, 1920	3	9	4	.....	3	1	2
44	Number, 1910	1	5	.....	5	4	.....	2
45	Engine capacity, 1920.....horsepower	53	97	78	.....	64	25	35
46	Engine capacity, 1910.....horsepower	1	8	.....	5	10	.....	2
47	Pump capacity, 1920.....gallons per minute	4,000	5,430	3,182	.....	5,500	2,500	2,400
48	Pump capacity, 1910.....gallons per minute	10	80	.....	54	100	.....	5
49	Average lift, 1920.....feet	25	36	16	.....	9	10	13
	CAPITAL INVESTED.							
50	Capital invested to Jan. 1, 1920.....dollars	211,145	170,435	59,613	111,800	229,001	162,500	205,734
51	Capital invested to July 1, 1910.....dollars	70,479	230,250	44,967	41,479	89,323	216,350	84,200
52	Per cent of increase, 1910–1920	199.6	—26.0	32.6	169.5	.....	—24.9	144.3
53	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	11.08	2.63	5.07	10.24	8.96	15.89	6.54
54	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	5.69	7.44	9.65	6.91	4.13	16.84	4.30
	ESTIMATED FINAL COST.							
55	Estimated final cost of existing enterprises in 1920.....dollars	243,245	270,435	59,613	112,300	270,201	162,500	221,334
56	Estimated final cost of existing enterprises in 1910.....dollars	70,479	230,250	44,967	41,479	89,323	216,350	84,200
57	Per cent of increase, 1910–1920	245.1	17.5	32.6	170.7	.....	—24.9	162.9
58	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	10.00	1.91	4.53	7.95	10.11	15.36	6.51
59	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	5.47	1.82	4.70	6.78	1.88	10.18	2.33

[1] Part annexed to Grant County in 1919.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		Kimball.	Lincoln.	Morrill.	Red-willow.	Scotts Bluff.	Sherman.	Sioux.	All other counties.
1	Number of all farms in 1920	456	2,024	957	1,091	1,391	1,337	842	103,908
2	Number of farms irrigated in 1919	50	203	397	33	1,166	6	312	27
3	Per cent of all farms	11.0	10.0	41.5	3.0	83.8	0.4	37.1	(1)
4	Number of farms irrigated in 1909	18	98	109	17	702	1	234	85
5	Per cent of increase, 1909–1919	.....	.....	264.2	.....	66.1	.....	33.3	.....
	LAND AND FARM AREA.								
6	Approximate land area—acres	613,120	1,623,040	906,880	460,800	462,720	366,720	1,315,200	31,845,760
7	All land in farms—acres	347,591	1,383,879	647,543	420,737	281,492	339,005	1,079,327	28,012,527
8	Improved land in farms—acres	115,174	512,778	152,555	257,025	157,176	244,643	108,353	18,395,634
9	Area irrigated in 1919—acres	9,101	35,246	55,216	4,013	173,245	850	29,796	1,126
10	Per cent of improved land in farms	7.9	6.9	36.2	1.6	110.2	0.3	27.5	(1)
11	Area irrigated in 1909—acres	3,432	34,760	29,445	2,003	100,301	3	5,576	836
12	Per cent of increase, 1909–1919	165.2	1.4	87.5	100.3	72.7	.....	434.4	34.7
13	Area enterprises were capable of irrigating in 1920—acres	11,117	41,811	70,645	4,700	196,229	1,200	39,793	2,483
14	Area enterprises were capable of irrigating in 1910—acres	3,507	38,240	56,990	10,003	191,206	3	7,170	1,135
15	Per cent of increase, 1910–1920	217.0	9.3	24.0	—53.0	2.6	.....	455.0	118.8
16	Area included in enterprises in 1920—acres	11,224	45,421	100,588	4,928	251,647	1,500	47,307	13,338
17	Area included in enterprises in 1910—acres	3,901	55,820	70,296	10,003	224,185	3	39,159	1,468
18	Per cent of increase, 1910–1920	187.7	—18.6	43.1	—50.7	12.2	.....	20.8	808.6
	IRRIGATION WORKS.								
	Independent enterprises:								
19	Number, 1920	16	10	48	9	28	1	54	23
20	Number, 1910	26	8	36	1	20	1	76	71
	Main ditches:								
21	Number, 1920	23	10	48	8	30	1	65	19
22	Number, 1910	26	9	39	1	22	.....	74	22
23	Length, 1920—miles	64	103	225	21	404	8	125	17
24	Length, 1910—miles	42	134	191	20	326	.....	100	39
25	Capacity, 1920—second-feet	174	710	1,386	66	4,754	31	558	176
26	Capacity, 1910—second-feet	104	1,175	1,058	150	3,923	.....	151	34
	Laterals:								
27	Number, 1920	20	27	187	14	100	3	48	36
28	Number, 1910	36	12	215	.....	465	.....	69	13
29	Length, 1920—miles	11	107	343	8	635	6	107	8
30	Length, 1910—miles	13	45	253	.....	755	.....	23	4
	Reservoirs:								
31	Number, 1920	7	1	2	1	4	.....	8	5
32	Number, 1910	.....	.....	.....	.....	1	.....	16	3
33	Capacity, 1920—acre-feet	7,058	4	4	10	75,165	.....	132	13,060
34	Capacity, 1910—acre-feet	.....	.....	.....	.....	1,000	.....	560	7
	Flowing wells:								
35	Number, 1920	.....	.....	.....	.....	.....	.....	.....	.....
36	Number, 1910	.....	.....	.....	.....	.....	.....	.....	.....
37	Capacity, 1920—gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1910—gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:								
39	Number, 1920	.....	.....	.....	11	.....	.....	.....	6
40	Number, 1910	.....	.....	1	5	1	1	.....	23
41	Capacity, 1920—gallons per minute	.....	.....	.....	4,700	.....	.....	.....	9,200
42	Capacity, 1910—gallons per minute	.....	.....	2,500	30	165	25	.....	308
	Pumping plants:								
43	Number, 1920	.....	1	.....	7	.....	.....	.....	15
44	Number, 1910	.....	.....	1	5	1	1	1	25
45	Engine capacity, 1920—horsepower	.....	10	.....	312	.....	.....	.....	219
46	Engine capacity, 1910—horsepower	.....	.....	20	3	6	3	8	51
47	Pump capacity, 1920—gallons per minute	.....	600	.....	18,403	.....	.....	.....	19,055
48	Pump capacity, 1910—gallons per minute	.....	.....	2,500	30	165	25	412	1,825
49	Average lift, 1920—feet	.....	35	.....	28	.....	.....	.....	.....
	CAPITAL INVESTED.								
50	Capital invested to Jan. 1, 1920—dollars	270,500	330,481	2,502,018	74,450	7,037,085	12,000	1,978,842	77,119
51	Capital invested to July 1, 1910—dollars	15,778	255,950	337,191	50,477	6,204,582	54	69,122	17,880
52	Per cent of increase, 1910–1920	.....	29.1	642.0	47.5	13.4	.....	.....	331.3
53	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	24.33	7.90	35.42	15.84	35.86	10.00	49.73	31.06
54	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	4.50	6.69	5.92	5.05	32.45	18.00	9.64	15.75
	ESTIMATED FINAL COST.								
55	Estimated final cost of existing enterprises in 1920—dollars	270,500	330,481	3,029,213	75,450	9,585,622	12,000	2,727,029	179,969
56	Estimated final cost of existing enterprises in 1910—dollars	15,778	255,950	337,191	50,477	7,891,503	54	69,122	17,880
57	Per cent of increase, 1910–1920	.....	29.1	798.4	49.5	21.5	.....	.....	906.5
58	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	24.10	7.28	30.12	15.31	38.09	8.00	57.65	13.49
59	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	4.04	4.59	4.80	5.05	35.20	18.00	1.77	12.18

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

NEVADA.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Nevada collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

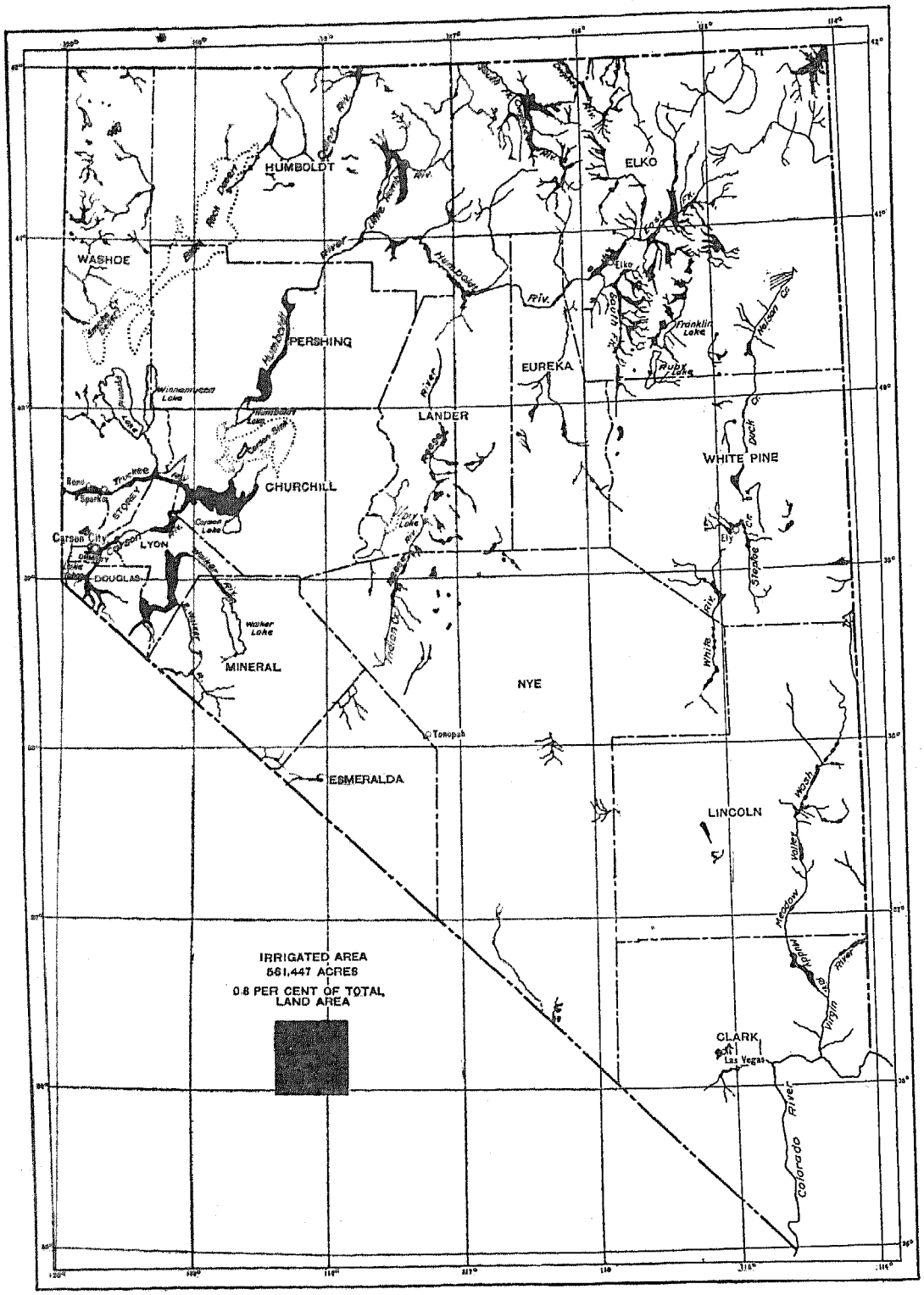
TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	3,163	2,689	474	17.6
Approximate land area of the state.....acres..	70,285,440	70,285,440		
All land in farms.....acres..	2,357,163	2,714,757	−357,594	−13.2
Improved land in farms.....acres..	594,741	752,117	−157,376	−20.9
Number of farms irrigated	2,718	2,406	312	13.0
Area irrigated.....acres..	561,447	701,833	−140,386	−20.0
Area enterprises were capable of irrigating.....acres..	704,708	840,962	−136,254	−16.2
Area included in enterprises.....acres..	1,382,036	1,232,142	149,894	12.2
Per cent irrigated:				
Number of all farms	85.9	89.5	−3.6	
Approximate land area of the state	0.8	1.0	−0.2	
Land in farms	23.8	25.9	−2.1	
Improved land in farms	94.4	93.3	1.1	
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	122,161	139,129	−16,968	−12.2
Excess of area included in enterprises over area irrigated.....acres..	801,589	530,309	271,280	51.2
Area of irrigated land reported as available for settlement.....acres..	139,352	[2]		
Capital invested	$14,754,280	$6,721,924	$8,032,356	119.5
Average per acre enterprises were capable of irrigating	$20.94	$7.99	$12.95	162.1
Estimated final cost of existing enterprises	$22,648,747	$12,188,756	$10,459,991	85.8
Average per acre included in enterprises	$16.39	$9.89	$6.50	65.7
Average cost of operation and maintenance per acre	$0.79	$0.97	−$0.18	−18.6
IRRIGATION WORKS.				
Number of enterprises	1,015	1,347	−332	−24.6
Number of main ditches	2,032	994	1,038	104.4
Length of main ditches.....miles..	3,123	1,938	1,185	61.1
Capacity of main ditches.....second-feet..	10,554	17,579	−7,025	−40.0
Number of lateral ditches	2,064	1,531	533	34.8
Length of lateral ditches.....miles..	1,245	1,213	32	2.6
Number of reservoirs	134	109	25	22.9
Capacity of reservoirs.....acre-feet..	504,428	325,953	178,475	54.8
Number of flowing wells	123	19	104	[3]
Capacity of flowing wells.....gallons per minute..	21,942	1,302	20,640	[3]
Number of pumped wells	129	6	123	[3]
Capacity of pumped wells.....gallons per minute..	6,798	1,349	5,449	403.9
Number of pumping plants	64	18	46	[3]
Engine capacity.....horsepower..	409	693	−284	−41.0
Pump capacity.....gallons per minute..	35,266	24,295	10,971	45.2
Average lift.....feet..	22	[2]	22	

[1] A minus sign (−) denotes decrease.
[2] Not reported in 1910.
[3] Per cent not shown when base is less than 100 or when per cent is more than 1,000.

NEVADA

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

Except for small areas on the extreme western border, the surface of the state of Nevada consists of broken ranges of mountains, with broad, sage-covered valleys between. Along the western border the state extends into the Sierra Nevada Mountains.

Precipitation is heavy in the Sierra Nevadas, particularly snowfall in the winter, and, as is usually the case, immediately to the east of the mountains precipitation drops suddenly, then increases gradually to the east, the driest part of the state being in the lowest part, which lies near the western border. A very small area on the western border of the state receives more than 15 inches of precipitation annually, a narrow strip east of that receives from 12 to 15 inches, another narrow strip receives from 9 to 12 inches, followed by another that receives from 6 to 9 inches. East of this, and extending along the southwestern border of the state and taking in the whole southern end, is a wide zone that receives less than 6 inches of precipitation annually. East and north of this the amount increases, rising to 12 to 15 inches in a section lying just east of the center of the state. Taking the state as a whole the average annual precipitation is less than 10 inches. More than half of this occurs in the winter, the summers being extremely dry and hot. In the Sierra Nevada Mountains the snowfall in winter is very heavy and the snow lies well into the summer.

The year 1919 was one of the driest years on record, the average precipitation for the state being about 7 inches, while the normal is about 9.5 inches. April and May were warm months, and the snow melted earlier than usual, thus decreasing the supply of water later in the season. The drouth was detrimental to crops where stored water was not available, and to pastures and ranges generally.

The state has a wide range of temperature. The extreme southern point of the state is semitropical, the growing season extending seven or eight months, while in some of the higher valleys in the Sierras it is but two or three months. In most of the valleys of the state the growing season is about six months.

In only very small areas in the state can crops be grown without irrigation in normal years.

WATER SUPPLY FOR IRRIGATION.

Except for a small area in the extreme southern point of the state, which is in the Colorado River drainage, and a somewhat larger area along the northern border of the state, which is in the Snake River drainage, the state of Nevada lies within the Great Basin and has no outlet to the sea. The rivers rise in the mountains and lose their waters by evaporation and seepage along their channels or flow into lakes or sinks, where the water evaporates, leaving large deposits of salt and other alkalis.

The principal streams are Humboldt River, which rises in the northeastern part of the state and flows in a southwesterly direction to the sinks in the western part of the state, and Truckee, Carson, and Walker Rivers, which rise in the Sierra Nevada Mountains in California and flow in an easterly direction to the sinks in the same part of the state.

Humboldt River, rising in the extreme northeastern part of the state, flows in a westerly and southwesterly direction, breaking through successive ranges of mountains which have a general north and south direction, forming a succession of valleys along the river. Tributaries reach the river from both north and south, draining the valleys between the mountain ranges. The discharge of the Humboldt and its tributaries is typical of such streams, being high in spring, when the snow melts, and very low in the summer. Without storage, crops are limited to such as mature early; in fact, the larger part of the irrigation along the Humboldt consists of flooding wild-grass meadows when the stream is in flood. Schemes for storage have been discussed but never carried out.

Truckee River rises in Lake Tahoe, which lies on the boundary between Nevada and California, and after a northerly course in the mountains in California, turns eastward into Nevada, where it waters considerable land in Truckee Meadows, near Reno, and below is diverted into the drainage basin of Carson River, to supply a part of the land in the Newlands Project of the United States Reclamation Service. Plans for using Lake Tahoe for storing water for summer use are delayed by controversies between water users in Nevada and the owners of land around the lake in California. Storage for a part of Truckee River water is provided for in Lahontan Reservoir of the United States Reclamation Service.

Carson and Walker Rivers also rise in the Sierra Nevadas in California and flow in a northeasterly direction into Carson Lake and Walker Lake, respectively, after being used for irrigation in the valleys through which they pass. Complete use of these streams requires storage, which has not yet been provided, except that some of the water of Carson River is stored in Lahontan Reservoir.

In the extreme southern part of the state Virgin River and its tributary, Muddy River, supply small areas, and in the northern part of the state tributaries of Snake River water small areas.

In by far the larger part of the state there is little or no surface water available for irrigation, but some of the streams water small areas before losing their water in the deserts.

In several of the valleys of the state wells have been put down and water obtained for small areas. No doubt much more land can be watered from this source if the value of the crops justifies the expense.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.	Per cent of all farms.	Acres.	Per cent of increase.[1]	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	2,718	13.0	85.9	561,447	−20.0	0.8	23.8	94.4
1910	2,406	26.2	89.5	701,833	39.2	1.0	25.9	93.3
1900	1,906	63.3	87.3	504,168	124.7	0.7	19.7	88.0
1890	1,167	.....	91.4	224,403	.....	0.3	13.5	91.0

[1] A minus sign (−) denotes decrease.

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	1,015	1,382,036	561,447	40.6	704,708
Before 1860	23	5,993	4,782	79.8	5,072
1860–1869	131	456,730	171,317	37.5	183,064
1870–1879	147	228,749	124,723	54.5	142,042
1880–1889	114	178,291	83,562	46.9	124,227
1890–1899	52	21,452	9,081	42.3	11,708
1900–1904	58	238,961	60,897	25.5	89,730
1905–1909	29	23,253	18,770	80.7	19,465
1910–1914	133	56,456	24,833	44.0	35,034
1915–1919	132	53,214	13,937	26.2	36,045
Not reported	196	118,937	49,545	41.7	58,521

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	561,447	701,833	−140,386	−20.0	704,708	1,382,036
Streams, gravity	466,812	661,299	−194,487	−29.4	585,105	1,130,770
Streams, pumped	2,647	463	2,184	471.7	2,675	4,330
Streams, pumped and gravity	720	(2)	720	.....	720	740
Wells, pumped	295	37	258	.....	524	1,546
Wells, flowing	811	150	661	440.7	1,210	5,577
Wells, flowing and pumped	65	(2)	65	.....	70	332
Lakes, gravity	445	500	−55	−11.0	1,410	4,516
Lakes, pumped	.....	406	−406	.....	.....	.....
Springs	21,987	38,840	−16,853	−43.4	25,659	72,179
Stored storm water	17,343	133	17,210	.....	17,508	23,648
City water	14	(2)	14	.....	20	20
Sewage	88	(2)	88	.....	88	708
Streams, gravity, and pumped wells	4,957	(2)	4,957	.....	8,024	22,764
Streams, gravity, and flowing wells	82	(2)	82	.....	82	592
Other mixed	45,176	(2)	45,176	.....	61,613	114,314

[1] A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.
[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

In 1889 Nevada enacted a law dividing the state into internal improvement districts, and provided for the issuing of bonds by such districts. The next legislature, in 1891, enacted a district law similar to those enacted by other Western states, and this has been amended from time to time. But one district is reported in the state, and this was organized to take over works already built. This accounts, in part, for the decrease in the acreage reported for individual and cooperative enterprises in Table 5. The land in the Newlands Project of the United States Reclamation Service has been organized into an irrigation district, but this land is credited to the Reclamation Service in Table 5, because the Government built the works and still controls them to a large extent.

