

IRRIGATION—OKLAHOMA.

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.	Beaver.	Cimarron.	All other counties.
1 Number of all farms in 1920.....	191,958	2,518	767	188,703
2 Number of farms irrigated in 1919.....	73	15	17	41
3 Per cent of all farms.....	(1)	0.6	2.2	(1)
4 Number of farms irrigated in 1909.....	187	11	32	94
5 Per cent of increase, 1909-1919.....	-46.7			
LAND AND FARM AREA.				
6 Approximate land area.....acres..	44,424,960	1,100,320	1,183,360	42,081,280
7 All land in farms.....acres..	31,951,934	1,099,058	809,024	30,043,852
8 Improved land in farms.....acres..	18,125,321	508,103	97,177	17,520,041
9 Area irrigated in 1919.....acres..	2,969	2,008	315	646
10 Per cent of improved land in farms.....	(1)	0.4	0.3	(1)
11 Area irrigated in 1909.....acres..	4,388	138	708	3,542
12 Per cent of increase, 1909-1919.....	-32.3		-55.5	-81.8
13 Area enterprises were capable of irrigating in 1920.....acres..	9,672	7,609	905	1,158
14 Area enterprises were capable of irrigating in 1910.....acres..	6,897	259	985	5,143
15 Per cent of increase, 1910-1920.....	51.2		-9.0	-77.5
16 Area included in enterprises in 1920.....acres..	11,742	7,609	2,255	1,878
17 Area included in enterprises in 1910.....acres..	8,528	353	1,165	7,010
18 Per cent of increase, 1910-1920.....	37.7		93.6	-73.2
IRRIGATION WORKS.				
19 Independent enterprises:				
20 Number, 1920.....	33	3	6	24
21 Number, 1910.....	114	11	32	71
22 Main ditches:				
23 Number, 1920.....	18	3	5	10
24 Number, 1910.....	47	2	16	29
25 Length, 1920.....miles..	38	17	14	7
26 Length, 1910.....miles..	54	3	10	41
27 Capacity, 1920.....second-feet..	344	150	123	71
28 Capacity, 1910.....second-feet..	155	2	42	111
29 Laterals:				
30 Number, 1920.....	72	53	8	11
31 Number, 1910.....	106	13	59	34
32 Length, 1920.....miles..	19	16	1	2
33 Length, 1910.....miles..	21	3	13	15
34 Reservoirs:				
35 Number, 1920.....	8	1		7
36 Number, 1910.....	11	5		6
37 Capacity, 1920.....acre-feet..	52			52
38 Capacity, 1910.....acre-feet..	22	10		12
39 Flowing wells:				
40 Number, 1920.....	1			1
41 Number, 1910.....				
42 Capacity, 1920.....gallons per minute..	100			100
43 Capacity, 1910.....gallons per minute..				
44 Pumped wells:				
45 Number, 1920.....	19	1	1	17
46 Number, 1910.....	65	7	17	41
47 Capacity, 1920.....gallons per minute..	3,643	35	1,600	2,008
48 Capacity, 1910.....gallons per minute..	1,791	199	400	1,192
49 Pumping plants:				
50 Number, 1920.....	22	1	1	20
51 Number, 1910.....	68	7	18	43
52 Engine capacity, 1920.....horsepower..	184		8	176
53 Engine capacity, 1910.....horsepower..	107	7	32	68
54 Pump capacity, 1920.....gallons per minute..	7,868	35	600	7,033
55 Pump capacity, 1910.....gallons per minute..	4,541	199	1,240	3,102
56 Average lift, 1920.....feet..	59		16	62
CAPITAL INVESTED.				
57 Capital invested to Jan. 1, 1920.....dollars..	151,325	41,360	33,680	76,285
58 Capital invested to July 1, 1910.....dollars..	47,200	3,699	8,360	35,141
59 Per cent of increase, 1910-1920.....	220.6		302.9	117.1
60 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	15.65	5.44	37.22	65.88
61 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	7.38	14.28	8.40	6.83
ESTIMATED FINAL COST.				
62 Estimated final cost of existing enterprises in 1920.....dollars..	162,775	41,360	42,680	78,735
63 Estimated final cost of existing enterprises in 1910.....dollars..	47,200	3,699	8,360	35,141
64 Per cent of increase, 1910-1920.....	244.9		410.5	124.1
65 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	13.86	5.44	18.93	41.92
66 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	5.53	10.48	7.18	5.01

1 Less than one-tenth of 1 per cent.

OREGON.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Oregon 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 show-

ing 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.

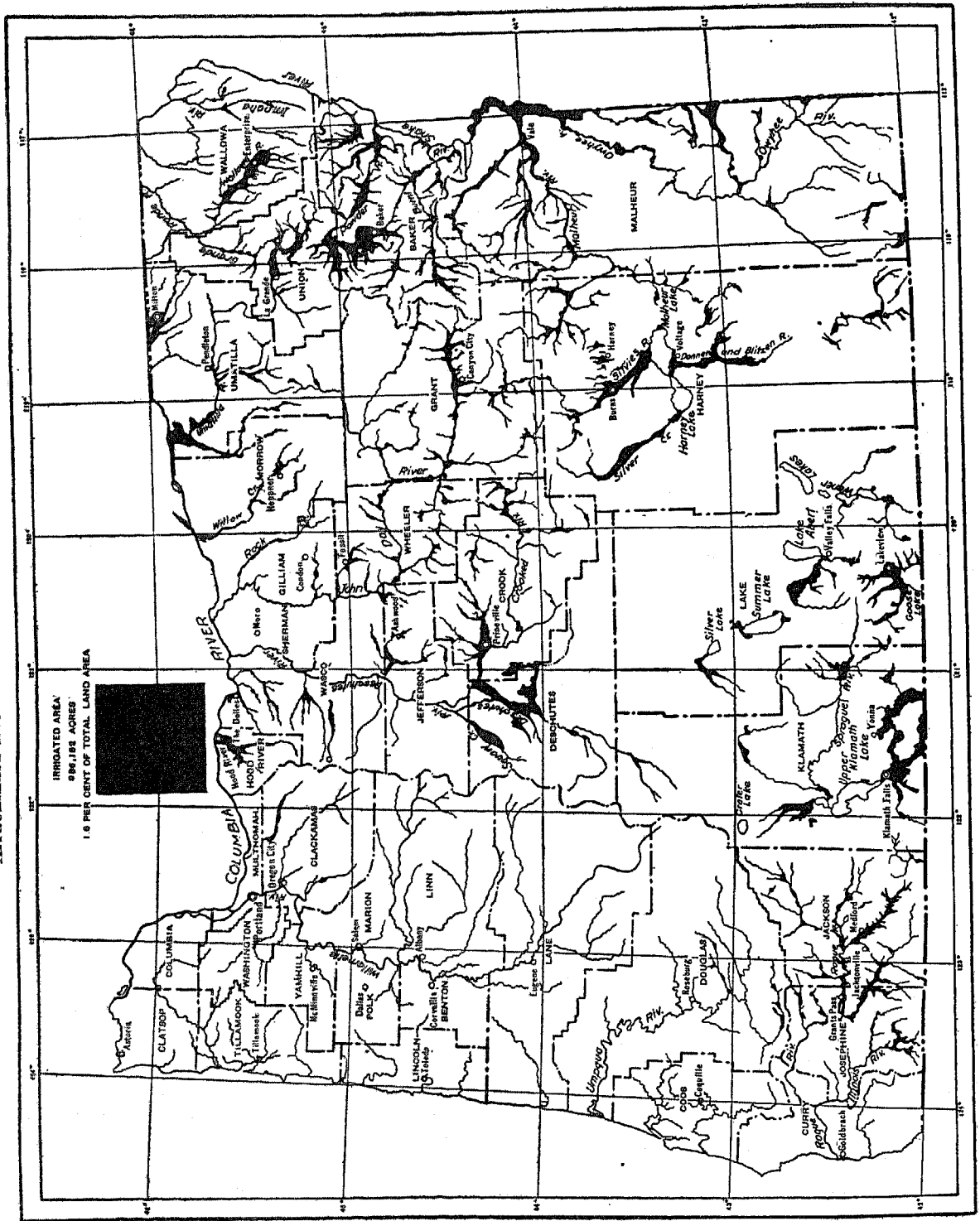
ITEM.	CENSUS OF—		INCREASE. ¹	
	1920	1910	Amount.	Per cent.
Number of all farms.....	50,206	45,502	4,704	10.3
Approximate land area of the state.....acres..	61,188,480	61,188,480		
All land in farms.....acres..	13,542,318	11,685,110	1,857,208	15.9
Improved land in farms.....acres..	4,913,851	4,274,803	639,048	14.9
Number of farms irrigated.....	9,154	6,669	2,485	37.3
Area irrigated.....acres..	986,162	686,129	300,033	43.7
Area enterprises were capable of irrigating.....acres..	1,344,046	830,526	513,520	61.8
Area included in enterprises.....acres..	1,925,987	2,527,208	-601,221	-23.8
Per cent irrigated:				
Number of all farms.....	18.2	14.7	3.5	
Approximate land area of the state.....	1.6	1.1	0.5	
Land in farms.....	7.3	5.9	1.4	
Improved land in farms.....	20.1	16.1	4.0	
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	357,884	144,397	213,487	147.8
Excess of area included in enterprises over area irrigated.....acres..	939,825	1,841,079	-901,254	-49.0
Area of irrigated land reported as available for settlement.....acres..	98,609	(²)		
Capital invested.....	\$28,929,151	\$12,760,214	\$16,168,937	126.7
Average per acre enterprises were capable of irrigating.....	\$21.52	\$15.36	\$6.16	40.1
Estimated final cost of existing enterprises.....	\$41,585,742	\$39,216,619	\$2,369,123	6.0
Average per acre included in enterprises.....	\$21.59	\$15.52	\$6.07	39.1
Average cost of operation and maintenance per acre.....	\$1.19	\$0.75	\$0.44	58.7
IRRIGATION WORKS.				
Number of enterprises.....	4,710	3,745	965	25.8
Number of main ditches.....	5,252	3,582	1,670	46.6
Length of main ditches.....miles..	7,115	5,539	1,576	28.5
Capacity of main ditches.....second-feet..	28,897	39,686	-10,789	-27.2
Number of lateral ditches.....	2,784	2,518	266	10.6
Length of lateral ditches.....miles..	1,956	2,052	-96	-4.7
Number of reservoirs.....	266	271	-5	-1.8
Capacity of reservoirs.....acre-feet..	1,905,037	1,024,266	880,771	86.0
Number of flowing wells.....	65	51	14	
Capacity of flowing wells.....gallons per minute..	11,968	3,035	8,933	294.3
Number of pumped wells.....	208	92	116	
Capacity of pumped wells.....gallons per minute..	47,026	20,883	26,143	125.2
Number of pumping plants.....	573	229	344	150.2
Engine capacity.....horsepower..	13,769	3,095	10,674	344.9
Pump capacity.....gallons per minute..	600,045	118,514	481,531	406.3
Average lift.....feet..	28	(²)	28	

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

² Not reported in 1910.

OREGON

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

The climatic conditions determining the necessity for irrigation are the amount and seasonal distribution of precipitation, principally rainfall. From the standpoint of amount of precipitation Oregon is divided into two distinct portions by the Cascade Mountains.

The portion of the state west of the Cascades receives the heaviest rainfall of any part of the United States, while east of the Cascades the rainfall is so small that this part of the state is mostly arid. West of the mountains, however, there is a fairly distinct dry season, only 10 per cent of the annual precipitation occurring in June, July, August, and September. This makes irrigation necessary to the maturing of crops whose growing season extends into the late summer, and makes it desirable for pastures at this season.

The chief characteristics of the climate of the part of the state east of the Cascades are a scanty rainfall, low humidity, rapid evaporation, and an abundance of sunshine. The annual precipitation ranges from 8 to 25 inches. At the summit of the Cascades the annual precipitation exceeds 40 inches; it decreases to the eastward, and reaches 15 inches about the center of the state. East of this there is a section receiving less than 15 inches, extending in a narrow strip to the north line of the state, but expanding to the southward, and occupying the whole southeast third of the state. In the Blue Mountains, in the northeastern part of the state, the precipitation increases to about 25 inches.

The precipitation is heaviest in the winter, but there is a secondary maximum in May and June, with a very dry period during the late summer. The relatively large winter and spring precipitation makes it possible to raise grain crops without irrigation in most sections in normal years, but irrigation is necessary for the growing of other crops except in some of the higher valleys.

The snowfall in the Cascades is very heavy, and snow remains on some of the higher peaks throughout the year.

For the state as a whole, precipitation in 1919 was slightly above the normal. There was a large excess in the western section and a slight deficiency in the eastern section. While the deficiency for the year was small, there was a marked drouth in spring and summer throughout the state, May and June recording the lowest amounts ever recorded for those months, and July having the lowest precipitation on record with two exceptions. In the eastern division of the state the precipitation from May to August, inclusive, was only 0.84 inch, which is but 26 per cent of the normal. As a consequence of this drouth both irrigated and nonirrigated crops suffered.

WATER SUPPLY FOR IRRIGATION.

West of the Cascade Mountains the heavy precipitation and the large flow of the streams provide an ample supply of water for the small amount of irrigation practiced during the summer dry season. Only small areas are irrigated in this part of the state.

Deschutes River and its tributaries drain the eastern slope of the Cascade Mountains in Oregon, and a considerable area of the high plains to the east of the mountains. Because of the character of its drainage area this river has a remarkably uniform flow, and, consequently, it is a valuable source of water for irrigation. Throughout its lower course it flows in a deep canyon and is not used for irrigation. In the central part of its course there are several large enterprises in the course of development.

John Day River rises in the Blue Mountains and flows west and north to the Columbia. The river and its tributaries are used for irrigation in the valleys near the headwaters, but for the last 100 miles of its course the river flows in a deep canyon and is not used for irrigation.

Umatilla River also rises in the Blue Mountains and flows in a northwesterly direction to the Columbia. There are large level areas along its lower course near the Columbia, and works have been built to utilize its waters.

Grande Ronde River, also, rises in the Blue Mountains. It flows to the northeast into Snake River. Near its source it flows through Grande Ronde Valley, where there is a large area of agricultural land.

Powder and Burnt Rivers rise in these same mountains and flow to the southeast into Snake River, supplying water to considerable areas.

Malheur River rises in the southern part of the Blue Mountains and flows in an easterly direction to Snake River. Its waters are used for irrigation.

Owyhee River rises in northern Nevada, flows through the southwest corner of Idaho, and then in a northerly direction in Oregon to Snake River. Its waters are used for irrigation in all three of the states through which it flows.

In south central Oregon there are many streams rising in the hills and flowing into lakes or sinks which have no outlets. The larger streams are Silvies River and Donner and Blitzen River. These flow into Malheur Lake, one from the north and the other from the south. Both are used for irrigation. There are many small streams of a similar character.

West of this Great Basin drainage is the drainage basin of Klamath River. There are large projects on this stream in the vicinity of Klamath Lake.

Taking the state as a whole, there are still large opportunities for irrigation development, since there are immense areas of tillable land, and large unused supplies of water.

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.....	9,154	37.3	18.2	986,162	43.7	1.6	7.3	23.1
1910.....	6,669	43.9	14.7	686,129	76.7	1.1	5.9	16.1
1900.....	4,636	47.2	12.9	388,310	118.2	0.6	3.9	11.7
1890.....	3,150	.....	12.3	177,944	.....	0.4	2.6	5.1

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.....	4,710	1,925,987	986,162	51.2	1,344,046
Before 1830.....	64	10,528	8,206	77.9	9,409
1830-1859.....	211	56,754	46,917	82.7	51,216
1870-1879.....	433	130,199	90,950	69.9	101,727
1880-1889.....	889	276,789	198,653	71.8	248,957
1890-1899.....	732	181,282	123,043	67.9	143,186
1900-1904.....	461	237,259	123,648	52.1	172,549
1905-1909.....	390	434,996	142,756	32.8	237,680
1910-1914.....	513	257,831	91,425	35.5	111,068
1915-1919.....	478	214,025	62,458	29.2	151,145
Not reported.....	539	126,324	98,106	77.7	117,109

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.....	986,162	686,129	300,033	43.7	1,344,046	1,925,987
Streams, gravity.....	796,354	643,281	143,073	22.2	1,070,244	1,423,039
Streams, pumped.....	64,576	3,585	60,991		81,136	99,562
Streams, pumped and gravity.....	253	(?)	253		263	293
Wells, pumped.....	1,993	805	1,188	147.6	2,418	2,723
Wells, flowing.....	72	655	-583	-89.0	146	436
Wells, flowing and pumped.....	340	(?)	340		340	340
Lakes, pumped.....	1,620	821	799	97.3	1,787	1,775
Lakes, gravity.....	5,750	22,915	-17,165	-74.9	31,779	31,779
Springs.....	9,584	10,788	-1,204	-11.2	10,610	13,813
Stored storm water.....	3,763	3,279	484	14.8	5,822	9,635
City water.....	258	(?)	258		264	264
Sewage.....	10	(?)	10		10	10
Streams, gravity, and pumped wells.....	105	(?)	105		105	130
Streams, gravity, and flowing wells.....	200	(?)	200		200	450
Other mixed.....	111,137	(?)	111,137		139,073	344,475
Other and not reported.....	147	(?)	147		147	163

¹ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.
² Not included in 1909 classification.

ACREAGE, BY CHARACTER OF ENTERPRISE.

Oregon enacted its original irrigation district law in 1895, and this act, as amended from time to time, is still in force.

The conditions of the Federal Carey Act (act of Congress, Aug. 18, 1894) were accepted by Oregon in

1901, and several large projects were begun under this act. These were not successful and in 1913 the state took over one of these projects and is completing it. This is reported under "Carey Act" in Table 5. The small area credited to the state belongs to a state institution, and does not represent a scheme of state construction.

The land in the Klamath project of the United States Reclamation Service has been organized into an irrigation district, 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 some water under special contract to lands included in another irrigation district and, to that extent, the acreage credited to the Reclamation Service in Table 5 does not represent the entire acreage receiving water from its 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.....	986,162	686,129	300,033	43.7
Individual and partnership.....	590,626	410,078	180,548	44.0
Cooperative.....	186,037	149,985	36,052	24.0
Irrigation district.....	92,081	1,500	90,581	.....
Carey Act.....	30,665	24,750	5,915	23.9
Commercial.....	27,338	77,387	-50,049	-64.7
U. S. Reclamation Service.....	54,981	22,000	32,981	149.9
U. S. Indian Service.....	4,000	429	3,571	832.4
State.....	330	(?)	330	.....
City.....	104	(?)	104	.....
Other.....	.....	.....	.....	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total.....	1,344,046	830,526	513,520	61.8
Individual and partnership.....	689,723	454,074	235,649	51.9
Cooperative.....	236,171	169,944	66,227	39.0
Irrigation district.....	188,540	1,500	197,040	.....
Carey Act.....	67,680	65,800	2,080	3.2
Commercial.....	67,163	93,750	-26,587	-28.4
U. S. Reclamation Service.....	79,625	45,319	31,206	68.9
U. S. Indian Service.....	7,600	439	7,161	.....
State.....	300	(?)	300	.....
City.....	340	(?)	340	.....
Other.....	104	(?)	104	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total.....	1,925,987	2,527,208	-601,221	-23.8
Individual and partnership.....	828,471	619,980	208,495	33.6
Cooperative.....	329,241	399,632	-70,391	-17.6
Irrigation district.....	271,172	5,980	265,192	.....
Carey Act.....	164,970	623,284	-458,294	-73.5
Commercial.....	150,289	692,487	-542,178	-78.3
U. S. Reclamation Service.....	171,444	185,000	-13,556	-7.3
U. S. Indian Service.....	9,600	879	8,721	992.2
State.....	300	(?)	300	.....
City.....	390	(?)	390	.....
Other.....	110	(?)	110	.....

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

ACREAGE, BY CHARACTER OF WATER RIGHTS.

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

Although Oregon was admitted to the Union in 1859, there was no legislation relating to water rights until 1891, when a law relating principally to the rights of corporations organized to supply water for hire was enacted. This law contained the following general declaration regarding water rights:

"All existing appropriations of water made for beneficial purposes, by any person, corporation, or company, in accordance with the laws of the United States, or in accordance with the laws of the state of Oregon, or the decisions of its supreme court, or the established customs and regulations of the district in which such appropriations have been made, shall be respected and upheld to the extent of the amount of water actually appropriated."

In the same year, 1891, it was provided that in any suit regarding water rights all parties taking water from the same source might be made parties to the suit, in order that all rights might be settled in a single action.

In 1905 the office of state engineer was created, but he was given no control over the waters of the state.

In 1909 a new code of water laws was adopted. The state board of control was created and given control over the waters of the state. This board consisted of the state engineer and the superintendents of the two water divisions into which the state was divided. Parties wishing to acquire rights are required to make application to the state engineer for a permit. When rights have been perfected in accordance with a permit proof is submitted to the board of control, which issues a certificate showing what rights have been acquired.

This law also provided a new procedure for adjudicating existing rights. The state engineer and the superintendent of the water division in which the source, the rights to which are being adjudicated, is located, collect all information regarding rights, make surveys of streams, ditches, and lands, and prepare findings and an order defining all rights. All testimony, reports of surveys, and the findings and order are filed with the court, which holds hearings, and issues a decree fixing all rights. Certificates are issued to all claimants in accordance with the decree of court.

Riparian rights are recognized to some extent in Oregon.

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.....	986,162	100.0	100.0
Appropriation and use.....	148,523	15.1	58.3
Notice filed and posted.....	150,332	15.3	29.0
Adjudicated by court.....	298,913	29.8	5.4
Permit from state.....	131,540	13.3	3.8
Certificate or license from state.....	217,228	22.0	.....
Riparian rights.....	14,277	1.5	3.5
Underground.....	3,235	0.3	(1)
Other and mixed.....	12,159	1.2	(1)
Not reported.....	14,955	1.5	(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.....	986,162	439,981	124.1	1,925,987	1,344,046
Columbia River and tributaries.....	638,223	232,145	174.9	1,145,451	810,918
Columbia River direct.....	92	193	-53.5	223	123
Snapke River and tributaries.....	394,205	167,790	134.9	628,588	489,719
Snapke River direct.....	22,199	415	.....	31,925	25,489
Owyhee River.....	36,285	13,215	174.7	78,811	42,093
Malheur River.....	52,850	40,686	29.9	117,688	79,618
Burnt River.....	34,287	16,012	113.7	54,467	37,606
Powder River.....	146,086	58,482	149.7	188,463	165,826
Pine Creek.....	12,635	10,149	24.5	40,637	39,321
Imnaha River.....	4,828	3,781	27.7	10,146	6,069
Grande Ronde River.....	79,191	22,628	250.0	98,774	87,191
Other tributaries of Snake River.....	5,884	* 2,392	146.0	8,177	6,626
Walla Walla River.....	17,514	3,321	427.4	18,457	17,780
Umatilla River.....	43,571	4,485	871.5	99,012	83,341
Willow Creek.....	5,553	3,013	84.3	7,159	6,618
John Day River.....	36,141	27,604	30.9	48,191	41,492
Deschutes River.....	111,916	21,108	430.2	291,014	174,790
Hood River.....	19,765	2,537	596.7	39,660	21,101
Willamette River.....	2,892	448	545.5	4,655	4,302
Other tributaries of Columbia River.....	6,574	* 1,341	390.2	8,491	7,652
Rogue River and tributaries.....	38,569	13,900	177.5	131,181	52,816
Rogue River direct.....	3,256	538	505.2	14,166	4,873
Little Butte Creek.....	6,706	1,208	455.1	54,383	8,417
Bear Creek.....	8,319	2,602	186.7	28,275	14,673
Evans Creek.....	1,333	225	492.4	2,746	1,614
Applegate River.....	10,659	4,239	151.5	17,335	13,012
Illinois River.....	4,961	2,804	76.9	8,708	6,323
Other tributaries of Rogue River.....	3,335	* 1,984	68.1	5,521	4,204
Klamath River and tributaries.....	90,570	27,724	226.7	239,940	135,099
Klamath River direct.....	3,185	105	.....	6,010	5,800
Lost River.....	58,568	1,180	.....	194,748	95,304
Sprague River.....	7,800	3,690	111.4	10,150	9,980
Other tributaries of Klamath River.....	21,017	* 22,749	-7.6	29,132	24,015
Other Pacific Ocean streams.....	2,134	(*)	.....	8,695	8,653
Independent streams.....	216,666	166,212	30.4	400,770	305,560
Deep Creek.....	1,906	2,165	-12.0	2,115	2,088
Donner and Blitzen River.....	21,356	34,701	-38.5	54,931	27,956
Silver Creek.....	16,819	13,609	23.6	42,779	17,394
Silvies River.....	64,842	20,041	149.0	102,258	95,887
Thomas Creek.....	5,596	1,990	172.0	6,806	6,466
Other independent streams.....	106,357	* 87,716	21.8	192,818	156,789

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

* Includes springs and wells.

* 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.....	\$28,929,151	126.7	\$21.52	40.1
1910.....	12,760,214	592.1	15.36	228.4
1900.....	1,843,771	123.3	4.75	2.4
1890.....	825,660	.....	4.64	.....

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

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total.....	\$28,929,151	100.0	\$21.52
Before 1890.....	151,216	0.5	16.07
1890-1899.....	398,003	1.4	7.78
1870-1879.....	1,072,943	3.7	10.55
1880-1889.....	2,321,961	8.0	9.33
1890-1899.....	1,666,226	5.8	11.64
1900-1909.....	4,193,262	14.5	24.80
1910-1919.....	10,878,802	37.6	45.76
1920-1921.....	2,741,335	9.5	24.68
1915-1919.....	4,759,181	16.4	31.49
Not reported.....	748,032	2.6	6.39

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.....	\$28,929,151	100.0	\$21.52	801,891	\$1.19
Streams, gravity.....	20,028,187	69.2	18.71	631,124	1.00
Streams, pumped.....	2,807,806	9.7	34.61	59,087	3.09
Streams, pumped and gravity.....	3,700	(*)	14.07	253	2.55
Wells, pumped.....	118,806	0.4	48.93	1,419	8.04
Wells, flowing.....	6,900	(*)	47.25	66	9.47
Wells, pumped and flowing.....	2,800	(*)	7.65	20	18.00
Lakes, pumped.....	26,583	0.1	14.88	457	2.52
Lakes, gravity.....	783,702	2.7	24.66	1,785	0.90
Springs.....	165,946	0.6	15.64	6,785	0.92
Stored storm water.....	124,499	0.4	22.55	2,287	1.23
City water.....	183,650	0.5	582.61	252	23.89
Sewage.....	1,500	(*)	150.00	.....	.....
Streams, gravity, and pumped wells.....	11,500	(*)	109.52	95	17.89
Streams, gravity, and flowing wells.....	1,000	(*)	5.00	200	4.00
Other mixed.....	4,691,072	16.2	33.73	97,014	1.13
Not reported.....	2,200	(*)	14.97	147	0.78

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.	
			Amount.	Per cent. ¹
Total.....	\$28,929,151	\$2,089,609	\$26,839,542	.....
Columbia River and tributaries.....	18,480,068	1,385,671	17,094,397	.....
Columbia River direct.....	11,150	3,500	7,650	218.6
S Snake River and tributaries.....	7,063,652	971,743	6,121,909	630.0
S Snake River direct.....	909,478	15,154	894,324	.....
Owyhee River.....	1,154,185	191,736	962,449	502.0
Matheur River.....	2,027,683	282,898	1,744,785	616.8
Burnt River.....	639,491	65,661	573,800	873.5
Powder River.....	1,552,987	268,101	1,284,886	479.3
Pine Creek.....	97,522	36,595	60,927	166.5
Imnaha River.....	206,378	10,885	195,493	.....
Grande Ronde River.....	471,436	82,011	389,425	474.8
Other tributaries of Snake River.....	34,492	18,672	15,820	84.7
Walla Walla River.....	280,934	4,885	276,049	.....
Umatilla River.....	4,308,892	61,430	4,247,462	.....
Willow Creek.....	60,139	20,375	39,764	195.2
John Day River.....	510,248	120,060	390,188	325.0
Deschutes River.....	5,078,636	138,755	4,939,881	.....
Hood River.....	807,289	54,000	753,289	.....
Willamette River.....	100,561	3,240	97,321	.....
Other tributaries of Columbia River.....	228,587	7,683	220,904	.....
Rogue River and tributaries.....	1,783,989	147,223	1,636,766	.....
Rogue River direct.....	165,665	7,540	158,125	.....
Little Butte Creek.....	604,794	10,490	594,304	.....
Bear Creek.....	615,878	20,895	594,983	.....
Evans Creek.....	40,836	2,675	38,161	.....
Applegate River.....	180,894	60,325	120,569	199.0
Illinois River.....	87,966	27,743	60,218	217.0
Other tributaries of Rogue River.....	87,966	17,550	70,406	401.2
Klamath River and tributaries.....	3,811,932	247,560	3,564,372	.....
Klamath River direct.....	43,141	1,100	42,041	.....
Lost River.....	3,451,383	17,550	3,433,833	.....
Sprague River.....	22,368	26,580	5,808	21.9
Other tributaries of Klamath River.....	285,040	202,350	82,690	40.9
Other Pacific Ocean streams.....	191,200	(*)	191,200	.....
Independent streams.....	4,661,962	309,155	4,352,807	.....
Deep Creek.....	6,829	6,100	729	12.0
Donner and Blitzen River.....	131,750	35,400	96,350	272.2
Silver Creek.....	26,016	21,845	4,171	19.1
Sivies River.....	1,005,862	74,210	931,652	.....
Thomas Creek.....	6,806	5,380	1,426	21.4
Other independent streams.....	3,484,999	166,140	3,318,859	.....

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 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.

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.....	\$28,929,151	100.0	801,891	\$1.19
Individual and partnership.....	6,584,382	22.8	493,527	0.95
Cooperative.....	3,143,908	10.8	157,111	1.09
Irrigation district.....	6,313,753	21.8	72,535	1.56
Carey Act.....	3,231,298	11.2	30,685	2.26
Commercial.....	3,231,034	11.3	18,638	2.47
U. S. Reclamation Service.....	5,956,950	20.6	54,981	1.85
U. S. Indian Service.....	230,038	0.8	4,000	1.00
State.....	16,107	0.1	.....	.....
City.....	171,068	0.6	330	18.39
Other.....	823	(*)	104	0.44

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.

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.....	176
Acreage included in enterprises reporting land drained or needing drainage.....	347,750
Acreage for which drains have been installed.....	93,799
Additional acreage needing drainage.....	40,115
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage.....	27.0
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state.....	4.9
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.....	7.3

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. Those representing estimates are reported separately in Table 14.

TABLE 14.—QUANTITY OF WATER USED IN 1919.

ITEM.	Total.	Measured.	Not measured.
Average volume of water entering canals, second-foot.....	8,311	2,926	5,385
Area irrigated in 1919..... acres.....	446,014	180,022	265,992
Average number of acres per second-foot.....	54	62	49
Total quantity of water entering canals, acre-foot.....	2,237,727	1,016,713	1,221,014
Area irrigated in 1919..... acres.....	498,843	212,100	286,743
Average quantity per acre..... acre-foot.....	4.5	4.8	4.3
Total quantity of water delivered..... acre-foot.....	458,880	159,035	299,845
Area irrigated in 1919..... acres.....	206,443	109,320	97,122
Average quantity per acre..... acre-foot.....	2.2	1.5	3.1

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

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.....	3,285	809	5,252	28,897	7,115	2,784	1,956	266	1,905,037
Before 1800.....	50	1	76	154	108	12	10	2	7
1800-1809.....	138	6	293	925	407	111	62	7	92
1870-1879.....	332	12	682	3,838	755	302	193	8	18,774
1880-1889.....	839	79	1,155	4,083	1,423	450	238	32	2,370
1890-1899.....	596	43	764	3,522	538	307	307	39	40,154
1900-1904.....	320	26	520	7,752	805	263	179	24	184,379
1905-1909.....	240	35	396	5,530	741	387	558	49	1,305,779
1910-1914.....	209	43	480	3,207	742	248	216	41	53,639
1915-1919.....	195	33	393	2,648	635	204	195	48	296,440
Not reported.....	336	31	527	611	504	269	33	16	315

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.....	159.6	65	11,968	208	47,026	573	13,769	614	600,045
Before 1860.....	2.3					1	8	1	700
1860-1869.....	4.5					3	55	3	60
1870-1879.....	13.6			1	110	6	40	6	1,050
1880-1889.....	6.7	14	137	1	800	6	564	7	47,300
1890-1899.....	29.3	17	10,055	3	557	14	181	14	8,625
1900-1904.....	30.5	4	572	14	2,095	27	419	29	18,520
1905-1909.....	20.6	15	405	38	9,280	82	1,051	83	44,957
1910-1914.....	23.5	8	225	75	19,029	173	7,250	193	251,798
1915-1919.....	20.1	5	574	54	8,060	198	3,563	201	182,794
Not reported.....	3.5	2		22	7,095	63	638	74	44,331

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.....	3,285	309	5,252	28,897	7,115	2,784	1,956	266	1,905,037
Individual and partnership.....	3,095	266	4,957	13,531	5,380	1,880	748	231	317,278
Cooperative.....	145	24	213	6,246	924	600	385	16	228,471
Irrigation district.....	16	9	39	2,105	347	70	246	9	719,700
Carey Act.....	5	2	9	2,465	130	14	64	.....	.....
Commercial.....	12	6	15	1,279	189	25	183	7	122,850
U. S. Reclamation Service.....	5	2	9	2,884	117	170	305	3	516,743
U. S. Indian Service.....	1	.....	3	160	19	12	24	.....	.....
State.....	.....	.....	1	.....	.....	.....	.....	.....	.....
City.....	3	.....	4	18	7	.....	.....	.....	.....
Other.....	3	.....	2	1	2	3	1	.....	.....

[illegible]

IRRIGATION—OREGON.

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.....	3,285	309	5,252	28,897	7,115	2,784	1,956	266	1,905,037
Columbia River and tributaries.....	2,458	168	3,901	19,161	5,300	1,866	1,256	163	796,738
Columbia River direct.....			4	2	1			3	1
Snake River and tributaries.....	1,182	103	2,150	10,917	3,121	772	489	109	634,859
Snake River direct.....			40	330	105	9	7	1	4,743
Owyhee River.....	96	18	125	1,555	236	8	11	15	18,195
Malheur River.....	250	34	350	2,022	640	92	84	31	368,446
Burnt River.....	213	8	318	781	400	20	14	14	12,331
Powder River.....	291	19	651	3,784	1,133	287	202	37	13,484
Pine Creek.....	51	4	83	176	107	7	18	3	10,350
Imnaha River.....	34	1	86	102	73	16	13	1	200
Grande Ronde River.....	203	19	475	1,843	483	329	138	6	205,230
Other tributaries of Snake River.....	18		22	314	44	4	2	1	880
Walla Walla River.....	101	7	170	404	140	331	66	4	15,000
Umatilla River.....	139	10	229	2,007	318	201	143	4	54,700
Willow Creek.....	71	7	94	110	94	18	11		
John Day River.....	504	8	670	1,052	655	161	52	10	39,236
Deschutes River.....	361	25	390	4,023	768	226	333	8	52,927
Hood River.....	34	5	72	435	88	86	132	5	13
Willamette River.....	15		40	148	53	15	5	2	
Other tributaries of Columbia River.....	71	3	82	63	62	66	25	8	
Rogue River and tributaries.....	257	18	645	1,978	837	169	117	47	35,882
Rogue River direct.....	8		26	149	38	2	3	9	1
Little Butte Creek.....	13	2	58	161	108	86	50	3	5,350
Bear Creek.....	29	6	99	512	159	18	37	10	30,507
Evans Creek.....	22		34	66	41	11	3		
Applegate River.....	55	4	164	434	241	17	8	15	16
Illinois River.....	87	3	135	400	127	19	10	4	1
Other tributaries of Rogue River.....	43	3	129	256	123	16	6	6	7
Klamath River and tributaries.....	57	18	121	3,162	231	259	324	20	927,311
Klamath River direct.....	4		22	62	43	3			
Lost River.....	8	13	39	1,889	71	113	232	14	925,923
Sprague River.....	9	5	15	212	84	6	8	6	1,388
Other tributaries of Klamath River.....	36		45	999	83	137	84		
Other Pacific Ocean streams.....	78	8	107	238	92	39	20	5	10,005
Independent streams.....	435	97	478	4,358	655	451	239	41	135,108
Deep Creek.....	1		10	18	11				
Donner and Blitzen River.....	44	6	30	239	74	122	84	6	57,630
Silver Creek.....	24	1	24	398	39	31	2		
Silvies River.....	206	72	187	876	220	115	54	17	360
Thomas Creek.....			10	10	28			1	
Other independent streams.....	160	18	217	2,817	283	183	99	17	77,168

IRRIGATION—OREGON.

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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.....	159.6	65	11,968	208	47,026	573	13,769	614	600,045	28
Columbia River and tributaries.....	132.2	19	1,182	178	32,077	416	11,470	442	491,607	28
Columbia River direct.....	2.5			9	178	11	42	12	2,418	45
Snake River and tributaries.....	29.2	12	1,102	39	9,818	178	9,289	190	377,160	24
Snake River direct.....	14.4			46	5,504	60	1,312	60	185,022	31
Owyhee River.....	2.4	4	787	2	240	60	521	10	80,153	28
Malheur River.....	2.0			2	60	10	521	10	30,010	17
Burnt River.....	1.0			3		3	24	3	965	17
Powder River.....	7.9	8	315	13	4,780	14	1,601	14	69,132	33
Imnaha River.....	0.1			4		4	23	4	500	40
Grande Ronde River.....	1.1			20	4,203	35	189	35	10,743	12
Other tributaries of Snake River.....	0.3			2	535	4	25	4	636	12
Walla Walla River.....	23.6	1		88	19,325	90	467	93	19,426	25
Umatilla River.....	14.3	2		6	171	13	115	13	4,246	34
Willow Creek.....	0.3			1		1	2	1	200	12
John Day River.....	5.7			6	475	45	413	47	41,280	25
Deschutes River.....	8.5			3	388	22	764	26	36,564	38
Hood River.....	38.6	3	10	1	17	5	36	5	755	70
Willamette River.....	8.2			15	1,369	30	220	32	7,813	24
Other tributaries of Columbia River.....	6.3	1	70	11	338	23	122	23	1,746	52
Rogue River and tributaries.....	20.5	3	10,000	23	11,499	102	723	111	38,147	26
Rogue River direct.....	7.1			11	6,964	44	347	44	16,697	30
Little Butte Creek.....	0.8			1		1	9	1		23
Bear Creek.....	6.3			9	1,133	28	120	26	8,138	23
Evans Creek.....	0.5					5	77	5	1,175	29
Applegate River.....	2.1					8	93	8	3,200	26
Illinois River.....	1.0			2	402	7	32	8	3,067	11
Other tributaries of Rogue River.....	2.7	3	10,000	1	3,000	9	45	9	5,970	25
Klamath River and tributaries.....	3.0	1	35	2	1,600	31	1,301	36	62,475	31
Klamath River direct.....	1.7					14	453	15	30,775	31
Lost River.....	0.6			2	1,600	14	786	16	21,100	22
Other tributaries of Klamath River.....	0.7	1	35			3	62	5	10,600	30
Other Pacific Ocean streams.....	3.2	1				10	66	10	3,705	49
Independent streams.....	0.7	41	751	5	1,850	14	209	15	4,111	26
Deep Creek.....		1				1	6	2	1,000	10
Donner and Blitzen River.....		1	10			1		1		16
Silver Creek.....		1	2	2	450	3	6	3	550	15
Silvies River.....				2	1,200	2	26	2	1,265	22
Other independent streams.....	0.7	38	739	1	200	7	171	7	1,296	61

IRRIGATION—OREGON.

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.....	1,764	5.5	696	4.0	157.1	Bu....	62,167	7.3	17,921	4.0	246.9
2 Oats.....	7,880	2.8	20,415	6.0	-60.9	Bu....	235,637	2.8	896,427	8.2	-73.7
3 Winter wheat.....	4,511	0.6	21,050	2.8	24.9	Bu....	78,949	0.5	569,942	4.6	-18.2
4 Spring wheat.....	21,799	8.3	18,395	16.9	-58.7	Bu....	381,487	11.3	585,074	23.8	-61.7
5 Barley.....	7,602	11.4	1,458	11.3	32.3	Bu....	216,498	15.1	17,062	12.0	4.6
6 Rye.....	1,929	4.5					18,470	5.9			
Hay and forage:											
7 Timothy alone.....	5,340	17.4	18,297	40.6	-67.2	Tons...	7,068	15.5	31,871	47.4	-77.8
8 Timothy and clover mixed.....	23,377	28.6	17,592	26.4	32.9	Tons...	33,484	24.7	31,009	24.0	8.0
9 Clover alone.....	5,275	9.9	1,549	3.3	240.5	Tons...	9,795	9.5	3,337	4.0	193.5
10 Alfalfa.....	102,409	48.6	100,623	83.6	1.8	Tons...	309,206	52.2	331,515	88.3	-6.7
11 Other tame grasses.....	7,094	8.6	8,442	5.5	106.1	Tons...	9,750	6.8	6,329	5.9	54.2
12 Small grains cut for hay.....	23,622	4.9	14,172	3.8	73.2	Tons...	28,695	4.6	21,530	4.2	29.7
13 Annual legumes cut for hay.....	1,523	6.2					1,219	3.1			
14 Wild, salt, or prairie grasses.....	51,453	22.7	138,143	63.3	-62.8	Tons...	49,792	18.6	157,100	63.1	-68.3
15 Silage crops.....	1,432	4.3	(²)			Tons...	6,578	3.6	(²)		
Vegetables:											
16 Potatoes.....	1,880	4.7	3,402	7.7	-44.7	Bu....	181,985	5.1	413,167	8.6	-56.0
Fruits:											
17 Grapes.....	* 8,525	2.4	(²)			Lbs....	110,395	3.9	(²)		
18 Apples.....	* 177,789	5.4	(²)			Bu....	402,912	5.8	(²)		
19 Peaches.....	* 25,953	6.3	(²)			Bu....	50,092	10.0	(²)		
20 Pears.....	* 115,520	15.9	(²)			Bu....	141,258	18.6	(²)		
21 Plums and prunes.....	* 21,664	0.7	(²)			Bu....	36,930	1.7	(²)		
22 Cherries.....	* 6,656	1.7	(²)			Bu....	7,803	2.6	(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....	26.5	26.0	35.2	132.8	135.4	\$102,576	7.3	\$15,187	4.9	575.4
2 Oats.....	Bu....	29.4	29.4	29.5	100.3	100.3	223,855	2.8	485,570	9.6	-53.9
3 Winter wheat.....	Bu....	19.7	19.7	17.4	88.3	89.3	185,949	0.5	507,089	4.7	94.0
4 Spring wheat.....	Bu....	13.0	12.6	17.8	136.9	141.3	817,698	11.3	380,643	25.2	-11.8
5 Barley.....	Bu....	21.5	20.6	28.5	132.6	138.3	385,664	15.1	14,463	10.9	168.2
6 Rye.....	Bu....	7.4	7.3	9.6	129.7	131.5	38,787	5.9			
Hay and forage:											
7 Timothy alone.....	Tons...	1.48	1.52	1.32	89.2	96.8	176,650	15.5	285,065	39.4	-38.0
8 Timothy and clover mixed.....	Tons...	1.66	1.75	1.43	86.1	81.7	770,132	24.7	286,819	19.8	168.5
9 Clover alone.....	Tons...	1.94	1.95	1.86	95.9	95.4	200,797	9.5	41,106	4.4	388.6
10 Alfalfa.....	Tons...	2.81	2.62	3.02	107.5	115.3	6,493,326	52.2	2,756,375	84.2	135.5
11 Other tame grasses.....	Tons...	1.74	1.77	1.38	79.3	78.0	175,632	6.8	61,342	5.7	186.4
12 Small grains cut for hay.....	Tons...	1.24	1.25	1.16	93.5	92.8	660,595	4.6	228,339	4.0	156.2
13 Annual legumes for hay.....	Tons...	1.61	1.66	0.80	49.7	48.2	24,380	8.1			
14 Wild, salt, or prairie grasses.....	Tons...	1.18	1.24	0.97	82.2	78.2	796,672	18.6	1,056,442	62.7	-24.6
15 Silage crops.....	Tons...	5.43	5.47	4.59	84.5	83.9	65,780	3.6	(²)		
Vegetables:											
16 Potatoes.....	Bu....	88.4	87.9	96.8	109.5	110.1	382,171	5.1	243,019	11.6	57.3
Fruits:											
17 Grapes.....	Lbs....	* 7.9	* 7.7	* 12.9	163.3	167.5	6,624	3.9	(²)		
18 Apples.....	Bu....	* 2.1	* 2.1	* 2.3	109.5	109.5	543,931	5.8	(²)		
19 Peaches.....	Bu....	* 1.2	* 1.2	* 2.0	166.7	166.7	78,573	10.0	(²)		
20 Pears.....	Bu....	* 1.0	* 1.0	* 1.2	120.0	120.0	226,013	18.6	(²)		
21 Plums and prunes.....	Bu....	* 0.7	* 0.7	* 1.7	242.9	242.9	81,246	1.7	(²)		
22 Cherries.....	Bu....	* 0.8	* 0.8	* 1.2	150.0	150.0	27,310	2.6	(²)		

¹ A minus sign (-) denotes decrease.
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.

IRRIGATION—OREGON.

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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.	Baker. ¹	Crook. ²	Deschutes. ²	Douglas.	Gilliam.	Grant.
1 Number of all farms in 1920.....	50,206	1,509	561	761	2,275	454	728
2 Number of farms irrigated in 1919.....	9,154	1,102	301	550	78	53	364
3 Per cent of all farms.....	18.2	73.0	53.7	73.2	3.4	11.7	50.0
4 Number of farms irrigated in 1909.....	6,609	1,051	546	.....	132	51	341
5 Per cent of increase, 1909-1919.....	37.3	4.9	.....	.....	-40.9	.....	6.7
LAND AND FARM AREA.							
6 Approximate land area.....acres..	61,188,480	1,975,040	1,877,760	1,961,600	3,194,240	768,640	2,892,800
7 All land in farms.....acres..	13,542,318	493,145	554,960	144,979	566,305	486,941	760,160
8 Improved land in farms.....acres..	4,913,851	163,317	93,957	51,744	136,553	259,002	74,729
9 Area irrigated in 1919.....acres..	986,162	171,490	42,708	57,293	1,901	3,298	32,409
10 Per cent of improved land in farms.....	20.1	105.0	45.5	110.7	1.4	1.3	43.4
11 Area irrigated in 1909.....acres..	689,129	129,673	55,900	.....	1,708	2,087	36,049
12 Per cent of increase, 1909-1919.....	43.7	32.2	.....	.....	11.3	58.0	-10.1
13 Area enterprises were capable of irrigating in 1920.....acres..	1,344,046	218,671	52,757	106,246	3,328	3,810	38,728
14 Area enterprises were capable of irrigating in 1910.....acres..	830,526	136,014	111,360	.....	4,500	2,367	38,631
15 Per cent of increase, 1910-1920.....	61.8	60.8	.....	.....	-26.0	61.0	0.3
16 Area included in enterprises in 1920.....acres..	1,925,987	259,361	62,449	176,387	8,370	4,621	42,079
17 Area included in enterprises in 1910.....acres..	2,527,208	241,919	463,811	.....	9,249	3,370	78,578
18 Per cent of increase, 1910-1920.....	-23.8	7.2	.....	.....	-10.5	37.1	-42.8
19 Area of irrigated land reported as available for settlement.....acres..	98,609	2,002	1,278	23,675	.....	.....	.....
IRRIGATION WORKS.							
Independent enterprises:							
20 Number, 1920.....	4,710	825	158	38	93	52	289
21 Number, 1910.....	3,745	566	202	.....	107	43	310
Main ditches:							
22 Number, 1920.....	5,252	959	212	35	98	51	512
23 Number, 1910.....	3,582	606	217	.....	88	47	396
24 Length, 1920.....miles..	7,115	1,461	313	255	87	60	516
25 Length, 1910.....miles..	5,539	1,175	504	.....	79	54	513
26 Capacity, 1920.....second-feet..	28,897	3,925	734	2,898	234	64	801
27 Capacity, 1910.....second-feet..	39,686	7,431	2,907	.....	320	202	1,771
Laterals:							
28 Number, 1920.....	2,784	302	97	93	38	19	90
29 Number, 1910.....	2,518	313	222	.....	31	96	140
30 Length, 1920.....miles..	1,956	201	111	142	20	5	41
31 Length, 1910.....miles..	2,052	309	340	.....	8	33	37
Reservoirs:							
32 Number, 1920.....	266	53	3	4	4	1	8
33 Number, 1910.....	271	75	11	.....	4	4	5
34 Capacity, 1920.....acre-feet..	1,905,037	36,145	47,101	5,123	10,005	.....	36,896
35 Capacity, 1910.....acre-feet..	1,024,266	100,938	11,856	.....	5	2	8
Flowing wells:							
36 Number, 1920.....	65	8	.....	.....	1	.....	.....
37 Number, 1910.....	51	3	.....	.....	.....	.....	.....
38 Capacity, 1920.....gallons per minute..	11,968	315	.....	.....	.....	.....	.....
39 Capacity, 1910.....gallons per minute..	3,035	19	.....	.....	.....	.....	.....
Pumped wells:							
40 Number, 1920.....	208	13	2	.....	.....	1	1
41 Number, 1910.....	92	4	.....	.....	.....	4	.....
42 Capacity, 1920.....gallons per minute..	47,026	4,780	371	.....	.....	20	30
43 Capacity, 1910.....gallons per minute..	20,883	1,003	.....	.....	.....	66	35
Pumping plants:							
44 Number, 1920.....	573	19	11	1	9	8	2
45 Number, 1910.....	229	8	5	.....	3	10	1
46 Engine capacity, 1920.....horsepower..	13,769	1,668	450	200	56	41	12
47 Engine capacity, 1910.....horsepower..	3,095	159	512	.....	13	48	1
48 Pump capacity, 1920.....gallons per minute..	600,045	71,297	23,121	7,500	3,225	1,710	22,530
49 Pump capacity, 1910.....gallons per minute..	118,514	5,964	6,548	.....	583	2,621	35
50 Average lift, 1920.....feet..	28	31	32	120	54	21	28
CAPITAL INVESTED.							
51 Capital invested to Jan. 1, 1920.....dollars..	28,929,151	2,153,639	1,789,917	2,758,084	188,894	110,909	261,332
52 Capital invested to July 1, 1910.....dollars..	12,760,214	1,446,334	1,061,817	.....	78,127	32,809	241,086
53 Per cent of increase, 1910-1920.....	126.7	48.9	.....	.....	141.8	238.0	8.4
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	21.52	9.85	33.93	25.96	56.76	29.11	6.75
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	15.36	10.63	17.62	.....	17.36	13.86	6.24
ESTIMATED FINAL COST.							
56 Estimated final cost of existing enterprises in 1920.....dollars..	41,585,742	2,941,589	2,115,043	4,747,115	294,994	111,409	266,507
57 Estimated final cost of existing enterprises in 1910.....dollars..	39,216,619	5,272,463	4,842,082	.....	78,127	32,809	250,986
58 Per cent of increase, 1910-1920.....	6.0	-44.2	.....	.....	277.6	239.6	6.2
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	21.59	11.34	33.87	25.91	35.24	24.11	6.33
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	15.52	21.79	10.67	.....	8.36	9.74	3.41

¹ Part of Union County annexed in 1902.

² Parts of Crook County were taken to form Jefferson County in 1915 and Deschutes County 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.]

		Harney.	Hood River. ¹	Jackson.	Jefferson. ²	Josephine.	Klamath.	Lake.
1	Number of all farms in 1920.....	589	878	1,720	572	727	902	549
2	Number of farms irrigated in 1919.....	295	811	754	53	419	508	256
3	Per cent of all farms.....	50.1	92.4	43.8	9.3	57.6	51.2	46.6
4	Number of farms irrigated in 1909.....	256	464	420	.....	401	266	198
5	Per cent of increase, 1909-1919.....	15.2	74.8	77.0	.....	4.5	91.0	29.3
LAND AND FARM AREA.								
6	Approximate land area.....acres..	6,357,120	345,600	1,788,100	1,138,560	1,047,680	3,839,360	5,068,800
7	All land in farms.....acres..	524,678	38,075	312,936	440,926	97,299	357,333	525,218
8	Improved land in farms.....acres..	176,934	19,064	92,810	132,812	29,637	152,742	183,396
9	Area irrigated in 1919.....acres..	119,429	19,765	24,002	3,320	14,903	90,993	99,220
10	Per cent of improved land in farms.....	67.5	100.5	26.0	2.5	50.5	59.8	54.1
11	Area irrigated in 1909.....acres..	129,135	8,071	12,239	.....	12,866	46,975	57,078
12	Per cent of increase, 1909-1919.....	-7.5	144.9	96.1	.....	15.8	93.7	73.8
13	Area enterprises were capable of irrigating in 1920.....acres..	157,588	21,101	34,931	3,943	18,294	135,449	149,467
14	Area enterprises were capable of irrigating in 1910.....acres..	130,621	14,150	17,978	.....	14,503	62,785	59,612
15	Per cent of increase, 1910-1920.....	15.3	49.1	94.3	.....	26.1	115.7	150.7
16	Area included in enterprises in 1920.....acres..	224,301	39,660	107,195	0,171	25,127	239,478	183,997
17	Area included in enterprises in 1910.....acres..	561,548	48,964	82,427	.....	24,059	208,105	273,546
18	Per cent of increase, 1910-1920.....	-60.1	-19.0	30.0	.....	4.4	15.1	-32.7
19	Area of irrigated land reported as available for settlement.....acres..	2,000	15,060	2,200	.....	394	2,000	.....
IRRIGATION WORKS.								
Independent enterprises:								
20	Number, 1920.....	328	77	345	51	309	90	149
21	Number, 1910.....	228	75	276	.....	269	52	171
Main ditches:								
22	Number, 1920.....	299	72	363	62	292	115	153
23	Number, 1910.....	143	61	245	.....	221	42	133
24	Length, 1920.....miles..	413	88	537	82	311	237	267
25	Length, 1910.....miles..	306	86	305	.....	220	162	247
26	Capacity, 1920.....second-feet..	1,752	435	1,048	117	952	3,135	2,767
27	Capacity, 1910.....second-feet..	1,826	369	1,748	.....	931	2,964	2,212
Laterals:								
28	Number, 1920.....	278	86	124	10	49	255	181
29	Number, 1910.....	327	50	53	.....	35	69	99
30	Length, 1920.....miles..	163	132	100	3	20	321	98
31	Length, 1910.....miles..	161	68	57	.....	17	160	54
Reservoirs:								
32	Number, 1920.....	32	5	23	1	24	14	17
33	Number, 1910.....	28	13	25	.....	19	8	17
34	Capacity, 1920.....acre-feet..	133,765	13	35,871	700	11	926,361	77,513
35	Capacity, 1910.....acre-feet..	363,140	5	45,907	.....	7	181,274	64,901
Flowing wells:								
36	Number, 1920.....	22	3	.....	.....	3	1	9
37	Number, 1910.....	25	.....	2	.....	1	20	.....
38	Capacity, 1920.....gallons per minute..	179	10	.....	.....	10,000	35	572
39	Capacity, 1910.....gallons per minute..	54	.....	225	.....	17	2,720	.....
Pumped wells:								
40	Number, 1920.....	5	1	12	1	11	2	1
41	Number, 1910.....	1	1	14	.....	11	.....	.....
42	Capacity, 1920.....gallons per minute..	1,650	17	10,133	15	1,366	1,600	200
43	Capacity, 1910.....gallons per minute..	400	100	5,533	.....	2,200	.....	.....
Pumping plants:								
44	Number, 1920.....	9	5	51	0	51	31	6
45	Number, 1910.....	2	2	21	.....	32	2	.....
46	Engine capacity, 1920.....horsepower..	38	36	345	9	378	1,303	171
47	Engine capacity, 1910.....horsepower..	10	10	165	.....	168	224	.....
48	Pump capacity, 1920.....gallons per minute..	1,815	755	18,410	240	19,737	62,475	2,296
49	Pump capacity, 1910.....gallons per minute..	496	231	19,080	.....	9,881	9,720	.....
50	Average lift, 1920.....feet..	18	70	28	10	24	26	44
CAPITAL INVESTED.								
51	Capital invested to Jan. 1, 1920.....dollars..	1,280,776	807,142	1,462,938	84,300	265,575	3,802,551	3,504,761
52	Capital invested to July 1, 1910.....dollars..	410,980	361,714	457,936	.....	239,327	1,010,580	769,906
53	Per cent of increase, 1910-1920.....	211.6	123.1	219.5	.....	11.0	99.0	355.2
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	8.13	38.25	41.88	21.38	14.52	28.07	23.45
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	3.01	25.56	25.47	.....	16.50	30.43	12.92
ESTIMATED FINAL COST.								
56	Estimated final cost of existing enterprises in 1920.....dollars..	2,036,296	1,174,817	4,807,783	85,943	285,645	5,568,847	3,896,381
57	Estimated final cost of existing enterprises in 1910.....dollars..	2,501,980	392,214	1,770,936	.....	239,327	5,110,580	7,333,681
58	Per cent of increase, 1910-1920.....	-18.6	199.6	171.5	.....	19.4	8.9	-46.9
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	9.08	29.62	44.85	13.93	11.37	23.25	21.18
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	4.46	8.61	21.43	.....	9.95	24.56	26.83

¹ Organized from part of Wasco County in 1908.² Organized from part of Crook County in 1915.

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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.]