Nevada accepted the terms of the Federal Carey Act (act of Congress, Aug. 18, 1894) in 1895, but no land is reported as being supplied with water under this law.

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Acres.	Per cent.
ACREAGE IRRIGATED.				
Total	561,447	701,833	−140,386	−20.0
Individual and partnership	355,901	581,406	−225,505	−38.8
Cooperative	69,877	78,966	−9,089	−11.5
Irrigation district	80,000	.....	80,000	.....
Commercial	5,990	8,864	−2,874	−32.4
U. S. Reclamation Service	44,324	30,000	14,324	47.7
U. S. Indian Service	5,321	2,597	2,724	104.9
State	12	(2)	12	.....
City	22	(2)	22	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	704,708	840,962	−136,254	−16.2
Individual and partnership	453,900	649,841	−195,941	−30.2
Cooperative	85,483	88,255	−2,772	−3.1
Irrigation district	80,000	.....	80,000	.....
Commercial	7,240	9,300	−2,060	−22.2
U. S. Reclamation Service	69,850	90,185	−20,335	−22.5
U. S. Indian Service	8,195	3,381	4,814	142.4
State	12	(2)	12	.....
City	28	(2)	28	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total	1,382,036	1,232,142	149,894	12.2
Individual and partnership	807,045	844,128	−37,083	−4.4
Cooperative	93,253	129,269	−36,016	−27.9
Irrigation district	260,000	.....	260,000	.....
Commercial	14,240	24,500	−10,260	−41.9
U. S. Reclamation Service	192,000	216,185	−24,185	−11.2
U. S. Indian Service	15,390	18,060	−2,670	−14.8
State	80	(2)	80	.....
City	28	(2)	28	.....

[1] A minus sign (−) denotes decrease. [2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The laws of Nevada relating to water rights are summarized in the following paragraphs:

In 1866 the legislature enacted a law requiring any person desiring to construct or maintain any ditch or flume to make a certificate describing the ditch, before some officer competent to take acknowledgments of deeds. No provision for recording these certificates was made.

The state of Nevada enacted in 1889 a law which was intended to provide for a complete record of water rights and for their administration. All parties claiming any interest in irrigation works were required to file statements of their claims on or before September 1, 1890, and parties wishing to build ditches or to enlarge

or extend existing ditches were required to file statements with the proper county recorders. The state was divided into districts, exclusive jurisdiction of controversies over water rights was given to the district courts, and the courts were to issue certificates to holders of rights. The law provided also for the appointment of commissioners to distribute water from streams in accordance with the decrees of the courts. This law was repealed in 1893, but many filings were made after that date.

In 1899 a new law on the subject of water rights was enacted. This law declared that "All natural water courses and natural lakes, and the waters thereof, which are not held in private ownership, belong to the state, and are subject to regulation and control by the state." It provided that rights to water might be acquired in the manner provided by the act, and not otherwise. The county commissioners and the county surveyor of each county were made a board of water commissioners for their county. Applications to appropriate water were to be made to these boards "but in no case shall permission to appropriate water be granted, except there be a surplus of water remaining in the source of supply over and above their existing vested and accrued rights." It was left to the discretion of each county board to determine whether the county should avail itself of the provision of the act. The act was not generally put into effect.

Another new water law was enacted in 1903. This law declared that the waters of all watercourses and lakes belong to the "public," rather than to the "state," and were subject to appropriation for beneficial use, and the use of water is made a public use. This law created the office of state engineer, and made it the duty of the engineer to prepare for each stream in the state a list of the appropriations of water according to their priority. County recorders were required to supply to the engineer transcripts of all claims on record in their respective offices, and the engineer was to get copies of all decrees rendered by the courts. The state engineer was to examine the lands irrigated and irrigable on each stream, make his list of rights on the basis of the claims filed, court decrees, and his own surveys, and issue certificates to claimants defining their rights. Appeal to the courts was provided for. This law has been amended in such a way that the findings of the engineer are submitted to the court and the court issues a decree defining rights.

This law was amended in 1905, and sections were added requiring parties wishing to acquire rights to make application to the state engineer for permits. The law provided for the submitting of proof of completion of works in accordance with the permits and for the issuing and recording of certificates showing the rights acquired. This law was repealed and reenacted in substance by the act of February 26, 1907, and that law was superseded by the act of March 22, 1913, which was the same in its general effect. The law of 1913 has been amended in some particulars, but the general system provided in that and previous laws is still in force.

Riparian rights are not recognized in Nevada.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909, per cent of total.
	Acres.	Per cent of total.	
Total	561,447	100.0	100.0
Appropriation and use	200,556	35.7	86.9
Notice filed and posted	52,027	9.3	5.5
Adjudicated by court	161,175	28.7	1.4
Permit from state	106,857	19.0	1.4
Certificate or license from state	6,666	1.2	4.8
Underground	1,244	0.2	(1)
Other and mixed	1,705	0.3	(1)
Not reported	31,217	5.6	(1)

[1] All land for which the class of water rights was not reported was included in "Appropriation and use."

ACREAGE, BY DRAINAGE BASIN.

The report of a special census taken in 1902 presented all data by drainage basins rather than by counties. The results of the census of 1920 have been tabulated on the same basis, and the data for 1902 are presented for purposes of comparison. For no other census have the results been tabulated in this form. The acreage reported for each drainage basin in 1919 comprises all the irrigated land in that drainage basin, including that watered from springs and wells. In the 1902 results the acreages irrigated from springs and wells were not reported for the smaller tributary streams, but the acreages for the tributaries were included in those reported for the main streams. This area is so small, however, that the comparison of the areas reported for the tributary streams is not seriously affected.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
Total	561,447	570,001	−1.5	1,382,036	704,708
Quinn River	9,935	38,150	−74.0	19,635	13,452
Owyhee River	57,632	8,625	568.2	143,690	62,385
Bruneau River	1,297	1,065	21.8	2,708	2,125
Salmon River		12,180			
Goose Creek	25,000	2,000		50,000	50,000
Humboldt River and tributaries	197,778	219,767	−10.0	348,573	231,251
Humboldt River direct	69,186	97,742	−29.2	84,049	77,726
East Fork of Humboldt River	33,473	11,680	186.6	74,264	43,649
Lamoille Creek	22,278	7,765	186.9	40,610	26,065
North Fork of Humboldt River	7,940	3,960	100.5	28,697	10,470
South Fork of Humboldt River	33,052	26,733	23.6	48,338	41,261
Pine Creek	3,250	1,010	221.8	3,530	3,250
Reese River	11,178	14,906	−25.0	40,769	10,898
Little Humboldt River	6,350	31,562	−79.9	6,790	6,350
Other tributaries of Humboldt River	11,071	[2] 24,409	−54.6	21,526	11,582
Truckee River and tributaries	20,002	40,541	−50.7	34,659	20,920
Truckee River direct	14,606	32,748	−55.4	28,040	15,436
Steamboat Creek	3,152	7,000	−55.0	3,298	3,218
Other tributaries of Truckee River	2,244	[2] 793	183.0	3,321	2,266
Carson River and tributaries	70,980	70,267	1.0	226,641	99,645
Carson River direct	4,860	48,155	−89.9	9,567	7,200
West Fork of Carson River	7,463	8,476	−12.0	7,691	7,523
East Fork of Carson River	11,028	9,524	15.8	11,128	11,128
Other tributaries of Carson River	47,629	[2] 4,112		198,255	73,794
Walker River and tributaries	113,364	54,055	109.7	357,937	139,207
Walker River direct	94,240	28,282	233.2	294,990	98,500
East Walker River	5,574	13,355	−58.3	8,637	6,767
West Walker River	12,980	12,348	5.1	51,850	32,590
Other tributaries of Walker River	570	[2] 70		2,460	1,350
Colorado River and tributaries	8,546	11,481	−25.6	21,342	10,338
Colorado River direct		890			
Virgin River	7,865	4,090	92.3	17,259	9,460
Other tributaries of Colorado River	681	[2] 6,501	−89.5	4,083	878
Independent streams	56,913	111,890	−49.1	176,851	75,385
Duck Creek	6,252	4,109	52.2	13,855	7,872
Steptoe Creek	3,708	6,705	−44.7	12,009	3,628
Other independent streams	46,953	[2] 101,076	−53.5	150,927	63,885

[1] A minus sign (−) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.
[2] Includes springs and wells.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1890 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.[1]	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.[1]
1920	$14,754,280	119.5	$20.94	162.1
1910	6,721,924	337.2	7.99	162.0
1900	1,537,559	−9.6	3.05	−59.8
1890	1,700,975	.....	7.58	.....

[1] A minus sign (−) denotes decrease.

TABLE 9.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	INCREASE.[1]	
			Amount.	Per cent.
Total	$14,754,280	$1,706,212	$13,048,068	764.7
Quinn River	50,548	61,100	−10,552	−17.3
Owyhee River	192,772	15,145	177,627	.....
Bruneau River	42,210	3,890	38,320	985.1
Salmon River	.....	14,840	−14,840	.....
Goose Creek	393,755	3,000	390,755	.....
Humboldt River and tributaries	1,751,566	763,110	988,456	129.5
Humboldt River direct	739,995	486,730	253,265	52.0
East Fork of Humboldt River	202,071	7,610	194,461	.....
Lamoille Creek	91,280	14,840	76,440	515.1
North Fork of Humboldt River	57,403	10,045	47,358	471.5
South Fork of Humboldt River	288,162	53,870	234,292	434.9
Pine Creek	2,809	2,450	359	14.7
Reese River	79,129	36,815	42,305	114.9
Little Humboldt River	2,544	53,580	−51,036	−95.3
Other tributaries of Humboldt River	288,182	[2] 97,170	191,012	196.6
Truckee River and tributaries	594,187	296,435	297,752	100.4
Truckee River direct	485,900	253,470	232,430	91.7
Steamboat Creek	42,070	39,670	2,400	6.0
Other tributaries of Truckee River	66,217	[2] 3,295	62,922	.....
Carson River and tributaries	8,024,300	142,703	7,881,597	.....
Carson River direct	61,055	95,913	−34,858	−36.3
West Fork of Carson River	14,169	14,610	−441	−3.0
East Fork of Carson River	48,786	13,695	35,091	256.2
Other tributaries of Carson River	7,900,290	[2] 18,485	7,881,805	.....
Walker River and tributaries	1,661,484	179,995	1,481,489	823.1
Walker River direct	1,466,889	71,425	1,395,464	.....
East Walker River	68,505	58,800	9,705	16.5
West Walker River	107,622	49,060	58,562	119.4
Other tributaries of Walker River	18,408	[2] 650	17,758	.....
Colorado River and tributaries	415,953	35,290	380,663	.....
Colorado River direct	.....	3,000	−3,000	.....
Virgin River	357,542	12,415	345,127	.....
Other tributaries of Colorado River	58,411	[2] 19,875	38,536	193.9
Independent streams	1,627,505	190,704	1,436,801	753.4
Duck Creek	252,851	10,700	242,151	.....
Steptoe Creek	189,986	19,940	170,046	852.8
Other independent streams	1,184,668	[2] 160,064	1,024,604	640.1

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.

TABLE 10.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$14,754,280	100.0	$20.94
Before 1860	55,645	0.4	10.97
1860-1869	2,400,682	16.3	13.11
1870-1879	1,599,890	10.8	11.26
1880-1889	1,026,933	7.0	8.27
1890-1899	134,494	0.9	11.49
1900-1904	8,149,026	55.2	91.02
1905-1909	244,493	1.7	12.56
1910-1914	576,638	3.9	16.46
1915-1919	234,932	1.6	6.52
Not reported	331,547	2.2	5.67

TABLE 11.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$14,754,280	100.0	$21.58	460,317	$0.79
Streams, gravity	12,493,231	84.7	22.28	384,358	0.65
Streams, pumped	119,900	0.8	44.82	897	1.76
Streams, pumped and gravity	8,000	0.1	11.11	720	0.76
Wells, pumped	19,900	0.1	37.98	236	12.10
Wells, flowing	50,575	0.4	41.80	157	6.56
Wells, flowing and pumped	5,500	[2]	78.57	65	61.77
Lakes, gravity	234,851	1.6	48.93	130	19.63
Springs	568,000	3.9	22.14	17,840	1.74
Stored storm water	164,350	1.1	9.39	15,548	0.37
City water	300	[2]	15.00	.....	.....
Sewage	620	[2]	7.05	80	0.44
Streams, gravity, and pumped wells	181,887	1.2	22.67	1,246	1.57
Streams, gravity, and flowing wells	3,400	[2]	41.46	82	1.46
Other mixed	903,766	6.1	14.67	33,958	1.54

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$14,754,280	100.0	460,317	$0.79
Individual and partnership	4,014,570	27.2	265,626	0.80
Cooperative	1,019,047	6.9	62,664	0.75
Irrigation district	1,246,611	8.5	80,000	0.05
Commercial	340,559	2.3	4,240	2.86
U. S. Reclamation Service	7,953,537	53.9	44,324	1.94
U. S. Indian Service	178,536	1.2	3,451	0.30
State	1,000	[2]	12	12.50
City	420	[2]	.....	.....

[1] Based on area irrigated in 1919. [2] Less than one-tenth of 1 per cent.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	58
Acreage included in enterprises reporting land drained or needing drainage	537,417
Acreage for which drains have been installed	34,175
Additional acreage needing drainage	98,249
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	6.4
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	2.5
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	9.6

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 14. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume of water entering canals.second-feet..	2,328	1,623	705
Area irrigated in 1919.....acres..	204,526	111,017	93,509
Average number of acres per second-foot.....	88	68	133
Total quantity of water entering canals....acre-feet..	926,308	727,037	199,271
Area irrigated in 1919.....acres..	212,323	122,627	89,696
Average quantity of water per acre....acre-feet..	4.4	5.9	2.2
Total quantity of water delivered.....acre-feet..	170,911	157,638	13,273
Area irrigated in 1919.....acres..	60,044	49,494	10,550
Average quantity delivered per acre....acre-feet..	2.8	3.2	1.3

IRRIGATION WORKS.

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	1,523	82	2,032	10,554	3,123	2,064	1,245	134	504,428
Before 1860	55		18	141	21	8	4		
1860–1869	340	3	489	1,474	838	521	309	2	1
1870–1879	437	6	485	3,232	681	321	143	9	9,387
1880–1889	233	9	335	890	627	397	174	14	36,606
1890–1899	50	7	87	220	98	55	12	9	646
1900–1904	58	7	79	3,480	195	195	330	8	350,825
1905–1909	37	2	40	42	29	56	13	13	33,438
1910–1914	77	26	167	402	178	228	107	41	9,935
1915–1919	93	16	156	420	215	167	106	32	12,288
Not reported	143	6	176	253	241	116	47	6	51,302

DATE OF BEGINNING.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	33.0	123	21,942	129	6,798	64	409	72	35,266
Before 1860									
1860–1869	2.0	2	110	50		2		2	
1870–1879	2.1	3	6	12	3	6	4	11	20,003
1880–1889	0.1	17	152	22	105	5	7	5	100
1890–1899	0.6								
1900–1904	1.8			3	100	3	11	4	850
1905–1909	0.6	2	663	1	442	2	75	2	2,600
1910–1914	16.5	49	14,770	18	1,630	16	122	16	3,625
1915–1919	5.5	44	6,127	20	4,418	25	168	26	6,308
Not reported	3.8	6	114	3	100	5	22	6	1,780

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	1,523	82	2,032	10,554	3,123	2,064	1,245	134	504,428
Individual and partnership	1,451	71	1,928	4,094	2,489	1,686	641	120	120,295
Cooperative	22	9	47	2,758	165	186	174	12	34,133
Irrigation district	40	.....	40	.....	320	50	100	.....	.....
Commercial	4	.....	4	318	63	.....	.....	.....	.....
U. S. Indian Service	4	.....	6	184	35	15	18	.....	.....
U. S. Reclamation Service	2	2	3	3,200	51	125	312	2	350,000
State	.....	.....	2	.....	.....	.....	.....	.....	.....
City	.....	.....	2	.....	.....	2	.....	.....	.....

CLASS.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	33.0	123	21,942	129	6,798	64	409	72	35,266
Individual and partnership	27.9	108	21,812	48	6,573	59	403	61	35,046
Cooperative	4.1	15	130	29	5	4	6	9	.....
Commercial	0.1	.....	.....	.....	.....	.....	.....	.....	.....
U. S. Indian Service	1.8	.....	.....	50	.....	.....	.....	.....	.....
State	.....	.....	.....	2	220	1	.....	2	220

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	1,523	82	2,032	10,554	3,123	2,064	1,245	134	504,428
Quinn River	5	1	14	98	22	20	16	2	.....
Owyhee River	181	2	202	525	245	170	90	1	1,000
Bruneau River	31	1	39	55	32	7	2	1	50
Goose Creek	35	.....	3	100	100	35	70	3	30,000
Humboldt River and tributaries	715	12	1,040	1,204	1,292	965	281	27	42,791
Humboldt River direct	55	3	51	384	147	303	119	5	32,025
East Fork of Humboldt River	195	2	226	75	188	241	44	4	688
Lamoille Creek	173	.....	196	90	193	128	41	.....	.....
North Fork of Humboldt River	47	.....	62	48	109	86	22	.....	.....
South Fork of Humboldt River	161	.....	281	297	354	96	29	4	7,974
Pine Creek	.....	.....	1	.....	.....	2	1	.....	.....
Reese River	47	.....	170	155	237	13	4	.....	.....
Little Humboldt River	6	.....	4	.....	4	.....	.....	.....	.....
Other tributaries of Humboldt River	31	7	49	155	60	96	21	14	2,104
Truckee River and tributaries	54	5	40	2,465	158	21	14	8	201
Truckee River direct	23	2	26	426	134	17	11	1	2
Steamboat Creek	6	1	8	2,001	14	4	3	1	.....
Other tributaries of Truckee River	25	2	6	38	10	.....	.....	6	199
Carson River and tributaries	128	12	95	3,853	170	179	340	14	400,060
Carson River direct	12	8	13	227	27	36	15	7	.....
West Fork of Carson River	19	.....	27	85	17	.....	.....	.....	.....
East Fork of Carson River	34	.....	39	324	50	.....	.....	.....	.....
Other tributaries of Carson River	63	4	16	3,217	76	143	325	7	400,060
Walker River and tributaries	70	14	120	1,267	498	96	157	4	1,503
Walker River direct	44	.....	47	515	368	60	127	.....	.....
East Walker River	5	.....	43	186	65	1	3	1	3
West Walker River	11	1	10	551	51	11	25	1	1,500
Other tributaries of Walker River	10	13	20	15	14	24	2	2	.....
Colorado River and tributaries	35	5	83	141	94	182	102	16	558
Virgin River	35	5	59	119	86	126	101	5	354
Other tributaries of Colorado River	.....	.....	24	22	8	56	1	11	204
Independent streams	269	30	396	846	512	389	173	58	28,265
Duck Creek	14	.....	21	45	36	17	12	1	50
Steptoe Creek	14	1	17	47	48	20	13	3	4,000
Other independent streams	241	29	358	754	428	352	148	54	24,215

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920—Continued.