	Malheur.	Morrow.	Umatilla.	Union. ¹	Wallowa.	Wasco. ²	Wheeler.	All other counties.
1 Number of all farms in 1920.....	1,322	692	2,353	1,279	1,149	1,339	359	29,408
2 Number of farms irrigated in 1919.....	946	191	1,149	469	427	267	137	24
3 Per cent of all farms.....	71.6	27.6	48.8	36.7	37.2	19.9	38.2	0.1
4 Number of farms irrigated in 1909.....	622	143	885	432	293	88	184	90
5 Per cent of increase, 1909-1919.....	52.1	33.6	67.7	8.6	45.7	—	—26.5	—
LAND AND FARM AREA.								
6 Approximate land area.....acres..	6,325,120	1,296,000	2,049,920	1,284,480	2,028,160	1,499,520	1,090,560	13,359,860
7 All land in farms.....acres..	465,851	781,613	1,075,400	441,735	524,029	728,226	485,178	3,746,331
8 Improved land in farms.....acres..	129,365	290,200	621,660	178,021	141,404	219,553	40,104	1,732,757
9 Area irrigated in 1919.....acres..	109,463	10,031	56,050	53,183	52,445	9,382	7,475	7,402
10 Per cent of improved land in farms.....	84.6	3.5	9.0	29.9	37.1	4.4	18.6	0.4
11 Area irrigated in 1909.....acres..	67,626	7,541	31,022	35,831	39,370	5,703	6,253	982
12 Per cent of increase, 1909-1919.....	61.9	33.0	80.7	48.4	33.2	64.5	19.5	653.8
13 Area enterprises were capable of irrigating in 1920.....acres..	143,266	15,561	91,543	61,444	56,601	13,611	8,692	9,015
14 Area enterprises were capable of irrigating in 1910.....acres..	70,210	8,116	50,213	37,260	42,855	5,989	6,983	1,379
15 Per cent of increase, 1910-1920.....	80.9	91.7	82.3	64.9	32.1	127.3	24.5	553.7
16 Area included in enterprises in 1920.....acres..	219,475	19,941	104,015	69,414	64,513	48,742	11,005	9,686
17 Area included in enterprises in 1910.....acres..	208,026	14,937	94,169	45,517	54,692	17,276	9,414	102,502
18 Per cent of increase, 1910-1920.....	5.5	33.5	10.5	52.5	18.0	182.1	16.9	—90.6
19 Area of irrigated land reported as available for settlement.....acres..	10,000	—	6,000	—	—	34,000	—	—
IRRIGATION WORKS.								
Independent enterprises:								
20 Number, 1920.....	354	109	497	311	230	148	156	101
21 Number, 1910.....	330	121	251	225	160	79	164	85
Main ditches:								
22 Number, 1920.....	496	110	375	362	295	144	185	62
23 Number, 1910.....	311	148	278	164	144	83	206	51
24 Length, 1920.....miles..	820	124	416	404	337	160	179	48
25 Length, 1910.....miles..	645	123	350	235	249	82	164	40
26 Capacity, 1920.....second-feet..	4,013	551	1,932	1,381	1,398	328	271	161
27 Capacity, 1910.....second-feet..	4,168	542	2,267	7,062	1,613	199	490	164
Laterals:								
28 Number, 1920.....	80	50	507	197	160	90	45	26
29 Number, 1910.....	271	94	263	159	62	108	64	64
30 Length, 1920.....miles..	82	45	175	97	87	99	16	8
31 Length, 1910.....miles..	350	27	254	87	56	28	16	2
Reservoirs:								
32 Number, 1920.....	43	—	8	1	7	10	1	7
33 Number, 1910.....	42	2	10	1	1	2	1	3
34 Capacity, 1920.....acre-feet..	317,979	—	69,700	20	205,430	1	2,400	3
35 Capacity, 1910.....acre-feet..	188,443	1	54,154	1	12,500	1	1,120	3
Flowing wells:								
36 Number, 1920.....	4	—	3	—	—	1	—	—
37 Number, 1910.....	—	—	—	—	—	—	—	—
38 Capacity, 1920.....gallons per minute..	787	—	—	—	—	70	—	—
39 Capacity, 1910.....gallons per minute..	—	—	—	—	—	—	—	—
Pumped wells:								
40 Number, 1920.....	5	—	94	20	—	20	—	19
41 Number, 1910.....	—	3	29	12	—	5	—	7
42 Capacity, 1920.....gallons per minute..	835	—	19,496	4,203	—	516	—	1,794
43 Capacity, 1910.....gallons per minute..	—	230	7,892	2,045	—	459	—	930
Pumping plants:								
44 Number, 1920.....	117	2	103	34	5	41	21	41
45 Number, 1910.....	29	4	39	22	2	15	6	28
46 Engine capacity, 1920.....horsepower..	7,409	22	552	186	26	273	266	318
47 Engine capacity, 1910.....horsepower..	410	24	259	96	56	189	69	707
48 Pump capacity, 1920.....gallons per minute..	294,620	1,700	23,671	10,578	685	8,974	14,195	10,531
49 Pump capacity, 1910.....gallons per minute..	26,513	1,125	10,840	4,136	850	3,856	4,940	12,089
50 Average lift, 1920.....feet..	27	18	26	12	32	49	21	26
CAPITAL INVESTED.								
51 Capital invested to Jan. 1, 1920.....dollars..	4,057,373	1,393,045	3,309,599	260,912	497,791	486,627	159,590	293,396
52 Capital invested to July 1, 1910.....dollars..	2,032,636	187,716	2,019,161	136,204	198,064	96,167	76,305	103,345
53 Per cent of increase, 1910-1920.....	99.6	642.1	63.9	91.6	151.3	406.0	109.1	183.9
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	28.32	89.52	30.15	4.25	8.79	35.75	18.36	32.55
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	25.66	23.13	40.21	3.66	4.62	16.06	10.93	74.94
ESTIMATED FINAL COST.								
56 Estimated final cost of existing enterprises in 1920.....dollars..	4,835,543	1,628,878	4,428,916	262,522	618,521	998,752	167,495	314,746
57 Estimated final cost of existing enterprises in 1910.....dollars..	5,057,171	187,716	2,593,387	136,204	211,114	96,167	76,305	3,028,370
58 Per cent of increase, 1910-1920.....	—4.4	767.7	70.8	92.7	193.0	938.6	119.5	—89.6
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	22.03	81.68	42.58	3.78	9.59	20.49	15.22	32.49
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	24.31	12.57	27.54	2.99	3.86	5.57	8.11	25.94

¹ Part annexed to Baker County in 1902.

² Part taken to form Hood River County in 1908.

SOUTH DAKOTA.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of South 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.

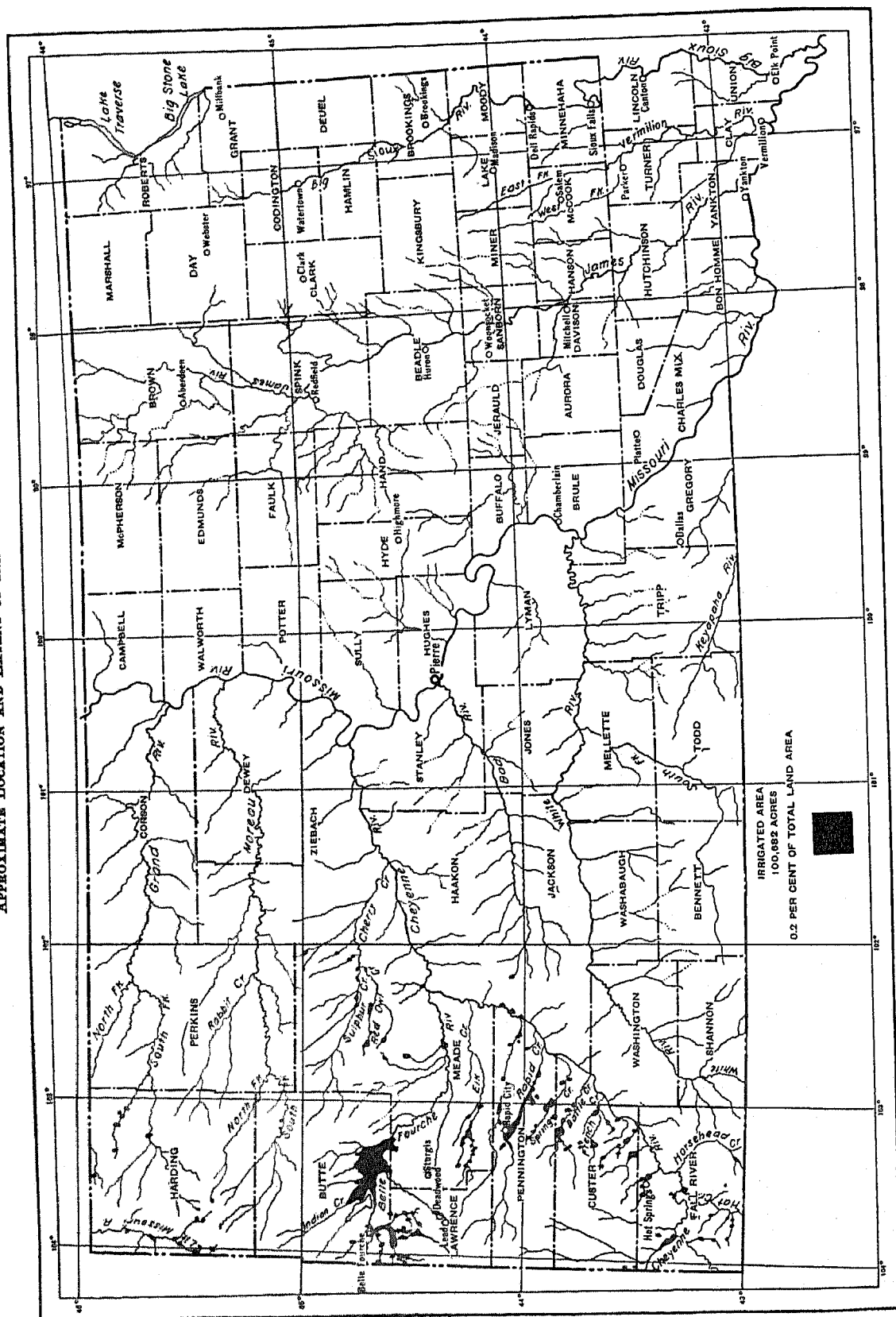
TABLE 1.—SUMMARY FOR THE STATE: 1920 AND 1910.

ITEM.	CENSUS OF—		INCREASE. ¹	
	1920	1910	Amount.	Per cent.
Number of all farms.....	74,637	77,644	-3,007	-3.9
Approximate land area of the state.....acres..	49,195,520	49,195,520		
All land in farms.....acres..	34,636,491	26,016,892	8,619,599	33.1
Improved land in farms.....acres..	18,199,250	15,827,208	2,372,042	15.0
Number of farms irrigated.....	1,198	500	698	139.6
Area irrigated.....acres..	100,682	63,248	37,434	59.2
Area enterprises were capable of irrigating.....acres..	150,914	128,481	22,433	17.5
Area included in enterprises.....acres..	188,382	201,625	-13,243	-6.6
Per cent irrigated:				
Number of all farms.....	1.6	0.6	1.0	
Approximate land area of the state.....	0.2	0.1	0.1	
Land in farms.....	0.3	0.2	0.1	
Improved land in farms.....	0.6	0.4	0.2	
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	50,232	65,233	-15,001	-23.0
Excess of area included in enterprises over area irrigated.....acres..	87,700	138,377	-50,677	-36.6
Capital invested.....	\$5,465,248	\$3,043,140	\$2,422,108	79.6
Average per acre enterprises were capable of irrigating.....	\$36.21	\$23.69	\$12.52	52.8
Estimated final cost of existing enterprises.....	\$5,500,748	\$3,800,556	\$1,700,192	44.7
Average per acre included in enterprises.....	\$29.20	\$18.85	\$10.35	54.9
Average cost of operation and maintenance per acre.....	\$1.26	\$0.64	\$0.62	96.9
IRRIGATION WORKS.				
Number of enterprises.....	292	395	-103	-26.1
Number of main ditches.....	370	348	22	6.3
Length of main ditches.....miles..	653	631	22	3.5
Capacity of main ditches.....second-feet..	5,427	3,598	1,829	50.8
Number of lateral ditches.....	632	332	300	90.4
Length of lateral ditches.....miles..	605	625	-20	-3.2
Number of reservoirs.....	119	314	-195	-62.1
Capacity of reservoirs.....acre-feet..	212,264	216,205	-3,941	-1.8
Number of flowing wells.....	4	42	-38	
Capacity of flowing wells.....gallons per minute..	2,750	14,382	-11,632	-80.9
Number of pumped wells.....	1	4	-3	
Capacity of pumped wells.....gallons per minute..	800	24	776	
Number of pumping plants.....	25	8	17	
Engine capacity.....horsepower..	498	63	435	
Pump capacity.....gallons per minute..	23,320	5,289	18,031	340.9
Average lift.....feet..	21	(²)	21	

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

² Not reported in 1910.

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND



in Table 4 as irrigated from artesian wells indicates that these laws have not been effective, at least so far as irrigation is concerned.

An irrigation district law was enacted in 1917, but no irrigation districts were reported in 1920.

South Dakota accepted the conditions of the Federal Carey Act (act of Aug. 18, 1894) in 1909, but no Carey Act enterprises were reported in 1920.

The United States Reclamation Service has one project in the state.

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.....	100,682	63,248	37,434	59.2
Individual and partnership.....	31,664	37,684	-6,020	-16.0
Cooperative.....	10,080	13,601	-3,521	-25.9
Commercial.....	2,280	6,300	-4,020	-63.8
U. S. Reclamation Service.....	56,638	5,613	51,025	909.1
U. S. Indian Service.....	20	50	-30	-60.0
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total.....	150,914	128,481	22,433	17.5
Individual and partnership.....	56,032	55,820	212	0.4
Cooperative.....	10,615	18,243	-7,628	-41.8
Commercial.....	1,600	6,800	-5,200	-76.5
U. S. Reclamation Service.....	82,592	47,568	35,024	73.6
U. S. Indian Service.....	75	50	25	50.0
ACREAGE INCLUDED IN ENTERPRISES.				
Total.....	188,382	201,625	-13,243	-6.6
Individual and partnership.....	76,683	69,971	6,712	9.6
Cooperative.....	11,410	22,687	-11,277	-49.7
Commercial.....	2,280	6,900	-4,620	-67.0
U. S. Reclamation Service.....	97,084	101,967	-4,883	-4.0
U. S. Indian Service.....	75	100	-25	-25.0

¹ A minus sign (—) denotes decrease.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

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

The state of South Dakota was created in 1889 from a part of Dakota territory. In 1881 Dakota territory enacted the following general declaration regarding rights to water:

"Any person or persons, corporation or company, who may have or hold a possessory right or title to any mineral or agricultural lands within the limits of this state shall be entitled to the usual enjoyment of the waters of the streams or creeks in said state for mining, milling, agricultural, or domestic purposes; provided, that the right to such use shall not interfere with any prior right or claim to such waters when the law has been complied with in doing the necessary work." The same law provided for securing rights of way over the lands lying between the streams and the places of use, and for the posting and filing of notices of intended appropriations.

In 1905 South Dakota adopted a new water law. This law provided that "all the 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." It created the office of state engineer, provided that parties wishing to acquire rights must apply to the engineer for permits to appropriate water; for the submitting of proof of completion of works and the issuing of certificates of completion; and for the submitting of proof of use of water and the issuing of licenses defining the rights acquired.

This law provided also that the state engineer should make surveys and collect the information necessary for the adjudication of

rights acquired previous to the passage of the act; that, on the advice of the engineer, the attorney general of the state should intervene in suits relating to water rights or initiate such suits; and that when suits were brought in the courts the courts should call on the engineer to make surveys of the streams in question at the expense of the litigants.

The supreme court of the state has held this law unconstitutional so far as it interferes with vested riparian rights and so far as it relates to participation in adjudication by the state engineer at the expense of litigants. (*St. Germain Irrigating Ditch Co. v. Hawthorne Ditch Co.*, 32 S. D., 260.)

Under this decision riparian rights seem to be paramount in South Dakota.

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.....	100,682	100.0	100.0
Appropriation and use.....	1,774	1.8	21.2
Notice filed and posted.....	62,054	61.6	35.0
Adjudicated by court.....	7,651	7.6	14.8
Permit from state.....	17,500	17.4	7.4
Certificate or license from state.....	8,012	8.0	17.5
Riparian rights.....	1,599	1.6	3.6
Underground.....	130	0.1	(1)
Other and mixed.....	190	0.2	(1)
Not reported.....	1,172	1.2	(1)

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

ACREAGE, BY DRAINAGE BASIN.

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.....	100,682	53,137	89.5	188,382	150,914
Missouri River and tributaries.....	100,682	53,137	89.5	188,382	150,914
Missouri River direct.....	99,333	49,547	100.5	600	150
Cheyenne River.....	840	700	-8.6	170,715	143,547
Little Missouri River.....	305	335	-9.0	4,133	3,323
Moreau River.....	404	2,555	-84.2	3,094	1,721
Other tributaries of Missouri River.....				3,840	1,873

¹ A minus sign (—) denotes decrease.

² Includes Belle Fourche River.

³ Includes springs and wells.

IRRIGATION—SOUTH DAKOTA.

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.....	207	182	370	5,427	653	632	605	119	212,264
1870-1879.....	20	2	22	1,701	78	28	12	4	62
1880-1889.....	30	3	49	481	99	65	19	4	700
1890-1899.....	22	6	32	370	51	84	42	15	205,404
1900-1904.....	23	54	41	1,813	165	92	261	60	4,127
1905-1909.....	55	75	117	390	141	239	136	27	1,840
1910-1914.....	38	31	73	613	75	88	30	7	100
1915-1919.....	11	6	17	51	19	30	1	2	1
Not reported.....	8	5	19	8	25	10	4		

DATE OF BEGINNING.	Pipelines, 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.....	7.2	4	2,750	1	800	25	498	25 23,320
1870-1879.....		1	500			2	40	2 5,000
1880-1889.....	0.2	1	650			1	20	1 600
1890-1899.....	0.2	1	800			6	66	6 3,940
1900-1904.....	5.5	1				10	233	10 7,450
1905-1909.....	0.8			1	800	5	139	5 6,330
1910-1914.....	0.5	1	800			1		1
1915-1919.....								
Not reported.....								

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.....	207	182	370	5,427	653	632	605	119	212,264
Individual and partnership.....	199	181	354	2,114	442	599	201	118	8,494
Cooperative.....	5		6	1,678	65	21	4		
Commercial.....	1		1	35	8				
U. S. Reclamation Service.....	1	1	8	1,600	137	12	400	1	203,770
U. S. Indian Service.....	1		1		1				

CLASS.	Pipelines, 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.....	7.2	4	2,750	1	800	25	498	25 23,320
Individual and partnership.....	1.3	4	2,750	1	800	25	498	25 23,320
Cooperative.....								
Commercial.....								
U. S. Reclamation Service.....	5.9							
U. S. Indian Service.....								

IRRIGATION—SOUTH DAKOTA.

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.....	2,176	0.1	1,166	0.1	86.6	Bu.....	39,667	0.1	25,476	(²) 55.7
2 Oats.....	3,026	0.2	2,526	0.2	19.8	Bu.....	71,692	0.1	91,045	0.2 -21.3
3 Winter wheat.....	759	0.6	1,329	(³)	781.0	Bu.....	7,335	0.6	25,590	0.1 449.7
4 Spring wheat.....	10,949	0.3				Bu.....	133,341	0.4		
5 Barley.....	1,026	0.1	317	(³)	223.7	Bu.....	17,841	0.1	6,086	(²) 193.1
Other grains and seeds:										
6 Clover and alfalfa seed ⁴	1,040	3.2	(⁴)			Bu.....	2,358	4.3	(⁴)	
Hay and forage:										
7 Timothy alone.....	539	0.5	1,927	1.1	-72.0	Tons...	566	0.4	3,352	1.3 -83.1
8 Timothy and clover mixed.....	1,989	3.0	2,116	1.6	-6.0	Tons...	1,953	2.2	3,189	1.5 -38.8
9 Alfalfa.....	28,519	8.3	10,005	15.1	285.0	Tons...	74,193	9.7	28,520	18.5 160.1
10 Small grains cut for hay.....	1,708	1.6	(⁴)			Tons...	1,720	2.3	(⁴)	
11 Wild, salt, or prairie grasses.....	3,825	0.1	17,652	0.6	-78.3	Tons...	3,026	0.1	20,334	0.7 -85.1
Vegetables:										
12 Potatoes.....	413	0.7	439	0.9	-5.9	Bu.....	35,065	1.2	35,666	1.0 -1.7
Miscellaneous:										
13 Sugar beets grown for sugar.....	1,052	95.1	(⁴)			Tons...	11,782	98.6	(⁴)	

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.....	25.1	25.1	18.2	72.5	72.5	\$51,567	0.1	\$17,532	0.1 194.1
2 Oats.....	Bu.....	27.8	27.8	23.7	85.3	85.3	53,769	0.1	42,035	0.3 27.9
3 Winter wheat.....	Bu.....	9.3	9.3	10.0	107.5	107.5	16,357	0.6		
4 Spring wheat.....	Bu.....	7.9	7.9	12.2	154.4	154.4	297,350	0.4	21,100	(²)
5 Barley.....	Bu.....	17.0	17.0	17.4	102.4	102.4	21,409	0.1	3,143	(²) 581.2
Other grains and seeds:										
6 Clover and alfalfa seed ⁴	Bu.....	1.8	1.7	2.3	127.8	135.3	53,055	4.3	(⁴)	
Hay and forage:										
7 Timothy alone.....	Tons...	1.13	1.14	1.05	92.9	92.1	8,490	0.4	25,290	2.0 -66.4
8 Timothy and clover mixed.....	Tons...	1.31	1.32	0.98	74.8	74.3	33,201	2.2	21,229	1.8 56.4
9 Alfalfa.....	Tons...	1.65	1.63	1.93	117.0	118.4	1,595,150	9.7	160,414	17.4 894.4
10 Small grains cut for hay.....	Tons...	0.69	0.69	1.01	146.4	146.4	28,380	2.3	(⁴)	
11 Wild, salt, or prairie grasses.....	Tons...	0.74	0.74	0.79	106.8	106.8	39,338	0.1	145,667	1.3 -73.0
Vegetables:										
12 Potatoes.....	Bu.....	49.2	49.0	84.9	172.6	173.3	87,662	1.2	25,049	1.3 250.0
Miscellaneous:										
13 Sugar beets grown for sugar.....	Tons...	10.81	3.17	11.20	103.6	353.3	117,820	98.6	(⁴)	

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 including red clover seed.⁴ Not reported in 1909 because of small acreage.

TEXAS.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Texas 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.

In the reports of the Thirteenth Census the returns for the counties where irrigation is limited to rice growing and those for the remainder of the state were presented separately. In this report this separation is not made, except that in the last column of the county table at the end of the report totals for rice growing are given.

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

ITEM.	CENSUS OF—		INCREASE. ¹	
	1920	1910	Amount.	Per cent.
Number of all farms.....	436,033	417,770	18,263	4.4
Approximate land area of the state.....acres..	167,934,720	167,934,720		
All land in farms.....acres..	114,020,621	112,435,067	1,585,554	1.4
Improved land in farms.....acres..	31,227,503	27,360,666	3,866,837	14.1
Number of farms irrigated.....	5,974	5,238	736	14.1
Area irrigated.....acres..	586,120	451,130	134,990	29.9
Area enterprises were capable of irrigating.....acres..	1,150,542	690,991	459,551	66.5
Area included in enterprises.....acres..	1,687,447	1,253,173	434,274	34.7
Per cent irrigated:				
Number of all farms.....	1.4	1.3	0.1	
Approximate land area of the state.....	0.3	0.3		
Land in farms.....	0.5	0.4	0.1	
Improved land in farms.....	1.9	1.6	0.3	
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	564,422	239,861	324,561	135.3
Excess of area included in enterprises over area irrigated.....acres..	1,101,327	802,043	299,284	37.3
Area of irrigated land reported as available for settlement....acres..	346,446	(²)		
Capital invested.....	\$35,072,739	\$13,487,347	\$21,585,392	160.0
Average per acre enterprises were capable of irrigating.....	\$30.48	\$19.52	\$10.96	56.1
Estimated final cost of existing enterprises.....	\$39,860,871	\$14,754,172	\$25,106,699	170.2
Average per acre included in enterprises.....	\$23.62	\$11.77	\$11.85	100.7
Average cost of operation and maintenance per acre.....	\$6.92	\$3.25	\$3.67	112.9
IRRIGATION WORKS.				
Number of enterprises.....	1,371	2,772	-1,401	-50.5
Number of main ditches.....	820	861	-41	-4.8
Length of main ditches.....miles..	1,524	1,479	45	3.0
Capacity of main ditches.....second-feet..	23,261	12,818	10,443	81.5
Number of lateral ditches.....	2,022	832	1,190	143.0
Length of lateral ditches.....miles..	2,949	1,224	1,725	140.9
Number of reservoirs.....	368	309	59	19.1
Capacity of reservoirs.....acre-feet..	392,999	74,361	318,638	428.5
Number of flowing wells.....	135	123	12	9.8
Capacity of flowing wells.....gallons per minute..	62,364	37,019	25,345	68.5
Number of pumped wells.....	901	1,912	-1,011	-52.9
Capacity of pumped wells.....gallons per minute..	538,565	567,126	-28,561	-5.0
Number of pumping plants.....	1,369	2,359	-990	-41.9
Engine capacity.....horsepower..	80,511	69,094	11,417	16.5
Pump capacity.....gallons per minute..	6,825,998	5,362,665	1,463,333	27.3
Average lift.....feet..	45	(²)	45	

¹A minus sign (—) denotes decrease.

²Not reported in 1910.

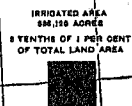


TABLE 4.—ACREAGE, CLASSIFIED BY SOURCE OF WATER SUPPLY: 1919 AND 1909.

CLASS.	AREA IRRIGATED (ACRES).				Area enter-prises were ca-pable of irrigating in 1920 (acres).	Area included in enter-prises, 1920 (acres).
	1919	1909	Increase. ¹			
			Amount.	Per cent.		
Total.....	586,120	451,130	134,990	29.9	1,150,542	1,687,447
Streams, gravity.....	73,982	75,496	-1,514	-2.0	142,782	232,373
Streams, pumped.....	421,338	297,578	123,760	41.7	819,794	1,185,420
Streams, pumped and gravity.....	350	(²)	350	.....	600	1,000
Wells, pumped.....	39,483	54,052	-14,569	-27.0	70,929	106,382
Wells, flowing.....	3,256	3,730	-474	-12.7	6,291	7,905
Wells, flowing and pumped.....	1,727	(²)	1,727	.....	3,428	8,414
Lakes, pumped.....	597	458	139	30.3	7,895	8,057
Springs.....	8,686	13,068	-4,382	-33.5	11,332	11,499
Stored storm water.....	11,572	6,748	4,824	71.5	54,737	62,715
Sewage.....	260	(²)	260	.....	260	650
Streams, gravity, and pumped wells.....	454	(²)	454	.....	778	1,128
Streams, gravity, and flowing wells.....	45	(²)	45	.....	55	55
Other mixed.....	24,170	(²)	24,170	.....	31,661	61,849

¹ A minus sign (—) denotes decrease. ² Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

In 1852 the state of Texas enacted a law providing for the regulation of community ditches by the commissioners' courts of the counties, according to "ancient usage and the laws of the state"; and providing also for the regulation by the same courts of all irrigation works belonging to two or more persons.

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.....	586,120	451,130	134,990	29.9
Individual and partnership.....	110,080	49,657	61,023	122.9
Cooperative.....	103,378	130,011	-26,633	-20.5
Irrigation district.....	88,571	(²)	88,571	.....
Commercial.....	262,892	271,462	-8,570	-3.2
U. S. Reclamation Service.....	20,284	(²)	20,284	.....
State.....	65	(²)	65	.....
City.....	250	(²)	250	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total.....	1,150,542	690,991	459,551	66.5
Individual and partnership.....	216,351	65,286	151,065	231.4
Cooperative.....	256,304	183,411	72,893	39.7
Irrigation district.....	170,548	(²)	170,548	.....
Commercial.....	481,899	442,294	39,605	9.0
U. S. Reclamation Service.....	25,070	(²)	25,070	.....
State.....	120	(²)	120	.....
City.....	250	(²)	250	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total.....	1,687,447	1,253,173	434,274	34.7
Individual and partnership.....	328,461	104,044	224,417	215.7
Cooperative.....	294,761	279,969	14,792	5.3
Irrigation district.....	266,674	(²)	266,674	.....
Commercial.....	738,685	869,160	-130,475	-15.0
U. S. Reclamation Service.....	58,106	(²)	58,106	.....
State.....	120	(²)	120	.....
City.....	640	(²)	640	.....

¹ A minus sign (—) denotes decrease. ² Not included in classification in 1910.

A law enacted in 1875 granted subsidies of state land to canal companies, but this law was repealed in 1882. A law of 1887 included among the purposes for which corporations may be organized the "construction and

maintenance of canals for the purposes of irrigation, navigation, or manufacturing"; and an act of 1895 authorized the incorporation of canal companies to build irrigation works, sell water rights, and supply water for rates. In addition to passing these general laws several companies were chartered by the legislature in 1866, and at subsequent dates. All of these laws seem to contemplate the organization of commercial enterprises, as defined on page 3.

An irrigation district law was enacted in 1905, and since that time laws providing for the organization and management of "water improvement districts" have been enacted. These are, in effect, irrigation districts, and all data relating to them are included in those reported for districts in Table 5.

The United States Reclamation law has been extended to Texas, and a part of one project lies in the state.

The Federal Carey Act (act of Aug. 18, 1894) does not apply to Texas.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

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

Without any formal declaration of the right to take water from the streams of the state, the legislature of Texas in 1852 and at subsequent dates recognized this right by providing for the control of ditches by the commissioners' courts of the counties, and by chartering companies and granting rights to take water from certain streams. By an act of October 1, 1866, a company was given the right to divert three-fourths of all the water in Guadalupe River. In the same year another company was given the right to divert two-thirds of all the water in San Marcos River, and another company was given the right to divert one-fourth of all the water forming the Rio Grande.

In 1895 there was enacted the first general law making a declaration on the subject of water rights. This declaration was as follows:

"The unappropriated waters of the ordinary flow or underflow of every running or flowing river or natural stream, and the storm or rain waters of every river or natural stream, canyon, ravine, depression, or watershed within those portions of the state of Texas in which by reason of the insufficient 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 provided, however, that water might not be diverted from its natural course to the detriment of riparian owners without their consent, except after condemnation. All persons having previously appropriated water and those making appropriations in the future were required to file statements of their claims with the county clerks.

In 1913 a law was enacted that made the law permitting the appropriation of water applicable to the whole state, created the state board of water engineers, and gave to this board supervision over the waters of the state.

All parties claiming rights to water were required to file statements of their claims with the board, parties wishing to acquire rights were required to apply to the board for permits, and the taking of water from streams without a permit was made illegal.

The original law gave the board no authority to define rights acquired previous to the creation of the board, but this authority was given to the board in 1917. When the board has completed an adjudication it issues certificates to all parties setting forth their rights.

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

CLASS.	1919		1909, per cent of total. ¹
	Acres.	Per cent of total.	
Total.....	586,120	100.0	100.0
Appropriation and use.....	69,334	11.8	70.8
Notice filed and posted.....	105,069	17.9	5.7
Adjudicated by court.....	2,755	0.5	(²)
Permit from state.....	229,753	39.2	(²)
Certificate or license from state.....	11,898	2.0	(²)
Riparian rights.....	72,396	12.4	11.7
Underground.....	44,649	7.6	(²)
Other and mixed.....	594	0.1	(²)
Not reported.....	40,672	8.5	(²)

¹ Exclusive of land irrigated for rice growing.
² This class was not included in the tabulation in 1909. All land for which the class of water rights was not reported was included in "Appropriation and use."
³ Small areas erroneously reported as in this class. State issued no permit certificate before 1913.

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.....	586,120	361,768	848.9	1,687,447	1,150,542
Rio Grande River and tributaries.....	315,693	39,269	703.9	883,708	681,602
Rio Grande River direct.....	254,186	8,749	.....	705,270	555,761
Pecos River.....	57,418	22,358	156.8	172,043	120,492
Las Moras Creek.....	1,469	680	116.0	1,534	1,519
Other tributaries of Rio Grande River.....	2,620	* 7,482	-65.0	4,861	3,730
Tributaries of Gulf of Mexico.....	263,464	21,833	.....	780,386	450,015
Nueces River.....	13,753	2,663	416.4	50,006	31,977
San Antonio River.....	13,179	2,955	346.0	61,789	60,177
Colorado River.....	71,278	10,402	585.2	277,268	125,636
Brazos River.....	7,535	448	.....	22,896	19,580
Trinity River.....	42,770	(²)	.....	96,320	52,720
Neches River.....	64,900	(²)	.....	149,300	82,000
Sabine River.....	12,822	(²)	.....	24,468	20,508
Other Gulf streams.....	37,227	* 5,365	593.9	97,839	63,407
Canadian River.....	440	340	29.4	840	440
Red River.....	6,523	161	.....	22,513	12,585

¹ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.
² Includes 165 acres for springs and wells not reported by drainage basins.
³ Includes springs and wells.
⁴ Not shown separately 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: 1900 TO 1920.

CENSUS YEAR.	Amount.	Per cent of increase. ¹	AVERAGE PER ACRE.	
			Amount.	Per cent of increase. ¹
1920.....	\$35,072,739	100.0	\$30.48	56.1
1910.....	13,487,847	.....	19.82	-5.7
1900.....	1,627,908	.....	20.70	.....

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

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

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total.....	\$35,072,739	100.0	\$30.48
1800-1869.....	30,000	0.1	75.00
1870-1879.....	1,108,104	3.2	25.17
1880-1889.....	205,723	0.8	10.53
1890-1899.....	987,951	2.8	17.88
1900-1904.....	4,903,055	14.0	22.21
1905-1909.....	7,762,497	22.1	28.80
1910-1914.....	14,010,412	39.9	34.90
1915-1919.....	2,747,636	7.8	36.26
Not reported.....	3,227,361	9.2	58.33

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.....	\$35,072,739	100.0	\$30.48	558,306	\$6.92
Streams, gravity.....	5,631,241	16.1	39.44	66,906	1.98
Streams, pumped.....	19,432,010	55.4	23.70	412,118	7.55
Streams, pumped and gravity.....	60,000	0.2	100.00	350	8.57
Wells, pumped.....	2,783,260	7.9	39.24	31,749	11.07
Wells, flowing.....	340,538	1.0	54.13	1,528	4.45
Wells, flowing and pumped.....	163,057	0.5	47.57	1,253	16.69
Lakes, pumped.....	176,700	0.5	22.38	517	6.32
Springs.....	316,604	0.9	27.94	8,217	2.72
Stored storm water.....	4,785,276	13.6	87.42	11,388	5.51
Sewage.....	40,072	0.1	154.12	.....	.....
Streams, gravity, and pumped wells.....	34,680	0.1	44.58	454	16.83
Streams, gravity, and flowing wells.....	5,000	(²)	90.91	.....	.....
Other mixed.....	1,304,241	3.7	41.19	23,828	5.95

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.	
			Amount.	Per cent. ¹
Total.....	\$35,072,739	\$1,579,118	\$33,493,621	.....
Rio Grande River and tributaries.....	18,925,769	1,032,480	17,893,289	.....
Rio Grande River direct.....	16,208,058	468,100	15,739,958	.....
Pecos River.....	2,219,595	451,045	1,768,550	392.1
Las Moras Creek.....	192,560	7,925	184,635	.....
Other tributaries of Rio Grande River.....	305,550	125,410	180,140	143.6
Tributaries of Gulf of Mexico.....	15,707,698	501,272	15,206,426	.....
Nueces River.....	1,326,555	56,808	1,269,747	.....
San Antonio River.....	5,087,542	63,765	5,023,777	.....
Colorado River.....	3,580,916	154,529	3,426,387	.....
Brazos River.....	569,543	25,443	544,100	.....
Trinity River.....	1,743,621	(¹)	1,743,621	.....
Neches River.....	1,596,770	(¹)	1,596,770	.....
Sabine River.....	345,935	(¹)	345,935	.....
Other Gulf streams.....	1,476,816	200,727	1,276,089	635.7
Canadian River.....	69,472	4,500	64,972	.....
Red River.....	369,800	2,250	367,550	.....

¹ Per cent not shown when more than 1,000.² Includes \$18,616 for springs and wells not reported by drainage basins.³ Includes springs and wells.⁴ 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.		OPERATION AND MAINTENANCE, 1919.	
	Amount.	Per cent of total.	Area for which cost is reported (acres).	Average cost per acre. ¹
Total.....	\$35,072,739	100.0	558,306	\$6.92
Individual and partnership.....	8,256,568	23.5	88,008	8.10
Cooperative.....	3,821,844	10.9	102,764	6.76
Irrigation district.....	5,449,142	15.5	88,571	6.44
Commercial.....	13,825,409	39.4	258,614	7.05
U. S. Reclamation Service.....	3,673,476	10.5	20,284	2.90
State.....	6,802	(²)	65	27.69
City.....	39,498	0.1	.....	.....

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.....	166
Acreage included in enterprises reporting land drained or needing drainage.....	650,822
Acreage for which drains have been installed.....	272,437
Additional acreage needing drainage.....	154,532
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage.....	41.9
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state.....	16.1
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.....	25.3

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-foot.....	5,835	817	5,018
Area irrigated in 1919.....acres..	171,716	45,001	126,715
Average number of acres per second-foot.....	29	55	25
Total quantity of water entering canals, acre-foot..	1,586,840	204,919	1,381,921
Area irrigated in 1919.....acres..	247,619	47,325	200,294
Average quantity per acre.....acre-foot..	6.4	4.3	6.9
Total quantity of water delivered.....acre-foot..	385,540	100,869	284,671
Area irrigated in 1919.....acres..	167,005	48,533	118,472
Average quantity per acre.....acre-foot..	2.3	2.1	2.4

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

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	165	134	820	23,261	1,524	2,022	2,949	368	392,999
1880-1889.....		2							
1870-1879.....	17	6	22	875	132	416	270	4	23,307
1880-1889.....	7	7	22	570	56	56	47	4	
1890-1899.....	24	9	34	1,234	108	58	72	8	28,089
1900-1904.....	21	8	72	5,449	275	169	358	13	31,385
1905-1909.....	21	31	101	6,887	285	268	964	50	12,837
1910-1914.....	45	36	303	4,741	386	577	993	91	287,357
1915-1919.....	22	27	197	2,297	191	365	215	70	8,634
Not reported.....	8	8	69	1,208	91	113	30	128	1,390

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	157.1	135	62,304	901	538,565	1,369	80,511	1,641	6,825,998
1880-1889.....						1	50	1	
1870-1879.....	0.1					1	12	1	380
1880-1889.....	0.4					10	61	10	4,670
1890-1899.....	1.6	2		4	30	30	4,939	42	1,719,180
1900-1904.....	16.5	11	3,150	40	19,150	114	18,647	156	1,544,080
1905-1909.....	14.0	16	12,390	116	62,622	210	19,271	265	1,656,729
1910-1914.....	26.1	37	18,734	278	195,239	432	16,343	498	937,844
1915-1919.....	9.0	26	14,020	284	204,449	360	13,399	402	622,488
Not reported.....	89.4	43	14,070	176	57,075	211	7,769	266	341,707

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

[illegible]

IRRIGATION—TEXAS.

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.....	165	134	820	23,261	1,524	2,022	2,949	368	392,999
Rio Grande River and tributaries.....	44	33	154	12,530	641	875	1,671	74	87,169
Rio Grande River direct.....	11	19	81	9,319	365	361	1,275	46	24,999
Pecos River.....	26	9	61	2,725	267	241	313	24	62,165
Las Moras Creek.....	2	1	4	75	8	260	67	.....	.....
Other tributaries of Rio Grande River.....	5	4	8	411	11	13	10	4	5
Tributaries of Gulf of Mexico.....	108	99	612	10,618	828	978	1,202	292	297,826
Nueces River.....	54	29	85	163	98	139	42	223	1,987
San Antonio River.....	4	10	50	1,782	60	80	82	24	260,346
Colorado River.....	46	53	244	3,925	324	333	639	30	8,092
Brazos River.....	.....	2	155	287	130	270	136	3	800
Trinity River.....	.....	1	6	1,022	77	47	102	1	25,000
Neches River.....	.....	.....	7	1,380	40	30	77	.....	.....
Sabine River.....	.....	.....	9	481	42	27	33	.....	.....
Other Gulf streams.....	4	4	56	1,578	59	52	91	11	1,601
Canadian River.....	.....	.....	4	4	2	8	2	.....	.....
Red River.....	13	2	50	109	53	161	74	2	8,004

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.		Aver- age lift (feet).
								Number.	Capacity (gallons per minute).	
Total.....	157.1	135	62,364	901	538,565	1,369	80,511	1,641	6,825,998	45
Rio Grande River and tributaries.....	41.1	15	9,110	49	23,872	151	22,560	232	2,414,876	.....
Rio Grande River direct.....	40.5	.....	.....	5	2,025	105	21,779	172	2,383,251	50
Pecos River.....	0.6	14	9,050	42	21,509	39	719	53	28,253	53
Las Moras Creek.....	.....	.....	.....	.....	.....	1	6	1	250	20
Other tributaries of Rio Grande River.....	.....	1	60	2	338	6	56	6	3,122	56
Tributaries of Gulf of Mexico.....	115.8	118	50,754	803	464,943	1,157	54,456	1,346	4,358,862	41
Nueces River.....	92.6	81	26,065	275	72,937	321	6,533	342	160,472	47
San Antonio River.....	10.9	25	15,465	43	12,864	77	1,438	80	31,039	39
Colorado River.....	8.5	3	5,400	57	30,697	311	13,500	359	912,048	30
Brazos River.....	2.2	3	3,500	150	136,332	166	6,276	175	153,585	63
Trinity River.....	1.5	.....	.....	.....	.....	11	7,688	20	445,100	34
Neches River.....	.....	.....	.....	.....	.....	6	5,850	23	1,029,500	24
Sabine River.....	.....	.....	.....	.....	.....	9	1,855	16	187,000	14
Other Gulf streams.....	1	6	324	278	212,143	256	11,316	331	540,118	42
Canadian River.....	2	.....	.....	3	2,000	3	115	3	2,000	80
Red River.....	.....	2	2,500	46	47,750	58	3,380	60	50,260	81

CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF 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.....	36,736	0.8	9,068	0.2	305.1	Bu.....	1,207,132	1.1	191,474	0.3	530.4
2	Oats.....	3,494	0.2	2,496	0.6	40.0	Bu.....	53,895	0.1	60,015	0.9	-10.2
3	Winter wheat.....	6,146	0.3	1,383	0.4	343.4	Bu.....	90,535	0.2	26,681	1.1	239.3
Other grains and seeds:												
4	Kafir, milo, etc.....	6,310	0.4	1,154	0.2	446.8	Bu.....	200,459	0.5	29,449	0.5	580.7
5	Dry beans, navy, etc.....	694	7.6	(²)			Bu.....	6,781	10.0	(²)		
Hay and forage:												
6	Alfalfa.....	19,455	33.4	13,778	24.9	41.2	Tons...	55,544	40.5	43,771	44.7	26.9
7	Other tame or cultivated grasses.....	4,612	1.8	5,009	1.9	-7.9	Tons...	8,790	2.3	6,655	2.8	32.1
8	Small grains cut for hay.....	1,145	0.7	(²)			Tons...	1,244	0.6	(²)		
9	Wild, salt, or prairie grasses.....	690	0.4	593	0.3	16.4	Tons...	691	0.3	773	0.4	-10.6
10	Corn cut for forage.....	582	0.5	(²)			Tons...	631	0.9	(²)		
11	Kafir, sorghum, etc., for forage.....	11,817	0.8	(²)			Tons...	26,570	1.1	(²)		
Vegetables:												
12	Potatoes (Irish or white).....	553	2.0	961	2.7	-42.5	Bu.....	35,317	2.1	90,089	4.0	-60.8
13	Sweet potatoes and yams.....	603	0.9	(²)			Bu.....	59,223	1.0	(²)		
14	Cabbages.....	1,976	45.6	1,416	31.7	39.5						
15	Onions.....	942	15.1	1,842	35.6	-48.9						
16	Beans (green).....	478	34.6	(²)								
17	Tomatoes.....	614	10.4	(²)								
Miscellaneous:												
18	Rough rice.....	164,301	99.9	(²)			Bu.....	5,297,169	99.8	(²)		
19	Broom corn.....	12,199	30.7	(²)			Lbs.....	5,144,047	36.0	(²)		
20	Cotton.....	22,006	0.2	7,474	0.1	194.4	Bales..	8,537	0.3	2,299	0.1	271.3

CROP.		AVERAGE YIELD PER ACRE, 1919.						VALUE.				
		Unit.	For state.	On non-irrigated land.	On irrigated land.			1919	Per cent of total for state.	1909	Per cent of total for state.	Per cent of increase. ¹
					Average.	Per cent of average for state.	Per cent of average on non-irrigated land.					
Cereals:												
1	Corn.....	Bu.....	22.8	22.7	32.9	144.3	144.9	\$1,629,628	1.1	\$162,467	0.3	903.1
2	Oats.....	Bu.....	34.3	34.4	15.4	44.8	44.8	43,116	0.1	38,668	1.0	11.5
3	Winter wheat.....	Bu.....	15.1	15.1	14.7	97.4	97.4	187,407	0.2	23,408	0.8	700.6
Other grains and seeds:												
4	Kafir, milo, etc.....	Bu.....	24.6	24.6	31.8	129.3	129.3	230,528	0.5	10,612	0.5	
5	Dry beans, navy, etc.....	Bu.....	7.4	7.2	9.8	132.4	136.1	29,836	10.0	(²)		
Hay and forage:												
6	Alfalfa.....	Tons...	2.35	2.10	2.85	121.3	135.7	1,638,548	40.5	598,911	44.7	173.6
7	Other tame or cultivated grasses.....	Tons...	1.46	1.46	1.91	130.8	130.8	202,170	2.3	80,460	3.0	151.3
8	Small grains cut for hay.....	Tons...	1.15	1.15	1.09	94.8	94.8	29,856	0.6	(²)		
9	Wild, salt, or prairie grasses.....	Tons...	1.18	1.18	1.00	84.7	84.7	12,784	0.3	10,743	0.7	19.0
10	Corn cut for forage.....	Tons...	0.61	0.61	1.08	177.0	177.0	11,989	0.9	(²)		
11	Kafir, sorghum, etc., for forage.....	Tons...	1.65	1.65	2.25	136.4	136.4	504,830	1.1	(²)		
Vegetables:												
12	Potatoes (Irish or white).....	Bu.....	62.6	62.6	63.9	102.1	102.1	79,441	2.1	81,052	4.4	-2.0
13	Sweet potatoes and yams.....	Bu.....	85.7	85.6	98.2	114.6	114.7	106,601	1.0	(²)		
14	Cabbages.....							394,833	54.5	143,671	37.6	174.9
15	Onions.....							424,763	16.0	297,440	36.2	42.8
16	Beans (green).....							74,620	43.6	(²)		
17	Tomatoes.....							176,800	14.6	(²)		
Miscellaneous:												
18	Rough rice.....	Bu.....	32.3	(²)	32.2	100.0	(²)	14,832,073	99.8	(²)		
19	Broom corn.....	Lbs.....	359.4	331.8	421.7	117.3	127.1	257,202	36.0	(²)		
20	Cotton.....	Bales...	0.26	0.26	0.39	150.0	150.0	1,476,901	0.3	143,157	0.9	931.7

¹ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.² Not reported in 1909.³ Acreage too small to use as a base for a just average.

IRRIGATION—TEXAS.

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.	Atascosa.	Bailey.	Bexar.	Brazoria.	Brewster.	Cameron. ¹	Chambers.	Colorado.
1	Number of all farms in 1920.....	436,033	1,534	79	3,205	2,074	163	1,597	506	2,460
2	Number of farms irrigated in 1919.....	5,974	94	24	174	3	17	871	146	120
3	Per cent of all farms.....	1.4	6.1	30.4	5.4	0.1	10.4	57.8	28.9	4.9
4	Number of farms irrigated in 1909.....	5,238			175	9		314	99	57
5	Per cent of increase, 1909-1919.....	14.1			-0.6					
LAND AND FARM AREA.										
6	Approximate land area.....acres..	167,934,720	869,120	659,200	808,320	857,600	3,798,400	896,640	395,520	622,080
7	All land in farms.....acres..	114,629,621	379,296	352,142	576,218	303,037	1,772,088	299,279	179,430	457,296
8	Improved land in farms.....acres..	31,227,903	127,520	13,553	234,287	165,150	9,511	83,121	61,321	169,846
9	Area irrigated in 1919.....acres..	586,120	2,312	2,195	12,933	350	596	60,008	29,200	15,321
10	Per cent of improved land in farms.....	1.9	1.8	16.2	5.5	0.2	6.3	72.2	56.9	9.0
11	Area irrigated in 1909.....acres..	451,130			4,600	1,972	17	29,439	27,375	7,503
12	Per cent of increase, 1909-1919.....	29.9			175.8	-82.3			6.7	104.2
13	Area enterprises were capable of irrigating in 1920.....acres..	1,150,542	4,067	3,555	57,736	1,000	873	120,943	38,700	19,378
14	Area enterprises were capable of irrigating in 1910.....acres..	690,991			7,122	2,700	17	115,363	27,950	10,435
15	Per cent of increase, 1910-1920.....	66.5			710.7	-63.0			38.5	85.7
16	Area included in enterprises in 1920.....acres..	1,687,447	6,445	4,680	59,055	1,000	1,087	178,414	72,200	45,287
17	Area included in enterprises in 1910.....acres..	1,253,173			9,438	5,150	32	156,349	70,450	13,501
18	Per cent of increase, 1910-1920.....	34.7			525.7	-80.6			2.5	235.4
19	Area of irrigated land reported as available for settlement.....acres..	346,446						50,568		
IRRIGATION WORKS.										
Independent enterprises:										
20	Number, 1920.....	1,371	35	24	43	1	16	17	4	31
21	Number, 1910.....	2,772			36	8		26	8	46
Main ditches:										
22	Number, 1920.....	820	23	26	24	1	9	21	4	10
23	Number, 1910.....	861			10	6	3	32	5	18
24	Length, 1920.....miles..	1,524	44	24	53	2	9	140	55	36
25	Length, 1910.....miles..	1,479			30	7	1	158	41	22
26	Capacity, 1920.....second-feet..	23,261	25	50	1,702	1	132	3,435	895	523
27	Capacity, 1910.....second-feet..	12,818			1,153		2	3,099		
Laterals:										
28	Number, 1920.....	2,022	34	52	44			92	24	39
29	Number, 1910.....	832			7		1	112	28	11
30	Length, 1920.....miles..	2,949	16	26	74			456	66	42
31	Length, 1910.....miles..	1,224			6		2	241	61	13
Reservoirs:										
32	Number, 1920.....	368	21		11		16	3	1	1
33	Number, 1910.....	309			16	5	3	16	1	2
34	Capacity, 1920.....acre-feet..	392,999	46		260,316		15	1,501	25,000	
35	Capacity, 1910.....acre-feet..	74,361			6,364	1,565	2	32,064	61	
Flowing wells:										
36	Number, 1920.....	135	40		23		1			
37	Number, 1910.....	123			21			2		
38	Capacity, 1920.....gallons per minute..	62,364	16,540		15,410		60			
39	Capacity, 1910.....gallons per minute..	37,019			11,983			90		
Pumped wells:										
40	Number, 1920.....	901	10	27	22		15	1		39
41	Number, 1910.....	1,912			18	3	7	12		65
42	Capacity, 1920.....gallons per minute..	538,565	7,700	24,150	10,820		964	25		25,850
43	Capacity, 1910.....gallons per minute..	567,126			11,207	2,600	114	5,175		39,620
Pumping plants:										
44	Number, 1920.....	1,369	11	24	31	1	15	23	7	44
45	Number, 1910.....	2,309			24	9	7	39	6	60
46	Engine capacity, 1920.....horsepower..	80,511	141	585	693	125	153	5,847	4,672	4,164
47	Engine capacity, 1910.....horsepower..	69,094			461	530	13	8,538	2,931	2,629
48	Pump capacity, 1920.....gallons per minute..	6,825,998	8,900	24,150	14,220	12,000	6,538	887,212	309,200	328,750
49	Pump capacity, 1910.....gallons per minute..	5,362,665			17,710	48,800	114	607,610	296,133	135,120
50	Average lift, 1920.....feet..	45	51	24	31	14	46	15	25	50
CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920.....dollars..	25,072,739	142,168	73,900	4,946,566	10,010	80,955	3,108,489	1,008,802	523,925
52	Capital invested to July 1, 1910.....dollars..	13,487,347			221,236	59,252	6,950	2,024,500	593,410	178,503
53	Per cent of increase, 1910-1920.....	180.0			-83.1				70.0	193.5
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	30.48	34.96	20.79	85.68	10.01	92.73	25.70	26.07	27.04
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	19.52			31.06	21.95	408.82	17.55	21.23	17.11
ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920.....dollars..	39,860,871	146,218	73,900	5,446,566	10,010	90,655	4,098,489	1,008,802	523,925
57	Estimated final cost of existing enterprises in 1910.....dollars..	14,754,172			221,236	59,252	6,950	2,518,199	593,410	178,503
58	Per cent of increase, 1910-1920.....	170.2			-83.1				70.0	193.5
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	23.62	22.60	15.79	92.23	10.01	83.40	22.97	13.97	11.57
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	11.77			23.44	11.51	217.19	16.11	8.42	13.22

¹ Part taken to form part of Willacy County in 1911.

IRRIGATION—TEXAS.

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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.]

		Deaf Smith.	Dimmit.	El Paso. ¹	Floyd.	Frio.	Galveston.	Hale.	Hardeman.	Harris.
1	Number of all farms in 1920.....	352	295	542	1,259	720	723	1,031	1,077	2,880
2	Number of farms irrigated in 1919.....	43	250	476	47	24	2	59	2	60
3	Per cent of all farms.....	11.3	86.8	87.8	3.6	3.3	0.3	5.7	0.2	2.1
4	Number of farms irrigated in 1909.....		94	445			9		2	90
5	Per cent of increase, 1909-1919.....									
LAND AND FARM AREA.										
6	Approximate land area.....acres.....	991,390	870,400	590,720	647,040	719,360	252,800	633,040	487,040	1,088,560
7	All land in farms.....acres.....	693,073	207,885	217,367	490,731	581,407	102,332	581,713	366,152	379,262
8	Improved land in farms.....acres.....	83,939	24,172	30,119	242,822	112,656	27,900	235,880	166,237	216,879
9	Area irrigated in 1919.....acres.....	6,463	5,397	20,259	1,497	655	203	3,335		8,000
10	Per cent of improved land in farms.....	7.7	23.3	67.3	0.6	0.6	0.7	1.4		3.7
11	Area irrigated in 1909.....acres.....		3,327	23,308			2,500	5	4,040	25,795
12	Per cent of increase, 1909-1919.....		62.2				-91.9			-69.0
13	Area enterprises were capable of irrigating in 1920.....acres.....	11,345	10,480	25,005	4,877	1,247	240	8,728	1,040	11,000
14	Area enterprises were capable of irrigating in 1910.....acres.....		5,618	25,324			3,195	5	4,040	26,700
15	Per cent of increase, 1910-1920.....		86.5				-89.4		-74.3	-58.9
16	Area included in enterprises in 1920.....acres.....	13,341	19,792	58,005	5,585	3,369	440	10,162	8,212	16,000
17	Area included in enterprises in 1910.....acres.....		9,934	35,287			3,985	5	5,075	27,960
18	Per cent of increase, 1910-1920.....		99.2				-89.0		61.8	-42.8
19	Area of irrigated land reported as available for settlement.....acres.....		1,250	25,000						
IRRIGATION WORKS.										
Independent enterprises:										
20	Number, 1920.....	43	146	2	47	24	2	58	2	1
21	Number, 1910.....		70	63			0		2	31
Main ditches:										
22	Number, 1920.....	46	7	4	48	4		64	2	1
23	Number, 1910.....		37	21			5		2	16
24	Length, 1920.....miles.....	43	3	40	48	1		52	8	5
25	Length, 1910.....miles.....		34	73			8		11	21
26	Capacity, 1920.....second-feet.....	94	39	774	94	10		113	12	266
27	Capacity, 1910.....second-feet.....		107	2,327					60	
Laterals:										
28	Number, 1920.....	141	2		94			112	12	5
29	Number, 1910.....		5	20						11
30	Length, 1920.....miles.....	70	2		47	1		56		35
31	Length, 1910.....miles.....		4	44						36
Reservoirs:										
32	Number, 1920.....		153			17		1	2	
33	Number, 1910.....		63	1			1		2	3
34	Capacity, 1920.....acre-feet.....		1,690			23		800	8,004	
35	Capacity, 1910.....acre-feet.....		295	2			1		5	333
Flowing wells:										
36	Number, 1920.....	2	27			4				
37	Number, 1910.....		42							1
38	Capacity, 1920.....gallons per minute.....	2,500	6,025			1,500				
39	Capacity, 1910.....gallons per minute.....		17,368							80
Pumped wells:										
40	Number, 1920.....	44	173		48	37	3	68		
41	Number, 1910.....		48	61			2	1		36
42	Capacity, 1920.....gallons per minute.....	45,250	48,450		43,250	7,695	2,216	62,797		
43	Capacity, 1910.....gallons per minute.....		24,760	37,190			6,000	50		35,000
Pumping plants:										
44	Number, 1920.....	43	181		47	27	2	65		1
45	Number, 1910.....		52	65			6	1		36
46	Engine capacity, 1920.....horsepower.....	2,340	3,851		1,960	306		3,212		2,400
47	Engine capacity, 1910.....horsepower.....		662	878			685	5		3,390
48	Pump capacity, 1920.....gallons per minute.....	48,750	74,000		43,250	8,045	2,216	62,985		120,000
49	Pump capacity, 1910.....gallons per minute.....		30,712	46,240			27,100	50		155,350
50	Average lift, 1920.....feet.....	79	39		91	63	41	76		50
CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920.....dollars.....	290,300	578,670	3,670,550	154,100	147,800	20,180	280,630	62,000	150,000
52	Capital invested to July 1, 1910.....dollars.....		243,078	282,590			72,476	125	75,850	848,600
53	Per cent of increase, 1910-1920.....		138.1				-72.2		-18.3	-82.3
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars.....	25.59	55.22	146.79	31.00	118.52	59.35	32.15	59.62	13.64
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars.....		43.27	11.16			22.68	25.00	18.77	31.71
ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920.....dollars.....	290,300	611,720	5,310,550	154,100	149,300	20,180	280,630	62,000	150,000
57	Estimated final cost of existing enterprises in 1910.....dollars.....		243,078	282,590			72,476	125	75,850	848,600
58	Per cent of increase, 1910-1920.....		151.7				-72.2		-18.3	-82.3
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars.....	21.76	30.91	91.55	27.59	44.32	45.86	27.62	7.55	9.38
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars.....		24.47	8.01			18.19	25.00	14.95	30.33

¹ Parts taken to form Culberson County in 1911 and Hudspeth County in 1917.

IRRIGATION—TEXAS.

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.)

		Hidalgo. ¹	Irion.	Jackson.	Jefferson.	Jeff Davis.	Kimble.	Kinney.	La Salle.	Liberty.
1	Number of all farms in 1920.....	1,727	136	1,485	419	62	372	98	280	1,314
2	Number of farms irrigated in 1919.....	1,131	64	45	274	18	68	9	65	12
3	Per cent of all farms.....	65.6	47.1	3.0	65.4	29.0	18.3	9.2	23.2	0.9
4	Number of farms irrigated in 1909.....	278	31	74	160	.....	59	16	58	5
5	Per cent of increase, 1909-1919.....	.....	.....	.....	71.3	.....	.....	.....	.....	.....
LAND AND FARM AREA.										
6	Approximate land area.....acres..	1,042,560	638,720	571,520	588,800	1,448,320	832,640	839,680	999,040	742,400
7	All land in farms.....acres..	394,874	286,014	298,771	130,230	927,451	672,596	595,500	595,010	199,937
8	Improved land in farms.....acres..	99,822	7,604	126,961	93,435	1,085	26,143	13,066	40,401	78,449
9	Area irrigated in 1919.....acres..	160,532	2,133	6,074	74,002	1,210	290	1,844	2,531	13,500
10	Per cent of improved land in farms.....	160.8	28.1	4.8	79.2	111.5	1.1	14.1	6.3	18.4
11	Area irrigated in 1909.....acres..	21,048	1,511	11,167	75,983	186	2,297	3,359	2,165	1,080
12	Per cent of increase, 1909-1919.....	.....	41.2	-45.6	-2.6	550.5	-87.4	-45.1	16.9	.....
13	Area enterprises were capable of irrigating in 1920.....acres..	358,538	2,062	6,749	97,100	1,351	2,904	2,969	5,292	14,000
14	Area enterprises were capable of irrigating in 1910.....acres..	71,327	1,562	10,293	92,918	236	2,569	3,359	3,022	4,870
15	Per cent of increase, 1910-1920.....	.....	32.0	-34.4	4.5	472.5	15.4	-11.6	75.1	187.5
16	Area included in enterprises in 1920.....acres..	424,538	2,417	8,584	174,000	2,034	4,763	4,034	8,574	24,000
17	Area included in enterprises in 1910.....acres..	222,569	1,662	14,996	99,822	731	9,885	3,634	15,940	8,470
18	Per cent of increase, 1910-1920.....	.....	45.4	-42.8	74.3	178.2	-51.8	11.0	-68.0	388.8
19	Area of irrigated land reported as available for settlement.....acres..	29,000	.....	.....	11,100	.....	.....	1,450	.....	500
IRRIGATION WORKS.										
Independent enterprises:										
20	Number, 1920.....	9	15	44	18	12	52	6	38	2
21	Number, 1910.....	12	11	78	160	.....	32	15	54	7
Main ditches:										
22	Number, 1920.....	10	24	10	19	9	37	5	2	2
23	Number, 1910.....	12	11	23	22	10	24	13	37	3
24	Length, 1920.....miles..	141	22	7	57	8	23	13	2	22
25	Length, 1910.....miles..	99	13	21	133	4	39	21	16	4
26	Capacity, 1920.....second-feet..	3,191	59	315	1,936	10	101	103	3	157
27	Capacity, 1910.....second-feet..	1,911	44	.....	.....	19	141	42	158	.....
Laterals:										
28	Number, 1920.....	134	66	18	40	.....	5	269	.....	23
29	Number, 1910.....	146	1	6	29	16	27	31	.....	.....
30	Length, 1920.....miles..	765	15	9	89	.....	1	77	.....	36
31	Length, 1910.....miles..	173	2	2	154	1	17	14	.....	.....
Reservoirs:										
32	Number, 1920.....	3	1	.....	1	8	2	.....	6	.....
33	Number, 1910.....	5	3	4	4	7	2	2	18	.....
34	Capacity, 1920.....acre-feet..	3,400	.....	.....	500	.....	5	.....	13	.....
35	Capacity, 1910.....acre-feet..	2,627	22	86	144	48	4	70	219	.....
Flowing wells:										
36	Number, 1920.....	.....	.....	.....	.....	.....	.....	.....	2	.....
37	Number, 1910.....	.....	.....	.....	.....	.....	.....	.....	2	.....
38	Capacity, 1920.....gallons per minute..	.....	.....	.....	.....	.....	.....	.....	1,000	.....
39	Capacity, 1910.....gallons per minute..	.....	.....	.....	.....	.....	.....	.....	21	.....
Pumped wells:										
40	Number, 1920.....	.....	1	48	.....	7	.....	.....	.....	.....
41	Number, 1910.....	3	.....	75	1	4	.....	2	10	5
42	Capacity, 1920.....gallons per minute..	.....	1,500	40,600	.....	3,180	.....	.....	.....	.....
43	Capacity, 1910.....gallons per minute..	81	.....	90,000	11	370	.....	30	760	45,500
Pumping plants:										
44	Number, 1920.....	10	12	44	19	11	37	2	43	3
45	Number, 1910.....	23	7	84	24	5	13	2	53	7
46	Engine capacity, 1920.....horsepower..	11,110	181	1,868	6,770	148	571	256	1,184	2,000
47	Engine capacity, 1910.....horsepower..	3,707	98	3,366	9,525	15	257	3	1,131	1,080
48	Pump capacity, 1920.....gallons per minute..	1,366,576	17,800	54,160	2,039,600	4,450	10,910	20,250	45,280	135,000
49	Pump capacity, 1910.....gallons per minute..	365,589	11,531	119,440	1,170,010	420	12,338	30	30,582	65,100
50	Average lift, 1920.....feet..	21	19	58	15	70	27	29	23	56
CAPITAL INVESTED.										
51	Capital invested to Jan. 1, 1920.....dollars..	8,024,550	53,400	236,189	1,785,400	50,098	86,381	383,118	155,450	732,779
52	Capital invested to July 1, 1910.....dollars..	1,961,902	17,090	265,525	1,210,787	7,050	62,790	11,676	117,559	71,600
53	Per cent of increase, 1910-1920.....	.....	212.5	-11.0	47.5	738.3	37.6	.....	32.2	924.9
54	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	20.65	25.90	35.00	18.39	43.74	29.14	129.04	29.37	52.34
55	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	27.51	10.94	25.80	13.03	29.87	24.44	3.48	38.90	14.68
ESTIMATED FINAL COST.										
56	Estimated final cost of existing enterprises in 1920.....dollars..	9,349,550	53,600	236,189	1,815,400	50,098	88,131	383,118	155,450	732,779
57	Estimated final cost of existing enterprises in 1910.....dollars..	2,342,318	17,090	265,525	1,210,787	7,050	62,790	11,676	117,559	71,600
58	Per cent of increase, 1910-1920.....	.....	213.6	-11.0	49.9	738.3	40.4	.....	32.2	924.9
59	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	22.02	22.18	27.52	10.43	29.06	18.50	94.97	23.65	30.53
60	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	10.52	10.28	17.71	12.13	9.64	6.35	3.21	7.52	13.07

¹ Parts taken to form parts of Brooks and Willacy Counties in 1911.² The excess of farm acreage over approximate land area is due to the fact that the entire acreage of a farm is tabulated as in the county where the operator resides, even though part of the farm may be situated in an adjoining county.