DRAINAGE BASIN.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.				
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.		Average lift (feet).
								Number.	Capacity (gallons per minute).	
Total	33.0	123	21,942	129	6,798	64	409	72	35,266	22
Quinn River				10	50	3	4	5		25
Owyhee River	0.1			1	25	1	6	1	350	30
Bruneau River	0.6									
Humboldt River and tributaries	15.7	12	805	18	2,540	18	71	19	22,495	30
Humboldt River direct	2.0	2		8	1,495	8	34	8	2,345	32
East Fork of Humboldt River				1	25	1		1	25	12
North Fork of Humboldt River	0.4			1		1	8	1		30
South Fork of Humboldt River				1	100	1	5	1	100	12
Pine Creek				1	10	1	10	1	10	
Reese River		4	190	4		3		3		
Other tributaries of Humboldt River	13.3	6	615	2	910	3	14	4	20,015	39
Truckee River and tributaries	0.9			1	250	1	6	1	250	8
Truckee River direct	0.7									
Other tributaries of Truckee River	0.2			1	250	1	6	1	250	8
Carson River and tributaries	4.1	3	22	1	50	12	134	13	1,650	12
Carson River direct	0.6			1	50	3	53	3	50	17
East Fork of Carson River						1		1		
Other tributaries of Carson River	3.5	3	22			8	81	9	1,600	11
Walker River and tributaries		26	242	71	5	2	2	2		10
Walker River direct				50						
West Walker River		17	240	20	5	2	2	2		10
Other tributaries of Walker River		9	2	1						
Colorado River and tributaries	7.2	53	18,872	7	705	8	72	9	4,878	21
Virgin River	4.4			5	230	6	43	7	2,245	15
Other tributaries of Colorado River	2.8	53	18,872	2	475	2	29	2	2,633	38
Independent streams	4.4	29	2,001	20	3,173	19	114	22	5,643	20
Duck Creek	0.1	2	794	6	2,285	5	56	8	2,465	20
Steptoe Creek				4	503	4	17	4	1,203	23
Other independent streams	4.3	27	1,207	10	385	10	41	10	1,975	17

CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 and 1909.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AREA HARVESTED.					QUANTITY HARVESTED.					
		1919		1909				1919		1909		
		Acres.	Per cent of total for state.	Acres.	Per cent of total for state.	Per cent of increase.[1]	Unit.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	Per cent of increase.[1]
	Cereals:											
1	Winter wheat	2,921	83.9	14,010	98.2	42.6	Bu.	60,220	87.7	392,472	99.1	11.5
2	Spring wheat	17,062	92.2				Bu.	377,248	95.4			
3	Oats	2,501	84.1	7,285	92.8	−65.7	Bu.	64,873	86.5	307,618	91.8	−78.9
4	Barley	5,156	92.1	11,852	97.1	−56.5	Bu.	138,793	93.6	401,450	97.4	−65.4
	Hay and forage:											
5	Alfalfa	112,166	95.7	89,904	99.7	24.8	Tons.	318,906	96.3	237,536	99.6	34.3
6	Timothy alone	4,229	94.8	10,437	69.8	−59.5	Tons.	4,855	95.6	16,217	75.8	−70.1
7	Timothy and clover mixed	14,059	95.8	9,442	55.1	48.9	Tons.	19,351	96.5	15,607	59.7	24.0
8	Clover alone	487	62.7				Tons.	768	64.4			
9	Other tame grasses	29,114	95.3	7,259	27.7	301.1	Tons.	31,306	96.6	11,107	27.5	181.9
10	Annual legumes cut for hay	706	91.2	1,775	42.4	253.2	Tons.	545	92.2	2,362	43.5	188.6
11	Small grains cut for hay	5,564	79.0				Tons.	6,272	84.1			
12	Wild, salt, or prairie grasses	134,389	75.8	195,381	98.8	−31.2	Tons.	122,146	82.6	188,582	99.6	−35.2
	Vegetables:											
13	Potatoes	2,823	77.6	4,711	96.9	−40.1	Bu.	410,001	83.5	728,227	95.0	−43.7

	CROP.	AVERAGE YIELD PER ACRE, 1919.						VALUE.				
		Unit.	For state.	On non-irrigated land.	On irrigated land.			1919		1909		
					Average.	Per cent of average for state.	Per cent of average on nonirrigated land.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	Per cent of increase.[1]
	Cereals:											
1	Winter wheat	Bu.	19.7	15.1	20.6	104.6	136.4	$138,506	87.7	$393,144	99.2	155.9
2	Spring wheat	Bu.	21.4	12.7	22.1	103.3	174.0	867,670	95.4			
3	Oats	Bu.	25.2	21.5	25.9	102.8	120.5	74,604	86.5	175,987	91.7	−57.6
4	Barley	Bu.	26.5	21.3	26.9	101.5	126.3	242,888	93.6	302,229	97.4	−19.6
	Hay and forage:											
5	Alfalfa	Tons.	2.83	2.42	2.84	100.4	117.4	6,537,573	96.3	1,951,293	99.8	235.0
6	Timothy alone	Tons.	1.14	0.97	1.15	100.9	118.6	111,665	95.6	127,553	77.8	−12.5
7	Timothy and clover mixed	Tons.	1.37	1.12	1.38	100.7	123.2	445,073	96.5	133,871	59.2	232.5
8	Clover alone	Tons.	1.54	1.37	1.58	102.6	107.5	16,896	64.4			
9	Other tame grasses	Tons.	1.06	0.76	1.08	101.9	142.1	641,773	96.6	91,240	27.6	603.4
10	Annual legumes cut for hay	Tons.	0.76	0.68	0.77	101.3	113.2	9,810	92.2	28,059	33.5	348.5
11	Small grains cut for hay	Tons.	1.06	0.80	1.13	103.6	141.2	116,032	84.1			
12	Wild, salt, or prairie grasses	Tons.	0.83	0.60	0.91	109.6	151.7	2,259,701	82.6	1,407,590	99.1	60.5
	Vegetables:											
13	Potatoes	Bu.	134.9	98.9	145.2	107.6	146.8	918,402	83.5	394,651	99.5	132.7

[1] A minus sign (−) denotes decrease.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100.]

		THE STATE.	Churchill.	Clark.	Douglas.	Elko.	Esmeralda.[1]	Eureka.	Humboldt.[2]	Lander.
1	Number of all farms in 1920	3,163	498	162	129	543	19	60	132	64
2	Number of farms irrigated in 1919	2,718	448	149	124	459	10	52	93	54
3	Per cent of all farms	85.9	90.0	92.0	96.1	84.5	52.6	86.7	70.5	84.4
4	Number of farms irrigated in 1909	2,406	326	145	132	359	99	58	270	54
5	Per cent of increase, 1909–1919	13.0	37.4	2.8	−0.1	27.9	.....	.....	.....	.....
	LAND AND FARM AREA.									
6	Approximate land area.....acres	70,285,440	3,232,000	5,148,800	469,120	10,917,760	2,184,320	2,660,480	6,274,560	3,661,440
7	All land in farms.....acres	2,357,103	108,307	13,544	119,211	718,102	13,977	86,197	393,865	133,566
8	Improved land in farms.....acres	594,741	35,870	5,646	27,277	183,721	3,457	25,121	76,788	16,342
9	Area irrigated in 1919.....acres	561,447	41,739	5,206	23,412	202,724	1,685	5,086	27,884	10,400
10	Per cent of improved land in farms	94.4	116.4	92.2	85.8	110.3	48.7	20.2	36.3	63.6
11	Area irrigated in 1909.....acres	701,833	35,114	8,116	32,181	183,552	14,011	18,715	207,753	23,342
12	Per cent of increase, 1909–1919	−20.0	18.9	−35.9	−27.2	10.4	.....	−72.8	.....	−55.4
13	Area enterprises were capable of irrigating in 1920.....acres	704,708	65,661	6,282	24,472	263,403	2,290	5,134	31,695	10,245
14	Area enterprises were capable of irrigating in 1910.....acres	840,962	42,622	16,844	35,548	189,253	14,106	21,973	228,845	24,085
15	Per cent of increase, 1910–1920	−16.2	54.1	−62.7	−31.2	39.2	.....	−76.6	.....	−57.5
16	Area included in enterprises in 1920.....acres	1,382,036	171,681	10,512	43,191	434,582	9,316	5,404	45,331	28,637
17	Area included in enterprises in 1910.....acres	1,232,142	52,030	22,016	37,649	262,315	26,538	23,008	304,152	54,285
18	Per cent of increase, 1910–1920	12.2	230.0	−52.3	14.7	65.7	.....	−77.1	.....	−47.2
19	Area of irrigated land reported as available for settlement.acres	139,352	87,451	1,230	19,220	.....	550	.....	1,764	.....
	IRRIGATION WORKS.									
	Independent enterprises:									
20	Number, 1920	1,015	14	37	78	367	7	24	63	41
21	Number, 1910	1,347	22	28	128	341	34	57	205	60
	Main ditches:									
22	Number, 1920	2,032	8	42	77	1,194	5	1	50	140
23	Number, 1910	994	17	32	142	172	39	36	199	70
24	Length, 1920.....miles	3,123	79	47	88	1,428	5	3	69	194
25	Length, 1910.....miles	1,938	78	65	213	211	85	55	379	118
26	Capacity, 1920.....second-feet	10,554	3,141	110	460	1,297	31	18	307	39
27	Capacity, 1910.....second-feet	17,579	1,656	203	1,688	1,529	236	280	3,368	2,654
	Laterals:									
28	Number, 1920	2,064	127	116	2	1,053	.....	.....	75	10
29	Number, 1910	1,531	78	30	24	803	8	23	66	29
30	Length, 1920.....miles	1,245	302	79	5	370	.....	.....	29	4
31	Length, 1910.....miles	1,213	191	12	17	200	25	15	102	13
	Reservoirs:									
32	Number, 1920	134	8	13	7	21	.....	.....	16	.....
33	Number, 1910	109	2	5	4	9	.....	21	15	8
34	Capacity, 1920.....acre-feet	504,428	350,009	214	.....	40,068	.....	.....	7,452	.....
35	Capacity, 1910.....acre-feet	325,953	300,010	7	5,043	3,007	.....	1,014	5,283	1
	Flowing wells:									
36	Number, 1920	123	6	53	2	2	.....	.....	20	1
37	Number, 1910	19	2	6	.....	.....	.....	.....	.....	11
38	Capacity, 1920.....gallons per minute	21,942	615	18,872	22	.....	.....	.....	400	25
39	Capacity, 1910.....gallons per minute	1,302	54	1,210	.....	.....	.....	.....	.....	38
	Pumped wells:									
40	Number, 1920	129	.....	2	.....	9	.....	.....	13	5
41	Number, 1910	6	.....	.....	.....	.....	1	.....	3	.....
42	Capacity, 1920.....gallons per minute	6,798	.....	475	.....	645	.....	.....	1,050	10
43	Capacity, 1910.....gallons per minute	1,349	.....	.....	.....	.....	5	.....	1,076	.....
	Pumping plants:									
44	Number, 1920	64	1	3	7	9	.....	.....	7	4
45	Number, 1910	18	1	4	2	.....	1	.....	3	.....
46	Engine capacity, 1920.....horsepower	409	6	41	108	32	.....	.....	22	10
47	Engine capacity, 1910.....horsepower	693	8	72	100	.....	2	.....	303	.....
48	Pump capacity, 1920.....gallons per minute	35,266	.....	4,633	.....	1,720	.....	.....	20,200	10
49	Pump capacity, 1910.....gallons per minute	24,295	490	6,750	4,000	.....	5	.....	1,076	.....
50	Average lift, 1920.....feet	22	6	28	16	23	.....	.....	26	.....
	CAPITAL INVESTED.									
51	Capital invested to Jan. 1, 1920.....dollars	14,754,280	7,774,129	352,332	94,311	1,447,201	26,849	25,211	271,719	79,332
52	Capital invested to July 1, 1910.....dollars	6,721,924	1,621,996	61,009	64,696	384,096	137,092	25,396	556,998	188,431
53	Per cent of increase, 1910–1920	119.5	379.3	477.5	45.8	276.8	.....	−0.7	.....	−57.9
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	20.94	118.40	56.09	3.85	5.49	11.72	4.91	8.57	7.74
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	7.99	38.06	3.62	1.82	2.03	9.72	1.16	2.43	7.82
	ESTIMATED FINAL COST.									
56	Estimated final cost of existing enterprises in 1920.....dollars	22,648,747	13,809,936	515,332	109,311	1,475,376	26,849	25,211	314,719	79,332
57	Estimated final cost of existing enterprises in 1910.....dollars	12,188,756	7,016,828	67,009	64,696	385,096	150,092	25,396	608,998	188,431
58	Per cent of increase, 1910–1920	85.8	96.8	669.0	69.0	283.1	.....	−0.7	.....	−57.9
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	16.39	80.44	49.02	2.53	3.39	2.88	4.67	6.94	2.77
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	9.89	134.86	3.04	1.72	1.47	5.66	1.08	2.00	3.47

[1] Part taken to form Mineral County in 1911.

[2] Part taken to form Pershing County in 1919.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100.]

		Lincoln.	Lyon.	Mineral.[1]	Nye.	Ormsby.	Pershing.[2]	Storey.	Washoe.	White Pine.
1	Number of all farms in 1920	145	297	92	152	49	115	14	481	211
2	Number of farms irrigated in 1919	131	275	89	110	37	109	12	381	185
3	Per cent of all farms	90.3	92.6	96.7	72.4	75.5	94.8	85.7	79.2	87.7
4	Number of farms irrigated in 1909	113	196	.....	106	39	.....	19	326	164
5	Per cent of increase, 1909–1919	15.9	40.3	.....	3.8	.....	.....	.....	16.9	12.8
	LAND AND FARM AREA.									
6	Approximate land area—acres	6,727,040	965,760	2,572,160	11,708,160	99,840	3,873,920	160,640	4,000,640	5,628,800
7	All land in farms—acres	31,105	145,371	27,621	95,002	9,972	130,968	1,833	230,052	98,470
8	Improved land in farms—acres	9,264	52,280	9,056	19,759	3,027	50,141	699	45,036	31,257
9	Area irrigated in 1919—acres	5,826	110,902	5,212	11,354	3,146	53,628	172	28,801	24,270
10	Per cent of improved land in farms	62.9	212.1	57.6	57.5	103.9	107.0	24.6	64.0	77.6
11	Area irrigated in 1909—acres	9,907	62,148	.....	19,978	2,426	.....	891	50,904	32,795
12	Per cent of increase, 1909–1919	—41.2	78.4	.....	—43.2	29.7	.....	—80.7	—43.4	—26.0
13	Area enterprises were capable of irrigating in 1920—acres	10,752	136,475	7,602	14,169	4,718	61,940	268	31,610	27,932
14	Area enterprises were capable of irrigating in 1910—acres	15,391	116,222	.....	28,902	2,466	.....	925	54,551	49,229
15	Per cent of increase, 1910–1920	—30.1	17.4	.....	—51.0	91.3	.....	—71.0	—42.1	—43.3
16	Area included in enterprises in 1920—acres	20,366	232,810	12,937	70,601	7,410	62,795	348	78,274	47,841
17	Area included in enterprises in 1910—acres	16,124	260,354	.....	34,062	2,466	.....	1,025	82,600	52,918
18	Per cent of increase, 1910–1920	26.3	27.8	.....	107.3	200.5	.....	—66.0	—5.2	—9.6
19	Area of irrigated land reported as available for settlement—acres	2,300	16,537	.....	1,020	1,380	.....	.....	7,000	300
	IRRIGATION WORKS.									
	Independent enterprises:									
20	Number, 1920	49	40	23	95	20	16	4	87	50
21	Number, 1910	51	59	.....	101	39	.....	17	99	106
	Main ditches:									
22	Number, 1920	54	79	49	159	3	12	4	84	71
23	Number, 1910	26	56	.....	65	11	.....	6	43	80
24	Length, 1920—miles	82	421	77	156	5	60	1	255	153
25	Length, 1910—miles	37	289	.....	83	7	.....	10	208	100
26	Capacity, 1920—second-feet	47	1,097	289	423	133	266	2	2,612	282
27	Capacity, 1910—second-feet	78	4,014	.....	147	28	.....	51	1,104	543
	Laterals:									
28	Number, 1920	78	74	24	77	51	190	3	136	48
29	Number, 1910	16	269	.....	91	12	.....	1	17	64
30	Length, 1920—miles	38	151	14	13	25	96	1	61	57
31	Length, 1910—miles	10	520	.....	34	4	.....	1	29	40
	Reservoirs:									
32	Number, 1920	6	3	2	13	5	3	1	29	7
33	Number, 1910	2	4	.....	13	6	.....	.....	8	12
34	Capacity, 1920—acre-feet	354	1,500	5	1,354	50,060	32,003	.....	16,626	4,783
35	Capacity, 1910—acre-feet	3	2	.....	1,083	203	.....	.....	10,277	20
	Flowing wells:									
36	Number, 1920	.....	26	.....	9	1	.....	.....	.....	3
37	Number, 1910	.....	.....	.....	.....	.....	.....	.....	.....	.....
38	Capacity, 1920—gallons per minute	.....	242	.....	410	.....	.....	.....	.....	1,356
39	Capacity, 1910—gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumped wells:									
40	Number, 1920	5	21	53	7	1	2	.....	1	10
41	Number, 1910	1	.....	.....	.....	.....	.....	.....	.....	1
42	Capacity, 1920—gallons per minute	230	5	25	360	50	910	.....	250	2,788
43	Capacity, 1910—gallons per minute	196	.....	.....	.....	.....	.....	.....	.....	72
	Pumping plants:									
44	Number, 1920	5	3	1	8	3	2	.....	2	9
45	Number, 1910	2	.....	.....	1	.....	.....	.....	3	1
46	Engine capacity, 1920—horsepower	31	2	.....	35	20	17	.....	12	73
47	Engine capacity, 1910—horsepower	10	.....	.....	1	.....	.....	.....	193	4
48	Pump capacity, 1920—gallons per minute	245	.....	25	350	1,650	915	.....	1,850	3,068
49	Pump capacity, 1910—gallons per minute	588	.....	.....	10	.....	.....	.....	11,304	72
50	Average lift, 1920—feet	16	10	17	19	10	78	.....	11	21
	CAPITAL INVESTED.									
51	Capital invested to Jan. 1, 1920—dollars	124,536	1,740,387	208,132	260,220	54,777	550,952	6,229	658,775	1,079,188
52	Capital invested to July 1, 1910—dollars	39,262	2,761,261	.....	56,871	11,620	.....	16,270	678,284	118,642
53	Per cent of increase, 1910–1920	217.2	—37.0	.....	357.6	371.4	.....	—61.7	—2.9	809.6
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	11.58	12.78	27.16	18.37	11.61	8.89	23.24	20.84	38.64
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	2.55	23.76	.....	1.97	4.71	.....	17.59	12.43	2.41
	ESTIMATED FINAL COST.									
56	Estimated final cost of existing enterprises in 1920—dollars	141,936	2,934,907	213,132	303,445	55,777	554,952	9,819	832,725	1,245,988
57	Estimated final cost of existing enterprises in 1910—dollars	39,262	2,761,261	.....	56,871	11,620	.....	16,270	678,284	118,642
58	Per cent of increase, 1910–1920	261.5	6.3	.....	433.6	380.0	.....	—39.6	22.8	950.2
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	6.97	8.82	16.47	4.30	7.53	8.84	28.22	10.64	26.04
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	2.44	10.61	.....	1.67	4.71	.....	15.87	8.21	2.24

[1] Formed from part of Esmeralda County in 1911.

[2] Formed from part of Humboldt County in 1919.

NEW MEXICO.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of New Mexico collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

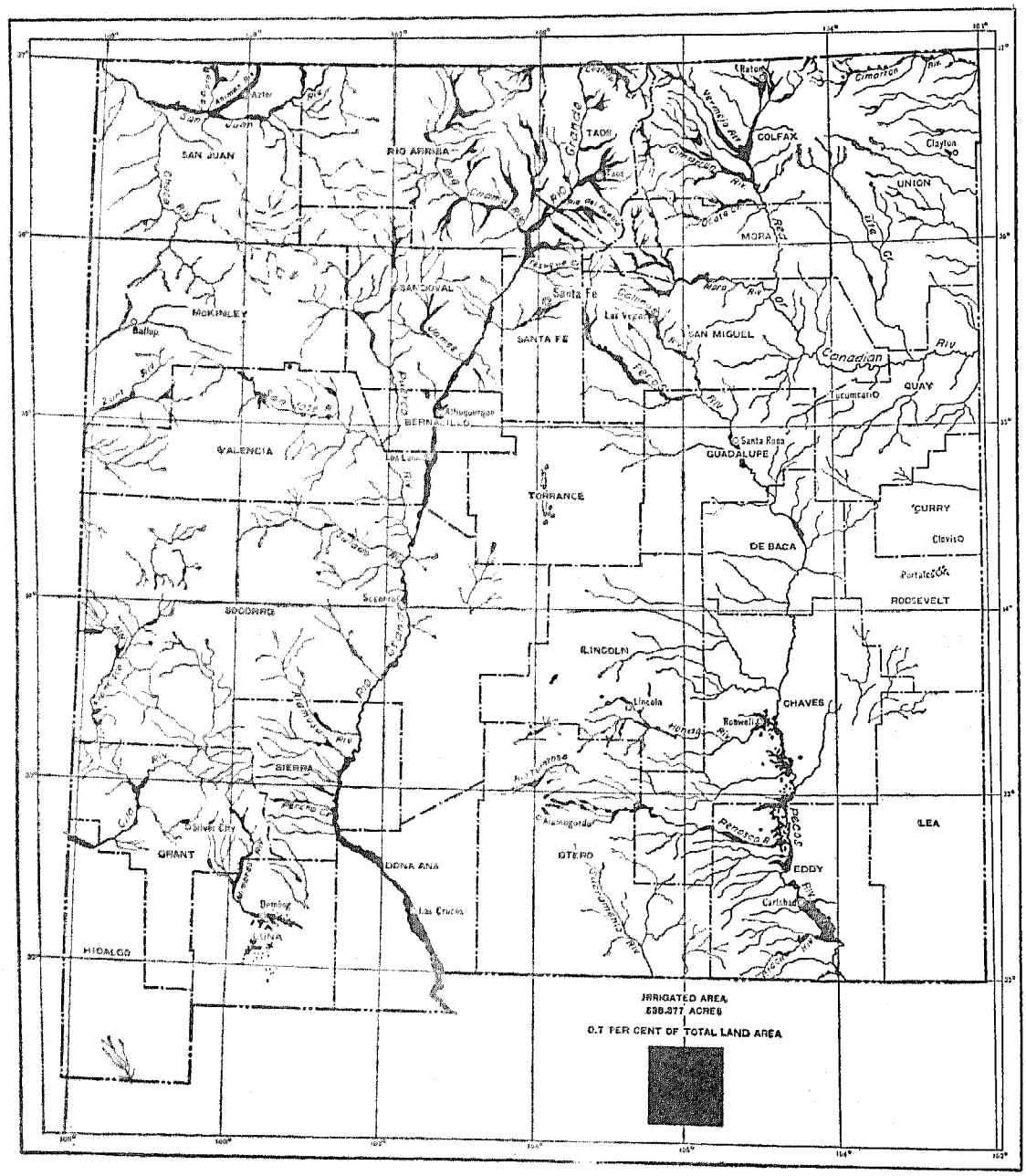
ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	29,844	35,676	−5,832	−16.3
Approximate land area of the state.....acres..	78,401,920	78,401,920		
All land in farms.....acres..	24,409,633	11,270,021	13,139,612	116.6
Improved land in farms.....acres..	1,717,224	1,467,191	250,033	17.0
Number of farms irrigated	11,390	12,795	−1,405	−11.0
Area irrigated.....acres..	538,377	461,718	76,659	16.6
Area enterprises were capable of irrigating.....acres..	696,119	644,970	51,149	7.9
Area included in enterprises.....acres..	961,879	1,102,297	−140,418	−12.7
Per cent irrigated:				
Number of all farms	38.2	35.9	2.3	
Approximate land area of the state	0.7	0.6	0.1	
Land in farms	2.2	4.1	−1.9	
Improved land in farms	31.4	31.5	−0.1	
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	157,742	183,252	−25,510	−13.9
Excess of area included in enterprises over area irrigated.....acres..	423,502	640,579	−217,077	−33.9
Area of irrigated land reported as available for settlement.....acres..	66,479	(2)		
Capital invested	$18,210,412	$9,154,897	$9,055,515	98.9
Average per acre enterprises were capable of irrigating	$26.16	$14.19	$11.97	84.4
Estimated final cost of existing enterprises	$20,440,646	$11,640,091	$8,800,555	75.6
Average per acre included in enterprises	$21.25	$10.56	$10.69	101.2
Average cost of operation and maintenance per acre	$2.41	$1.36	$1.05	77.2
IRRIGATION WORKS.				
Number of enterprises	2,391	2,786	−395	−14.2
Number of main ditches	2,228	2,101	127	6.0
Length of main ditches.....miles..	4,469	4,664	−195	−4.2
Capacity of main ditches.....second-feet..	23,432	29,646	−6,214	−21.0
Number of lateral ditches	2,158	1,280	878	68.6
Length of lateral ditches.....miles..	1,463	1,190	273	22.9
Number of reservoirs	328	522	−194	−37.2
Capacity of reservoirs.....acre-feet..	2,960,718	454,162	2,506,556	552.1
Number of flowing wells	556	673	−117	−17.4
Capacity of flowing wells.....gallons per minute..	376,222	669,268	−293,046	−43.8
Number of pumped wells	461	466	−5	−1.1
Capacity of pumped wells.....gallons per minute..	265,618	190,690	74,928	39.3
Number of pumping plants	472	413	59	14.3
Engine capacity.....horsepower..	8,488	14,226	−5,738	−40.3
Pump capacity.....gallons per minute..	304,789	216,355	88,434	40.9
Average lift.....feet..	40	(2)	40	