IRRIGATION—TEXAS.

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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.]

	Loving.	Mata-gorda.	Maver-ick.	Menard.	Orange.	Pecos.	Presidio.	Real.	Reeves.	Run-nels.
1 Number of all farms in 1920.....	14	1,616	66	308	311	207	102	260	206	2,023
2 Number of farms irrigated in 1919.....	7	126	36	85	115	134	31	37	153	18
3 Per cent of all farms.....	50.0	7.8	54.5	27.6	37.0	64.7	30.4	14.2	74.3	0.9
4 Number of farms irrigated in 1909.....	12	212	8	52	62	2	43		63	
5 Per cent of increase, 1909-1919.....		-40.6								
LAND AND FARM AREA.										
6 Approximate land area.....acres..	481,920	727,040	800,640	594,960	232,320	2,645,760	2,439,680	396,160	1,779,840	693,120
7 All land in farms.....acres..	172,323	406,587	131,521	512,431	64,872	2,331,822	1,212,914	359,814	1,050,716	531,469
8 Improved land in farms.....acres..	456	221,676	4,242	20,414	26,071	10,043	6,723	15,952	10,386	234,498
9 Area irrigated in 1919.....acres..	400	33,510	2,653	5,003	12,822	22,312	2,150	452	13,288	467
10 Per cent of improved land in farms.....	87.7	15.1	62.5	24.5	49.2	139.1	32.0	2.8	81.1	0.2
11 Area irrigated in 1909.....acres..	1,040	60,834	1,166	3,499	10,615	2,300	855		13,986	372
12 Per cent of increase, 1909-1919.....	-61.5	-44.9	127.5	43.0	21.9	870.1	151.5		-6.0	25.5
13 Area enterprises were capable of irrigating in 1920.....acres..	500	68,200	3,913	6,564	20,508	60,453	1,850	3,227	20,553	901
14 Area enterprises were capable of irrigating in 1910.....acres..	5,651	86,216	2,345	3,847	12,615	3,300	897		17,373	463
15 Per cent of increase, 1910-1920.....	-91.0	-23.2	66.9	70.6	63.9		108.6		18.3	94.6
16 Area included in enterprises in 1920.....acres..	3,000	164,875	6,513	7,120	24,468	68,653	2,550	3,274	26,066	1,535
17 Area included in enterprises in 1910.....acres..	30,061	130,304	2,545	5,440	26,045	35,600	897		44,858	515
18 Per cent of increase, 1910-1920.....	-90.0	26.5	155.9	30.9	-6.1	62.8	184.3		-41.9	198.1
19 Area of irrigated land reported as available for settle-ment.....acres..	2,600	90,175	2,750		8,588	28,580	300		9,960	
IRRIGATION WORKS.										
Independent enterprises:										
20 Number, 1920.....	1	15	5	55	8	16	3	19	28	17
21 Number, 1910.....	4	37	7	19	11	2	9		16	
Main ditches:										
22 Number, 1920.....	1	20	7	27	9	18	6	21	24	13
23 Number, 1910.....	4	29	4	17	9	2	3		12	3
24 Length, 1920.....miles..	2	111	5	28	42	135	13	24	53	5
25 Length, 1910.....miles..	6	114	3	21	28	13	3		62	2
26 Capacity, 1920.....second-feet..	9	1,772	60	254	481	1,372	28	23	399	22
27 Capacity, 1910.....second-feet..	557		24	145		37	16		207	4
Laterals:										
28 Number, 1920.....	2	55	28	13	27	85	12	11	139	4
29 Number, 1910.....	4	86	3	2	21	9			107	
30 Length, 1920.....miles..	1	105	32	428	33	212	5	7	47	1
31 Length, 1910.....miles..	7	142	1	4	27	11	2		75	
Reservoirs:										
32 Number, 1920.....		1		1		2			1	5
33 Number, 1910.....							1		5	10
34 Capacity, 1920.....acre-feet..		3		100		56,000			6,155	931
35 Capacity, 1910.....acre-feet..							1		5,002	187
Flowing wells:										
36 Number, 1920.....		2				9			5	
37 Number, 1910.....									2	
38 Capacity, 1920.....gallons per minute..		120				7,200			1,850	
39 Capacity, 1910.....gallons per minute..									600	
Pumped wells:										
40 Number, 1920.....		8		3		1			22	
41 Number, 1910.....		14			2		1		7	32
42 Capacity, 1920.....gallons per minute..		8,700		1,040		1,200			16,465	
43 Capacity, 1910.....gallons per minute..		10,858			15,000		7		2,156	396
Pumping plants:										
44 Number, 1920.....	1	20	7	50	9	1		1	17	16
45 Number, 1910.....	2	42	4	15	11		1		10	40
46 Engine capacity, 1920.....horsepower..	40	4,676	540	967	1,855	20		8	459	202
47 Engine capacity, 1910.....horsepower..	54	8,373	458	504	1,501		1		111	102
48 Pump capacity, 1920.....gallons per minute..	4,000	442,700	15,600	30,995	187,000	1,200		250	18,065	9,850
49 Pump capacity, 1910.....gallons per minute..	8,700	915,600	18,250	27,350	208,700		7		5,556	4,977
50 Average lift, 1920.....feet..	15	26	50	24	14	42		40	41	29
CAPITAL INVESTED.										
51 Capital invested to Jan. 1, 1920.....dollars..	5,000	1,323,342	68,078	108,273	345,935	1,180,335	10,300	13,700	581,475	41,630
52 Capital invested to July 1, 1910.....dollars..	9,785	1,403,239	24,198	61,238	171,684	50,950	2,500		211,910	10,040
53 Per cent of increase, 1910-1920.....	-48.9	-5.7	181.3	73.5	101.5		312.0		174.4	314.8
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	10.00	19.99	17.40	16.19	16.87	19.52	5.57	4.25	28.29	40.23
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	1.76	16.28	10.32	15.92	13.72	15.44	2.82		12.19	21.68
ESTIMATED FINAL COST.										
56 Estimated final cost of existing enterprises in 1920.....dollars..	5,000	1,323,942	68,078	108,273	345,935	1,288,535	10,300	13,700	587,575	41,850
57 Estimated final cost of existing enterprises in 1910.....dollars..	190,285	1,403,239	24,198	61,238	171,684	75,950	6,000		211,910	10,040
58 Per cent of increase, 1910-1920.....	-97.4	-5.7	181.3	76.8	103.2		71.7		177.3	316.8
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	1.67	8.03	10.45	15.21	14.26	18.91	4.04	4.18	22.54	27.26
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	6.33	10.77	9.51	11.26	6.59	2.13	6.69		4.72	19.50

¹ Organized from parts of Bandera, Edwards, and Kerr 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.]

	San Saba.	Tom Green.	Uvalde.	Val Verde.	Ward.	Webb.	Whar- ton.	Zavalla.	All other counties.	Total for rice growing.
1 Number of all farms in 1920.....	1,268	680	706	285	238	257	2,967	239	397,911	.....
2 Number of farms irrigated in 1919.....	45	107	7	101	182	87	146	228	225	5,957
3 Per cent of all farms.....	3.5	15.7	1.0	35.4	76.5	33.9	4.9	95.4	0.1	.....
4 Number of farms irrigated in 1909.....	50	102	16	59	178	76	282	32	2,013	1,088
5 Per cent of increase, 1909-1919.....	.....	4.9	.....	.....	2.2	.....	-48.2	.....	-88.9	447.5
LAND AND FARM AREA.										
6 Approximate land area.....acres.....	714,240	930,560	1,016,960	1,973,120	529,280	2,000,160	711,680	862,720	125,463,680	.....
7 All land in farms.....acres.....	570,216	750,663	1,222,589	1,699,287	349,476	971,850	438,068	655,164	88,049,730	.....
8 Improved land in farms.....acres.....	120,400	95,530	101,988	7,059	19,051	21,698	245,952	18,974	27,558,162	.....
9 Area irrigated in 1919.....acres.....	95	7,103	484	2,475	20,000	7,480	19,516	1,642	3,410	212,498
10 Per cent of improved land in farms.....	0.1	7.4	0.5	35.1	105.0	34.5	7.9	8.7	(1)	.....
11 Area irrigated in 1909.....acres.....	2,022	6,227	1,676	2,416	16,406	4,186	53,930	1,021	19,962	286,847
12 Per cent of increase, 1909-1919.....	-95.3	14.1	-71.1	2.4	21.9	78.7	-63.8	60.8	-82.9	-25.9
13 Area enterprises were capable of irrigating in 1920.....acres.....	2,221	10,040	2,032	3,550	37,000	13,143	40,623	4,645	11,275	315,598
14 Area enterprises were capable of irrigating in 1910.....acres.....	2,379	6,708	1,676	4,036	28,712	5,625	63,613	1,818	25,242	350,350
15 Per cent of increase, 1910-1920.....	-6.6	49.8	21.2	-12.0	28.9	133.7	-36.1	155.5	-55.3	-9.9
16 Area included in enterprises in 1920.....acres.....	2,395	14,718	2,032	4,660	71,500	31,736	75,612	5,933	16,789	606,466
17 Area included in enterprises in 1910.....acres.....	3,135	7,372	4,380	4,036	105,012	10,677	91,632	3,440	35,630	499,474
18 Per cent of increase, 1910-1920.....	-23.6	99.6	-53.6	15.6	-31.9	197.2	-17.5	72.5	-62.9	21.4
19 Area of irrigated land reported as available for settle- ment.....acres.....	.....	.....	.....	2,125	49,600	.....	31,000	.....	1,900	.....
IRRIGATION WORKS.										
Independent enterprises:										
20 Number, 1920.....	31	50	5	2	3	58	138	36	189	264
21 Number, 1910.....	38	30	17	5	6	62	199	19	1,620	611
Main ditches:										
22 Number, 1920.....	18	54	4	3	4	20	29	19	111	105
23 Number, 1910.....	32	20	12	9	7	57	78	11	242	225
24 Length, 1920.....miles.....	10	53	9	11	61	12	45	8	47	382
25 Length, 1910.....miles.....	19	43	11	22	65	54	125	9	120	538
26 Capacity, 1920.....second-feet.....	30	348	18	408	925	1,666	1,076	35	325	7,392
27 Capacity, 1910.....second-feet.....	280	110	67	160	1,306	165	.....	44	453	.....
Laterals:										
28 Number, 1920.....	13	92	1	13	9	51	25	86	150	256
29 Number, 1910.....	4	16	12	21	12	.....	21	.....	57	216
30 Length, 1920.....miles.....	3	25	.....	16	52	6	41	12	40	456
31 Length, 1910.....miles.....	1	9	5	13	68	.....	57	.....	32	502
Reservoirs:										
32 Number, 1920.....	.....	11	.....	.....	.....	45	1	18	35	5
33 Number, 1910.....	4	2	.....	1	.....	9	1	9	109	21
34 Capacity, 1920.....acre-feet.....	.....	6,750	.....	.....	.....	20,248	100	65	1,334	25,603
35 Capacity, 1910.....acre-feet.....	307	1,320	.....	1	.....	196	120	90	22,325	2,310
Flowing wells:										
36 Number, 1920.....	.....	.....	.....	.....	.....	.....	1	8	11	3
37 Number, 1910.....	.....	.....	.....	.....	.....	.....	.....	11	42	1
38 Capacity, 1920.....gallons per minute.....	.....	.....	.....	.....	.....	.....	1,000	.....	8,159	1,120
39 Capacity, 1910.....gallons per minute.....	.....	.....	.....	.....	.....	.....	3,500	.....	3,377	80
Pumped wells:										
40 Number, 1920.....	.....	7	1	.....	.....	9	192	37	73	290
41 Number, 1910.....	1	1	4	1	7	.....	278	6	1,205	500
42 Capacity, 1920.....gallons per minute.....	.....	632	50	.....	.....	2,975	160,817	7,942	13,297	238,183
43 Capacity, 1910.....gallons per minute.....	15	45	180	60	2,714	.....	150,000	4,750	82,477	445,495
Pumping plants:										
44 Number, 1920.....	32	48	2	.....	.....	68	173	37	184	323
45 Number, 1910.....	32	23	3	1	7	15	268	10	1,802	575
46 Engine capacity, 1920.....horsepower.....	616	1,105	20	.....	.....	3,885	6,531	809	3,114	36,143
47 Engine capacity, 1910.....horsepower.....	675	573	58	8	66	2,850	12,346	249	6,240	48,179
48 Pump capacity, 1920.....gallons per minute.....	16,570	57,020	410	.....	.....	86,950	185,442	20,692	105,042	3,816,068
49 Pump capacity, 1910.....gallons per minute.....	23,908	38,199	1,700	60	2,714	87,341	625,797	11,350	252,477	3,907,380
50 Average lift, 1920.....feet.....	40	29	38	.....	.....	72	38	91	30	40
CAPITAL INVESTED.										
51 Capital invested to Jan. 1, 1920.....dollars.....	117,256	401,194	28,550	275,000	370,000	1,098,640	1,543,808	160,850	635,943	7,680,370
52 Capital invested to July 1, 1910.....dollars.....	49,527	97,732	16,149	122,138	780,382	263,312	889,174	49,456	941,484	6,140,639
53 Per cent of increase, 1910-1920.....	136.8	310.5	76.8	125.2	-52.6	317.2	73.6	225.2	-32.5	25.1
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars.....	52.79	39.96	14.05	77.46	10.00	83.59	38.00	34.63	56.40	24.34
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars.....	20.82	14.58	9.64	30.26	27.18	46.81	13.98	27.20	37.30	17.53
ESTIMATED FINAL COST.										
56 Estimated final cost of existing enterprises in 1920.....dollars.....	117,271	402,194	28,550	315,000	370,000	1,139,702	1,574,608	160,850	645,548	7,744,770
57 Estimated final cost of existing enterprises in 1910.....dollars.....	49,527	97,732	16,149	122,138	950,382	263,312	889,174	49,456	955,194	6,140,639
58 Per cent of increase, 1910-1920.....	136.8	311.5	76.8	157.9	-61.1	332.8	77.1	225.2	-32.4	26.1
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars.....	48.96	27.33	14.05	67.60	5.17	35.91	20.82	27.11	38.47	12.77
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars.....	15.80	13.26	3.69	30.26	9.05	24.66	9.70	14.38	26.81	12.29

1 Less than one-tenth of 1 per cent.

UTAH.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Utah 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 show-

ing 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.

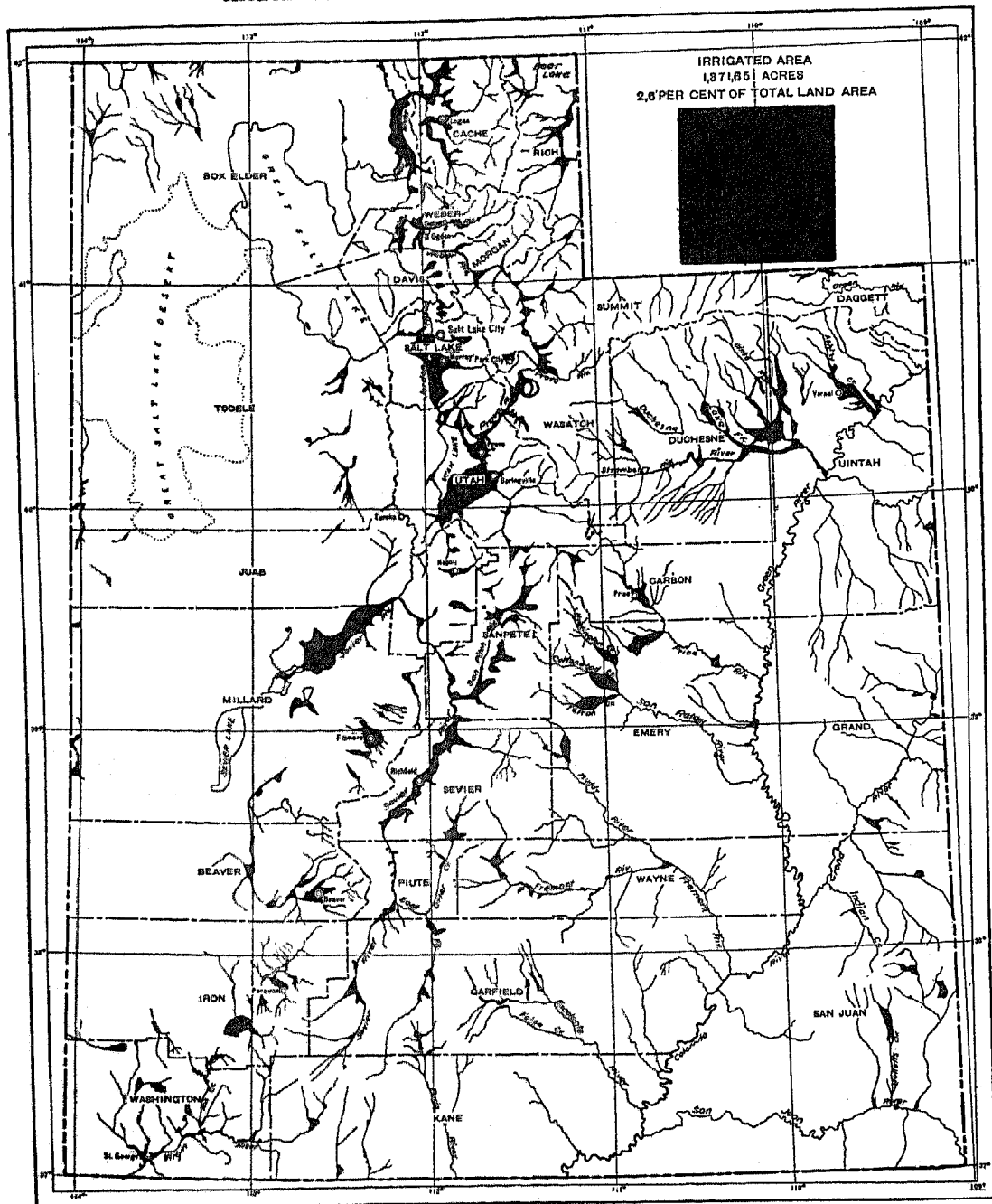
ITEM.	CENSUS OF—		INCREASE. ¹	
	1920	1910	Amount.	Per cent.
Number of all farms.....	25,662	21,676	3,986	18.4
Approximate land area of the state.....acres..	52,597,760	52,597,760		
All land in farms.....acres..	5,050,410	3,397,699	1,652,711	48.6
Improved land in farms.....acres..	1,715,380	1,368,211	347,169	25.4
Number of farms irrigated.....	22,218	19,709	2,509	12.7
Area irrigated.....acres..	1,371,651	999,410	372,241	37.2
Area enterprises were capable of irrigating.....acres..	1,700,550	1,250,246	450,304	36.0
Area included in enterprises.....acres..	2,359,244	1,947,625	411,619	21.1
Per cent irrigated:				
Number of all farms.....	86.6	90.9	-4.3	
Approximate land area of the state.....	2.6	1.9	0.7	
Land in farms.....	27.2	29.4	-2.2	
Improved land in farms.....	80.0	73.0	7.0	
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	328,899	250,836	78,063	31.1
Excess of area included in enterprises over area irrigated.....acres..	658,694	948,215	-289,521	-30.5
Area of irrigated land reported as available for settlement.....acres..	189,563	(²)		
Capital invested.....	\$32,037,351	\$14,028,717	\$18,008,634	128.4
Average per acre enterprises were capable of irrigating.....	\$18.84	\$11.22	\$7.62	67.9
Estimated final cost of existing enterprises.....	\$33,835,641	\$17,840,775	\$15,994,866	89.7
Average per acre included in enterprises.....	\$14.34	\$9.16	\$5.18	56.6
Average cost of operation and maintenance per acre.....	\$1.08	\$0.65	\$0.43	66.2
IRRIGATION WORKS.				
Number of enterprises.....	2,403	2,472	-69	-2.8
Number of main ditches.....	2,381	2,495	-114	-4.6
Length of main ditches.....miles..	6,343	5,887	456	7.7
Capacity of main ditches.....second-feet..	29,447	25,081	4,366	17.4
Number of lateral ditches.....	4,068	1,357	2,711	199.8
Length of lateral ditches.....miles..	5,384	1,822	3,512	192.8
Number of reservoirs.....	476	480	-4	-0.8
Capacity of reservoirs.....acre-feet..	1,600,505	588,317	1,012,188	172.0
Number of flowing wells.....	1,256	1,138	118	10.4
Capacity of flowing wells.....gallons per minute..	96,371	42,794	53,577	125.2
Number of pumped wells.....	192	27	165	
Capacity of pumped wells.....gallons per minute..	39,059	4,827	34,232	709.2
Number of pumping plants.....	250	69	181	
Engine capacity.....horsepower..	11,392	2,143	9,249	431.6
Pump capacity.....gallons per minute..	783,588	315,057	468,531	148.7
Average lift.....feet..	25	(²)	25	

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

² Not reported in 1910.

UTAH

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

The climatic conditions determining the necessity for irrigation are the amount and seasonal distribution of precipitation, especially rainfall, and, to a lesser extent, temperature and wind movement.

The surface of the central, eastern, and southern parts of the state is mountainous, with high plateaus and stream valleys interspersed between the ranges of mountains. The west central and northwestern parts of the state lie within the Great Basin, the bed of the ancient Lake Bonneville, and here the surface consists of extensive level plains, with occasional small ranges of mountains and hills or isolated peaks.

The whole state may be classed as arid, since only on the high mountains does the annual precipitation amount to 20 inches.

On the Wasatch and Uinta Mountains in the north central part of the state and on the divide between Virgin River and the Great Basin in the southwestern part of the state the annual precipitation exceeds 20 inches.

Immediately surrounding each of these sections lies a belt that receives from 15 to 20 inches of precipitation annually, and beyond that is a zone receiving from 10 to 15 inches. About one-third of the area of the state, divided about equally between the west central and the eastern parts of the state, receives less than 10 inches of precipitation annually, and in the Great Salt Lake Desert the annual precipitation is less than 5 inches.

In all of the valleys of the state the land slopes up from the central drainage channels toward the mountains, and the rainfall on the higher lands near the mountains is greater than that in the valleys, and on the higher lands crops, especially the cereals, are grown without irrigation. It is very common for farmers to have home farms on which crops are grown under irrigation and additional land above the canals on which crops are grown without irrigation.

Throughout the state the precipitation is fairly well distributed throughout the year, although it is slightly heavier in the winter than in the summer, the snowfall in the mountains being heavy and remaining well into the summer.

Precipitation in 1919 was much below the normal, and this condition was aggravated by a great deficiency in the summer months, that was offset to some extent by heavy rains in the fall. The drought was felt to some extent in May, but was much more pronounced in June and July, being accompanied by low humidities and high wind movement. Pastures, ranges, and dry-land crops suffered severely, and in many places irrigation water became scarce. On the whole, the season was unfavorable to the production of the best crops, although the fall rains helped late crops.

WATER SUPPLY FOR IRRIGATION.

The area of the state of Utah is about equally divided between the drainage basin of Colorado River and its tributaries and the great interior basin, which has no outlet to the sea. The eastern and extreme southern parts of the state are drained by the Colorado and its tributaries, while the northern and western parts of the state are within the Great Basin.

Green and Grand Rivers unite to form Colorado River in the southeastern part of Utah. Green River rises in northwestern Wyoming, enters Utah from Wyoming, flows across the northeastern corner of Utah, makes a short loop in Colorado, and returns to Utah. It flows in a southerly direction through eastern Utah roughly parallel to the eastern boundary and receives tributaries from Colorado on the east and from the Wasatch Mountains on the west. Green River itself flows in deep canyons most of its course in Utah, and the same is true of its tributaries from the east. Its principal tributaries from the west—Duchesne and Price Rivers—flow through large valleys and are utilized to a considerable extent for irrigation.

Grand River enters Utah from Colorado about midway of the eastern boundary of the state, and Colorado River leaves the state about midway of the southern boundary of the state. Both of these streams flow in deep canyons and are not used for irrigation to any considerable extent, although they carry large volumes of water.

Virgin River, a tributary of Colorado River, provides a small supply of water for irrigation in the southwestern corner of the state.

The larger part of the irrigated land of the state lies in the Great Salt Lake drainage basin, the water supply coming principally from streams draining the Wasatch and Uinta Mountains and flowing into Utah Lake and Great Salt Lake. Of these Bear River rises in the Uinta Mountains in Utah, flows north into Wyoming, crosses and recrosses from Wyoming into Utah, makes a loop into Idaho, returns to Utah, and discharges into the northern end of Great Salt Lake. It is used for irrigation to some extent throughout its course and supplies a large area in northern Utah. Its tributaries also serve considerable areas.

From the Wasatch Mountains many short streams flow into Great Salt Lake and Utah Lake, and these water the older irrigated areas of the state.

Southwest of the Great Salt Lake drainage basin lies the drainage basin of Sevier River, and other streams that rise in the high lands of southern Utah, and flow out into the deserts and discharge into lakes or are lost.

In most of the valleys of the state artesian water is found and is used for irrigation, and in the valleys of the Great Basin there appears to be much ground water that can be obtained by pumping.

FARMS AND ACREAGE IRRIGATED.

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

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Num- ber.	Per cent of in- crease.	Per cent of all farms.	Acres.	Per cent of in- crease.	Per cent of total land area.	Per cent of land in farms.	Per cent of im- proved land in farms.
1920.....	22,218	12.7	86.6	1,371,651	37.2	2.6	27.2	80.0
1910.....	19,709	10.0	90.9	999,410	58.8	1.9	29.4	73.0
1900.....	17,924	84.8	92.5	628,293	188.8	1.2	15.3	61.0
1890.....	9,724		92.5	263,473		0.5	20.0	48.1

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

DATE OF BEGINNING.	Number of enter- prises.	Area in- cluded in enter- prises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enter- prises were ca- pable of irrigating in 1920 (acres).
			Acres.	Per cent of area in enter- prises.	
Total.....	2,403	2,359,244	1,371,651	58.1	1,700,550
Before 1860.....	157	131,071	106,132	81.0	118,938
1860-1869.....	256	165,414	144,957	87.6	150,010
1870-1879.....	268	247,868	201,840	81.4	222,904
1880-1889.....	389	474,566	300,415	63.3	334,883
1890-1899.....	296	184,057	113,386	61.6	125,078
1900-1904.....	127	124,565	81,407	65.4	91,590
1905-1909.....	171	551,485	250,048	45.3	404,876
1910-1914.....	179	257,123	67,466	26.2	121,504
1915-1919.....	205	149,259	44,989	30.1	64,172
Not reported.....	355	73,636	61,061	82.7	66,595

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

CLASS.	AREA IRRIGATED (ACRES).				Area enter- prises were capable of irrigat- ing in 1920 (acres).	Area in- cluded in enter- prises, 1920 (acres).
	1919	1909	Increase. ¹			
			Amount.	Per cent.		
Total.....	1,371,651	999,410	372,241	37.2	1,700,550	2,359,244
Streams, gravity.....	1,105,691	954,800	150,891	15.8	1,389,171	1,917,751
Streams, pumped.....	10,389	2,559	7,830	306.0	16,575	76,187
Streams, pumped and gravity.....	50	(²)	.....	.....	200	350
Wells, pumped.....	7,308	300	7,008	.....	12,941	19,503
Wells, flowing.....	4,908	4,100	808	19.7	5,706	10,252
Wells, flowing and pumped.....	178	(²)	.....	.....	261	331
Lakes, pumped.....	11,400	.....	.....	.....	19,000	24,400
Lakes, gravity.....	15,218	1,671	13,547	810.7	16,185	17,285
Springs.....	41,810	35,412	6,398	16.7	45,128	80,378
Stored storm water.....	977	568	409	72.0	1,620	2,330
City water.....	25	(²)	.....	.....	25	25
Streams, gravity, and pumped wells.....	125	(²)	.....	.....	233	233
Streams, gravity, and flowing wells.....	537	(²)	.....	.....	595	793
Other mixed.....	173,495	(²)	.....	.....	201,841	229,324
Other and not reported.....	40	(²)	.....	.....	71	102

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.