[1] A minus sign (−) denotes decrease.

[2] Not reported in 1910.

NEW MEXICO

Approximate Location and Extent of Irrigated Land.



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CLIMATIC CONDITIONS.

The climatic conditions having the greatest influence in determining the necessity for irrigation are the amount and seasonal distribution of precipitation, especially rainfall, although temperature, relative humidity, and wind movement have an influence.

The surface of New Mexico is very much broken, and the state does not lie in the path of the large storm movements of the country; consequently there is a great variety of both temperature and moisture conditions, depending on local influences.

The San Juan Valley, in the northwestern corner of the state, has the lowest precipitation in the state, the annual total falling below 6 inches in the lower valley. The precipitation increases with elevation to the north, east, and south of this valley, reaching about 15 inches where San Juan River crosses the Colorado-New Mexico boundary, and 20 inches in the mountains between the San Juan and the Rio Grande and on the high lands in the west-central part of the state.

The northeastern part of the state has the heaviest precipitation in the state. The precipitation of this section is mostly received in the form of showers during the months from April to September, inclusive, July and August being the months of greatest rainfall. The smallest precipitation in this section occurs in a strip passing along the eastern side of Colfax County, through central Mora and San Miguel Counties and eastern Guadalupe County. In this strip the annual precipitation falls below 14 inches in southern Colfax County, and averages 15 to 16 inches over the rest of the strip. To the east the annual precipitation increases to 16 or 18 inches in Union and Quay Counties. To the west of this strip of low precipitation the annual average increases to 18 inches in the western parts of Colfax, Mora, and San Miguel Counties, and exceeds 20 inches on the mountain slopes at an altitude of 8,000 feet.

The Rio Grande flows through the central part of the state from north to south. Over the greater part of the Rio Grande Valley the average annual precipitation is less than 10 inches; in the Pecos Valley it rises to about 15 inches; over the great plains east of the Pecos it ranges from 15 to 20 inches, while on the mountains between the two river valleys it ranges from 15 to more than 25 inches.

Over the high plateaus and mountains west of the Rio Grande the annual precipitation ranges from about 20 inches in the northern and higher elevations to less than 10 inches on the lower plains near the Mexican boundary.

In the eastern part of the state fully 75 per cent of the annual precipitation occurs during the months from May to October, making it possible to grow cereals and forage crops without irrigation. In the state generally, the larger part of the precipitation occurs in the summer.

In 1919 the precipitation was far above the normal, the average for the state being nearly 21 inches, while the normal is between 15 and 16 inches.

WATER SUPPLY FOR IRRIGATION.

The Rio Grande flows through the state of New Mexico from north to south, slightly west of the center of the state. The river rises in the mountains of southern Colorado. In New Mexico it flows in a narrow valley, but at places the hills recede, forming a succession of valleys containing considerable areas of arable land. In its natural condition the river is subject to heavy floods when the snows in the mountains melt in spring and during heavy rains at other times, and at times between floods is dry, or nearly so. In 1907 the construction of the Elephant Butte Dam to store the flood water was begun, and the dam was completed in 1916. This reservoir supplies water in New Mexico only to the lower part of the valley, leaving the valleys above to use the stream in its natural condition. Water from the reservoir at Elephant Butte is used for lands in Texas, as well as New Mexico, and under treaty with Mexico a fixed quantity of water is to be supplied for land in that country.

The northeastern part of the state is drained by the Canadian River and its tributaries. This stream rises in the mountains and flows out onto the plains and, like other such streams, loses in the sands and by evaporation most of the water entering it in the mountains. Without storage it is not a reliable source of water for irrigation, except in flood seasons.

The southeastern part of the state is drained by the Pecos and its tributaries. Like the Rio Grande and the Canadian, the Pecos at times carries large floods and at other times carries very little water. Storage of water for use along the lower part of the stream in New Mexico has been provided by the United States Reclamation Service.

There has been a large development of both flowing and pumped wells in the Pecos Valley in the vicinity of Roswell, in Chaves County.

In the southwestern part of the state, near Deming, there has been a large development of underground water from pumped wells. Farther west the Gila and San Francisco Rivers supply water for land in their valleys. These rivers within New Mexico are perennial streams, furnishing a reliable supply of water.

San Juan River and its tributaries rise in high mountains in Colorado and New Mexico, and furnish an abundant supply of water for the San Juan Valley.

In the west-central part of the state there is a high plateau region that has many small streams rising in the hills and losing their waters in the valleys. There is so little water in this section that there is no large opportunity for irrigation.

Throughout the state there are many valleys containing large areas of fine land which have no surface supply of water. In many of these it is possible to obtain water from wells, and this may be done where the value of crops will justify the expense.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.[1]	Per cent of all farms.	Acres.	Per cent of increase.	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	11,390	−11.0	38.2	538,377	16.6	0.7	2.2	31.4
1910	12,795	40.2	35.9	461,718	126.5	0.6	4.1	31.5
1900	9,128	195.9	74.1	203,893	122.2	0.3	4.0	62.4
1890	3,085	.....	69.2	91,745	.....	0.1	11.6	34.9

[1] A minus sign (−) denotes decrease.

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	2,391	961,879	538,377	56.0	696,119
Before 1860	116	46,962	28,062	59.8	41,073
1860-1869	103	34,775	26,597	76.5	28,628
1870-1879	176	51,249	33,720	65.8	37,601
1880-1889	276	98,832	71,909	72.8	78,785
1890-1899	221	82,523	55,223	66.9	60,947
1900-1904	156	49,681	27,312	55.0	35,997
1905-1909	326	145,064	71,843	49.5	117,623
1910-1914	380	195,842	89,720	45.8	128,866
1915-1919	336	153,489	60,919	39.7	78,982
Not reported	301	103,462	73,067	70.6	87,617

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	538,377	461,718	76,659	16.6	696,119	961,879
Streams, gravity	432,478	397,059	35,419	8.9	558,292	748,646
Streams, pumped	1,890	1,533	357	23.3	2,930	3,320
Wells, pumped	15,709	5,952	9,757	163.9	23,141	42,563
Wells, flowing	30,030	48,877	−18,847	−38.6	33,394	50,968
Wells, flowing and pumped	6,556	(2)	6,556	.....	7,452	9,084
Lakes, gravity	1,945	862	1,083	125.6	12,245	23,150
Springs	10,791	6,163	4,628	75.1	11,127	19,332
Stored storm water	6,448	1,272	5,176	406.9	6,774	15,689
City water	40	(2)	40	.....	150	350
Streams, gravity, and pumped wells	1,341	(2)	1,341	.....	1,584	1,792
Streams, gravity, and flowing wells	685	(2)	685	.....	685	740
Other mixed	29,787	(2)	29,787	.....	37,368	45,367
Other and not reported	677	(2)	677	.....	977	878

[1] A minus sign (−) denotes decrease.
[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

Irrigation was practiced in parts of what is now New Mexico for hundreds of years before this territory became a part of the United States, and water for irrigation was supplied by "community ditches" or "public acequias," owned and controlled by the water users in accordance with old Spanish customs. New Mexico was organized as a territory in 1850, and in 1852 the territorial legislature enacted a law declaring "All rivers and streams of water in this territory, formerly known as public ditches (acequias), are hereby established and declared to be public ditches (acequias)." This law provided for annual elections of officers, under the supervision of justices of the peace, and contained regulations requiring each party receiving water to furnish labor for repairs and cleaning, and fixed fines for refusal or failure to furnish labor. Similar laws are still in force in New Mexico, and a large part of the irrigated land in the state is watered by such ditches. They are classed as cooperative in Table 5.

A law enacted in 1887 provided for the organization of corporations for constructing irrigation and other canals and the colonization and improvement of lands. Such companies were authorized to issue bonds and to collect rates for water, but were not empowered to levy and collect taxes, as are the irrigation districts provided for by the later laws. Such companies are classed as commercial in Table 5.

An irrigation district law containing the bonding and taxing powers was enacted in 1909. It has been amended from time to time, and revised in 1919.

The conditions of the Federal Carey Act (act of Congress, Aug. 18, 1894) were accepted in 1909.

The small area credited to the state belongs to a state institution and does not represent a scheme of state construction of irrigation works.

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Acres.	Per cent.
ACREAGE IRRIGATED.				
Total	533,377	461,718	76,659	16.6
Individual and partnership	151,351	144,212	7,139	5.0
Cooperative	264,610	251,911	12,699	5.0
Irrigation district	15,008	.....	15,008	.....
Carey Act	.....	.....	.....	.....
Commercial	19,871	23,190	−8,319	−29.5
U. S. Reclamation Service	77,678	13,398	64,280	479.8
U. S. Indian Service	9,072	24,007	−14,935	−62.2
State	77	(2)	77	.....
City	600	(2)	600	.....
Other	110	(2)	110	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	696,119	644,970	51,149	7.9
Individual and partnership	215,618	185,283	30,335	16.4
Cooperative	305,540	355,327	−49,787	−14.0
Irrigation district	24,808	.....	24,808	.....
Carey Act	7,500	.....	7,500	.....
Commercial	33,743	58,150	−24,407	−42.0
U. S. Reclamation Service	96,751	21,467	75,284	350.7
U. S. Indian Service	11,372	24,743	−13,371	−54.0
State	77	(2)	77	.....
City	600	(2)	600	.....
Other	110	(2)	110	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total	961,879	1,102,297	−140,418	−12.7
Individual and partnership	313,170	295,171	17,999	6.1
Cooperative	404,928	482,954	−78,026	−16.2
Irrigation district	28,520	16,400	12,120	73.9
Carey Act	7,500	16,000	−8,500	−53.1
Commercial	67,050	224,950	−157,900	−70.2
U. S. Reclamation Service	127,226	30,267	96,959	320.3
U. S. Indian Service	13,570	37,455	−23,885	−63.8
State	77	(2)	77	.....
City	600	(2)	600	.....
Other	138	(2)	138	.....

[1] A minus sign (−) denotes decrease.
[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The laws of New Mexico relating to water rights are summarized in the following paragraphs:

The territory of New Mexico was organized under the act of Congress approved September 9, 1850, and the first territorial legislature passed an act declaring "All the inhabitants of the territory of New Mexico shall have the right to construct either private or common acequias, and to take water for said acequias from wherever they can."

A law enacted in 1891 required the filing of descriptions of all works built after the enactment of the law within 90 days after the beginning of construction, and provided that no right should accrue because of such construction until the filing was made.

In 1905 a law requiring filing in advance of construction was enacted.

In the same year a comprehensive water law was passed. It declared that "All natural waters within the limits of New Mexico are hereby declared to belong to the public, and no person shall be denied the right to appropriate said waters for beneficial use." It created the office of territorial engineer, and gave to this officer supervision of the administration of the public waters of the territory. It created also a board of control, consisting of the engineer and six water commissioners, and gave to this board authority to adjudicate and define all existing rights to water. However, no funds for the enforcement of this law were appropriated, and it was inoperative.

In 1907 the act of 1905 was repealed and a new law differing in many respects was enacted. This law placed the adjudication of rights in the courts, but provided for the collection of information for such adjudication by the territorial engineer, and for the initiation of actions by the attorney general of the territory. Any party wishing to acquire rights was required to apply to the territorial engineer for a permit to appropriate water and to submit proof of the completion of works and of the use of water in accordance with the terms of the permit. When satisfactory proof of completion of works is made, a certificate of completion is issued by the engineer, and when satisfactory proof of use of water is submitted a license setting forth the rights acquired is issued by the engineer. This law is still in force.

New Mexico was admitted as a state in 1911. The state constitution adopted at that time contained the following sections relating to water rights (Art. XVI):

Sec. 1. "All existing rights to the use of any waters in this state for any useful or beneficial purpose are hereby recognized and confirmed."

Sec. 2. "The unappropriated water of every natural stream, perennial or torrential, within the state of New Mexico, is hereby declared to belong to the public and to be subject to appropriation for beneficial use, in accordance with the laws of the state. Priority of appropriation shall give the better right."

Sec. 3. "Beneficial use shall be the basis, the measure and the limit of the right to the use of water."

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909, per cent of total.
	Acres.	Per cent of total.	
Total	538,377	100.0	100.0
Appropriation and use	152,746	28.4	83.9
Notice filed and posted	54,356	10.1	2.2
Adjudicated by court	91,807	17.1	5.6
Permit from state	103,459	19.2	8.0
Certificate or license from state	20,096	3.7	0.1
Riparian rights	400	0.1	0.1
Underground	52,325	9.7	(1)
Other and mixed	8	(2)	(1)
Not reported	63,180	11.7	(1)

[1] All land for which the class of water rights was not reported was included in "Appropriation and use."
[2] Less than one-tenth of 1 per cent.

ACREAGE, BY DRAINAGE BASIN.

The report of a special census taken in 1902 presented all data by drainage basins rather than by counties. The results of the census of 1920 have been tabulated on the same basis, and the data for 1902 are presented for purposes of comparison. For no other census have the results been tabulated in this form. The acreage reported for each drainage basin in 1919 comprises all the irrigated land in that drainage basin, including that watered from springs and wells. In the 1902 results the acreages irrigated from springs and wells were not reported for the smaller tributary streams, but the acreages for the tributaries were included in those reported for the main streams.

This area is so small, however, that the comparison of the areas reported for the tributary streams is not seriously affected.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
Total	538,377	254,945	111.2	961,879	696,119
Canadian River and tributaries	90,185	56,203	60.5	179,462	136,947
Canadian River direct	1,680	1,156	45.3	1,680	1,680
Cimarron River	31,967	8,122	293.6	70,318	45,628
Vermejo River	23,678	4,110	476.1	23,978	23,878
Ocate Creek	4,861	1,380	252.2	13,908	13,095
Mora River	17,057	32,796	−48.0	36,670	29,528
Ute Creek	77	4,061	−98.1	709	519
Other tributaries of Canadian River	10,865	[2] 4,578	137.3	32,199	22,619
Cimarron River	5,757	[2] 6,554	−12.2	14,173	12,363
Trinchera River	389	691	−43.7	911	468
Pecos River and tributaries	119,040	56,497	110.7	225,400	160,658
Pecos River direct	62,430	12,333	406.2	102,200	77,794
Gallinas River	4,097	6,281	−34.8	41,810	24,201
Hondo River	20,561	24,603	−16.4	33,118	23,625
Penasco River	13,375	5,102	162.2	19,889	13,733
Other tributaries of Pecos River	18,577	[2] 8,173	127.3	28,383	21,405
Rio Grande and tributaries	250,206	96,836	158.4	421,363	298,663
Rio Grande direct	103,844	49,520	109.7	172,747	123,464
Rio Costilla	4,417	2,115	108.8	7,385	4,803
Pueblo River	11,780	7,075	66.5	12,443	11,791
Rio Chama	26,166	8,549	206.1	42,225	30,237
Rio Santa Cruz	9,171	3,086	197.2	9,863	9,221
Tesuque Creek	3,012	4,744	−36.5	3,411	3,183
Rio Pueroo	14,309	2,927	388.9	42,877	25,991
Other tributaries of Rio Grande	77,507	[2] 18,820	311.8	130,402	89,973
Rio Mimbres	12,557	[2] 6,546	91.8	24,243	19,554
Gila River and tributaries	9,983	9,342	6.9	14,936	10,493
Gila River direct	6,424	4,647	38.2	7,027	6,587
San Francisco River	3,162	4,068	−22.3	6,986	3,383
Other tributaries of Gila River	397	[2] 27	.....	923	523
San Juan River and tributaries	43,825	20,467	114.1	71,608	49,655
San Juan River direct	12,026	6,285	91.3	21,386	12,651
Los Pinos River	1,260	463	172.1	2,640	1,260
Animas River	23,355	10,502	122.4	35,370	28,455
La Plata River	5,830	3,005	94.0	9,445	5,830
Other tributaries of San Juan River	1,354	[2] 212	538.7	2,767	1,459
Independent streams	6,435	1,809	255.7	9,783	7,298
Fresno River	1,798	200	799.0	3,598	2,331
Rio Tularosa	4,547	1,563	190.0	6,095	4,877
Other independent streams	90	[2] 41	.....	90	90

[1] A minus sign (−) denotes decrease. Per cent not shown when base is less than 100.
[2] Includes springs and wells.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1890 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.[1]
1920	$18,210,412	98.9	$26.16	84.4
1910	9,154,897	119.8	14.19	−30.5
1900	4,165,312	713.6	20.43	266.1
1890	511,037	.....	5.58	.....

[1] A minus sign (−) denotes decrease.