Utah enacted the original irrigation district law in the United States in 1865, which did not, however, contain the provision for issuing bonds, which is the most important feature of present-day irrigation dis-

trict laws. Many districts were organized under this law, but they were short-lived. A district law providing for the issuing of bonds was enacted in 1909, but little has been done under this law. Some of the land served by the United States Reclamation Service has been organized into irrigation districts, 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. The Reclamation Service also supplies stored water to land in other enterprises under the terms of the Warren Act (act of Congress, Feb. 21, 1911) and under special agreements.

The state of Utah accepted the terms of the Federal Carey Act (act of Congress, Aug. 18, 1894) in 1897, but little has been done under this act.

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.....	1,371,651	999,410	372,241	37.2
Individual and partnership.....	196,887	222,448	-25,561	-25.0
Cooperative.....	1,014,649	687,290	327,359	47.6
Irrigation district.....	21,143	8,455	12,688	150.1
Carey Act.....	16,000	5,000	11,000	220.0
Commercial.....	70,811	64,727	6,084	9.6
U. S. Reclamation Service.....	* 29,285		29,285	
U. S. Indian Service.....	25,270	11,520	13,750	119.4
City.....	24,206	(²)	24,206	
Other.....	3,300	(²)	3,300	
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total.....	1,700,550	1,250,246	450,304	36.0
Individual and partnership.....	195,858	257,266	-61,408	-23.9
Cooperative.....	1,225,084	790,855	434,229	54.9
Irrigation district.....	24,023	8,455	15,568	184.1
Carey Act.....	35,000	20,000	15,000	75.0
Commercial.....	91,833	87,070	4,763	5.5
U. S. Reclamation Service.....	* 50,030		50,030	
U. S. Indian Service.....	49,870	86,000	-36,130	-42.4
City.....	25,552	(²)	25,552	
Other.....	3,300	(²)	3,300	
ACREAGE INCLUDED IN ENTERPRISES.				
Total.....	2,359,244	1,947,625	411,619	21.1
Individual and partnership.....	261,720	376,502	-114,782	-30.5
Cooperative.....	1,736,863	1,259,351	477,512	37.9
Irrigation district.....	27,933	10,802	17,131	158.6
Carey Act.....	38,000	43,000	-5,000	-11.6
Commercial.....	147,933	151,970	-4,037	-2.7
U. S. Reclamation Service.....	* 60,030		60,030	
U. S. Indian Service.....	55,870	106,000	-50,130	-47.3
City.....	27,595	(²)	27,595	
Other.....	3,300	(²)	3,300	

¹ A minus sign (—) denotes decrease.

² Does not include about 23,000 acres to which stored water is supplied under Warren Act.

³ Not included in classification in 1910.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

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

The organic act of the territory of Utah, enacted in 1851, did not mention the subject of irrigation, but the territorial legislature disposed of water rights by direct grant and also delegated this power to the county courts of the several counties. Many such grants were made both by the legislature and by the county courts in some counties.

The act of February 20, 1880, provided for the recording of vested rights to the use of water and for regulating their exercise. The county selectmen were made water commissioners for their respective counties and were empowered to hear and determine all claims to the use of water, and to issue certificates showing their findings. No suits were to be maintained in the courts until the commissioners had acted, but appeal might be taken to the courts.

The constitution of the state of Utah, adopted in 1896, declares (Art. XVII) that "all existing rights to any waters of this state for any useful or beneficial purpose are hereby recognized and confirmed."

The act of March 11, 1897, provided that any party desiring to appropriate water should post a notice at the intended point of diversion and in the nearest post office and should file a copy of the notice in the county records.

The act of March 12, 1903, provided that parties wishing to appropriate water should apply to the state engineer for permits, and for the issuing of certificates by the state engineer when works have been completed and water used in accordance with the terms of the permits.

The same act provided a special procedure for the adjudication of water rights. The state engineer was to make surveys and collect information regarding rights, and submit reports to the appropriate district courts. The courts were to determine rights on the basis of these reports and any testimony they might take. This act is still in force, but has not been utilized to any large extent. Many rights have been adjudicated in ordinary suits between claimants.

Riparian rights are not recognized in Utah.

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.....	1,371,651	100.0	100.0
Appropriation and use.....	469,944	34.3	51.5
Notice filed and posted.....	171,955	12.5	6.2
Adjudicated by court.....	581,080	42.4	35.1
Permit from state.....	56,061	4.1	3.9
Certificate or license from state.....	66,778	4.9	3.2
Underground.....	8,631	0.6	(1)
Other and mixed.....	4,077	0.3	(1)
Not reported.....	13,125	0.9	(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.....	1,371,651	713,621	92.2	2,359,244	1,700,550
Tributaries of Great Salt Lake.....	870,868	402,406	41.9	836,075	680,283
Bear River and tributaries.....	202,581	141,616	43.1	272,100	218,037
Bear River direct.....	104,731	48,560	115.7	161,328	117,523
Little Bear River.....	46,541	38,592	20.6	48,358	46,890
Malad River.....	1,189	(2)	.....	1,935	1,189
Other tributaries of Bear River.....	50,220	* 54,484	-7.8	60,479	52,435
Weber River and tributaries.....	97,539	80,355	21.4	149,051	112,031
Weber River direct.....	44,726	41,067	6.6	83,796	40,341
Ogden River.....	21,584	22,873	-2.2	27,097	26,882
East Canyon Creek.....	6,202	4,414	40.5	6,538	6,468
Other tributaries of Weber River.....	24,777	* 11,601	113.6	31,650	30,320
Jordan River and Utah Lake and tributaries.....	270,598	180,435	50.0	414,894	329,265
Jordan River direct.....	48,052	32,401	48.3	90,495	65,720
Big Cottonwood Creek.....	10,991	8,813	24.7	13,207	12,271
Little Cottonwood Creek.....	12,144	7,673	58.3	16,698	16,691
American Fork River.....	19,146	20,446	-6.4	20,371	20,241
Provo River.....	54,782	36,939	48.3	62,703	56,672
Hobbs Creek.....	5,620	18,424	-69.5	6,599	5,946
Spanish Fork River.....	61,434	23,778	158.4	96,176	83,142
Other tributaries of Jordan River and Utah Lake.....	58,429	* 21,961	82.8	108,655	78,582
Sevier River and tributaries.....	325,718	131,048	148.5	630,484	402,387
Sevier River direct.....	153,651	59,257	159.3	351,553	226,199
San Pitch River.....	77,615	42,502	82.6	105,519	78,348
Otter Creek.....	7,289	5,260	38.6	7,845	7,289
South Fork.....	18,325	3,495	424.3	32,620	19,170
Other tributaries of Sevier River.....	68,837	* 20,534	235.2	132,947	71,381
Green River and tributaries.....	280,877	53,934	420.8	510,426	385,612
Green River direct.....	2,541	1,372	85.2	3,629	3,038
Ashley Fork River.....	26,787	16,834	69.2	44,087	44,087
Duchesne River.....	138,446	(2)	.....	322,689	217,809
Price River.....	23,811	0,021	259.6	37,191	24,848
San Rafael River.....	77,290	21,546	253.7	85,028	80,028
Other tributaries of Green River.....	12,002	* 8,561	40.2	17,802	15,802
Grand River and tributaries.....	9,740	* 3,843	153.4	24,615	18,529
Colorado River and tributaries.....	71,959	34,845	106.5	171,054	92,850
Fremont River.....	26,513	15,701	68.9	42,005	34,005
Virgin River.....	27,106	10,741	152.4	82,450	35,586
San Juan River.....	9,554	(2)	.....	26,646	14,158
Other tributaries of Colorado River.....	8,788	* 8,403	4.0	19,953	9,101
Independent streams.....	112,499	87,545	28.5	186,590	140,889
Beaver River.....	28,732	15,599	84.2	53,729	46,469
Coal Creek.....	27,206	2,845	856.3	60,891	33,893
Deep Creek.....	1,983	1,515	30.9	4,326	3,446
Grouse Creek.....	3,469	990	250.4	4,599	3,639
Other independent streams.....	51,099	* 66,596	-23.3	63,045	53,442

¹ A minus sign (-) denotes decrease.

² Included in "Other tributaries" 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. ¹
1920.....	\$32,097,351	128.4	\$18.84	67.9
1910.....	14,028,717	139.2	11.22	20.4
1900.....	5,865,302	111.0	9.32	-11.7
1890.....	2,780,000	.....	10.55	.....

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.....	\$32,037,351	100.0	\$18.81
Before 1890.....	1,883,633	5.9	15.84
1890-1899.....	1,639,394	5.1	10.93
1870-1879.....	2,495,342	7.8	11.19
1880-1889.....	4,728,282	14.8	14.12
1890-1899.....	2,333,321	7.3	18.65
1900-1904.....	807,149	2.5	8.81
1905-1909.....	10,322,803	32.2	28.50
1910-1914.....	5,113,678	16.0	42.09
1915-1919.....	1,863,298	5.8	29.04
Not reported.....	856,451	2.6	12.77

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.....	\$32,037,351	100.0	\$18.84	1,122,456	\$1.08
Streams, gravity.....	26,503,462	82.7	19.20	910,594	1.01
Streams, pumped.....	735,077	2.3	44.23	7,444	5.16
Streams, pumped and gravity.....	5,100	(*)	25.50	—	—
Wells, pumped.....	153,091	0.5	11.83	6,212	2.08
Wells, flowing.....	167,152	0.5	29.29	756	1.79
Wells, flowing and pumped.....	18,571	0.1	71.15	27	9.48
Lakes, pumped.....	565,000	1.8	29.74	26,400	3.58
Lakes, gravity.....	75,281	0.2	4.65	13,577	0.25
Springs.....	899,214	2.7	19.26	25,858	0.75
Stored storm water.....	81,808	0.3	50.50	857	2.23
City water.....	800	(*)	32.00	—	—
Streams, gravity, and pumped wells.....	22,000	0.1	94.42	85	2.94
Streams, gravity, and flowing wells.....	11,822	(*)	19.87	203	0.49
Other mixed.....	2,828,242	8.8	14.01	130,126	0.94
Other and not reported.....	2,736	(*)	38.54	17	1.76

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.....	\$32,037,351	\$7,363,607	\$24,733,744	338.7
Tributaries of Great Salt Lake.....	14,102,393	5,017,457	9,084,936	181.1
Bear River and tributaries.....	3,430,663	2,397,638	1,033,025	43.1
Bear River direct.....	2,150,603	2,062,254	88,349	4.3
Little Bear River.....	720,363	165,170	555,193	341.5
Malad River.....	18,087	(*)	—	—
Other tributaries of Bear River.....	541,600	\$ 172,214	369,386	214.5
Weber River and tributaries.....	2,106,048	796,837	1,309,211	164.3
Weber River direct.....	1,353,323	549,432	803,891	148.3
Ogden River.....	423,755	168,406	255,349	151.6
East Canyon Creek.....	74,010	22,890	51,120	223.3
Other tributaries of Weber River.....	254,960	\$ 50,109	198,851	354.4
Jordan River and Utah Lake and tributaries.....	8,565,682	1,822,982	6,742,700	369.9
Jordan River direct.....	740,836	753,100	—6,264	—0.8
Big Cottonwood Creek.....	315,563	45,590	269,973	592.2
Little Cottonwood Creek.....	226,221	25,825	200,396	776.0
American Fork River.....	302,449	162,180	140,269	86.5
Provo River.....	985,979	328,691	657,288	200.0
Hobbs Creek.....	41,024	32,588	8,436	25.9
Spanish Fork River.....	4,120,999	123,930	4,003,069	—
Other tributaries of Jordan River and Utah Lake.....	1,820,611	\$ 351,128	1,469,483	418.5
Sevier River and tributaries.....	9,508,836	808,872	8,700,964	—
Sevier River direct.....	7,002,349	443,032	6,559,317	—
San Pitch River.....	1,142,510	228,536	913,974	398.9
Other Creek.....	151,880	18,355	133,525	727.3
South Fork.....	372,628	15,080	357,548	—
Other tributaries of Sevier River.....	840,501	\$ 103,299	737,202	712.7

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

DRAINAGE BASIN.	1920	1902	INCREASE. ¹	
			Amount.	Per cent.
Green River and tributaries.....	\$4,154,660	\$508,374	\$3,646,286	717.2
Green River direct.....	376,325	26,150	350,175	—
Ashley Fork River.....	374,140	57,835	316,305	546.9
Duchesne River.....	2,428,174	(*)	—	—
Price River.....	458,725	41,719	417,006	999.6
San Rafael River.....	285,100	285,850	—7,750	—2.6
Other tributaries of Green River.....	229,198	\$ 89,820	142,378	104.0
Grand River and tributaries.....	219,489	13,760	205,729	—
Colorado River and tributaries.....	2,203,203	441,845	1,761,358	398.6
Fremont River.....	567,050	189,380	377,670	199.4
Virgin River.....	1,257,981	155,515	1,102,466	708.9
San Juan River.....	206,438	(*)	—	—
Other tributaries of Colorado River.....	171,714	\$ 96,950	74,764	77.1
Independent streams.....	1,847,770	513,299	1,334,471	200.0
Beaver River.....	842,305	65,325	776,980	—
Coal Creek.....	179,171	7,076	172,095	—
Deep Creek.....	8,844	6,692	2,152	32.2
Grouse Creek.....	28,338	2,850	25,488	894.3
Other independent streams.....	789,112	\$ 431,356	357,756	82.9

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.

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.....	\$32,037,351	100.0	1,122,456	\$1.08
Individual and partnership.....	2,736,804	8.6	64,612	2.43
Cooperative.....	20,254,212	63.2	895,509	0.87
Irrigation district.....	265,484	0.8	19,143	0.71
Carey Act.....	1,823,779	4.1	16,000	0.69
Commercial.....	2,374,991	7.4	70,431	2.71
U. S. Reclamation Service.....	3,567,057	11.1	29,255	1.80
U. S. Indian Service.....	765,354	2.4	—	—
City.....	729,090	2.3	24,206	1.08
Other.....	20,580	0.1	3,300	0.33

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.

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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.....	143
Acreage included in enterprises reporting land drained or needing drainage.....	503,212
Acreage for which drains have been installed.....	85,448
Additional acreage needing drainage.....	91,976
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage.....	17.0
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state.....	3.6
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.....	7.5

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 meas-ured.
Average volume entering canals.....second-feet..	48,620	15,106	33,523
Area irrigated in 1919.....acres..	937,243	720,715	216,528
Average number of acres per second-foot.....	19	48	6
Total quantity entering canals.....acre-feet..	3,554,233	2,708,931	845,302
Area irrigated in 1919.....acres..	982,614	770,348	212,266
Average quantity per acre.....acre-feet..	3.6	3.5	4.0
Total quantity of water delivered.....acre-feet..	1,718,769	729,360	989,409
Area irrigated in 1919.....acres..	353,424	188,406	165,018
Average quantity per acre.....acre-feet..	4.9	3.9	6.0

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.....	1,479	307	2,381	29,447	6,343	4,068	5,334	476	1,600,505
Before 1860.....	168	18	204	1,723	412	673	502	32	3,638
1860-1869.....	205	9	366	3,145	711	615	539	22	30,558
1870-1879.....	245	20	317	3,556	927	706	644	35	8,069
1880-1889.....	311	127	449	6,042	1,354	827	768	71	72,113
1890-1899.....	190	26	315	2,400	736	289	286	50	47,447
1900-1904.....	34	9	114	2,047	291	136	157	24	16,080
1905-1909.....	170	31	177	6,114	812	430	1,037	48	688,990
1910-1914.....	63	16	147	2,423	459	227	1,205	71	448,384
1915-1919.....	66	38	117	1,313	250	85	109	52	283,066
Not reported.....	27	4	175	684	391	80	87	61	2,170

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.....	154.7	1,256	96,371	192	39,059	250	11,392	291	783,588
Before 1860.....	22.1	15	1,915	7	2,210	15	134	18	7,980
1860-1869.....	5.0	14	177	2	550	5	84	5	4,600
1870-1879.....	22.8	9	137	3	-----	3	1,840	9	6,400
1880-1889.....	41.8	38	6,162	4	-----	4	1,060	9	524,650
1890-1899.....	13.4	109	4,640	15	2,228	12	50	13	1,378
1900-1904.....	2.5	126	6,356	6	1,620	10	120	11	6,740
1905-1909.....	10.2	248	24,162	19	3,890	22	1,989	28	53,202
1910-1914.....	9.8	122	8,955	34	8,782	43	3,480	51	60,435
1915-1919.....	9.0	168	17,833	71	16,883	104	2,332	112	108,873
Not reported.....	18.1	407	26,034	38	2,906	32	303	35	9,330

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.....	1,479	307	2,381	29,447	6,343	4,068	5,334	476	1,600,505
Individual and partnership.....	408	48	1,422	4,027	2,077	323	956	313	46,231
Cooperative.....	1,017	241	877	21,602	3,758	3,284	3,614	143	763,299
Irrigation district.....	37	5	33	292	83	27	53	5	280,972
Carey Act.....	1	1	1	590	7	20	95	2	252,500
Commercial.....	6	2	14	1,256	236	49	78	2	27,000
U. S. Reclamation Service.....	1	2	3	820	28	35	71	1	250,000
U. S. Indian Service.....	2	-----	18	3	93	201	392	-----	-----
City.....	7	8	17	425	60	129	175	10	503
Other and not reported.....	-----	-----	1	22	1	-----	-----	-----	-----

IRRIGATION—UTAH.

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 (horse-power).	Number.	Capacity (gallons per minute).
Total.....	154.7	1,256	96,371	192	39,059	250	11,392	291	783,588
Individual and partnership.....	68.8	1,092	75,999	181	31,829	220	2,540	231	106,943
Cooperative.....	73.1	164	20,372	11	7,230	26	3,502	40	267,145
Commercial.....	3.6					3	4,350	12	27,000
Irrigation districts.....	1.2								
City.....	8.0					1	1,000	8	382,500

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.....	1,479	307	2,381	29,447	6,343	4,068	5,334	470	1,600,505
Tributaries of Great Salt Lake.....	576	71	1,057	13,165	2,435	1,672	2,068	164	568,177
Bear River and tributaries.....	118	17	319	4,253	781	479	320	48	2,026
Bear River direct.....	8	1	40	2,264	322	17	74	2	
Little Bear River.....	47	6	104	1,074	195	395	183	4	4
Malad River.....	2	1	3	13	10			1	2
Other tributaries of Bear River.....	61	9	172	902	254	67	63	41	2,020
Weber River and tributaries.....	256	18	391	2,823	570	146	106	52	30,794
Weber River direct.....	72	1	101	1,417	181	53	46	5	22
Ogden River.....	27		73	490	109	57	29	4	4
East Canyon Creek.....	38	1	40	179	49	5	5	2	28,004
Other tributaries of Weber River.....	119	16	177	747	231	31	26	41	2,764
Jordan River and Utah Lake and tributaries.....	202	36	347	6,089	1,084	1,047	1,642	64	535,357
Jordan River direct.....	14	4	20	1,151	296	101	26	3	600
Big Cottonwood Creek.....	32	3	27	228	58	160	31	4	300
Little Cottonwood Creek.....	21	1	36	650	60	50	45	1	750
American Fork River.....	27		23	70	43	63	130	4	
Provo River.....	31	11	99	1,752	304	416	262	21	6,681
Hobbs Creek.....	1		13	31	9	10	4	1	2
Spanish Fork River.....	12	6	46	1,358	93	95	202	8	502,116
Other tributaries of Jordan River and Utah Lake.....	64	11	83	849	221	152	942	22	24,908
Sevier River and tributaries.....	95	50	321	7,762	1,301	903	1,195	63	869,405
Sevier River direct.....	23	13	44	4,693	468	330	508	14	741,900
San Pitch River.....	26	20	80	970	372	254	401	21	30,698
Otter Creek.....	2	3	12	86	42	24	9	3	8,900
South Fork.....	9		32	381	114	65	42	2	21,015
Other tributaries of Sevier River.....	35	14	153	1,632	395	230	235	23	68,892
Green River and tributaries.....	414	11	239	4,047	1,047	775	1,404	15	51,919
Green River direct.....	2		10	71	29	12			
Ashley Fork River.....	109		18	113	75	8	15		
Duchesne River.....	156	8	106	2,416	543	306	771	7	41,871
Price River.....	13	1	54	636	161	37	34	2	1,248
San Rafael River.....	11	2	30	591	170	401	570	6	8,800
Other tributaries of Green River.....	123		21	220	69	11	14		
Grand River and tributaries.....	36	5	80	286	132	44	24	6	13,152
Colorado River and tributaries.....	260	129	303	1,693	570	229	219	56	25,542
Fremont River.....	148	117	43	548	121	87	65	13	4,078
Virgin River.....	85	7	164	645	263	89	86	21	19,655
San Juan River.....	16	4	38	332	75	32	47	11	1,485
Other tributaries of Colorado River.....	11	1	58	168	111	21	21	11	324
Independent streams.....	98	41	381	2,494	768	445	424	172	72,310
Beaver River.....	36	14	128	775	210	196	229	9	40,555
Coal Creek.....	22	2	58	1,158	136	97	63	63	967
Deep Creek.....	3		21	50	36			2	
Grouse Creek.....	14	3	29	35	45			1	10
Other independent streams.....	23	22	145	476	341	152	132	97	30,778

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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.....	154.7	1,256	96,371	192	39,059	250	11,392	291	783,588	25
Tributaries of Great Salt Lake.....	100.3	395	34,780	68	16,067	137	9,917	167	686,245	38
Bear River and tributaries.....	14.7	114	5,167	57	11,597	97	2,443	103	103,370	42
Bear River direct.....	1.2	2	902	2	902	26	1,678	29	74,845	41
Little Bear River.....	2.0	20	3,025	4	60	4	60	4	3,740	18
Malad River.....	2	2	219	55	10,695	67	715	70	24,785	44
Other tributaries of Bear River.....	11.5	83	1,923	6	1,640	23	232	25	27,145	16
Weber River and tributaries.....	8.2	33	1,358	6	1,640	9	106	10	6,615	14
Weber River direct.....	1.3	12	338	1	230	1	7	1	230	33
Ogden River.....	1.8	9	320	5	1,410	13	119	14	20,300	17
Other tributaries of Weber River.....	5.1	12	650	5	2,830	17	7,242	39	555,730	38
Jordan River and Utah Lake and tributaries.....	77.4	248	28,255	5	2,830	5	4,300	20	388,500	19
Jordan River direct.....	0.3	9	130	1	900	3	23	3	1,830	21
Big Cottonwood Creek.....	2.0	9	92	1	830	1	20	1	900	45
American Fork River.....	2.2	27	2,665	1	766	1	6	1	766	14
Provo River.....	1.2	61	11,716	2	1,100	6	2,892	13	164,000	65
Hobbs Creek.....	18	21	1,390	2	1,100	6	2,892	13	164,000	65
Spanish Fork River.....	9.8	21	1,390	2	1,100	6	2,892	13	164,000	65
Other tributaries of Jordan River and Utah Lake.....	61.9	103	11,496	2	1,100	6	2,892	13	164,000	65
Sevier River and tributaries.....	9.0	258	38,863	3	178	8	117	10	18,318	30
Sevier River direct.....	1.9	184	27,127	1	150	1	5	1	11,250	4
San Pitch River.....	3.4	16	3	1	150	1	5	1	450	4
Otter Creek.....	6	6	112	2	28	6	112	7	6,618	35
Other tributaries of Sevier River.....	3.7	52	11,621	2	28	6	112	7	6,618	35
Green River and tributaries.....	0.9			1	1,350	10	545	13	39,315	29
Green River direct.....	0.3			1	1,350	8	537	10	11,580	26
Duchesne River.....	0.6					1		2	27,000	70
Price River.....	0.6					1	8	1	735	10
Other tributaries of Green River.....										
Grand River and tributaries.....	0.6					10	212	10	17,812	19
Colorado River and tributaries.....	11.4	6	196	3	1,500	3	32	3	900	80
Fremont River.....	1.0			3	1,500	3	32	3	900	80
Virgin River.....	3.2	4	106							
San Juan River.....	7.0	2	90							
Other tributaries of Colorado River.....	0.2									
Independent streams.....	32.5	597	22,532	117	19,964	82	569	88	20,998	14
Beaver River.....	1.5	1		11	3,610	9	91	9	4,010	21
Coal Creek.....	0.7	135	9,955	41	10,500	20	270	24	10,400	47
Grouse Creek.....				1	205	1	6	3	205	240
Other independent streams.....	30.3	461	12,577	64	5,589	52	202	52	6,322	9

IRRIGATION—UTAH.

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 in-crease. ¹	Unit.	1919		1909		Per cent of in-crease. ¹
		Acres.	Percent of total for state.	Acres.	Percent of total for state.			Amount.	Percent of total for state.	Amount.	Percent of total for state.	
Cereals:												
1	Corn.....	9,028	65.2	6,752	92.9	33.7	Bu.....	193,560	72.9	155,890	91.9	24.2
2	Oats.....	52,695	85.2	74,687	92.4	-29.4	Bu.....	1,560,574	90.5	3,065,554	95.2	-49.1
3	Winter wheat.....	41,289	27.6	72,293	40.5	83.7	Bu.....	548,706	28.9	2,059,700	52.2	18.
4	Spring wheat.....	91,533	77.0	15,938	59.6	-25.4	Bu.....	1,895,241	86.1	678,249	76.1	-54.3
5	Barley.....	11,884	74.6	1,396	26.7	178.8	Bu.....	309,724	84.8	27,412	41.7	1.8
6	Rye.....	3,892	37.5					27,915	38.5			
Hay and forage:												
7	Timothy alone.....	11,972	89.7	10,852	64.5	10.3	Tons...	19,200	91.1	23,685	69.2	-18.9
8	Timothy and clover mixed.....	31,284	94.3	3,429	29.8	812.3	Tons...	50,953	94.4	7,745	32.1	557.9
9	Clover alone.....	2,136	75.0	281	35.6	660.1	Tons...	3,383	83.7	629	35.1	437.8
10	Alfalfa.....	342,635	93.8	250,210	88.0	36.9	Tons...	738,746	98.6	724,395	91.5	2.0
11	Other tame grasses.....	22,341	88.0	15,756	80.4	41.8	Tons...	29,999	89.6	26,384	82.8	13.7
12	Grains cut green.....	9,320	59.8				Tons...	14,985	85.2			
13	Annual legumes cut for hay.....	1,596	87.2	1,057	68.6	932.7	Tons...	3,601	89.0	1,851	70.5	904.1
14	Wild, salt, or prairie grasses.....	67,344	83.2	64,160	94.5	5.0	Tons...	78,886	82.9	89,609	98.1	-12.0
15	Corn cut for forage.....	3,837	57.8	(²)			Tons...	9,557	75.7	(²)		
16	Silage crops.....	3,377	86.8	(²)			Tons...	27,284	86.9	(²)		
17	Root crops for forage.....	733	78.6	(²)			Tons...	7,024	78.8	(²)		
Vegetables:												
18	Potatoes.....	10,758	89.3	13,264	93.3	-18.9	Bu.....	1,559,386	94.6	2,237,600	92.9	-30.3
19	Green peas.....	2,056	84.4	(²)								
20	Tomatoes.....	3,428	94.0	(²)								
Fruits:												
21	Grapes.....	93,344	45.5	(²)			Lbs....	535,807	48.6	(²)		
22	Apples.....	594,168	81.8	(²)			Bu.....	756,624	99.6	(²)		
23	Peaches.....	519,350	93.7	(²)			Bu.....	854,342	96.7	(²)		
24	Pears.....	46,261	89.3	(²)			Bu.....	65,861	86.6	(²)		
25	Plums and prunes.....	55,925	83.6	(²)			Bu.....	44,112	87.0	(²)		
26	Cherries.....	94,612	84.0	(²)			Bu.....	107,238	86.8	(²)		
Miscellaneous:												
27	Sugar beets grown for sugar.....	92,439	99.0	26,032	94.8	255.1	Tons...	921,418	99.0	393,897	95.2	133.9
28	Clover and alfalfa seed.....	9,692	72.3	8,083	60.8	19.9	Bu.....	46,125	75.5	36,366	69.7	26.8

CROP.		AVERAGE YIELD PER ACRE, 1919.						VALUE.				
		Unit.	For state.	On non-irrigated land.	On irrigated land.			1919	Per cent of total for state.	1909	Per cent of total for state.	Per cent of in-crease. ¹
					Average.	Per cent of average for state.	Per cent of average on non-irrigated land.					
Cereals:												
1	Corn.....	Bu.....	19.2	14.9	21.4	111.5	143.6	\$377,442	72.9	\$125,379	93.3	201.0
2	Oats.....	Bu.....	27.9	17.9	29.6	106.1	165.4	1,872,689	90.5	1,578,417	94.5	18.6
3	Winter wheat.....	Bu.....	12.7	12.5	13.3	104.7	106.4	1,207,153	28.9			
4	Spring wheat.....	Bu.....	18.5	11.2	20.7	111.9	184.8	4,169,530	86.1	2,006,852	53.3	167.9
5	Barley.....	Bu.....	22.9	13.7	26.1	114.0	190.5	526,531	84.8	369,201	78.1	42.6
6	Rye.....	Bu.....	7.0	6.9	7.2	102.9	104.3	57,226	38.5	18,206	39.3	214.3
Hay and forage:												
7	Timothy alone.....	Tons...	1.58	1.37	1.60	101.3	116.8	508,800	91.1	211,763	69.9	140.3
8	Timothy and clover mixed.....	Tons...	1.63	1.62	1.63	100.0	100.6	1,324,778	94.4	63,165	30.9	
9	Clover alone.....	Tons...	1.42	0.93	1.58	111.3	169.9	74,426	83.7	5,221	35.3	
10	Alfalfa.....	Tons...	2.05	0.45	2.16	105.4	480.0	18,838,023	98.6	5,425,453	91.2	247.2
11	Other tame grasses.....	Tons...	1.22	1.14	1.34	101.5	117.5	623,979	89.6	198,068	88.3	218.1
12	Grains cut green.....	Tons...	1.13	0.41	1.61	142.5	392.7	299,700	85.2			
13	Annual legumes cut for hay.....	Tons...	2.21	1.90	2.26	102.3	118.9	72,020	89.0	14,470	70.6	
14	Wild, salt, or prairie grasses.....	Tons...	1.18	1.20	1.17	99.2	97.5	1,498,834	82.9	525,401	99.1	135.3
15	Corn cut for forage.....	Tons...	1.90	1.09	2.49	131.1	228.4	129,020	75.7	(²)		
16	Silage crops.....	Tons...	8.07	7.98	8.08	100.1	101.8	272,840	86.9	(²)		
17	Root crops for forage.....	Tons...	9.85	9.45	9.58	100.3	101.4	136,908	78.8	(²)		
Vegetables:												
18	Potatoes.....	Bu.....	136.8	69.1	145.0	106.0	209.8	3,305,898	94.6	805,094	92.1	310.6
19	Green peas.....							133,259	84.2	(²)		
20	Tomatoes.....							483,659	93.3	(²)		
Fruits:												
21	Grapes.....	Lbs....	5.4	3.1	5.7	105.6	183.9	32,148	48.6	(²)		
22	Apples.....	Bu.....	1.0	(²)	1.3	130.0		1,261,923	99.6	(²)		
23	Peaches.....	Bu.....	1.6	0.8	1.6	100.0	200.0	1,366,947	96.7	(²)		
24	Pears.....	Bu.....	1.5	1.8	1.4	93.3	77.8	125,015	86.6	(²)		
25	Plums and prunes.....	Bu.....	0.8	0.6	0.8	100.0	133.3	77,196	87.0	(²)		
26	Cherries.....	Bu.....	1.1	0.9	1.1	100.0	122.2	348,524	86.8	(²)		
Miscellaneous:												
27	Sugar beets grown for sugar.....	Tons...	9.97	9.79	9.97	100.0	101.8	9,951,314	99.0	1,777,435	95.6	459.9
28	Clover and alfalfa seed.....	Bu.....	4.6	4.0	4.8	104.3	120.0	922,500	75.5	213,194	68.3	332.7