TABLE 9.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$18,210,412	100.0	$26.16
Before 1860	268,876	1.5	6.55
1860–1869	384,754	2.1	13.44
1870–1879	482,843	2.6	12.84
1880–1889	2,508,298	14.1	32.60
1890–1899	1,262,916	6.9	20.72
1900–1904	1,122,232	6.2	31.18
1905–1909	4,692,515	25.8	39.89
1910–1914	4,594,735	25.2	35.06
1915–1919	2,021,448	11.1	25.69
Not reported	811,795	4.5	9.27

TABLE 10.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$18,210,412	100.0	$26.16	336,387	$2.41
Streams, gravity	13,524,889	74.2	24.23	257,818	1.65
Streams, pumped	36,520	0.2	12.46	1,132	1.30
Wells, pumped	925,003	5.1	39.97	12,388	7.51
Wells, flowing	1,220,519	6.7	36.55	14,394	2.15
Wells, flowing and pumped	388,165	2.1	52.09	4,601	8.99
Lakes, gravity	18,750	0.1	1.53	1,945	1.41
Springs	257,179	1.4	23.11	7,452	1.92
Stored storm water	686,047	3.8	101.28	6,207	1.67
City water	1,000	(2)	6.67	40	1.25
Streams, gravity, and pumped wells	175,000	1.0	110.48	1,319	39.77
Streams, gravity, and flowing wells	14,000	0.1	20.44	500	1.00
Other mixed	958,740	5.3	25.66	28,534	4.84
Other and not reported	4,600	(2)	4.71	57	4.91

[1] Based on area irrigated in 1919.
[2] Less than one-tenth of 1 per cent.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	INCREASE.[1] Amount.	INCREASE.[1] Per cent.
Total	$18,210,412	$4,301,915	$13,908,497	323.3
Canadian River and tributaries	5,039,780	424,442	4,615,338	.....
Canadian River direct	32,625	10,690	21,935	205.2
Cimarron River	2,188,908	130,580	2,058,328	.....
Vermejo River	1,248,537	131,020	1,117,517	852.9
Ocate Creek	319,529	9,400	310,129	.....
Mora River	262,575	99,475	163,100	164.0
Ute Creek	7,000	10,000	−3,000	−30.0
Other tributaries of Canadian River	980,606	[2] 33,277	947,329	.....
Cimarron River	308,147	[2] 46,200	261,947	567.0
Trinchera River	3,513	1,010	2,503	247.8
Pecos River and tributaries	5,263,454	2,734,810	2,528,644	92.5
Pecos River direct	3,294,504	2,284,176	1,010,328	44.2
Gallinas River	519,566	30,931	488,635	.....
Hondo River	578,094	261,863	316,231	120.8
Penasco River	222,693	50,363	172,330	342.2
Other tributaries of Pecos River	648,597	[2] 107,477	541,120	503.5
Rio Grande and tributaries	5,158,057	599,836	4,558,221	759.9
Rio Grande direct	3,605,725	295,898	3,309,827	.....
Rio Costilla	11,471	4,697	6,774	144.2
Pueblo River	19,982	11,560	8,422	72.9
Rio Chama	141,891	29,849	112,042	375.4
Rio Santa Cruz	18,281	12,862	5,419	42.1
Tesuque Creek	16,804	22,080	−5,816	−25.6
Rio Pueroo	88,109	53,523	34,586	64.6
Other tributaries of Rio Grande	1,255,734	[2] 168,767	1,086,967	644.1
Rio Mimbres	318,062	[2] 112,192	205,870	183.5
Gila River and tributaries	70,423	73,769	−3,346	−4.5
Gila River direct	47,182	46,014	1,168	2.5
San Francisco River	9,809	21,455	−11,646	−54.3
Other tributaries of Gila River	13,432	[2] 6,300	7,132	113.2
San Juan River and tributaries	1,715,867	295,298	1,420,569	481.1
San Juan River direct	807,700	164,994	642,706	389.5
Los Pinos River	3,000	4,550	−1,550	−34.1
Animas River	824,450	101,535	722,915	712.0
La Plata River	47,975	23,144	24,831	107.3
Other tributaries of San Juan River	32,742	[2] 1,075	31,667	.....
Independent streams	333,109	14,358	318,751	.....
Fresno River	297,724	2,440	295,284	.....
Rio Tularosa	33,900	5,868	28,032	477.7
Other independent streams	1,485	[2] 6,050	−4,565	−75.5

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Includes springs and wells.

In classifying capital invested by type of enterprise the average capital invested per acre is not presented, for the reason that it is not possible to compute this correctly. The United States Reclamation Service supplies stored water to enterprises controlled by agencies of some of the other classes shown in the table, and a part of its expenditure is properly chargeable to those lands; but it is not possible to tell how much should be so charged or how it should be distributed among the various classes. The Reclamation Service also supplies water to land in Mexico, under treaty with that country.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920. Amount.	CAPITAL INVESTED, 1920. Per cent of total.	OPERATION AND MAINTENANCE, 1919. Area for which cost is reported (acres).	OPERATION AND MAINTENANCE, 1919. Average cost per acre.[1]
Total	$18,210,412	100.0	336,387	$2.41
Individual and partnership	5,589,372	30.7	97,967	4.43
Cooperative	3,558,863	19.6	176,594	1.29
Irrigation district	914,479	5.0	15,000	3.30
Commercial	1,877,842	10.3	17,071	1.64
Carey Act	262,713	1.4	.....	.....
U. S. Reclamation Service	5,020,230	27.6	22,233	2.76
U. S. Indian Service	691,194	3.8	6,922	0.97
State	18,544	0.1	.....	.....
City	276,299	1.5	600	4.17
Other	876	.....	.....	.....

[1] Based on area irrigated in 1919.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	203
Acreage included in enterprises reporting land drained or needing drainage	212,353
Acreage for which drains have been installed	74,783
Additional acreage needing drainage	60,277
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	35.2
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	7.8
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	14.0

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules, and the figures given vary greatly. In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 14. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume of water entering canals, second-feet	4,041	1,306	2,735
Area irrigated in 1919.....acres	184,253	105,922	78,331
Average number of acres per second-foot	46	81	29
Total quantity of water entering canals, acre-feet	1,007,575	688,428	319,147
Area irrigated in 1919.....acres	199,859	126,090	73,769
Average quantity per acre.....acre-feet	5.0	5.5	4.3
Total quantity of water delivered.....acre-feet	274,746	212,359	62,387
Area irrigated in 1919.....acres	160,996	119,013	41,983
Average quantity per acre.....acre-feet	1.7	1.8	1.5

IRRIGATION WORKS.

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	1,423	153	2,228	23,432	4,469	2,158	1,463	328	2,960,718
Before 1860	90	9	118	1,376	316	92	142	10	12
1860-1869	152	10	122	626	289	513	178	3	277
1870-1879	147	6	193	1,057	388	156	64	12	98
1880-1889	220	27	293	4,042	546	290	307	28	146,847
1890-1899	182	11	240	1,524	494	173	120	14	922
1900-1904	99	12	150	922	315	113	100	37	11,270
1905-1909	135	13	296	5,584	443	259	325	80	95,097
1910-1914	106	27	285	3,655	363	205	72	83	2,681,759
1915-1919	152	24	286	3,053	755	188	76	42	22,126
Not reported	140	14	245	1,593	560	169	79	19	1,710

DATE OF BEGINNING.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	60.8	556	376,222	461	265,618	472	8,488	491	304,789
Before 1860									
1860-1869	0.6			3	3,300	3	55	4	10
1870-1879	4.8	3	1,500	6	3,000	2	115	7	6,000
1880-1889	10.6	2	2,850	6	880	5	32	7	3,710
1890-1899	7.5	24	16,179	7	2,900	7	63	7	3,100
1900-1904	3.8	84	54,090	35	15,388	37	406	40	21,588
1905-1909	13.2	222	150,443	95	54,743	102	1,595	104	65,782
1910-1914	14.3	145	101,372	177	116,362	173	4,004	176	132,893
1915-1919	2.7	16	18,190	92	47,789	100	1,647	100	49,579
Not reported	3.3	60	31,598	40	21,256	43	571	46	22,127

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	1,423	153	2,228	23,432	4,469	2,158	1,463	328	2,960,718
Individual and partnership	948	102	1,656	5,982	2,055	1,085	506	270	186,740
Cooperative	454	36	535	13,047	2,064	962	639	39	41,199
Irrigation district	6	2	4	388	72	8	57	2	12,000
Carey Act	2		2	1,050	30			3	19,390
Commercial	5	8	7	538	68	24	66	6	4,925
U. S. Reclamation Service	4	3	9	2,192	116	53	100	3	2,690,860
U. S. Indian Service	1	2	12	219	54	26	35	2	5,600
State								1	1
City	1		1	6	7			2	3
Other	2		2	10	3				

CLASS.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	60.8	556	376,222	461	265,618	472	8,488	491	304,789
Individual and partnership	39.2	546	369,580	457	261,343	464	8,373	483	301,572
Cooperative	3.0			1	3,300	3	25	3	2,010
Irrigation district	3.3								
Commercial	7.0	8	5,842						
U. S. Reclamation Service									
U. S. Indian Service	0.2	2	800			1		1	
State	2.1					1	5	1	230
City	6.0			3	975	3	85	3	977

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	1,423	153	2,228	23,432	4,469	2,158	1,463	328	2,960,718
Canadian River and tributaries	264	61	305	8,111	671	481	303	61	79,160
Canadian River direct	1	.....	2	47	7	.....	.....	.....	.....
Cimarron River	60	9	63	2,035	178	87	154	7	21,235
Vermejo River	23	10	42	2,357	98	15	52	10	18,111
Ocate Creek	27	3	29	1,217	74	61	19	14	20,759
Mora River	108	12	113	1,075	231	262	41	6	277
Ute Creek	3	2	4	6	4	6	1	1	1
Other tributaries of Canadian River	42	25	52	1,374	79	50	36	23	18,777
Cimarron River	45	8	62	352	109	167	53	6	56
Trinchera River	9	2	9	9	8	14	4	1	.....
Pecos River and tributaries	368	16	713	2,894	911	701	601	132	107,798
Pecos River direct	169	2	262	1,418	320	196	204	83	82,131
Gallinas River	38	5	42	276	83	60	9	8	25,619
Hondo River	99	2	196	547	222	196	161	13	18
Penasco River	16	.....	96	245	102	152	168	.....	.....
Other tributaries of Pecos River	46	7	117	408	184	97	59	28	30
Rio Grande and tributaries	577	45	842	6,633	2,177	510	314	94	2,772,882
Rio Grande direct	48	5	122	3,007	765	130	83	11	2,639,866
Rio Costilla	48	.....	52	139	43	.....	.....	.....	.....
Pueblo River	40	.....	42	434	80	7	3	.....	.....
Rio Chama	187	2	183	832	298	167	80	2	150
Rio Santa Cruz	11	.....	32	134	52	10	3	.....	.....
Tesuque Creek	18	.....	39	72	50	7	6	1	.....
Rio Puerco	30	9	50	215	237	41	20	11	44,068
Other tributaries of Rio Grande	195	29	322	1,800	652	148	119	69	88,798
Rio Mimbres	45	5	77	3,168	78	60	13	11	40
Gila River and tributaries	32	2	81	417	130	30	11	5	26
Gila River direct	4	.....	21	299	69	11	8	.....	.....
San Francisco River	26	.....	52	88	54	11	2	1	.....
Other tributaries of Gila River	2	2	8	30	7	8	1	4	26
San Juan River and tributaries	44	11	66	1,403	273	121	87	11	651
San Juan River direct	11	1	12	240	69	14	40	2	1
Los Pinos River	4	.....	4	32	8	.....	.....	.....	.....
Animas River	14	.....	23	923	134	90	43	.....	.....
La Plata River	11	1	14	186	47	2	2	1	150
Other tributaries of San Juan River	4	9	13	22	15	15	2	8	500
Independent streams	39	3	73	445	112	74	77	7	105
Fresno River	33	.....	53	205	66	17	7	5	5
Rio Tularosa	6	3	20	240	46	57	70	2	100
Other independent streams	.....	.....	.....	.....	.....	.....	.....	.....	.....

TABLE 17.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920—Continued.

DRAINAGE BASIN.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.				
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.		Average lift (feet).
								Number.	Capacity (gallons per minute).	
Total	60.8	556	376,222	461	265,618	472	8,488	491	304,789	40
Canadian River and tributaries	14.8			5	3,311	6	66	7	1,522	60
Cimarron River	4.8					1	10	1	1,500	22
Vermejo River	1.1			2		1	50	2		100
Ocate Creek	1.5									
Mora River				1	3,300	2	5	2	10	35
Other tributaries of Canadian River	7.4			2	11	2	1	2	12	72
Cimarron River	0.2			2	36	3	32	4	532	36
Pecos River and tributaries	18.2	549	375,275	245	153,429	243	4,455	256	193,036	28
Pecos River direct	5.5	286	198,415	96	70,598	105	2,379	106	96,448	28
Gallinas River	0.5			1	3	1		1	3	75
Hondo River	11.0	176	125,606	79	46,585	74	1,041	79	57,275	21
Penasco River	0.5	51	30,132	10	7,210	11	216	11	9,000	29
Other tributaries of Pecos River	0.7	36	21,122	59	29,033	52	819	59	30,310	36
Rio Grande and tributaries	16.3	2	27	121	61,898	127	1,852	128	62,245	49
Rio Grande direct	2.3			26	11,356	29	336	30	14,828	33
Rio Santa Cruz	0.1									
Rio Puerco						1		1		96
Other tributaries of Rio Grande	13.9	2	27	95	50,542	97	1,516	97	47,417	53
Rio Mimbres	1.1	1	75	85	46,825	88	2,065	90	46,660	57
Gila River and tributaries	2.5					2	4	2	675	17
Gila River direct	0.3									
San Francisco River						1		1	275	20
Other tributaries of Gila River	2.2					1	4	1	400	14
San Juan River and tributaries		4	845	1		2	5	2		170
Other tributaries of San Juan River		4	845	1		2	5	2		170
Independent streams	7.7			2	119	3	9	2	119	68
Fresno River	7.7									
Rio Tularosa				2	119	3	9	2	119	68

CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 AND 1909.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AREA HARVESTED.					Unit.	QUANTITY HARVESTED.				
		1919		1909		Per cent of increase.[1]		1919		1909		Per cent of increase.[1]
		Acres.	Per cent of total for state.	Acres.	Per cent of total for state.			Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	38,954	17.1	34,430	40.0	13.1	Bu.	948,594	20.0	714,710	61.4	32.7
2	Oats	8,880	22.2	18,221	54.1	−51.3	Bu.	250,102	23.0	440,500	61.1	−43.2
3	Winter wheat	9,059	9.8	25,757	79.6	21.6	Bu.	185,479	10.6	456,531	91.3	27.3
4	Spring wheat	22,251	51.5				Bu.	395,679	57.6			
5	Barley	2,889	32.2	1,469	68.9	96.7	Bu.	62,070	32.0	35,391	81.4	75.4
	Hay and forage:											
6	Timothy alone	1,766	28.0	894	37.7	97.5	Tons	2,658	34.7	1,505	46.6	76.6
7	Timothy and clover mixed	1,338	55.3	115	6.1	.....	Tons	2,074	59.6	189	7.1	997.4
8	Clover alone	821	55.9	25	12.7	.....	Tons	1,581	69.2	47	11.5	.....
9	Alfalfa	87,105	74.5	98,963	96.4	−12.0	Tons	211,351	75.9	261,989	98.6	−19.3
10	Other tame or cultivated grasses	4,015	17.1	2,276	7.8	76.4	Tons	5,356	20.2	2,652	13.0	102.0
11	Annual legumes cut for hay	701	20.5	3,353	25.5	113.5	Tons	1,011	27.9	4,419	25.5	155.7
12	Small grains cut for hay	6,459	24.1				Tons	10,287	30.0			
13	Wild, salt, or prairie grasses	8,513	19.9	13,024	46.5	−34.6	Tons	6,337	16.9	14,512	65.8	−56.3
14	Silage crops	1,188	33.5	[2]	.....	.....	Tons	8,409	50.6	[2]	.....	.....
15	Corn cut for forage	3,456	10.7	[2]	.....	.....	Tons	5,805	17.6	[2]	.....	.....
16	Kafir, sorghum, etc., for forage	5,748	3.3	[2]	.....	.....	Tons	10,848	4.4	[2]	.....	.....
	Vegetables:											
17	Potatoes	504	16.4	1,119	18.0	−55.0	Bu.	19,650	17.7	83,234	28.2	−76.4
18	Green peppers	400	72.6	[2]	.....	.....	.....	.....	.....	[2]	.....	.....
19	Cantaloupes and muskmelons	421	41.2	[2]	.....	.....	.....	.....	.....	[2]	.....	.....
	Fruits:											
20	Grapes	[3] 176,520	62.9	[2]	.....	.....	Lbs.	630,440	62.8	[2]	.....	.....
21	Apples	[4] 321,233	46.7	[2]	.....	.....	Bu.	487,878	52.0	[2]	.....	.....
22	Peaches	[4] 56,464	36.4	[2]	.....	.....	Bu.	93,140	47.0	[2]	.....	.....
23	Pears	[4] 21,681	44.0	[2]	.....	.....	Bu.	26,007	39.7	[2]	.....	.....
24	Plums and prunes	[4] 9,351	21.4	[2]	.....	.....	Bu.	11,123	37.0	[2]	.....	.....
25	Cherries	[4] 8,204	29.1	[2]	.....	.....	Bu.	5,876	49.0	[2]	.....	.....
	Miscellaneous:											
26	Clover and alfalfa seed [5]	2,583	49.3	[2]	.....	.....	Bu.	6,354	41.2	[2]	.....	.....
27	Kafir, milo, etc	2,205	1.5	[2]	.....	.....	Bu.	66,683	1.8	[2]	.....	.....
28	Dry beans, navy, etc	5,630	5.0	2,741	13.2	105.4	Bu.	63,289	7.4	26,288	30.6	140.7
29	Dry peas, Canada	3,606	62.7	1,541	62.0	134.0	Bu.	51,202	73.1	21,839	70.8	134.5
30	Cotton	7,527	70.6	[2]	.....	.....	Bales	4,077	75.5	[2]	.....	.....

	CROP.	AVERAGE YIELD PER ACRE, 1919.						VALUE.				
		Unit.	For state.	On non-irrigated land.	On irrigated land.			1919		1909		Per cent of increase.[1]
					Average.	Per cent of average for state.	Per cent of average on non-irrigated land.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Corn	Bu.	20.9	20.1	24.4	116.7	121.4	$1,422,891	20.0	$636,151	64.6	123.7
2	Oats	Bu.	27.1	26.8	28.2	104.1	105.2	262,607	23.0	309,911	67.5	−15.3
3	Winter wheat	Bu.	19.0	18.9	20.5	107.9	108.5	370,958	10.6	447,704	88.0	159.6
4	Spring wheat	Bu.	15.9	13.9	17.8	111.9	128.1	791,358	57.6			
5	Barley	Bu.	21.6	21.7	21.5	99.5	99.1	80,691	32.0	27,960	78.5	188.6
	Hay and forage:											
6	Timothy alone	Tons	1.22	1.10	1.51	123.8	137.3	53,160	34.7	17,073	46.1	211.4
7	Timothy and clover mixed	Tons	1.44	1.30	1.55	107.6	109.2	37,332	59.6	2,214	7.9	.....
8	Clover alone	Tons	1.56	1.09	1.93	123.7	177.1	25,296	69.2	488	13.6	.....
9	Alfalfa	Tons	2.38	2.25	2.43	102.1	108.0	4,861,073	75.9	2,795,987	98.2	73.9
10	Other tame or cultivated grasses	Tons	1.13	1.09	1.33	117.7	122.0	112,476	20.2	27,433	11.7	310.0
11	Annual legumes cut for hay	Tons	1.06	0.96	1.44	135.8	150.0	15,165	27.9	46,686	24.0	362.2
12	Small grains cut for hay	Tons	1.28	1.18	1.59	124.2	134.7	200,597	30.0			
13	Wild, salt, or prairie grasses	Tons	0.87	0.91	0.74	85.1	81.3	101,392	16.9	149,075	62.3	−32.0
14	Silage crops	Tons	4.69	3.48	7.08	151.0	203.4	79,886	50.6	[2]	.....	.....
15	Corn cut for forage	Tons	1.02	0.94	1.68	164.7	178.7	69,660	17.6	[2]	.....	.....
16	Kafir, sorghum, etc., for forage	Tons	1.41	1.39	1.89	134.0	136.0	162,720	4.4	[2]	.....	.....
	Vegetables:											
17	Potatoes	Bu.	36.1	35.5	39.0	108.0	109.9	46,178	17.7	65,625	28.0	−29.6
18	Green peppers	.....	.....	.....	.....	.....	.....	58,290	72.3	[2]	.....	.....
19	Cantaloupes and muskmelons	.....	.....	.....	.....	.....	.....	54,590	38.3	[2]	.....	.....
	Fruits:											
20	Grapes	Lbs.	[6] 3.6	[6] 3.6	[6] 3.6	100.0	100.0	50,435	62.8	[2]	.....	.....
21	Apples	Bu.	[7] 1.4	[7] 1.2	[7] 1.5	107.1	125.0	780,605	52.0	[2]	.....	.....
22	Peaches	Bu.	[7] 1.3	[7] 1.1	[7] 1.6	123.1	145.5	200,251	47.0	[2]	.....	.....
23	Pears	Bu.	[7] 1.3	[7] 1.4	[7] 1.2	92.3	85.7	45,512	39.7	[2]	.....	.....
24	Plums and prunes	Bu.	[7] 0.7	[7] 0.5	[7] 1.2	171.4	240.0	23,914	37.0	[2]	.....	.....
25	Cherries	Bu.	[7] 0.4	[7] 0.3	[7] 0.7	175.0	233.3	19,978	49.0	[2]	.....	.....
	Miscellaneous:											
26	Clover and alfalfa seed [5]	Bu.	2.9	3.4	2.5	86.2	73.5	127,080	41.2	[2]	.....	.....
27	Kafir, milo, etc	Bu.	24.9	24.9	30.2	121.3	121.3	83,354	1.8	[2]	.....	.....
28	Dry beans, navy, etc	Bu.	7.6	7.4	11.2	147.4	151.4	221,442	7.4	74,551	32.1	197.0
29	Dry peas, Canada	Bu.	12.2	8.8	14.2	116.4	161.4	128,005	73.1	23,606	67.3	442.3
30	Cotton	Bales	0.51	0.42	0.54	105.9	128.6	913,248	75.5	[2]	.....	.....

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000.
[2] Not reported separately in 1910.
[3] Number of vines of bearing age.
[4] Number of trees of bearing age.
[5] Not including red clover seed.
[6] Yield per vine.
[7] Yield per tree.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.]

		THE STATE.	Bernalillo.	Chaves.[1]	Colfax.	De Baca.[2]	Dona Ana.	Eddy.[3]	Grant.[4]	Guadalupe.[5]
1	Number of all farms in 1920	29,844	1,200	744	1,052	477	1,054	785	545	982
2	Number of farms irrigated in 1919	11,390	504	319	305	51	975	555	166	275
3	Per cent of all farms	38.2	42.0	42.9	29.0	10.7	92.5	70.7	30.5	28.0
4	Number of farms irrigated in 1909	12,795	700	733	270	.....	778	605	256	305
5	Per cent of increase, 1909-1919	—11.0	—28.0	.....	13.0	.....	25.3	.....	.....	.....
	LAND AND FARM AREA.									
6	Approximate land area, acres	78,401,920	776,960	3,866,880	2,430,720	1,536,000	2,445,440	2,716,800	2,547,840	1,939,840
7	All land in farms, acres	24,409,633	220,708	1,924,179	1,952,760	1,233,305	195,316	794,543	474,169	986,406
8	Improved land in farms, acres	1,717,224	29,144	59,450	111,293	22,041	42,164	52,311	31,230	31,441
9	Area irrigated in 1919, acres	538,377	14,536	42,259	66,187	3,035	52,205	51,353	6,987	3,206
10	Per cent of improved land in farms	31.4	49.9	83.8	59.5	13.8	124.0	98.2	22.4	10.2
11	Area irrigated in 1909, acres	461,718	14,832	56,064	30,756	.....	32,232	47,141	14,834	4,395
12	Per cent of increase, 1909-1919	16.6	—2.0	.....	115.2	.....	62.2	.....	.....	.....
13	Area enterprises were capable of irrigating in 1920, acres	696,119	15,218	47,433	90,881	6,928	65,057	59,784	7,243	4,800
14	Area enterprises were capable of irrigating in 1910, acres	644,970	20,375	64,385	52,391	.....	48,744	74,004	16,668	13,952
15	Per cent of increase, 1910-1920	7.9	—25.3	.....	73.5	.....	33.5	.....	.....	.....
16	Area included in enterprises in 1920, acres	961,879	19,056	57,785	117,715	9,128	88,023	87,661	7,781	5,102
17	Area included in enterprises in 1910, acres	1,102,297	25,510	106,948	156,503	.....	77,530	94,680	18,821	26,212
18	Per cent of increase, 1910-1920	—12.7	—25.3	.....	—24.8	.....	13.5	.....	.....	.....
19	Area of irrigated land reported as available for settlement, acres	66,479	650	.....	27,729	.....	.....	2,550	.....	.....
	IRRIGATION WORKS.									
	Independent enterprises:									
20	Number, 1920	2,391	44	339	86	3	12	240	70	16
21	Number, 1910	2,786	34	471	115	.....	37	270	102	18
	Main ditches:									
22	Number, 1920	2,228	35	191	150	3	7	258	61	16
23	Number, 1910	2,101	22	49	166	.....	29	51	75	14
24	Length, 1920, miles	4,469	172	217	374	18	53	266	100	66
25	Length, 1910, miles	4,064	120	174	398	.....	139	136	154	60
26	Capacity, 1920, second-feet	23,432	137	836	5,889	153	1,231	1,215	331	82
27	Capacity, 1910, second-feet	29,645	710	801	5,445	.....	2,020	1,203	241	676
	Laterals:									
28	Number, 1920	2,153	61	184	161	8	11	235	39	75
29	Number, 1910	1,280	108	68	82	.....	10	54	11	11
30	Length, 1920, miles	1,463	56	93	238	13	.....	323	8	22
31	Length, 1910, miles	1,190	112	80	286	.....	31	39	7	17
	Reservoirs:									
32	Number, 1920	328	10	74	38	.....	6	27	10	.....
33	Number, 1910	522	19	54	51	.....	4	65	23	7
34	Capacity, 1920, acre-feet	2,960,718	1,001	313	65,668	.....	6	81,855	55	.....
35	Capacity, 1910, acre-feet	454,162	5	40,560	181,320	.....	2	52,008	9	162
	Flowing wells:									
36	Number, 1920	556	.....	318	.....	.....	.....	230	.....	.....
37	Number, 1910	673	.....	404	.....	.....	.....	267	.....	.....
38	Capacity, 1920, gallons per minute	376,222	.....	228,885	.....	.....	.....	146,330	.....	.....
39	Capacity, 1910, gallons per minute	609,268	.....	428,640	.....	.....	.....	240,549	.....	.....
	Pumped wells:									
40	Number, 1920	461	13	143	2	1	8	48	4	1
41	Number, 1910	466	12	130	.....	.....	19	25	30	5
42	Capacity, 1920, gallons per minute	265,618	6,261	99,328	.....	1,500	1,575	27,118	400	800
43	Capacity, 1910, gallons per minute	190,690	3,980	50,315	.....	.....	7,938	8,450	10,652	89
	Pumping plants:									
44	Number, 1920	472	12	146	2	1	8	52	8	1
45	Number, 1910	413	12	131	4	.....	22	27	31	6
46	Engine capacity, 1920, horsepower	8,488	126	2,810	60	15	109	843	32	60
47	Engine capacity, 1910, horsepower	14,226	105	10,445	50	.....	304	219	110	71
48	Pump capacity, 1920, gallons per minute	304,789	6,361	135,605	1,500	1,500	2,277	30,633	800	800
49	Pump capacity, 1910, gallons per minute	216,355	3,980	58,648	1,890	.....	13,638	9,144	11,002	4,289
50	Average lift, 1920, feet	40	37	26	61	10	42	28	35	20
	CAPITAL INVESTED.									
51	Capital invested to Jan. 1, 1920, dollars	18,210,412	165,784	1,323,948	4,526,888	66,512	2,485,908	2,952,707	54,162	87,195
52	Capital invested to July 1, 1910, dollars	[6]9,154,897	130,450	1,757,561	1,683,408	.....	165,505	1,607,244	72,242	191,287
53	Per cent of increase, 1910-1920	98.9	27.1	.....	168.9	.....	.....	.....	.....	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920, dollars	26.16	10.89	27.91	49.81	9.60	38.21	49.39	7.48	18.17
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910, dollars	14.19	6.40	27.30	32.13	.....	3.40	21.72	4.33	13.71
	ESTIMATED FINAL COST.									
56	Estimated final cost of existing enterprises in 1920, dollars	20,440,646	165,784	1,334,688	4,626,388	92,112	2,488,908	3,503,207	56,967	93,195
57	Estimated final cost of existing enterprises in 1910, dollars	11,640,091	130,450	1,953,424	2,512,336	.....	165,505	1,685,990	72,242	226,787
58	Per cent of increase, 1910-1920	75.6	27.1	.....	84.1	.....	.....	.....	.....	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920, dollars	21.25	8.70	23.10	39.30	10.09	28.28	39.96	7.32	18.27
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910, dollars	10.56	5.11	18.27	16.05	.....	2.13	17.81	3.84	8.65

[1] Parts taken to form parts of De Baca and Lea Counties, and part annexed to Roosevelt County in 1917.
[2] Organized from parts of Chaves, Guadalupe, and Roosevelt Counties in 1917.
[3] Part taken to form part of Lea County in 1917.
[4] Part taken to form Hidalgo County in 1919.
[5] Part taken to form part of De Baca County in 1917.
[6] Includes $41,241 for Indian reservations, which was not reported by counties.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (−) denotes decrease.]

		Hidalgo.[1]	Lincoln.	Luna.	McKinley.	Mora.	Otero.	Rio Arriba.	Sandoval.	San Juan.
1	Number of all farms in 1920	238	640	287	668	1,911	459	2,063	1,110	874
2	Number of farms irrigated in 1919	64	194	168	263	437	220	1,478	957	584
3	Per cent of all farms	26.9	30.3	58.5	39.4	22.9	47.9	71.6	86.2	66.8
4	Number of farms irrigated in 1909	.....	239	116	172	620	241	1,487	1,038	706
5	Per cent of increase, 1909–1919	.....	−18.8	44.8	52.9	−29.5	−8.7	−0.6	−7.8	−17.3
	LAND AND FARM AREA.									
6	Approximate land area—acres	2,206,080	3,058,560	1,904,640	3,523,840	1,584,000	4,280,960	3,757,440	2,477,440	3,504,640
7	All land in farms—acres	242,479	495,543	1,032,827	177,952	1,013,981	251,796	364,881	135,595	78,877
8	Improved land in farms—acres	22,644	20,425	19,533	15,538	106,995	15,869	41,625	24,258	30,231
9	Area irrigated in 1919—acres	2,840	6,128	11,323	6,919	17,833	7,556	46,036	23,214	42,470
10	Per cent of improved land in farms	12.5	30.0	58.0	44.5	16.7	47.6	110.6	95.7	140.5
11	Area irrigated in 1909—acres	.....	7,355	5,347	2,564	19,083	6,378	45,673	18,259	29,520
12	Per cent of increase, 1909–1919	.....	−16.7	111.8	169.9	−6.6	18.5	0.8	27.1	43.9
13	Area enterprises were capable of irrigating in 1920—acres	2,940	6,341	21,143	7,229	29,749	8,565	50,247	26,659	48,195
14	Area enterprises were capable of irrigating in 1910—acres	.....	7,907	9,763	4,200	28,137	8,359	51,635	21,791	52,656
15	Per cent of increase, 1910–1920	.....	−19.8	116.6	72.1	5.7	2.5	−2.7	22.3	−8.5
16	Area included in enterprises in 1920—acres	3,340	11,899	34,786	9,057	37,673	12,117	68,691	32,988	68,515
17	Area included in enterprises in 1910—acres	.....	9,678	15,291	10,200	32,668	12,173	67,384	27,136	77,169
18	Per cent of increase, 1910–1920	.....	22.9	127.5	−11.2	15.3	−0.5	1.9	−11.2	−11.2
19	Area of irrigated land reported as available for settlement—acres	500	.....	.....	360	.....	.....	.....	.....	3,210
	IRRIGATION WORKS.									
	Independent enterprises:									
20	Number, 1920	5	102	153	15	102	96	274	82	54
21	Number, 1910	.....	121	101	3	116	99	338	92	91
	Main ditches:									
22	Number, 1920	4	102	51	19	110	115	273	86	52
23	Number, 1910	.....	117	38	4	117	89	342	100	88
24	Length, 1920—miles	20	142	41	35	231	155	454	337	255
25	Length, 1910—miles	.....	161	43	22	254	145	574	299	383
26	Capacity, 1920—second-feet	47	193	3,171	126	1,081	576	1,526	363	1,371
27	Capacity, 1910—second-feet	.....	440	2,141	135	1,344	454	2,195	842	2,543
	Laterals:									
28	Number, 1920	11	94	37	41	277	75	192	22	106
29	Number, 1910	.....	11	16	11	39	56	83	59	22
30	Length, 1920—miles	8	124	7	39	45	77	87	9	85
31	Length, 1910—miles	.....	3	9	10	25	25	64	29	45
	Reservoirs:									
32	Number, 1920	.....	3	16	11	16	13	10	5	2
33	Number, 1910	.....	21	34	10	12	30	12	22	6
34	Capacity, 1920—acre-feet	.....	12	37	6,685	672	110	753	44,049	150
35	Capacity, 1910—acre-feet	.....	21	158	20,547	3,166	88	1,444	241	4,820
	Flowing wells:									
36	Number, 1920	.....	.....	1	4	.....	.....	.....	.....	.....
37	Number, 1910	.....	.....	1	.....	.....	.....	.....	.....	.....
38	Capacity, 1920—gallons per minute	.....	.....	75	845	.....	.....	.....	.....	.....
39	Capacity, 1910—gallons per minute	.....	.....	75	.....	.....	.....	.....	.....	.....
	Pumped wells:									
40	Number, 1920	.....	2	156	1	1	4	.....	.....	.....
41	Number, 1910	.....	14	94	.....	3	18	.....	.....	.....
42	Capacity, 1920—gallons per minute	.....	18	95,300	.....	3,300	419	.....	.....	.....
43	Capacity, 1910—gallons per minute	.....	240	32,078	.....	28	3,805	.....	.....	.....
	Pumping plants:									
44	Number, 1920	.....	4	153	2	2	4	.....	.....	.....
45	Number, 1910	.....	14	94	.....	3	15	2	.....	2
46	Engine capacity, 1920—horsepower	.....	8	3,471	5	5	9	.....	.....	.....
47	Engine capacity, 1910—horsepower	.....	27	1,034	.....	3	102	41	.....	10
48	Pump capacity, 1920—gallons per minute	.....	118	91,010	.....	10	419	.....	.....	.....
49	Pump capacity, 1910—gallons per minute	.....	240	32,078	.....	28	3,805	3,069	.....	655
50	Average lift, 1920—feet	.....	82	57	170	35	44	.....	.....	.....
	CAPITAL INVESTED.									
51	Capital invested to Jan. 1, 1920—dollars	31,935	51,939	422,450	697,280	316,097	361,284	245,425	108,419	1,666,875
52	Capital invested to July 1, 1910—dollars	.....	39,645	110,264	364,256	133,604	182,211	244,156	138,371	789,927
53	Per cent of increase, 1910–1920	.....	31.0	283.1	91.4	136.6	98.3	0.5	−21.6	111.0
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920—dollars	10.86	8.19	19.98	96.46	10.63	42.18	4.88	4.07	34.59
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910—dollars	.....	5.01	11.29	86.73	4.75	21.80	4.73	6.35	15.00
	ESTIMATED FINAL COST.									
56	Estimated final cost of existing enterprises in 1920—dollars	46,935	52,014	430,350	702,280	327,786	364,489	259,670	124,939	2,716,875
57	Estimated final cost of existing enterprises in 1910—dollars	.....	39,645	110,264	515,256	133,604	182,211	244,156	138,371	800,147
58	Per cent of increase, 1910–1920	.....	31.2	290.3	36.3	145.3	100.0	6.4	−9.7	239.5
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920—dollars	14.05	4.37	12.37	77.54	8.70	30.08	3.78	3.79	39.65
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910—dollars	.....	4.10	7.21	50.52	4.09	14.97	3.62	3.73	10.37

[1] Organized from part of Grant County in 1919.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910—Continued.

[A minus sign (—) denotes decrease. Per cent not shown when base is less than 100 or when per cent is more than 1,000.]

		San Miguel.	Santa Fe.	Sierra.	Socorro.	Taos.	Torrance.[1]	Union.	Valencia.	All other counties.[2]
1	Number of all farms in 1920	1,643	896	395	1,191	1,116	1,365	2,652	1,097	4,400
2	Number of farms irrigated in 1919	470	529	240	567	1,022	41	47	839	120
3	Per cent of all farms	28.6	59.0	60.8	47.6	91.6	3.0	1.8	76.5	2.7
4	Number of farms irrigated in 1909	594	844	209	710	949	.....	94	1,093	36
5	Per cent of increase, 1909–1919	—20.9	—37.3	14.8	—20.1	7.7	.....	.....	—23.2	.....
	LAND AND FARM AREA.									
6	Approximate land area.....acres	3,132,160	1,262,720	1,995,520	9,644,800	1,441,280	2,156,160	3,436,800	3,021,760	7,152,640
7	All land in farms.....acres	1,452,379	522,788	330,872	1,180,546	84,873	776,789	2,515,522	1,000,985	4,969,562
8	Improved land in farms.....acres	58,534	49,439	7,712	32,770	23,497	88,526	273,748	28,818	486,988
9	Area irrigated in 1919.....acres	16,565	10,582	8,491	11,110	59,607	1,085	6,774	19,241	775
10	Per cent of improved land in farms	28.3	21.4	110.1	33.9	253.7	1.2	2.5	66.8	0.2
11	Area irrigated in 1909.....acres	14,318	16,180	3,637	14,289	41,486	653	6,315	30,302	105
12	Per cent of increase, 1909–1919	15.7	—34.6	133.5	—22.2	43.7	66.2	7.3	—36.5	.....
13	Area enterprises were capable of irrigating in 1920.....acres	43,277	10,858	9,533	13,356	67,001	1,165	17,986	32,666	1,805
14	Area enterprises were capable of irrigating in 1910.....acres	16,902	16,707	5,959	22,532	44,395	653	8,766	51,948	2,141
15	Per cent of increase, 1910–1920	156.0	—35.0	60.0	—40.7	51.1	78.4	105.2	—37.1	.....
16	Area included in enterprises in 1920.....acres	68,806	12,244	18,432	29,780	88,265	1,550	20,056	48,780	2,649
17	Area included in enterprises in 1910.....acres	52,417	51,758	10,426	41,760	60,426	1,103	30,107	74,814	11,583
18	Per cent of increase, 1910–1920	31.3	—76.3	76.8	—28.7	46.1	40.5	—33.4	—34.8	.....
19	Area of irrigated land reported as available for settlement.acres	940	.....	.....	4,640	4,400	.....	1,500	20,000	.....
	IRRIGATION WORKS.									
	Independent enterprises:									
20	Number, 1920	101	102	66	95	168	7	70	46	43
21	Number, 1910	152	122	63	99	205	.....	43	62	32
	Main ditches:									
22	Number, 1920	115	103	64	88	163	8	84	49	21
23	Number, 1910	153	141	57	89	238	3	48	64	7
24	Length, 1920.....miles	213	142	119	289	326	30	132	278	4
25	Length, 1910.....miles	264	229	84	242	343	4	95	334	7
26	Capacity, 1920.....second-feet	1,459	226	523	814	1,268	2	407	360	45
27	Capacity, 1910.....second-feet	2,378	853	149	991	1,513	10	452	2,105	2
	Laterals:									
28	Number, 1920	104	17	35	48	57	22	178	40	28
29	Number, 1910	43	42	6	69	100	.....	114	265	.....
30	Length, 1920.....miles	33	11	15	18	50	10	58	30	4
31	Length, 1910.....miles	64	28	6	63	105	.....	31	111	.....
	Reservoirs:									
32	Number, 1920	21	8	14	11	3	1	11	6	12
33	Number, 1910	32	41	9	12	11	2	25	8	12
34	Capacity, 1920.....acre-feet	38,419	160	2,638,862	80,003	1,735	75	76	14	8
35	Capacity, 1910.....acre-feet	72,335	75,451	104	24	327	26	1,324	14	6
	Flowing wells:									
36	Number, 1920	.....	.....	1	1	.....	.....	.....	.....	1
37	Number, 1910	.....	.....	.....	.....	.....	.....	1	.....	.....
38	Capacity, 1920.....gallons per minute	.....	.....	20	7	.....	.....	.....	.....	60
39	Capacity, 1910.....gallons per minute	.....	.....	.....	.....	.....	.....	4	.....	.....
	Pumped wells:									
40	Number, 1920	2	2	11	8	.....	.....	4	.....	50
41	Number, 1910	2	8	4	3	.....	1	2	2	94
42	Capacity, 1920.....gallons per minute	3	.....	1,269	3,600	.....	.....	47	.....	24,080
43	Capacity, 1910.....gallons per minute	518	1,026	140	208	.....	6	609	50	70,558
	Pumping plants:									
44	Number, 1920	2	1	15	11	.....	.....	5	2	41
45	Number, 1910	2	10	4	4	.....	1	2	1	26
46	Engine capacity, 1920.....horsepower	.....	2	59	94	.....	.....	33	20	727
47	Engine capacity, 1910.....horsepower	25	107	10	10	.....	1	8	2	1,542
48	Pump capacity, 1920.....gallons per minute	3	.....	2,839	3,875	.....	.....	544	2,000	24,495
49	Pump capacity, 1910.....gallons per minute	518	1,710	140	298	.....	6	609	50	70,558
50	Average lift, 1920.....feet	62	1	31	27	.....	.....	50	52	111
	CAPITAL INVESTED.									
51	Capital invested to Jan. 1, 1920.....dollars	777,482	69,975	758,484	235,051	160,886	21,100	363,939	194,471	64,216
52	Capital invested to July 1, 1910.....dollars	300,708	123,834	19,089	187,682	190,940	1,010	70,925	254,063	355,274
53	Per cent of increase, 1910–1920	158.6	—43.5	.....	25.2	—15.7	.....	413.1	—23.5	.....
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	17.97	6.44	79.56	17.60	2.40	18.11	20.23	5.95	35.58
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	17.79	7.41	3.20	8.33	4.30	1.55	8.09	4.89	165.94
	ESTIMATED FINAL COST.									
56	Estimated final cost of existing enterprises in 1920...dollars	788,502	69,975	1,060,459	259,351	177,176	23,600	382,389	227,991	64,616
57	Estimated final cost of existing enterprises in 1910...dollars	1,189,708	347,056	19,089	301,582	190,940	1,010	70,981	254,063	355,274
58	Per cent of increase, 1910–1920	—33.7	—79.8	.....	—14.0	—7.2	.....	438.7	—10.3	.....
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	11.46	5.72	57.53	8.71	2.01	15.23	19.07	4.67	24.39
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	22.70	6.71	1.83	7.22	3.16	0.92	2.36	3.40	30.67

[1] Included in "All other counties" in 1910.
[2] Includes Curry, Lea, Quay, and Roosevelt Counties. Lea County formed from parts of Chaves and Eddy Counties in 1917.