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.		
1	Cereals:												
2	Corn.....	Bu.....	19.2	14.9	21.4	111.5	143.6	\$377,442	72.9	\$125,379	93.3	201.0	
3	Oats.....	Bu.....	27.9	17.9	29.6	106.1	165.4	1,872,689	90.5	1,578,417	94.5	18.6	
4	Winter wheat.....	Bu.....	12.7	12.5	13.3	104.7	106.4	1,207,153	28.9	2,006,852	53.3	167.9	
5	Spring wheat.....	Bu.....	18.5	11.2	20.7	111.9	184.8	4,169,530	86.1				
6	Barley.....	Bu.....	22.9	13.7	26.1	114.0	190.5	526,531	84.8				369,201	78.1	42.6
	Rye.....	Bu.....	7.0	6.9	7.2	102.9	104.3	57,226	38.5	18,206	39.3	214.3	
7	Hay and forage:												
8	Timothy alone.....	Tons...	1.58	1.37	1.60	101.3	116.8	508,800	91.1	211,763	69.9	140.3	
9	Timothy and clover mixed.....	Tons...	1.63	1.62	1.63	100.0	100.6	1,324,778	94.4	63,165	30.9		
10	Clover alone.....	Tons...	1.42	0.93	1.58	111.3	169.9	74,426	83.7	5,221	35.3		
11	Alfalfa.....	Tons...	2.05	0.45	2.16	105.4	480.0	18,838,023	98.6	5,425,453	91.2	247.2	
12	Other tame grasses.....	Tons...	1.32	1.14	1.34	101.5	117.5	629,979	89.6	198,068	88.3	218.1	
13	Grains cut green.....	Tons...	1.13	0.41	1.61	142.5	392.7	299,700	85.2	14,470	70.6		
14	Annual legumes cut for hay.....	Tons...	2.21	1.90	2.26	102.3	118.9	72,020	89.0				
15	Wild, salt, or prairie grasses.....	Tons...	1.18	1.20	1.17	99.2	97.5	1,498,834	82.9	525,401	99.1	135.3	
16	Corn cut for forage.....	Tons...	1.90	1.09	2.49	131.1	228.4	129,020	75.7	(*)			
17	Silage crops.....	Tons...	8.07	7.98	8.08	100.1	101.8	272,840	86.9	(*)			
	Root crops for forage.....	Tons...	9.55	9.45	9.58	100.3	101.4	136,908	78.8	(*)			
18	Vegetables:												
19	Potatoes.....	Bu.....	136.8	69.1	145.0	106.0	209.8	3,305,898	94.6	805,094	92.1	310.6	
20	Green peas.....							133,259	84.2	(*)			
	Tomatoes.....							483,659	93.3	(*)			
21	Fruits:												
22	Grapes.....	Lbs....	5.4	3.1	5.7	105.6	183.9	32,148	48.6	(*)			
23	Apples.....	Bu.....	1.0	(*)	1.3	130.0		1,261,923	99.6	(*)			
24	Peaches.....	Bu.....	1.6	0.8	1.6	100.0	200.0	1,366,947	96.7	(*)			
25	Pears.....	Bu.....	1.5	1.5	1.4	93.3	77.8	125,015	86.6	(*)			
26	Plums and prunes.....	Bu.....	0.8	0.6	0.8	100.0	133.3	77,196	87.0	(*)			
	Cherries.....	Bu.....	1.1	0.9	1.1	100.0	122.2	348,524	86.8	(*)			
27	Miscellaneous:												
	Sugar beets grown for sugar.....	Tons...	9.97	9.79	9.97	100.0	101.8	9,951,314	99.0	1,777,435	95.6	459.9	
28	Clover and alfalfa seed.....	Bu.....	4.6	4.0	4.8	104.3	120.0	922,500	75.5	213,194	68.3	332.7	

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 Average yield per vine.
⁷ Average yield per tree.
⁸ Returns not sufficient to justify an average.

IRRIGATION—UTAH.

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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.	Beaver.	Box Elder.	Cache.	Carbon.	Daggett. ¹	Davis.	Duchesne. ²	Emery.	Garfield.
1 Number of all farms in 1920.....	25,662	373	1,859	2,242	235	37	1,172	1,248	759	540
2 Number of farms irrigated in 1919.....	22,218	343	1,538	1,969	181	36	1,096	1,188	727	410
3 Per cent of all farms.....	86.6	92.0	82.7	87.8	77.0	97.3	93.5	95.2	95.8	75.9
4 Number of farms irrigated in 1909.....	19,709	313	1,271	1,501	169	.....	1,193	.....	664	383
5 Per cent of increase, 1909-1919.....	12.7	9.6	21.0	31.2	7.1	.....	-8.1	.....	9.5	7.0
LAND AND FARM AREA.										
6 Approximate land area.....acres..	52,597,760	1,702,400	3,484,160	744,960	951,680	544,000	176,000	2,090,240	2,849,920	3,349,760
7 All land in farms.....acres..	5,050,410	52,626	542,348	317,698	35,899	18,665	98,732	252,031	105,268	113,712
8 Improved land in farms.....acres..	1,715,380	33,094	219,657	183,654	12,117	5,104	52,029	96,097	43,587	33,738
9 Area irrigated in 1919.....acres..	1,371,651	28,103	86,784	94,705	21,676	6,572	19,468	90,435	91,145	27,097
10 Per cent of improved land in farms.....	80.0	84.9	89.5	51.6	178.9	128.8	87.4	93.5	209.1	80.3
11 Area irrigated in 1909.....acres..	999,410	24,430	75,926	77,330	11,620	.....	25,291	.....	46,776	26,437
12 Per cent of increase, 1909-1919.....	37.2	16.0	14.2	22.5	86.5	.....	-23.0	.....	94.9	2.5
13 Area enterprises were capable of irrigating in 1920.....acres..	1,700,550	45,829	100,633	96,619	22,458	10,599	19,536	140,100	98,933	27,353
14 Area enterprises were capable of irrigating in 1910.....acres..	1,250,246	26,630	94,133	82,503	30,882	.....	25,447	.....	50,524	33,532
15 Per cent of increase, 1910-1920.....	36.0	72.1	6.9	17.1	-27.2	.....	-23.2	.....	95.8	-18.4
16 Area included in enterprises in 1920.....acres..	2,359,244	52,180	145,465	100,507	33,381	10,600	20,375	225,959	112,943	54,998
17 Area included in enterprises in 1910.....acres..	1,947,625	31,931	129,084	119,304	40,778	.....	35,245	.....	87,303	49,322
18 Per cent of increase, 1910-1920.....	21.1	63.2	12.7	-15.8	-18.1	.....	-42.2	.....	29.4	11.5
19 Area of irrigated land reported as available for settlement.....acres..	189,563	16,874	15,590	80	10,700	3,750	.....	30,100	19,120	.....
IRRIGATION WORKS.										
Independent enterprises:										
20 Number, 1920.....	2,403	95	220	133	40	8	187	71	31	82
21 Number, 1910.....	2,472	109	218	137	45	.....	116	.....	46	107
Main ditches:										
22 Number, 1920.....	2,381	120	164	177	43	7	41	85	46	37
23 Number, 1910.....	2,495	125	185	150	50	.....	47	.....	51	106
24 Length, 1920.....miles..	6,343	207	481	344	141	28	72	356	227	221
25 Length, 1910.....miles..	5,837	208	354	324	123	.....	129	.....	230	202
26 Capacity, 1920.....second-feet..	29,447	759	1,411	1,820	546	153	114	1,588	1,061	454
27 Capacity, 1910.....second-feet..	25,081	611	2,107	1,393	600	.....	495	.....	1,065	971
Laterals:										
28 Number, 1920.....	4,068	195	67	433	31	2	81	265	447	37
29 Number, 1910.....	1,357	37	84	153	3	.....	41	.....	2	60
30 Length, 1920.....miles..	5,334	229	76	229	24	5	72	658	626	57
31 Length, 1910.....miles..	1,822	31	116	142	6	.....	59	.....	1	34
Reservoirs:										
32 Number, 1920.....	476	7	46	6	2	.....	72	7	9	5
33 Number, 1910.....	480	13	69	1	4	.....	28	.....	15	18
34 Capacity, 1920.....acre-feet..	1,000,505	40,451	3,597	1,509	1,248	.....	23,135	41,871	8,875	24,521
35 Capacity, 1910.....acre-feet..	888,317	12,945	260	1,566	26,746	.....	14,511	.....	13,850	43,477
Flowing wells:										
36 Number, 1920.....	1,256	1	82	32	.....	.....	379	.....	.....	.....
37 Number, 1910.....	1,138	.....	77	33	.....	.....	242	.....	.....	.....
38 Capacity, 1920.....gallons per minute..	96,371	.....	1,880	3,237	.....	.....	8,185	.....	.....	.....
39 Capacity, 1910.....gallons per minute..	42,794	.....	1,768	784	.....	.....	9,551	.....	.....	.....
Pumped wells:										
40 Number, 1920.....	192	11	61	.....	.....	.....	54	.....	.....	.....
41 Number, 1910.....	27	.....	22	.....	.....	.....	.....	.....	1	.....
42 Capacity, 1920.....gallons per minute..	39,059	3,610	12,932	.....	.....	.....	4,319	.....	.....	.....
43 Capacity, 1910.....gallons per minute..	4,827	.....	3,964	.....	.....	.....	.....	.....	480	.....
Pumping plants:										
44 Number, 1920.....	250	9	71	27	.....	2	50	1	2	.....
45 Number, 1910.....	69	.....	23	.....	.....	.....	.....	.....	11	.....
46 Engine capacity, 1920.....horsepower..	11,392	91	762	1,064	.....	13	179	.....	425	.....
47 Engine capacity, 1910.....horsepower..	2,143	.....	206	.....	.....	.....	.....	.....	378	.....
48 Pump capacity, 1920.....gallons per minute..	783,588	4,010	25,205	76,200	.....	965	5,253	27,000	8,000	.....
49 Pump capacity, 1910.....gallons per minute..	316,057	.....	3,957	.....	.....	.....	.....	.....	62,000	.....
50 Average lift, 1920.....feet..	25	21	46	.....	.....	11	9	70	46	.....
CAPITAL INVESTED.										
51 Capital invested to Jan. 1, 1920.....dollars..	32,037,351	831,344	1,896,863	1,436,207	420,075	112,698	522,813	1,432,832	781,800	430,199
52 Capital invested to July 1, 1910.....dollars..	14,028,717	91,922	1,880,966	304,285	449,291	.....	408,488	.....	509,285	262,095
53 Per cent of increase, 1910-1920.....	128.4	804.4	-3.9	372.0	-6.5	.....	27.9	.....	53.5	64.1
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	18.84	18.14	17.95	14.86	18.70	10.63	26.74	10.23	7.90	15.73
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	11.22	3.45	19.98	3.69	14.56	.....	16.05	.....	10.08	7.82
ESTIMATED FINAL COST.										
56 Estimated final cost of existing enterprises in 1920.....dollars..	33,835,641	859,444	2,084,063	1,472,007	420,075	112,698	545,313	1,848,675	871,800	430,199
57 Estimated final cost of existing enterprises in 1910.....dollars..	17,840,775	96,922	1,880,966	304,285	404,151	.....	408,483	.....	537,485	262,075
58 Per cent of increase, 1910-1920.....	89.7	786.7	10.8	383.8	-15.0	.....	33.5	.....	48.4	61.7
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	14.34	16.47	14.08	14.65	12.58	10.63	26.76	8.18	7.72	7.82
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	9.16	3.04	14.58	2.55	12.12	.....	11.59	.....	6.73	5.39

¹ Formed from part of Uintah County in 1918.

² Formed from part of Wasatch County in 1915; part of Uintah County annexed in 1917.

IRRIGATION—UTAH.

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 more than 1,000.]

	Grand.	Iron.	Juab.	Kana.	Millard.	Morgan.	Piute. ¹	Rich. ²	Salt Lake.	San Juan.
1 Number of all farms in 1920.....	114	646	419	229	1,038	289	246	224	2,438	405
2 Number of farms irrigated in 1919.....	89	512	305	172	941	232	224	204	1,564	203
3 Per cent of all farms.....	78.1	79.3	72.8	75.1	90.7	97.1	91.1	91.1	64.2	50.1
4 Number of farms irrigated in 1909.....	126	317	333	118	689	240	193	212	2,048	139
5 Per cent of increase, 1909-1919.....	-20.4	61.5	-8.4	45.8	30.6	-8.3	16.1	.....	-23.6	46.0
LAND AND FARM AREA.										
6 Approximate land area.....acres..	2,362,880	2,083,840	2,176,640	2,697,000	4,199,040	400,640	488,320	659,840	483,840	4,987,040
7 All land in farms.....acres..	42,666	278,671	105,741	71,861	185,197	117,230	35,093	236,971	317,281	167,739
8 Improved land in farms.....acres..	8,191	46,765	49,761	12,309	91,685	15,926	16,730	48,813	92,447	33,491
9 Area irrigated in 1919.....acres..	5,865	32,066	10,068	4,088	137,980	12,242	8,514	42,913	102,051	13,469
10 Per cent of improved land in farms.....	71.6	68.6	20.1	33.2	150.5	78.9	50.9	87.9	110.4	40.2
11 Area irrigated in 1909.....acres..	6,759	11,624	14,216	3,220	48,992	11,309	13,262	63,030	82,710	3,915
12 Per cent of increase, 1909-1919.....	-13.2	175.9	-29.6	27.0	181.6	8.3	-35.8	.....	23.4	51.1
13 Area enterprises were capable of irrigating in 1920.....acres..	9,664	38,658	12,372	4,469	209,694	13,506	10,258	43,503	125,194	23,283
14 Area enterprises were capable of irrigating in 1910.....acres..	8,723	12,321	16,949	3,330	91,788	11,606	15,406	68,780	100,555	9,336
15 Per cent of increase, 1910-1920.....	10.8	215.4	-27.0	34.2	128.5	16.4	-33.4	.....	24.5	149.4
16 Area included in enterprises in 1920.....acres..	11,010	98,475	14,707	7,114	373,926	13,806	10,938	50,238	176,122	40,511
17 Area included in enterprises in 1910.....acres..	22,372	19,652	21,699	6,633	241,922	12,058	51,253	89,791	121,452	21,254
18 Per cent of increase, 1910-1920.....	-50.8	401.1	-32.2	7.3	54.6	14.5	-78.7	.....	45.0	90.6
19 Area of irrigated land reported as available for settlement.....acres..	.....	.....	.....	45	29,116	.....	.....	.....	20,506	4,715
IRRIGATION WORKS.										
Independent enterprises:										
20 Number, 1920.....	37	86	27	25	66	95	22	37	135	42
21 Number, 1910.....	56	47	43	7	47	77	39	48	112	75
Main ditches:										
22 Number, 1920.....	51	75	30	27	77	114	36	59	129	69
23 Number, 1910.....	61	31	47	33	50	94	51	60	95	47
24 Length, 1920.....miles..	76	164	67	46	439	166	75	180	520	134
25 Length, 1910.....miles..	84	58	101	42	282	134	154	186	298	77
26 Capacity, 1920.....second-feet..	150	1,242	156	59	3,560	748	722	1,205	2,530	476
27 Capacity, 1910.....second-feet..	270	144	376	168	1,437	432	694	709	1,740	252
Laterals:										
28 Number, 1920.....	10	103	73	9	151	52	120	11	383	66
29 Number, 1910.....	16	3	21	4	52	35	13	39	89	2
30 Length, 1920.....miles..	8	67	58	8	384	26	35	30	920	63
31 Length, 1910.....miles..	18	9	30	6	154	18	13	66	123	1
Reservoirs:										
32 Number, 1920.....	3	66	3	9	21	3	3	4	14	14
33 Number, 1910.....	.....	21	5	11	12	7	3	12	5	12
34 Capacity, 1920.....acre-feet..	2,752	9,968	3,100	218	672,617	104	55,000	52	3,051	11,885
35 Capacity, 1910.....acre-feet..	.....	2,229	79	199	178,518	74	131,040	10,531	932	292
Flowing wells:										
36 Number, 1920.....	.....	139	11	.....	178	.....	.....	.....	20	2
37 Number, 1910.....	.....	86	6	.....	.....	.....	10	.....	68	10
38 Capacity, 1920.....gallons per minute..	.....	10,061	342	.....	28,955	.....	.....	.....	222	90
39 Capacity, 1910.....gallons per minute..	.....	2,137	100	.....	.....	.....	3,600	.....	1,910	774
Pumped wells:										
40 Number, 1920.....	.....	41	1	.....	.....	.....	.....	.....	1	.....
41 Number, 1910.....	.....	.....	.....	.....	1	.....	.....	.....	2	1
42 Capacity, 1920.....gallons per minute..	.....	10,500	28	.....	.....	.....	.....	.....	.....	.....
43 Capacity, 1910.....gallons per minute..	.....	.....	.....	.....	116	.....	.....	.....	67	200
Pumping plants:										
44 Number, 1920.....	11	21	3	.....	1	.....	.....	2	9	.....
45 Number, 1910.....	19	.....	.....	.....	1	.....	.....	.....	2	1
46 Engine capacity, 1920.....horsepower..	227	272	28	.....	.....	.....	.....	46	4,333	.....
47 Engine capacity, 1910.....horsepower..	404	.....	.....	.....	2	.....	.....	.....	8	15
48 Pump capacity, 1920.....gallons per minute..	17,812	10,400	2,468	.....	11,250	.....	.....	3,300	524,900	.....
49 Pump capacity, 1910.....gallons per minute..	31,057	.....	.....	.....	116	.....	.....	.....	67	200
50 Average lift, 1920.....feet..	18	56	40	.....	.....	.....	.....	40	34	.....
CAPITAL INVESTED.										
51 Capital invested to Jan. 1, 1920.....dollars..	167,511	854,295	562,667	150,188	5,148,282	147,278	253,668	319,225	2,096,530	259,287
52 Capital invested to July 1, 1910.....dollars..	133,609	41,569	156,298	63,064	1,664,652	53,197	312,310	268,005	1,817,542	78,337
53 Per cent of increase, 1910-1920.....	26.3	.....	260.0	188.2	211.1	176.9	-18.8	19.1	15.3	231.0
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	17.33	21.99	45.48	33.61	24.55	10.90	24.73	7.34	16.75	11.14
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	15.33	3.37	9.22	18.94	18.03	4.58	20.27	3.90	18.08	8.39
ESTIMATED FINAL COST.										
56 Estimated final cost of existing enterprises in 1920.....dollars..	218,211	882,370	564,667	152,688	5,210,982	147,378	255,168	319,225	2,154,030	319,162
57 Estimated final cost of existing enterprises in 1910.....dollars..	133,609	44,468	156,298	63,397	2,088,652	53,197	450,648	268,005	1,827,542	90,337
58 Per cent of increase, 1910-1920.....	63.2	.....	261.3	133.5	149.5	177.0	-43.4	19.1	17.9	253.3
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	19.82	8.96	38.39	21.46	13.94	10.67	23.33	6.35	12.23	7.88
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	5.98	2.26	7.20	9.86	8.63	4.41	8.79	2.98	15.05	4.25

¹ Part of Piute County annexed to Sevier County in 1902.² Part of Summit County annexed in 1917.

IRRIGATION—UTAH.

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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.]

	Sanpete.	Sevier. ¹	Summit. ²	Tooele.	Uintah. ³	Utah.	Wasatch. ⁴	Washington.	Wayne.	Weber.
1 Number of all farms in 1920.....	1,813	1,108	521	417	899	3,237	507	738	272	1,087
2 Number of farms irrigated in 1919.....	1,646	1,069	485	305	805	2,990	487	667	264	1,566
3 Per cent of all farms.....	90.8	96.5	93.1	73.1	89.5	92.4	96.1	90.4	97.1	92.8
4 Number of farms irrigated in 1909.....	1,650	1,034	396	272	586	2,717	946	568	235	1,396
5 Per cent of increase, 1909-1919.....	-0.2	3.4	-----	12.1	-----	10.0	-----	17.4	12.3	12.2
LAND AND FARM AREA.										
6 Approximate land area.....acres..	1,034,240	1,265,920	1,196,800	4,383,360	2,748,160	1,301,760	746,880	1,577,600	1,584,000	346,240
7 All land in farms.....acres..	391,007	113,005	271,778	163,375	126,151	318,133	150,536	127,899	33,551	259,566
8 Improved land in farms.....acres..	138,552	66,960	38,907	49,570	54,407	135,996	25,132	29,023	14,293	66,855
9 Area irrigated in 1919.....acres..	90,153	68,838	32,139	9,652	80,789	138,143	22,797	20,838	16,198	56,973
10 Per cent of improved land in farms.....	65.1	102.8	82.8	19.5	148.5	101.6	90.7	71.8	113.3	85.2
11 Area irrigated in 1909.....acres..	88,959	51,622	37,245	12,318	48,469	89,886	29,031	18,686	12,842	47,505
12 Per cent of increase, 1909-1919.....	1.3	33.4	-----	-21.6	-----	53.7	-----	11.5	17.0	19.9
13 Area enterprises were capable of irrigating in 1920.....acres..	91,885	69,178	32,394	11,453	127,787	173,487	22,892	29,077	18,690	70,846
14 Area enterprises were capable of irrigating in 1910.....acres..	90,389	52,425	39,313	13,606	130,850	102,926	49,539	24,662	15,980	48,131
15 Per cent of increase, 1910-1920.....	1.7	32.0	-----	-15.8	-----	68.6	-----	17.9	17.0	47.2
16 Area included in enterprises in 1920.....acres..	127,708	81,548	34,795	17,405	147,608	203,065	24,883	43,387	19,690	105,897
17 Area included in enterprises in 1910.....acres..	133,589	68,993	46,312	18,623	186,886	127,020	106,841	67,681	34,617	56,160
18 Per cent of increase, 1910-1920.....	-4.4	18.2	-----	-6.0	-----	59.9	-----	-35.9	-43.8	88.6
19 Area of irrigated land reported as available for settlement.....acres..	-----	2,556	-----	-----	1,100	27,664	-----	6,848	800	-----
IRRIGATION WORKS.										
Independent enterprises:										
20 Number, 1920.....	91	82	132	69	42	210	48	126	29	135
21 Number, 1910.....	106	78	173	77	66	230	162	105	39	107
Main ditches:										
22 Number, 1920.....	93	73	158	55	54	146	62	137	37	129
23 Number, 1910.....	177	69	173	70	90	226	166	138	49	75
24 Length, 1920.....miles..	429	312	232	144	295	381	161	226	97	212
25 Length, 1910.....miles..	394	234	277	168	371	400	395	263	141	192
26 Capacity, 1920.....second-feet..	1,159	1,979	665	146	996	2,725	766	527	174	1,517
27 Capacity, 1910.....second-feet..	1,630	1,390	635	239	3,136	1,730	1,305	437	366	683
Laterals:										
28 Number, 1920.....	262	288	24	29	58	449	212	79	56	72
29 Number, 1910.....	118	44	138	36	160	70	38	17	17	50
30 Length, 1920.....miles..	407	274	23	40	137	624	89	80	19	60
31 Length, 1910.....miles..	139	55	58	28	384	133	50	15	21	106
Reservoirs:										
32 Number, 1920.....	23	16	18	16	-----	32	16	18	10	33
33 Number, 1910.....	30	17	22	37	5	56	17	16	18	26
34 Capacity, 1920.....acre-feet..	20,708	87,779	1,810	21	-----	527,715	3,581	10,654	4,003	30,289
35 Capacity, 1910.....acre-feet..	33,816	11,925	488	443	404	48,612	1,454	44,242	14,274	320
Flowing wells:										
36 Number, 1920.....	33	46	-----	80	-----	220	-----	-----	-----	33
37 Number, 1910.....	156	103	-----	102	-----	195	-----	-----	-----	50
38 Capacity, 1920.....gallons per minute..	505	9,395	-----	4,362	-----	27,729	-----	-----	-----	1,358
39 Capacity, 1910.....gallons per minute..	4,070	5,125	-----	2,102	-----	9,316	-----	-----	-----	1,607
Pumped wells:										
40 Number, 1920.....	1	1	-----	7	1	4	-----	3	-----	6
41 Number, 1910.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
42 Capacity, 1920.....gallons per minute..	150	-----	-----	200	1,350	2,830	-----	1,500	-----	1,040
43 Capacity, 1910.....gallons per minute..	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pumping plants:										
44 Number, 1920.....	1	3	1	-----	4	8	-----	2	-----	22
45 Number, 1910.....	-----	-----	-----	-----	3	5	-----	3	-----	1
46 Engine capacity, 1920.....horsepower..	5	84	6	-----	92	2,919	-----	30	-----	225
47 Engine capacity, 1910.....horsepower..	-----	-----	-----	-----	54	966	-----	102	-----	25
48 Pump capacity, 1920.....gallons per minute..	450	4,150	900	-----	3,350	30,830	-----	900	-----	26,245
49 Pump capacity, 1910.....gallons per minute..	-----	-----	-----	-----	3,700	202,900	-----	2,330	-----	8,700
50 Average lift, 1920.....feet..	4	32	12	-----	20	43	-----	20	-----	17
CAPITAL INVESTED.										
51 Capital invested to Jan. 1, 1920.....dollars..	1,288,433	2,083,537	229,639	136,263	1,458,111	5,880,832	410,198	576,824	453,600	1,756,652
52 Capital invested to July 1, 1910.....dollars..	630,936	404,501	143,499	165,573	639,427	1,868,232	442,162	372,362	113,935	463,090
53 Per cent of increase, 1910-1920.....	104.2	415.1	-----	-17.7	-----	214.8	-----	54.9	298.1	279.3
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	14.02	30.12	7.00	11.90	11.65	33.90	17.92	19.84	24.27	24.80
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	6.98	7.72	3.65	12.17	7.18	18.15	8.93	15.10	7.13	9.62
ESTIMATED FINAL COST.										
56 Estimated final cost of existing enterprises in 1920.....dollars..	1,346,933	2,208,437	242,839	136,263	1,711,468	6,010,982	450,198	628,774	467,200	1,764,392
57 Estimated final cost of existing enterprises in 1910.....dollars..	653,214	404,501	143,499	165,573	995,635	4,613,401	525,965	507,362	146,925	463,090
58 Per cent of increase, 1910-1920.....	104.6	446.0	-----	-17.7	-----	31.5	-----	23.9	218.0	281.0
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	10.55	27.06	6.98	7.83	11.59	29.88	18.09	14.49	23.73	16.66
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	4.93	5.86	3.10	8.94	5.33	36.32	4.92	7.50	4.24	8.25

¹ Part of Plute County annexed to Sevier County in 1902.

² Part annexed to Rich County in 1917; part of Uintah County annexed to Summit County in 1917.

³ Parts annexed to Duchesne and Summit Counties in 1917; part taken to form Daggett County in 1918.

⁴ Part taken to form Duchesne County in 1915.

WASHINGTON.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Washington 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.