NORTH DAKOTA.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of North Dakota collected at the census of 1920. Statistics of acreage irrigated, of acreage, yield, and value of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage, yield, and value of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

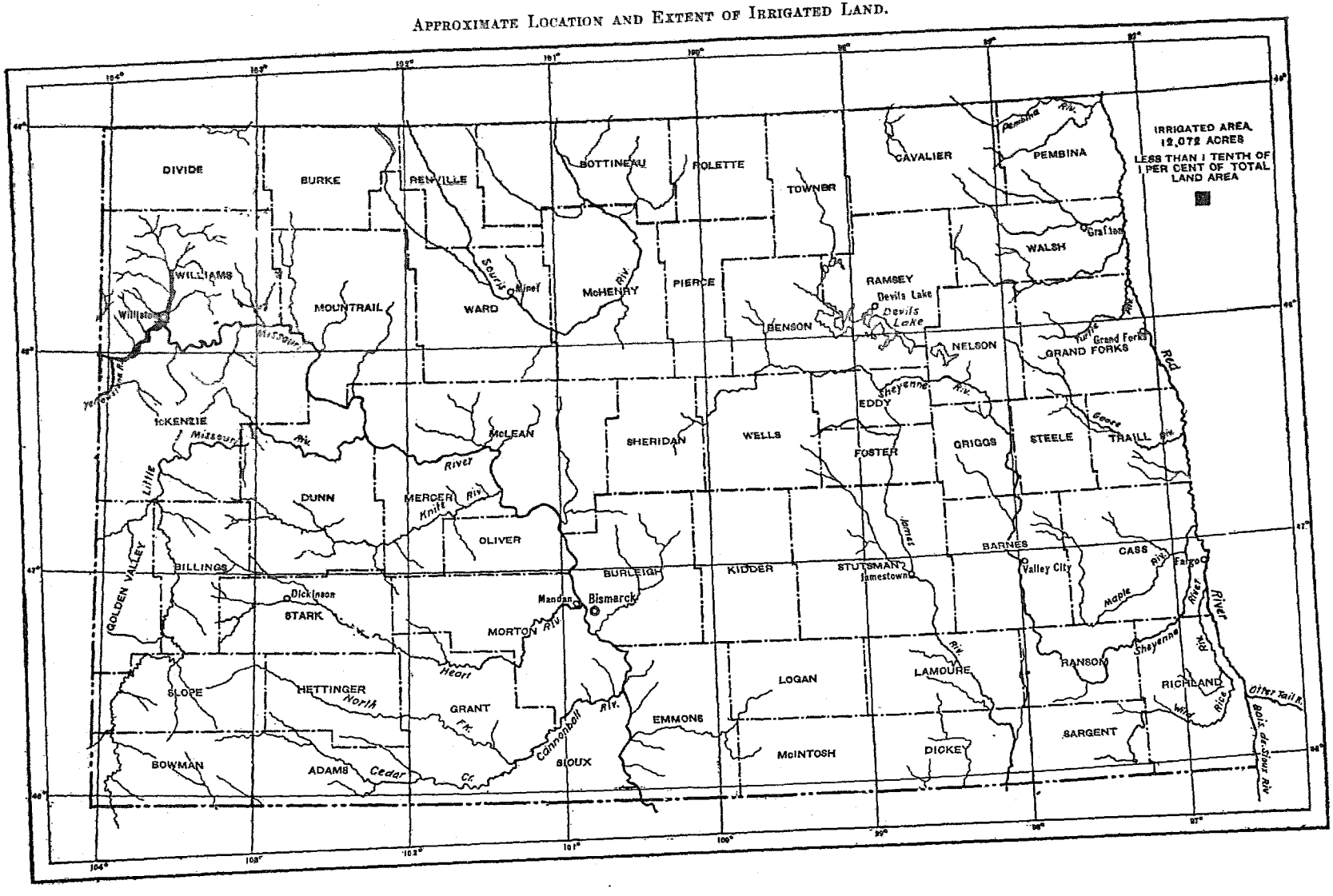
TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	77,690	74,360	3,330	4.5
Approximate land area of the state—acres	44,917,120	44,917,120	----------	----------
All land in farms—acres	36,214,751	28,426,650	7,788,101	27.4
Improved land in farms—acres	24,563,178	20,455,092	4,108,086	20.1
Number of farms irrigated	340	69	271	----------
Area irrigated—acres	12,072	10,248	1,824	17.8
Area enterprises were capable of irrigating—acres	34,235	21,917	12,318	56.2
Area included in enterprises—acres	57,476	38,173	19,303	50.6
Per cent irrigated:				
Number of all farms	0.4	0.1	0.3	----------
Approximate land area of the state	(2)	(2)	----------	----------
Land in farms	(2)	(2)	----------	----------
Improved land in farms	(2)	0.1	----------	----------
Excess of area enterprises were capable of irrigating over area irrigated—acres	22,163	11,669	10,494	89.9
Excess of area included in enterprises over area irrigated—acres	45,404	27,925	17,479	62.6
Capital invested	$1,857,118	$836,482	$1,020,636	122.0
Average per acre enterprises were capable of irrigating	$54.25	$38.17	$16.08	42.1
Estimated final cost of existing enterprises	$2,072,766	$836,482	$1,236,284	147.8
Average per acre included in enterprises	$36.06	$21.91	$14.15	64.6
Average cost of operation and maintenance per acre	$5.50	$28.40	—$22.90	—80.6
IRRIGATION WORKS.				
Number of enterprises	30	49	—19	----------
Number of main ditches	32	47	—15	----------
Length of main ditches—miles	58	52	6	----------
Capacity of main ditches—second-feet	836	2,161	—1,325	—61.3
Number of lateral ditches	58	46	12	----------
Length of lateral ditches—miles	93	74	19	----------
Number of reservoirs	9	22	—13	----------
Capacity of reservoirs—acre-feet	1,110	132,187	—131,077	—99.2
Number of pumped wells	(3)	1	—1	----------
Capacity of pumped wells—gallons per minute	(3)	15	15	----------
Number of pumping plants	4	4	----------	----------
Engine capacity—horsepower	2,068	2,038	30	1.5
Pump capacity—gallons per minute	51,250	182,115	—130,865	—71.9
Average lift—feet	38	(4)	38	----------

[1] A minus sign (—) denotes decrease. Per cent not shown when base is less than 100.
[2] Less than one-tenth of 1 per cent.
[3] Not reported in 1920.
[4] Not reported in 1910.

NORTH DAKOTA

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

Throughout the state of North Dakota the precipitation is, in normal years, sufficient for the maturing of crops, without irrigation, the normal rainfall for the state being 17.92 inches. In the western part of the state, however, the precipitation is below the average for the state, and irrigation is practiced to a limited extent. In 1919 the precipitation was below the normal, being below 15 inches over most of the western half of the state, and below 10 inches over the southwestern part of the state. This low precipitation resulted in a short supply of water for irrigation where water is taken from small local streams, and it is probable that some land was not irrigated in 1919 which would have been if water had been available.

WATER SUPPLY FOR IRRIGATION.

The whole of that part of the state of North Dakota within which irrigation is practiced lies within the drainage basin of Missouri River and its tributaries. With the exception of the Missouri itself these streams are plains streams and subject to drouth when local rainfall fails. The Missouri is fed by mountain streams, and supplies sufficient water for the limited area receiving water from it.

There are many artesian wells in the state, but they are not used for irrigation.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1890 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.	Per cent of all farms.	Acres.	Per cent of increase.	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	340	392.8	0.4	12,072	17.8	(1)	(1)	(1)
1910	69	27.8	0.1	10,248	110.3	(1)	(1)	0.1
1900	54	671.4	0.1	4,872	994.8	(1)	(1)	0.1
1890	7	.....	(1)	445	.....	(1)	(1)	(1)

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

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	30	57,476	12,072	21.0	34,235
1880–1889 [1]	3	2,100	595	28.3	1,060
1890–1899	5	2,130	458	21.5	1,520
1900–1904	9	4,967	955	19.2	3,255
1905–1909	2	46,031	8,766	19.0	26,238
1910–1914	1	325	285	87.7	325
1915–1919	6	1,128	330	29.3	1,042
Not reported	4	795	683	85.9	795

[1] Dakota Territory.

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	12,072	10,248	1,824	17.8	34,235	57,476
Streams, gravity	9,030	7,153	1,877	26.2	21,241	30,740
Streams, pumped	2,409	1,614	855	53.0	12,298	26,040
Wells, pumped	.....	1	−1	.....	.....	.....
Springs	.....	200	−200	.....	.....	.....
Stored storm water	508	1,280	−772	−60.3	606	606
Other mixed	65	.....	65	.....	90	90

[1] A minus sign (−) denotes decrease.

ACREAGE, BY CHARACTER OF ENTERPRISE.

An irrigation district law was enacted in North Dakota in 1917, and a district has been organized to take over the Williston project of the United States Reclamation Service, but this project is credited to the Reclamation Service in Table 5 because the Government built the works and still controls them to a large extent.

North Dakota has not accepted the conditions of the Federal Carey Act (act of Congress, Aug. 18, 1894).

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
ACREAGE IRRIGATED.				
Total	12,072	10,248	1,824	17.8
Individual and partnership	3,306	8,638	−5,332	−61.7
U. S. Reclamation Service	8,766	1,610	7,156	444.5
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	34,235	21,917	12,318	56.2
Individual and partnership	7,997	9,821	−1,824	−18.6
U. S. Reclamation Service	26,238	12,096	14,142	116.9
ACREAGE INCLUDED IN ENTERPRISES.				
Total	57,476	38,173	19,303	50.6
Individual and partnership	11,445	13,693	−2,248	−16.4
U. S. Reclamation Service	46,031	24,480	21,551	88.0

[1] A minus sign (−) denotes decrease.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The laws of North Dakota relating to water rights are summarized in the following paragraphs:

North Dakota was organized from a part of Dakota territory and admitted to the Union in 1889.

The constitution of the state made the following declaration regarding water: "All flowing streams and natural water sources shall forever remain the property of the state for mining, irrigation, and manufacturing purposes." (Sec. 210.)

In 1905 the state adopted a comprehensive code covering the subject of water rights.

This code contained the following general provision: "All waters within the limits of the state from all sources of water supply belong to the public and, except as to navigable waters, are subject to appropriation for beneficial use." (Laws 1905, ch. 34, sec. 1.)

Under this law any party wishing to acquire water rights is required to apply to the state engineer for a permit. When works are completed the state engineer issues a certificate of completion, and when water has been put to use a license is issued.

The law of 1905 provided the machinery for a complete adjudication of all rights to water. The state engineer was to make hydrographic surveys of all streams and ditches, and, when these surveys were completed, file reports with the attorney general of the state, "who shall, within 60 days thereafter, enter suit on behalf of the state for the determination of all rights to the use of such water." (Laws 1905, ch. 34, secs. 14 and 15.) Table 6 indicates that this provision of the law has not been carried out.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909
	Acres.	Per cent of total.	per cent of total.
Total	12,072	100.0	100.0
Appropriation and use	6,348	52.6	88.9
Notice filed and posted	2,328	19.3	6.8
Permit from state	2,936	24.3	4.3
Not reported	460	3.8	(1)

[1] All land for which the class of water rights was reported was included in "Appropriation and use."

ACREAGE, BY DRAINAGE BASIN.

The report of a special irrigation census taken in 1902 presented all data by drainage basins rather than by counties. The results of the census of 1920 have been tabulated on the same basis, and the data for 1902 are presented for purposes of comparison. For no other census have the results been tabulated in this form. The acreage reported for each drainage basin in 1919 comprises all the irrigated land in that drainage basin, including that watered from springs and wells. In the 1902 results the acreages irrigated from springs and wells were reported separately in such a way that it is not possible to tell in what drainage basin these areas are situated. This area is so small, however, that the comparisons are not affected seriously.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.		
Total	12,072	10,384	16.3	57,476	34,235
Missouri River and tributaries	12,072	9,444	27.8	57,476	34,235
Mouse River and tributaries	(1)	676	.....	.....	.....
Red River of the North and tributaries	(1)	6	.....	.....	.....
Springs	(2)	256	.....	.....	.....
Wells	(2)	2	.....	.....	.....

[1] Not reported in 1919. [2] Included in figures for streams.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1890 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.[1]	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.
1920	$1,857,118	122.0	$54.25	42.1
1910	836,482	.....	38.17	993.7
1900	16,980	.....	3.49	.....
1890	(2)	.....	.....	.....

[1] Per cent not shown when more than 1,000.
[2] Not reported in 1890.

TABLE 9.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$1,857,118	100.0	$54.25
1880–1889[1]	8,000	0.4	7.55
1890–1899	17,669	1.0	11.62
1900–1904	37,714	2.0	11.59
1905–1909	1,777,570	95.7	67.75
1910–1914	2,000	0.1	6.15
1915–1919	11,207	0.6	10.76
Not reported	2,958	0.2	3.72

[1] Dakota Territory.

TABLE 10.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$1,857,118	100.0	$54.25	10,951	$5.50
Streams, gravity	1,299,951	70.0	61.20	8,485	3.55
Streams, pumped	552,007	29.7	44.89	2,466	12.21
Stored storm water	4,660	0.3	7.69	.....	.....
Other mixed	500	.....	5.56	.....	.....

[1] Based on area irrigated in 1919.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	Increase.
Total	$1,857,118	$45,087	$1,812,031
Missouri River and tributaries	1,857,118	40,375	1,816,743
Mouse River and tributaries	(1)	3,637	.....
Red River of the North and tributaries	(1)	300	.....
Springs	(2)	600	.....
Wells	(2)	175	.....

[1] Not reported in 1920. [2] Included in figures for streams.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$1,857,118	100.0	10,951	$5.50
Individual and partnership	81,693	4.4	2,185	0.79
U. S. Reclamation Service	1,775,425	95.6	8,766	6.67

[1] Based on area irrigated in 1919.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Additional acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

Number of enterprises reporting land drained or needing drainage	8
Acreage included in enterprises reporting land drained or needing drainage	49,581
Acreage for which drains have been installed	1,613
Additional acreage needing drainage	659
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	3.3
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	2.8
Per cent that acreage for which drains have been installed plus that needing drainage is of total acreage included in irrigation enterprises in the state	4.0

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only part of the irrigation schedules. While the data are incomplete, the reports represent sufficient acreages to serve as bases for reliable averages. In all cases in which the quantity is reported the water was measured.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

Average volume of water entering canals	second-feet	130
Area irrigated in 1919	acres	8,766
Average number of acres per second-foot		67.4
Total quantity of water entering canals	acre-feet	28,106
Area irrigated in 1919	acres	8,766
Average quantity per acre	acre-feet	3.2
Total quantity of water delivered	acre-feet	11,636
Area irrigated in 1919	acres	8,766
Average quantity per acre	acre-feet	1.3

IRRIGATION WORKS.

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.		Pipe lines, length (miles).	PUMPING PLANTS.			
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).		Number.	Engine capacity (horse-power).	Pumps.	
													Number.	Capacity (gallons per minute).
Total	26	11	32	836	58	58	93	9	1,110	0.3	4	2,068	10	51,250
1880-1889[1]	8	2	4		6									
1890-1899	2	4	7	28	7	5	2	1	140		1	8	1	250
1900-1904	9	2	10	327	11	4	3	6	563					
1905-1909			2	371	26	22	6			0.3	2	2,040	8	50,000
1910-1914	2	1	1	100	1	25	81							
1915-1919	4	2	5	10	4	2	1	2	407		1	20	1	1,000
Not reported	1		3		3									

[1] Dakota Territory.

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.		Pipe lines, length (miles).	PUMPING PLANTS.			
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).		Number.	Engine capacity (horse-power).	Pumps.	
													Number.	Capacity (gallons per minute).
Total	26	11	32	836	58	58	93	9	1,110	0.3	4	2,068	10	51,250
Individual and partnership	26	11	30	465	32	33	12	9	1,110		2	28	2	1,250
U. S. Reclamation Service			2	371	26	25	81			0.3	2	2,040	8	50,000

CROPS.

TABLE 17.—ACREAGE, YIELD, AND VALUE OF PRINCIPAL CROPS GROWN ON IRRIGATED LAND, AND COMPARISONS WITH TOTALS FOR THE STATE: 1919 AND 1909.

[Totals for the state, used in making comparisons, are shown in state bulletin on agriculture.]

	CROP.	AREA HARVESTED.					QUANTITY HARVESTED.					
		1919		1909		Per cent of increase.[1]	Unit.	1919		1909		Per cent of increase.[1]
		Acres.	Per cent of total for state.	Acres.	Per cent of total for state.			Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Oats	2,870	0.1	544	(2)	427.6	Bu.	30,555	0.1	25,655	(2)	19.1
2	Spring wheat	15,713	0.2	1,268	(2)	.....	Bu.	80,292	0.1	28,011	(2)	186.6
3	Barley	1,186	0.1	(3)	.....	.....	Bu.	10,565	0.1	(3)	.....	.....
4	Rye	2,040	0.1	(3)	.....	.....	Bu.	8,673	0.1	(3)	.....	.....
	Hay and forage:											
5	Small grains cut for hay	1,664	0.3	(3)	.....	.....	Tons.	906	0.2	(3)	.....	.....
6	Other tame or cultivated grasses	1,028	0.4	(3)	.....	.....	Tons.	453	0.1	(3)	.....	.....
7	Wild, salt, or prairie grasses	779	(2)	1,057	(2)	−26.3	Tons.	301	(2)	1,424	0.1	−78.9

	CROP.	AVERAGE YIELD PER ACRE, 1919.						VALUE.				
		Unit.	For state.	On non-irrigated land.	On irrigated land.			1919		1909		Per cent of increase.[1]
					Average.	Per cent of average for state.	Per cent of average on non-irrigated land.	Amount.	Per cent of total for state.	Amount.	Per cent of total for state.	
	Cereals:											
1	Oats	Bu.	14.6	14.6	10.6	72.6	72.6	$24,444	0.1	$8,368	.....	192.1
2	Spring wheat	Bu.	6.8	6.8	5.1	75.0	75.0	192,701	0.1	26,145	.....	637.0
3	Barley	Bu.	11.1	11.1	8.9	80.2	80.2	12,150	0.1	(3)	.....	.....
4	Rye	Bu.	6.7	6.7	4.3	64.2	64.2	12,576	0.1	(3)	.....	.....
	Hay and forage:											
5	Small grains cut for hay	Tons.	0.60	0.60	0.54	90.0	90.0	13,137	0.2	(3)	.....	.....
6	Other tame or cultivated grasses	Tons.	1.23	1.23	0.44	35.8	35.8	7,474	0.1	(3)	.....	.....
7	Wild, salt, or prairie grasses	Tons.	0.77	0.77	0.39	50.6	50.6	4,666	(2)	9,518	0.1	−51.0

[1] A minus sign (−) denotes decrease. Per cent not shown when more than 1,000. [2] Less than one-tenth of 1 per cent. [3] Not reported separately in 1909.

COUNTY TABLE.—ACREAGE IRRIGATED, 1919 AND 1909; AND ACREAGE IN ENTERPRISES, IRRIGATION WORKS, AND CAPITAL INVESTED IN IRRIGATION ENTERPRISES, 1920 AND 1910.

[A minus sign (−) denotes decrease. Per cent not shown when base is less than 100, or when per cent is more than 1,000.]

		THE STATE.	McKenzie.	Williams.	All other counties.
1	Number of all farms in 1920	77,690	2,033	2,437	73,220
2	Number of farms irrigated in 1919	340	156	184	.....
3	Per cent of all farms	0.4	7.7	7.6	.....
4	Number of farms irrigated in 1909	69	7	53	9
5	Per cent of increase, 1909–1919	.....	.....	.....	.....
	LAND AND FARM AREA.				
6	Approximate land area.....acres	44,917,120	1,822,080	1,368,320	41,726,720
7	All land in farms.....acres	36,214,751	1,231,370	987,569	33,995,812
8	Improved land in farms.....acres	24,563,178	363,760	508,372	23,691,046
9	Area irrigated in 1919.....acres	12,072	6,630	5,442	.....
10	Per cent of improved land in farms	(1)	1.8	1.1	.....
11	Area irrigated in 1909.....acres	10,248	850	8,043	1,355
12	Per cent of increase, 1909–1919	17.8	680.0	−32.3	.....
13	Area enterprises were capable of irrigating in 1920.....acres	34,235	14,726	19,509	.....
14	Area enterprises were capable of irrigating in 1910.....acres	21,917	850	19,664	1,403
15	Per cent of increase, 1910–1920	56.2	.....	−0.8	.....
16	Area included in enterprises in 1920.....acres	57,476	21,424	36,052	.....
17	Area included in enterprises in 1910.....acres	38,173	1,532	34,865	1,776
18	Per cent of increase, 1910–1920	50.6	.....	3.4	.....
	IRRIGATION WORKS.				
	Independent enterprises:				
19	Number, 1920	30	4	26	.....
20	Number, 1910	49	6	34	9
	Main ditches:				
21	Number, 1920	32	4	28	.....
22	Number, 1910	47	5	35	7
23	Length, 1920.....miles	58	26	32	.....
24	Length, 1910.....miles	52	8	40	4
25	Capacity, 1920.....second-feet	836	276	560	.....
26	Capacity, 1910.....second-feet	2,161	162	1,703	296
	Laterals:				
27	Number, 1920	58	.....	58	.....
28	Number, 1910	46	16	30	.....
29	Length, 1920.....miles	93	34	59	.....
30	Length, 1910.....miles	74	1	73	.....
	Reservoirs:				
31	Number, 1920	9	1	8	.....
32	Number, 1910	22	8	13	1
33	Capacity, 1920.....acre-feet	1,110	400	710	.....
34	Capacity, 1910.....acre-feet	132,187	25	132,157	5
	Pumped wells:				
35	Number, 1920	.....	.....	.....	.....
36	Number, 1910	1	.....	.....	1
37	Capacity, 1920.....gallons per minute	.....	.....	.....	.....
38	Capacity, 1910.....gallons per minute	15	.....	.....	15
	Pumping plants:				
39	Number, 1920	4	.....	4	.....
40	Number, 1910	4	1	1	2
41	Engine capacity, 1920.....horsepower	2,068	1,980	88	.....
42	Engine capacity, 1910.....horsepower	2,038	30	2,000	8
43	Pump capacity, 1920.....gallons per minute	51,250	.....	51,250	.....
44	Pump capacity, 1910.....gallons per minute	182,115	2,000	180,000	115
45	Average lift, 1920.....feet	38	.....	38	.....
	CAPITAL INVESTED.				
46	Capital invested to Jan. 1, 1920.....dollars	1,857,118	1,235,209	621,909	.....
47	Capital invested to July 1, 1910.....dollars	836,482	6,663	781,100	48,719
48	Per cent of increase, 1910–1920	122.0	.....	−20.4	.....
49	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars	54.25	83.88	31.88	.....
50	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars	38.17	7.84	39.72	34.72
	ESTIMATED FINAL COST.				
51	Estimated final cost of existing enterprises in 1920.....dollars	2,072,766	1,321,457	751,309	.....
52	Estimated final cost of existing enterprises in 1910.....dollars	836,482	6,663	781,100	48,719
53	Per cent of increase, 1910–1920	147.8	.....	−3.8	.....
54	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars	36.06	61.68	20.84	.....
55	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars	21.91	4.35	22.40	27.43

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

OKLAHOMA.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Oklahoma collected at the census of 1920. Statistics of acreage irrigated, of acreage and yield of crops grown on irrigated land, and of cost of operation and maintenance relate to the year 1919; other items relate to the year 1920. Throughout the report figures for the census of 1910 are given for purposes of comparison; and, for the purpose of showing the historical development of irrigation, items which have been reported in censuses previous to 1910 are presented.

Statistics of number of farms irrigated and of acreage and yield of crops grown on irrigated land were collected in the general census of agriculture. All other statistics were obtained in a special canvass of irrigation enterprises.

Alfalfa and corn are the only crops for which the area reported as irrigated exceeds 100 acres. The area of irrigated alfalfa reported is 417 acres, with a yield of 615 tons, or 1.47 tons per acre. The average yield for the whole state is 1.96 tons per acre. The area of corn reported as irrigated is 237 acres, with a yield of 4,124 bushels, or 17.4 bushels per acre. The average yield for the state is 21.8 bushels per acre. The remaining irrigated area is divided among other farm crops, gardens, and pastures.

TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

ITEM.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Amount.	Per cent.
Number of all farms	191,988	190,192	1,796	0.9
Approximate land area of the state.....acres	44,424,960	44,424,960	.....	.....
All land in farms.....acres	31,951,934	28,859,353	3,092,581	10.7
Improved land in farms.....acres	18,125,321	17,551,337	573,984	3.3
Number of farms irrigated	73	137	−64	−46.7
Area irrigated.....acres	2,969	4,388	−1,419	−32.3
Area enterprises were capable of irrigating.....acres	9,672	6,397	3,275	51.2
Area included in enterprises.....acres	11,742	8,528	3,214	37.7
Per cent irrigated:				
Number of all farms	(2)	0.1	.....	.....
Approximate land area of the state	(2)	(2)	.....	.....
Land in farms	(2)	(2)	.....	.....
Improved land in farms	(2)	(2)	.....	.....
Excess of area enterprises were capable of irrigating over area irrigated.....acres	6,703	2,009	4,694	233.6
Excess of area included in enterprises over area irrigated.....acres	8,773	4,140	4,633	111.9
Capital invested	$151,325	$47,200	$104,125	220.6
Average per acre enterprises were capable of irrigating	$15.65	$7.38	$8.27	112.1
Estimated final cost of existing enterprises	$162,775	$47,200	$115,575	244.9
Average per acre included in enterprises	$13.86	$5.53	$8.33	150.6
Average cost of operation and maintenance per acre	$2.92	$0.51	$2.41	472.5
IRRIGATION WORKS.				
Number of enterprises	33	114	−81	−71.1
Number of main ditches	18	47	−29	.....
Length of main ditches.....miles	38	54	−16	.....
Capacity of main ditches.....second-feet	344	155	189	121.9
Number of lateral ditches	72	106	−34	−32.1
Length of lateral ditches.....miles	19	31	−12	.....
Number of reservoirs	8	11	−3	.....
Capacity of reservoirs.....acre-feet	52	22	30	.....
Number of flowing wells	1	(3)	1	.....
Capacity of flowing wells.....gallons per minute	100	(3)	100	.....
Number of pumped wells	19	65	−46	.....
Capacity of pumped wells.....gallons per minute	3,643	1,791	1,852	103.4
Number of pumping plants	22	68	−46	.....
Engine capacity.....horsepower	184	107	77	72.0
Pump capacity.....gallons per minute	7,668	4,541	3,127	68.9
Average lift.....feet	59	(3)	59	.....

[1] A minus sign (−) denotes decrease. Per cent not shown when base is less than 100.

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

[3] Not reported in 1910.

CLIMATIC CONDITIONS.

The larger part of the state of Oklahoma receives sufficient rainfall to obviate the necessity for irrigation, the normal annual precipitation for the state being about 34 inches, and of this about three-fourths occurs during the growing season. In the extreme northwestern part of the state the normal annual precipitation is about 20 inches, but a large part of the rainfall in late summer in this section as well as in the rest of the state, comes in local showers, and crops sometimes suffer for moisture.

In the western part of the state the spring and summer precipitation in 1919 was far above normal, and there was little or no need of irrigation.

WATER SUPPLY FOR IRRIGATION.

Most of western Oklahoma is well watered. It is drained by the Salt Fork of the Arkansas, the Cimarron, the North Canadian, the South Canadian, the Washita, and the Red Rivers and their tributaries. As a rule these streams do not carry large volumes of water. They are subject to sudden rises coming from heavy local rains, but the floods are seldom of long duration. Without the storing of flood waters these streams are not reliable sources of water for irrigation.

No doubt ground water can be obtained from wells in the stream valleys, but the demand for water for irrigation has not been sufficient to bring about either the storing of flood water or the sinking of wells.

FARMS AND ACREAGE IRRIGATED.

TABLE 2.—NUMBER OF FARMS AND ACREAGE IRRIGATED: 1900 TO 1920.

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Number.	Per cent of increase.[1]	Per cent of all farms.	Acres.	Per cent of increase.[1]	Per cent of total land area.	Per cent of land in farms.	Per cent of improved land in farms.
1920	73	−46.7	(2)	2,969	−32.3	(2)	(2)	(2)
1910	137	10.5	0.1	4,388	59.0	(2)	(2)	(2)
1900	124	.....	0.1	2,759	.....	(2)	(2)	(2)

[1] A minus sign (−) denotes decrease. [2] Less than one-tenth of 1 per cent.

TABLE 3.—ACREAGE, CLASSIFIED BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION.

DATE OF BEGINNING.	Number of enterprises.	Area included in enterprises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enterprises were capable of irrigating in 1920 (acres).
			Acres.	Per cent of acreage in enterprises.	
Total	33	11,742	2,969	25.3	9,672
1890–1899	5	8,812	2,392	27.1	8,112
1900–1904	3	159	108	67.9	159
1905–1909	2	150	55	36.7	150
1910–1914	12	1,983	298	15.0	633
1915–1919	9	398	36	9.0	378
Not reported	2	240	80	33.3	240

TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enterprises were capable of irrigating in 1920 (acres).	Area included in enterprises, 1920 (acres).
	1919	1909	Increase.[1]			
			Amount.	Per cent.		
Total	2,969	4,388	−1,419	−32.3	9,672	11,742
Streams, gravity	2,522	4,205	−1,683	−40.0	8,972	11,022
Streams, pumped	188	50	138	.....	355	355
Wells, pumped	107	69	38	.....	118	138
Wells, flowing	18	.....	18	.....	18	18
Lakes, gravity	.....	28	−28	.....	.....	.....
Springs	6	16	−10	.....	6	6
Stored storm water	.....	20	−20	.....	.....	.....
City water	3	(2)	3	.....	3	3
Mixed	125	(2)	125	.....	200	200

[1] A minus sign (−) denotes decrease. Per cent not shown when base is less than 100.

[2] Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

The constitution of the state of Oklahoma, adopted in 1907, contains the following section relating to organization for land reclamation:

"The legislature shall have the power and shall provide for a system of levees, drains, and ditches and of irrigation in this state when deemed expedient, and provide for a system of taxation on the lands affected or benefited by such levees, drains, and ditches and irrigation, or on crops produced on such land, to discharge such bonded indebtedness or expense necessarily incurred in the establishment of such improvements; and to provide for compulsory issuance of bonds by the owners or lessees of the lands benefited by such levees, drains and ditches, or irrigation."—Art. XVI, sec. 3.

In 1915 the legislature enacted an irrigation district law under this section of the constitution, but no districts are reported.

The state has never accepted the conditions of the Federal Carey Act (act of Aug. 18, 1894).

TABLE 5.—ACREAGE, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920 AND 1910.

ITEM AND CLASS.	CENSUS OF—		INCREASE.[1]	
	1920	1910	Acres.	Per cent.
ACREAGE IRRIGATED.				
Total	2,969	4,388	−1,419	−32.3
Individual	969	2,388	−1,419	−59.4
Cooperative	2,000	2,000	.....	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total	9,672	6,397	3,275	51.2
Individual	2,072	3,397	−1,325	−39.0
Cooperative	7,600	3,000	4,600	153.3
ACREAGE INCLUDED IN ENTERPRISES.				
Total	11,742	8,528	3,214	37.7
Individual	4,142	5,028	−886	−17.6
Cooperative	7,600	3,500	4,100	117.1

[1] A minus sign (−) denotes decrease.

An act passed in 1897 provided for the organization of corporations to build irrigation works and authorized such corporations to enter into contracts for the sale of water rights, having these secured by liens on the lands covered, or to lease water and have the rentals secured by liens on the crops grown, or otherwise. No such commercial companies are reported.

The United States Reclamation Service has investigated proposed enterprises in Oklahoma, but has not undertaken any of them.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

The laws of Oklahoma relating to water rights are summarized in the following paragraphs:

The territory of Oklahoma was organized in 1890, and in 1897 the territorial legislature enacted its first law relating to water rights. This law contained the following section:

"The unappropriated waters of the ordinary flow or underflow of every running stream or flowing river, and the storm or rain water of every river or natural stream, canon, ravine, depression, or watershed within those portions of the state of Oklahoma in which by reason of the insufficient rainfall, or by reason of the irregularity of the rainfall, irrigation is beneficial for agricultural purposes, are hereby declared to be the property of the public, and may be acquired by appropriation for the uses and purposes and in the manner as hereinafter provided."

This law contained the following proviso recognizing riparian rights: "Provided, that such flow or underflow of water shall not be diverted to the prejudice of the rights of the riparian owner without his consent, except after condemnation thereof in the manner as hereinafter provided."

This law provided for the filing of claims for new enterprises with county recorders of deeds, and required also the filing of claims for previously existing rights.

In 1905, the territory created the office of territorial engineer and provided that parties wishing to acquire rights to water should apply to the engineer for permits. The law provided for the submitting of proof of completion of works and the issuing of certificates of completion and for the submitting of proof of having put the water appropriated to a beneficial use and the issuing of licenses to divert the quantities of water to which rights had been acquired.

The state engineer is directed to make surveys and collect the information necessary for defining rights to water and to transmit the results to the attorney general of the state, who is directed to bring suits on behalf of the state for the adjudication of rights. The attorney general is directed also to intervene in suits brought by other parties, while the courts are directed to call on the state engineer for information when suits involving water rights are brought.

TABLE 6.—ACREAGE IRRIGATED, CLASSIFIED BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1919 AND 1909.

CLASS.	1919		1909, per cent of total.
	Acres.	Per cent of total.	
Total	2,969	100.0	100.0
Appropriation and use	35	1.2	77.4
Notice filed and posted	215	7.2	5.4
Adjudicated by court	2,200	74.1	17.1
Permit from state	310	10.4	.....
Riparian rights	80	2.7	.....
Underground	120	4.0	(1)
Other and mixed	3	0.1	(1)
Not reported	6	0.2	(1)

[1] All land for which the class of water rights was not reported was included in "Appropriation and use."

ACREAGE, BY DRAINAGE BASIN.

TABLE 7.—ACREAGE IRRIGATED, CLASSIFIED BY DRAINAGE BASIN: 1919 AND 1902.

DRAINAGE BASIN.	AREA IRRIGATED (ACRES).			Area included in enterprises, 1920 (acres).	Area enterprises were capable of irrigating in 1920 (acres).
	1919	1902	Per cent of increase.[1]		
Total	2,969	[2] 3,328	—10.8	11,742	9,672
Arkansas River and tributaries	2,843	[2] 3,207	—11.4	11,449	9,379
Canadian River	251	869	—71.1	502	495
Cimarron River	2,588	1,963	31.8	10,929	8,879
Other tributaries of Arkansas River	4	220	—98.2	18	5
Red River and tributaries	126	121	4.1	293	293

[1] A minus sign (—) denotes decrease.
[2] Includes 155 acres irrigated by springs but not shown by drainage basins.

CAPITAL INVESTED AND COST OF OPERATION AND MAINTENANCE.

TABLE 8.—CAPITAL INVESTED IN IRRIGATION ENTERPRISES: 1900 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase.	AVERAGE PER ACRE.	
			Amount.	Per cent of increase.[1]
1920	$151,325	220.6	$15.65	112.1
1910	47,200	115.8	7.38	—6.9
1900	21,872	.....	7.93	.....

[1] A minus sign (—) denotes decrease.

TABLE 9.—CAPITAL INVESTED, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total	$151,325	100.0	$15.65
1890–1899	54,378	35.9	6.70
1900–1904	3,403	2.2	21.40
1905–1909	4,085	2.7	27.23
1910–1914	67,101	44.3	106.00
1915–1919	17,009	11.2	45.00
Not reported	5,349	3.5	22.29

TABLE 10.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY SOURCE OF WATER SUPPLY.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.			OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Average per acre.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$151,325	100.0	$15.65	2,626	$2.92
Streams, gravity	90,040	59.5	10.04	2,322	1.56
Streams, pumped	4,210	2.8	11.86	123	3.74
Wells, pumped	47,075	31.1	398.94	32	40.78
Wells, flowing	5,000	3.3	277.78	18	55.56
Springs	1,000	0.7	166.67	6	4.17
City water	1,500	1.0	500.00	.....	.....
Mixed	2,500	1.7	12.50	125	10.00

[1] Based on area irrigated in 1919.

TABLE 11.—CAPITAL INVESTED, CLASSIFIED BY DRAINAGE BASIN: 1920 AND 1902.

DRAINAGE BASIN.	1920	1902	INCREASE.	
			Amount.	Per cent.
Total	$151,325	[1] $36,770	$114,555	311.5
Arkansas River and tributaries	142,597	[1] 35,802	106,795	298.3
Canadian River	46,234	6,918	39,316	568.3
Cimarron River	93,157	15,977	77,180	483.1
Other tributaries of Arkansas River	3,206	1,582	1,624	102.7
Red River and tributaries	8,728	968	7,760	801.7

[1] Includes $11,325 invested in springs and wells but not shown by drainage basins.

TABLE 12.—CAPITAL INVESTED, 1920, AND COST OF OPERATION AND MAINTENANCE, 1919, CLASSIFIED BY CHARACTER OF ENTERPRISE.

[When water is pumped, cost of operation and maintenance includes cost of fuel and attendance.]

CLASS.	CAPITAL INVESTED, 1920.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre.[1]
Total	$151,325	100.0	2,626	$2.92
Individual	110,658	73.1	626	8.73
Cooperative	40,667	26.9	2,000	1.10

[1] Based on area irrigated in 1919.

DRAINAGE OF IRRIGATED LAND.

The acreages reported in Table 13 relate to lands within the boundaries of irrigation projects, and do not include lands within the vicinity of these projects. "Acreage needing drainage" includes all lands so reported by the owners of the enterprises, and includes lands producing partial crops as well as those wholly unproductive.

TABLE 13.—ACREAGE WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL ACREAGE IN NEED OF DRAINAGE: 1920.

[No land is reported as having had drains installed.]

Number of enterprises reporting land needing drainage	3
Acreage included in enterprises reporting land needing drainage	1,960
Acreage needing drainage	1,820
Per cent that acreage needing drainage is of total acreage in irrigation enterprises in the state	15.5

QUANTITY OF WATER USED.

The quantity of water used in 1919 was reported on only one irrigation schedule, and in this instance the water was not measured. The average volume entering the canal was reported as 2 second-feet, and the area irrigated was 125 acres, making an average of 62.5 acres per second-foot.

IRRIGATION WORKS.

TABLE 14.—IRRIGATION WORKS, CLASSIFIED BY DATE OF BEGINNING.

DATE OF BEGINNING.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	7	3	18	344	38	72	19	8	52
1890–1899	3		5	182	25	28	17		
1900–1904	1	1	3	31	2	34		2	
1905–1909	1		2	7	1	8	1		
1910–1914	1	1	5	70	7	2	1	3	2
1915–1919	1		2	54	3			1	
Not reported		1	1					2	50

DATE OF BEGINNING.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	4.3	1	100	19	3,643	22	184	26	7,668
1900–1904				1	35	1		1	35
1905–1909						1	12	1	750
1910–1914	1.8	1	100	11	2,980	12	121	15	5,265
1915–1919	2.4			7	628	7	39	8	1,618
Not reported	0.1					1	12	1	

TABLE 15.—IRRIGATION WORKS, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CLASS.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	7	3	18	344	38	72	19	8	52
Individual	6	3	17	194	22	49	3	8	52
Cooperative	1	.....	1	150	16	23	16	.....	.....

CLASS.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.			
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horsepower).	Pumps.	
								Number.	Capacity (gallons per minute).
Total	4.3	1	100	19	3,643	22	184	26	7,668
Individual	4.3	1	100	19	3,643	22	184	26	7,668

TABLE 16.—IRRIGATION WORKS, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	Number of diverting dams.	Number of storage dams.	MAIN DITCHES.			LATERAL DITCHES.		RESERVOIRS.	
			Number.	Capacity (second-feet).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total	7	3	18	344	38	72	19	8	52
Arkansas River and tributaries	7	2	14	290	38	70	18	7	52
Canadian River	.....	2	5	8	3	9	1	6	52
Cimarron River	7	.....	9	282	35	61	17	1	.....
Other tributaries of Arkansas River	.....	.....	.....	.....	.....	.....	.....	.....	.....
Red River and tributaries	.....	1	4	54	.....	2	1	1	.....

DRAINAGE BASIN.	Pipe lines, length (miles).	FLOWING WELLS.		PUMPED WELLS.		PUMPING PLANTS.				
		Number.	Capacity (gallons per minute).	Number.	Capacity (gallons per minute).	Number.	Engine capacity (horse-power).	Pumps.		Average lift (feet).
								Number.	Capacity (gallons per minute).	
Total	4.3	1	100	19	3,643	22	184	26	7,668	59
Arkansas River and tributaries	4.3	.....	.....	19	3,643	18	120	22	4,668	69
Canadian River	4.0	.....	.....	12	1,106	12	78	16	3,141	89
Cimarron River	.....	.....	.....	5	2,485	4	33	4	1,485	26
Other tributaries of Arkansas River	0.3	.....	.....	2	52	2	9	2	42	19
Red River and tributaries	.....	1	100	.....	.....	4	64	4	3,000	30