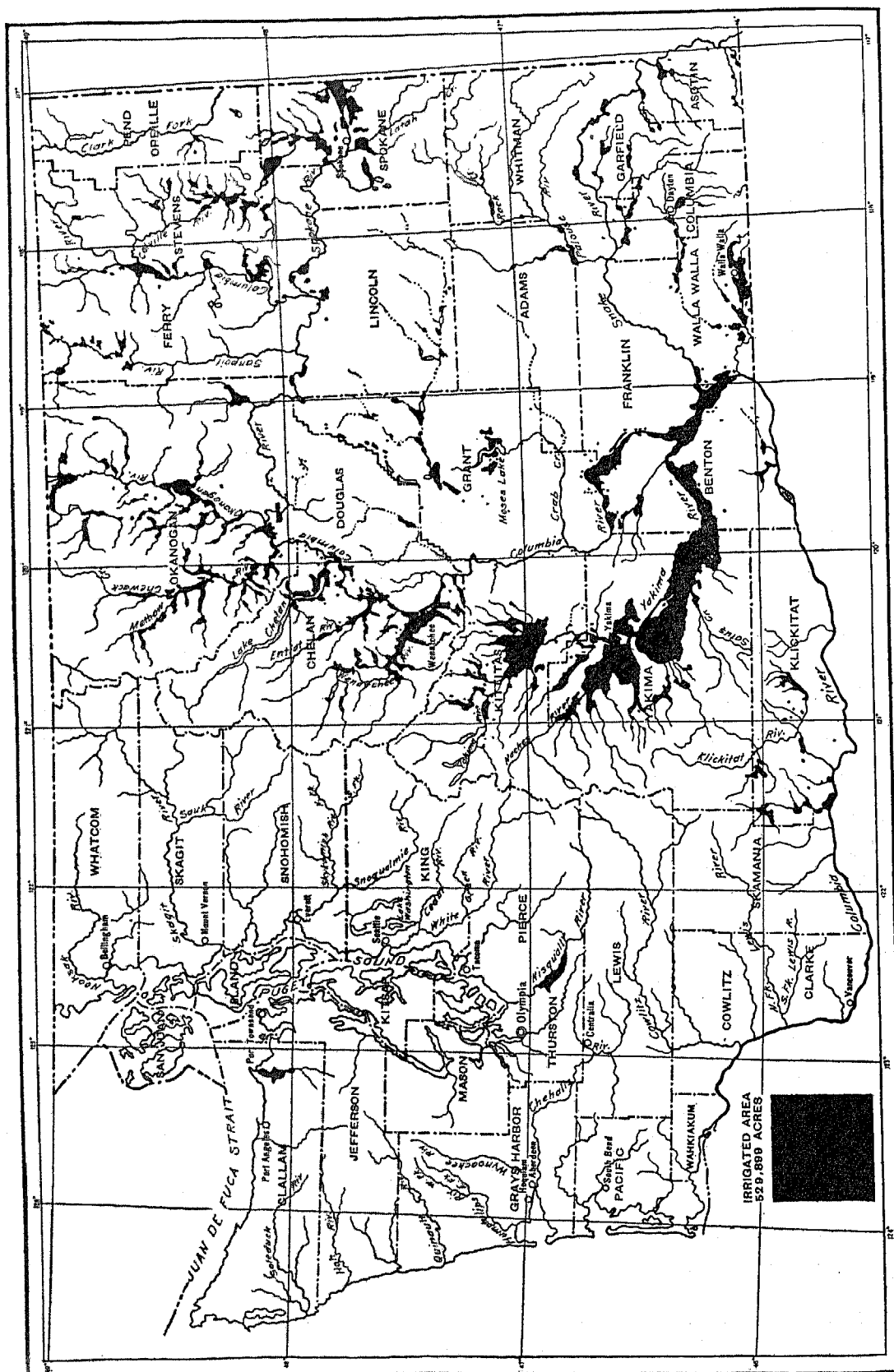
ITEM.	CENSUS OF—		INCREASE. ¹	
	1920	1910	Amount.	Percent.
Number of all farms.....	66,318	56,192	10,126	18.0
Approximate land area of the state.....acres..	42,775,040	42,775,040		
All land in farms.....acres..	13,219,053	11,712,235	1,506,818	12.9
Improved land in farms.....acres..	7,129,343	6,373,311	756,032	10.6
Number of farms irrigated.....	13,271	7,664	5,607	73.2
Area irrigated.....acres..	529,899	334,378	195,521	58.5
Area enterprises were capable of irrigating.....acres..	637,151	470,514	166,637	35.4
Area included in enterprises.....acres..	836,795	817,032	19,763	2.4
Per cent irrigated:				
Number of all farms.....	20.0	13.6	6.4	
Approximate land area of the state.....	1.2	0.8	0.4	
Land in farms.....	4.0	2.9	1.1	
Improved land in farms.....	7.4	5.2	2.2	
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	107,252	136,136	-28,884	-21.2
Excess of area included in enterprises over area irrigated.....acres..	306,896	482,654	-175,758	-36.4
Area of irrigated land reported as available for settlement.....acres..	61,738	(²)		
Capital invested.....	\$29,299,011	\$16,219,149	\$13,079,862	80.6
Average per acre enterprises were capable of irrigating.....	\$45.98	\$34.47	\$11.51	33.4
Estimated final cost of existing enterprises.....	\$37,684,591	\$22,322,856	\$15,361,735	68.8
Average per acre included in enterprises.....	\$45.03	\$27.32	\$17.71	64.8
Average cost of operation and maintenance per acre.....	\$3.45	\$3.08	\$0.37	12.0
IRRIGATION WORKS.				
Number of enterprises.....	2,692	1,934	758	39.2
Number of main ditches.....	1,873	1,600	273	17.1
Length of main ditches.....miles..	3,851	2,594	1,257	48.5
Capacity of main ditches.....second-feet..	16,242	13,178	3,064	23.3
Number of lateral ditches.....	3,179	1,180	1,999	169.4
Length of lateral ditches.....miles..	1,764	1,298	466	35.9
Number of reservoirs.....	205	156	49	31.4
Capacity of reservoirs.....acre-feet..	477,789	121,543	356,246	293.1
Number of flowing wells.....	60	55	5	
Capacity of flowing wells.....gallons per minute..	14,925	18,926	-4,001	-21.1
Number of pumped wells.....	520	128	392	306.3
Capacity of pumped wells.....gallons per minute..	227,744	60,220	167,524	278.2
Number of pumping plants.....	978	391	587	150.1
Engine capacity.....horsepower..	22,929	13,847	9,082	65.6
Pump capacity.....gallons per minute..	636,552	365,411	271,141	74.2
Average lift.....feet..	60	(³)	60	

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

² Not reported in 1910.

WASHINGTON

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

With reference to climatic conditions and the necessity for irrigation, the state of Washington may be divided into three fairly distinct zones—humid, arid, and semiarid.

West of the Cascade Mountains there is a heavy annual precipitation, varying from 21 to 55 inches in the valleys and from 55 inches upward in the mountains. In this section of the state there is a fairly well-defined wet season, more than 80 per cent of the precipitation occurring between October 15 and May 15, or the winter season. July and August are the driest months, the average precipitation for each of these months at many points being less than 1 inch. This creates a necessity for irrigation if crops not capable of withstanding considerable periods of drought are to be grown during the late summer months. However, only small areas are irrigated in this part of the state.

Immediately east of the Cascades and between them and Columbia River lies the arid section of the state. The rainfall at the summit of the Cascades is very heavy, but in the valleys, extending from the mountains to the Columbia, it varies from 12 to 6 inches per annum, and irrigation is necessary to the growing of crops. Most of the irrigated land in the state lies in this section.

East of the Columbia River lies the great wheat belt of Washington, where the annual rainfall varies from 13 to 25 inches. In this section most of the precipitation occurs in the fall, winter, and spring, leaving a dry summer season for the grain harvest. In this section there is little irrigation, although the desire to diversify crops has led to the consideration of many plans for irrigating large areas. These plans have not, however, advanced far enough to enter into the tabulation.

Weather conditions in 1919 were peculiarly unfavorable. The meteorologist of the United States Weather Bureau for the Washington section, in his annual summary, makes the following statement regarding the year 1919:

The most striking features of the weather in the year 1919 were the heavy rains, melting snows, and consequent freshets of January, a cold and backward spring, an unusually long and excessive drought in which the precipitation was deficient from April to November, periods of hot and desiccating winds in June and July * * *.

The snowfall of the season of 1918-19 was so much lighter in the mountains than the average that the irrigation supply proved inadequate at some projects, owing largely to the unusual demands of an excessively dry and hot summer. During the growing season there was even a less supply of rain than in the preceding year, which had also a noteworthy scarcity of precipitation.

From an agricultural point of view the year was hardly a successful one, but there was an unprecedented crop of unusually fine apples.

WATER SUPPLY FOR IRRIGATION.

West of the Cascade Mountains the streams flowing from these mountains and the Olympic Mountains to the Pacific Ocean and Puget Sound and to Columbia River furnish an ample supply of water for the small amount of irrigation required.

The streams most used for irrigation are those heading on the eastern slope of the Cascade Mountains and flowing into the Columbia. The precipitation on the Cascades is very heavy, affording a large supply of water, and there are many lakes on the headwaters of the rivers, affording opportunity for storing the flood water. The larger streams in this section, named in the order in which they enter the Columbia, from south to north, are the Klickitat, Yakima, Wenatchee, Entiat, Chelan, Methow, and Okanogan. While the building of storage reservoirs on these streams has been begun, there is opportunity for much additional storage. The streams named supply water to about 80 per cent of the total irrigated acreage of the state, Yakima River and tributaries alone supplying about 64 per cent of the total acreage.

East of Columbia River the principal streams entering the Columbia from the east, named in order from south to north, are the following: Walla Walla River, rising in the Blue Mountains in eastern Washington and Oregon; Snake River, rising in western Wyoming, flowing across the state of Idaho, and forming the eastern boundary of Oregon and Washington for nearly 200 miles; Spokane River, rising in Idaho; Colville River, rising in eastern Washington; and Clark Fork, rising in western Montana, flowing across northern Idaho and through northeastern Washington, and entering Columbia River just north of the international boundary. In this section of the state crops are grown without irrigation, and the water supply is not all utilized.

The Columbia itself enters the state from Canada near the northeast corner of the state and drains a large area in western Montana, northern Idaho, and southern Canada before entering Washington. Throughout most of its course the Columbia flows in a deep channel far below the level of the adjoining land and is not used to a large extent for irrigation.

The acreages irrigated from the various streams of the state and their tributaries are given in Table 7.

The extent of the supply of underground water has not been determined. Of the 60 flowing wells reported as being used for irrigation, two-thirds are in the vicinity of the confluence of Columbia and Snake Rivers. Pumped wells are more generally distributed, but nearly one-half of those reported are located in Benton and Grant Counties.

FARMS AND ACREAGE IRRIGATED.

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

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Num-ber.	Per cent of in-crease.	Per cent of all farms.	Acres.	Per cent of in-crease.	Per cent of total land area.	Per cent of land in farms.	Per cent of im-proved land in farms.
1920.....	13,271	73.2	20.0	529,899	58.5	1.2	4.0	7.4
1910.....	7,664	118.2	13.6	334,378	146.8	0.8	2.9	5.2
1900.....	3,513	235.9	10.6	135,470	177.6	0.3	1.6	3.9
1890.....	1,046	.....	5.8	48,799	.....	0.1	1.2	2.7

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

DATE OF BEGINNING.	Num-ber of enter-prises.	Area in-cluded in enter-prises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enter-prises were capable of irri-gating in 1920 (acres).
			Acres.	Per cent of acre-age in enter-prises.	
Total.....	2,692	836,795	529,899	63.3	637,151
Before 1890.....	7	1,066	461	43.2	806
1890-1899.....	10	998	798	80.0	887
1870-1879.....	89	24,619	22,650	92.0	23,602
1880-1889.....	226	79,276	65,791	83.0	68,546
1890-1899.....	315	208,025	126,359	60.7	145,602
1900-1904.....	274	59,942	42,534	71.0	49,136
1905-1909.....	343	278,907	175,283	62.9	217,215
1910-1914.....	483	85,461	30,663	35.9	50,788
1915-1919.....	427	49,787	24,466	49.2	38,771
Not reported.....	518	48,744	40,794	83.7	41,798

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

CLASS.	AREA IRRIGATED (ACRES).				Area enter-prises were capable of irri-gating in 1920 (acres).	Area in-cluded in enter-prises, 1920 (acres).
	1919	1909	Increase. ¹			
			Amount.	Per cent.		
Total.....	529,899	334,378	195,521	58.5	637,151	836,795
Streams, gravity.....	352,199	301,341	50,858	16.9	416,769	550,325
Streams, pumped.....	26,244	9,085	17,159	188.9	49,545	71,150
Streams, pumped and gravity.....	92,702	(²)			95,745	114,773
Wells, pumped.....	17,504	5,437	12,067	221.9	19,938	24,763
Wells, flowing.....	1,671	3,227	-1,556	-48.2	2,843	3,654
Wells, flowing and pumped.....	1,490	(²)			1,490	1,794
Lakes, gravity.....	3,442	4,698	-1,256	-26.7	3,979	5,562
Lakes, pumped.....	4,662	6,084	-1,422	-23.4	4,888	6,294
Springs.....	7,869	4,207	3,662	87.0	9,569	15,393
Stored storm water.....	129	299	-170	-56.9	141	151
City water.....	42	(²)			21	52
Streams, gravity, and pumped wells.....	2,415	(²)			4,060	4,674
Streams, gravity, and flowing wells.....	441	(²)			443	592
Other mixed.....	19,027	(²)			27,664	37,491
Other and not reported.....	62	(²)			67	127

¹ A minus sign (-) denotes decrease. ² Not included in classification in 1910.

ACREAGE, BY CHARACTER OF ENTERPRISE.

The original irrigation district law in Washington was enacted by the first state legislature, in 1890, and it has been amended from time to time since that date. Generally, in Washington, irrigation districts have not built irrigation works, but have been or-

ganized 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. Most 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 land in other enterprises under the "Warren Act" (act of Congress, Feb. 21, 1911), and other special arrangements.

The state of Washington accepted the conditions of the Federal Carey Act (act of Congress, Aug. 18, 1894) in 1895, but nothing has been accomplished under this law.

The small acreage credited to the state belongs to state institutions 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.....	529,899	334,378	195,521	58.5
Individual and partnership.....	142,215	95,655	46,560	48.7
Cooperative.....	93,192	81,122	12,070	14.9
Irrigation district.....	79,918	.....	79,918	.....
Commercial.....	21,705	68,911	-45,206	-67.6
U. S. Reclamation Service.....	² 122,889	55,690	67,179	120.6
U. S. Indian Service.....	69,510	35,000	34,510	98.6
State.....	200	(³)	200	.....
Other and mixed.....	290	(³)	290	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total.....	637,151	470,514	166,637	35.4
Individual and partnership.....	189,457	117,145	52,312	44.7
Cooperative.....	104,899	90,805	13,894	15.3
Irrigation district.....	118,009	.....	118,009	.....
Commercial.....	31,652	138,064	-106,412	-77.1
U. S. Reclamation Service.....	² 135,119	74,500	60,619	81.4
U. S. Indian Service.....	77,710	50,000	27,710	55.4
State.....	200	(³)	200	.....
Other and mixed.....	305	(³)	305	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total.....	836,795	817,032	19,763	2.4
Individual and partnership.....	226,671	192,310	34,361	17.9
Cooperative.....	118,539	115,410	3,129	2.7
Irrigation district.....	134,641	.....	134,641	.....
Commercial.....	75,292	268,216	-190,924	-71.7
U. S. Reclamation Service.....	² 152,947	143,098	9,851	6.9
U. S. Indian Service.....	128,200	100,000	28,200	28.2
State.....	200	(³)	200	.....
Other and mixed.....	305	(³)	305	.....

¹ A minus sign (-) denotes decrease.² Does not include about 100,000 acres to which stored water is supplied.³ Not included in classification in 1910.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

Rights to water from streams and other sources are subject to control by the states. The laws of the state of Washington relating to water rights are summarized in the following paragraphs:

The territory of Washington was organized in 1853, and the state of Washington was admitted to the Union in 1889. During the territorial period no general legislation relating to irrigation was enacted.

The constitution of the state, ratified October 1, 1889, declared that "The use of the waters of this state for irrigation, mining, and manufacturing purposes shall be deemed a public use."—(Art. XXI.)

The first state legislature enacted a law requiring each party claiming any right to water to file with the clerk of the district court before June 1, 1890, a sworn statement of his claim; and requiring also that any party wishing to take water from a stream or lake after the passage of the law should file a statement and a map setting forth his claim. This law was in effect until 1917.

The law just referred to, enacted by the first legislature, provided that after June 1, 1890, any party interested might apply to the superior court of the county to have the rights to water from any source adjudicated, and that on such application the court should proceed with the adjudication, if he should "deem it practicable." A law approved March 17, 1917, provided a new procedure for the adjudication of water rights. Water rights may also be defined in ordinary suits between rival claimants.

The law of March 17, 1917, provided that any party wishing to acquire a right to water must make application to the state hydraulic engineer for a permit. When work has been completed in accordance with a permit issued by the state hydraulic engineer, that official issues a certificate setting forth the right that has been acquired.

The irrigation law passed by the first state legislature provided that riparian owners were entitled to use any water, not otherwise appropriated, for the purpose of irrigation, "to the full extent of the soil for agricultural purposes," and that riparian rights might be condemned.

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.....	529,899	100.0	100.0
Appropriation and use.....	196,700	37.1	54.5
Notice filed and posted.....	169,831	32.0	29.3
Adjudicated by court.....	56,309	10.6	7.6
Permit from state.....	39,608	7.5	(1)
Certificate or license from state.....	17,406	3.3	(1)
Riparian rights.....	17,095	3.2	5.2
Underground.....	20,859	3.9	(2)
Other and mixed.....	561	0.1	(2)
Not reported.....	11,530	2.2	(2)

¹ In 1910 there was no provision of law for permits or certificates from the state. Small areas were incorrectly reported in these classes.

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 1902 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 tributary streams 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.

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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.....	529,899	154,962	242.0	836,795	637,151
Columbia River and tributaries.....	521,462	153,937	238.8	810,266	621,458
Columbia River direct.....	24,471	584	.....	49,209	32,492
Clark Fork.....	306	(2)	.....	1,431	1,084
Colville River.....	6,960	310	.....	18,200	13,993
Spokane River.....	16,453	210	.....	40,391	21,675
Okanogan River and tributaries.....	20,583	2,257	812.0	42,042	30,261
Okanogan River direct.....	2,357	14	.....	3,708	2,899
Salmon Creek.....	6,729	1,095	514.5	11,478	11,238
Other tributaries of Okanogan River.....	11,497	* 1,148	901.5	26,856	16,124
Methow River.....	12,579	1,675	651.0	24,017	16,529
Entiat River.....	2,054	2,919	-29.6	2,652	2,251
Wenatchee River.....	23,734	3,285	622.5	39,288	34,568
Crab Creek.....	6,088	1,937	214.3	10,400	8,048
Yakima River and tributaries.....	337,293	121,705	177.1	436,797	353,644
Yakima River direct.....	254,262	66,371	283.1	345,373	299,163
Wilson Creek.....	11,297	6,613	70.8	12,042	11,807
Naches River.....	19,864	20,232	-1.8	21,656	20,284
Ahtanum Creek.....	9,287	3,549	141.3	9,982	9,342
Other tributaries of Yakima River.....	42,583	* 24,640	72.8	47,744	43,048
Snake River and tributaries.....	11,788	4,968	137.3	36,295	30,260
Snake River direct.....	4,047	100	.....	24,233	20,130
Grande Ronde River.....	66	(2)	.....	138	126
Asotin Creek.....	3,051	3,225	-5.4	4,051	4,051
Pataha River.....	1,480	619	139.1	2,362	2,209
Palouse River.....	1,735	508	241.5	3,645	2,020
Other tributaries of Snake River.....	1,409	* 516	173.1	1,866	1,733
Walla Walla River.....	22,270	6,328	251.9	36,157	29,965
Klickitat River.....	12,332	372	.....	19,241	13,440
White Salmon River.....	6,247	912	585.0	11,958	7,277
Other tributaries of Columbia River.....	18,304	* 6,475	182.7	48,188	25,952
Independent streams.....	8,437	1,025	723.1	20,529	15,693
Dungeness River.....	6,160	685	799.3	12,660	9,860
McDowell Creek.....	2,277	200	.....	7,869	5,833
Other independent streams.....	2,277	* 140	.....	7,869	5,833

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

² Not reported separately in 1902.

* 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.....	\$29,299,011	80.6	\$45.98	33.4
1910.....	16,218,149	841.7	34.47	171.2
1900.....	1,722,369	775.8	12.71	215.4
1890.....	196,060	.....	4.03	.....

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

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total.....	\$29,299,011	100.0	\$45.98
Before 1860.....	37,112	0.1	46.04
1860-1869.....	15,300	0.1	17.25
1870-1879.....	102,262	0.3	4.33
1880-1889.....	1,098,045	3.7	16.02
1890-1899.....	4,743,934	16.2	32.58
1900-1904.....	2,823,289	9.6	57.46
1905-1909.....	12,153,628	41.5	55.95
1910-1914.....	5,535,131	18.9	108.99
1915-1919.....	1,935,660	6.6	49.93
Not reported.....	854,650	2.9	20.45

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	\$29,299,011	100.0	\$45.98	465,758	\$3.45
Streams, gravity	18,764,090	64.0	45.02	308,899	2.49
Streams, pumped	2,605,718	8.9	52.59	23,129	11.16
Streams, pumped and gravity	3,827,148	13.1	39.87	92,674	1.99
Wells, pumped	1,033,134	3.6	81.91	16,153	12.71
Wells, flowing	114,300	0.4	40.20	1,076	2.03
Wells, flowing and pumped	66,500	0.2	37.62	1,490	1.86
Lakes, pumped	455,631	1.6	114.51	2,976	13.05
Lakes, gravity	257,797	0.9	52.74	4,371	3.96
Springs	507,103	1.7	53.05	4,857	7.08
Stored storm water	5,985	(²)	42.45	65	11.85
City water	381	(²)	18.14		
Streams, gravity, and pumped wells	237,150	0.8	58.28	2,158	20.70
Streams, gravity, and flowing wells	22,522	0.1	50.84	324	4.97
Other mixed	811,102	2.8	29.33	7,681	6.14
Not reported	450	(²)	6.72		

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	\$29,299,011	\$2,330,758	\$26,968,253	.....
Columbia River and tributaries	28,960,618	2,319,513	26,671,105	.....
Columbia River direct	2,229,066	5,200	2,223,866	.....
Clark Fork	7,293	(²)	7,293	.....
Colville River	486,747	938	485,809	.....
Spokane River	1,637,743	2,994	1,634,749	.....
Okanogan River and tributaries	2,259,015	12,374	2,246,644	.....
Okanogan River direct	227,290	360	226,930	.....
Salmon Creek	1,069,972	5,085	1,064,887	.....
Other tributaries of Okanogan River	961,756	³ 6,929	954,827	.....
Methow River	483,806	20,825	462,984	.....
Entiat River	73,889	17,150	56,739	330.8
Wenatchee River	1,868,541	95,755	1,772,786	.....
Crab Creek	859,050	5,415	853,635	.....
Yakima River and tributaries	14,849,689	1,968,555	12,881,134	654.3
Yakima River direct	13,912,727	1,580,195	12,332,532	780.4
Wilson Creek	45,875	17,925	27,950	155.9
Naches River	458,027	276,223	181,804	65.8
Ahtanum Creek	88,443	14,950	73,493	491.6
Other tributaries of Yakima River	244,617	³ 79,262	265,355	334.8
Snake River and tributaries	1,398,296	109,853	1,288,443	.....
Snake River direct	471,772	1,080	470,692	.....
Grande Ronde River	5,562	(²)	5,562	.....
Asotin Creek	606,084	94,100	511,984	544.1
Pataha River	47,085	1,905	45,180	.....
Palouse River	175,100	2,810	172,290	.....
Other tributaries of Snake River	92,693	³ 9,958	82,735	830.8
Walla Walla River	890,980	27,022	863,958	.....
Klickitat River	64,423	1,852	62,541	.....
White Salmon River	91,786	6,700	85,086	.....
Other tributaries of Columbia River	1,790,288	44,850	1,745,438	.....
Independent streams	308,393	11,245	297,148	.....
Dumngness River	94,010	8,000	86,010	.....
McDowell Creek	2,000		2,000	.....
Other independent streams	214,383	³ 1,245	213,138	.....

¹ A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.² Not reported separately in 1902.³ 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 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 distribute this among the classes, because the area receiving water varies from season to season.

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	\$29,299,011	100.0	465,758	\$3.45
Individual and partnership	4,732,706	16.2	84,405	6.02
Cooperative	3,949,896	13.5	87,791	2.38
Irrigation district	6,112,628	20.9	79,618	5.73
Commercial	2,341,428	8.0	21,585	5.96
U. S. Reclamation Service	10,441,145	35.6	122,849	1.89
U. S. Indian Service	1,658,040	5.7	69,510	1.03
State	55,668	0.2		
Other	7,500	(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	103
Acreage included in enterprises reporting land drained or needing drainage	218,763
Acreage for which drains have been installed	79,168
Additional acreage needing drainage	43,461
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage	36.2
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state	9.5
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	14.6

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 entering canals .. second-feet ..	8,827	4,827	4,000
Area irrigated in 1919	376,270	280,363	95,907
Average number of acres per second-foot	43	58	24
Total quantity entering canals .. acre-feet ..	2,168,818	1,513,616	655,202
Area irrigated in 1919	341,569	264,558	77,011
Average quantity per acre	6.3	5.7	8.5
Total quantity of water delivered .. acre-feet ..	594,479	139,232	455,247
Area irrigated in 1919	174,989	77,235	97,754
Average quantity per acre	3.4	1.8	4.6

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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.....	579	115	1,873	16,242	3,851	3,179	1,764	205	477,789
Before 1860.....	1	.....	6	11	3	.....	.....	.....	.....
1860-1869.....	5	.....	12	51	14	56	4	.....	.....
1870-1879.....	33	.....	92	512	120	85	4	1	10
1880-1889.....	58	7	234	2,243	429	138	63	8	1,510
1890-1899.....	122	21	321	3,993	550	1,466	325	25	861
1900-1904.....	78	11	241	1,814	392	167	37	20	4,752
1905-1909.....	91	30	232	3,999	529	729	1,172	59	68,191
1910-1914.....	53	25	234	1,235	316	348	57	55	390,416
1915-1919.....	43	11	166	1,241	256	144	79	30	10,849
Not reported.....	95	10	335	1,143	1,242	46	23	7	1,206

DATE OF BEGINNING.	Pipelines, 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.....	790.0	60	14,925	520	227,744	975	22,929	1,059	636,552
Before 1860.....	1.7	.....	.....	2	1,050	3	72	3	980
1860-1869.....	0.5	.....	.....	.....	.....	.....	.....	.....	.....
1870-1879.....	1.1	.....	.....	2	500	3	20	3	1,000
1880-1889.....	16.0	.....	.....	1	470	7	116	9	5,230
1890-1899.....	63.8	7	1,150	14	2,265	31	278	33	25,105
1900-1904.....	44.1	4	1,075	21	5,896	50	757	50	16,819
1905-1909.....	373.3	3	1,000	72	63,736	148	12,411	190	302,486
1910-1914.....	143.5	17	1,980	186	83,117	316	4,705	344	131,465
1915-1919.....	109.9	8	5,460	142	36,585	286	3,332	296	106,929
Not reported.....	36.1	21	4,260	80	34,135	131	1,238	131	46,538

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.....	579	115	1,873	16,242	3,851	3,179	1,764	205	477,789
Individual and partnership.....	498	87	1,694	6,611	2,578	2,307	229	171	4,647
Cooperative.....	48	8	108	2,777	522	250	272	10	12,050
Irrigation district.....	20	3	35	2,347	424	232	130	5	7,984
Commercial.....	6	8	14	1,061	118	12	50	9	9,607
U. S. Indian Service.....	3	1	9	1,720	83	26	192	1	3,500
U. S. Reclamation Service.....	3	8	11	1,716	124	350	890	7	440,000
State.....								2	1
Other and not reported.....	1		2	10	2	2	1		

CLASS.	Pipelines, 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.....	790.0	60	14,925	520	227,744	975	22,929	1,059	636,552
Individual and partnership.....	355.5	60	14,925	484	164,586	914	10,290	965	347,849
Cooperative.....	131.3			26	60,138	29	4,048	40	97,138
Irrigation district.....	93.5			1	1,500	14	3,935	23	31,295
Commercial.....	73.3			6	870	10	1,771	11	78,520
U. S. Indian Service.....	2.3								
U. S. Reclamation Service.....	129.4					4	2,735	14	62,200
State.....	2.8			3	650	2	85	4	18,650
Other and not reported.....	1.9					2	65	2	1,400

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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.....	579	115	1,873	16,242	3,851	3,179	1,764	205	477,789
Columbia River and tributaries.....	570	113	1,858	15,007	3,801	3,089	1,718	198	477,785
Columbia River direct.....	9	18	95	630	154	174	44	38	1,529
Clark Fork.....	5	1	23	99	12	1	.....	3	50
Colville River.....	40	1	101	363	174	131	21	3	.....
Spokane River.....	15	8	61	802	101	74	134	31	5,062
Okanogan River and tributaries.....	12	11	124	552	158	69	132	19	24,136
Okanogan River direct.....	1	3	39	45	24	25	4	8	2,211
Salmon Creek (Conconully).....	1	3	15	143	32	3	67	5	16,550
Other tributaries of Okanogan River.....	10	5	70	364	102	41	61	6	5,375
Methow River.....	52	11	166	1,230	231	59	45	19	209
Entiat River.....	5	1	22	85	41	.....	.....	.....	.....
Wenatchee River.....	41	6	87	553	195	66	18	8	2,000
Crab Creek.....	24	9	67	100	34	18	9	10	4,501
Yakima River and tributaries.....	105	10	459	7,486	1,070	477	1,155	10	423,810
Yakima River direct.....	.....	7	88	4,823	473	446	1,079	7	423,800
Wilson Creek.....	.....	.....	50	163	62	6	5	1	10
Naches River.....	.....	.....	63	724	113	7	21	.....	.....
Ahtanum Creek.....	.....	.....	49	180	82	3	1	.....	.....
Other tributaries of Yakima River.....	1	3	209	1,596	340	15	50	2	.....
Snake River and tributaries.....	48	9	115	1,075	120	261	17	9	107
Snake River direct.....	1	2	25	427	36	187	5	4	3
Grande Ronde River.....	4	.....	7	11	8	.....	.....	.....	.....
Asotin Creek.....	2	1	1	1	.....	1	.....	1	100
Pataha River.....	10	.....	33	377	24	31	1	1	.....
Palouse River.....	13	5	21	219	31	42	11	2	4
Other tributaries of Snake River.....	18	1	28	40	21	.....	.....	1	.....
Walla Walla River.....	135	7	242	1,049	1,065	1,574	93	4	.....
Klickitat River.....	19	.....	30	352	66	17	4	.....	.....
White Salmon River.....	19	3	28	478	99	21	15	3	.....
Other tributaries of Columbia River.....	41	18	228	723	281	144	30	41	15,781
Independent streams.....	9	2	15	635	50	93	46	7	4
Dungeness River.....	6	.....	7	570	36	75	32	.....	.....
Other independent streams.....	3	2	8	65	14	18	14	7	4

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.		Number.	
								Capacity (gallons per minute).	
Total.....	790.0	60	14,925	520	227,744	975	22,929	1,059	636,552
Columbia River and tributaries.....	785.9	59	14,925	517	227,624	966	22,901	1,050	635,735
Columbia River direct.....	162.2	8	4,390	166	58,228	323	6,451	347	231,403
Clark Fork.....	1.0	.....	.....	1	40	5	23	5	8,450
Colville River.....	14.6	.....	.....	47	58,504	83	3,476	93	68,643
Spokane River.....	132.7	.....	.....	.....	.....	.....	.....	.....	79
Okanogan River and tributaries.....	20.9	.....	.....	48	13,278	111	1,599	119	47,903
Okanogan River direct.....	14.9	.....	.....	44	12,428	97	830	104	38,258
Salmon Creek (Conconully).....	0.6	.....	.....	6	.....	5	607	6	7,335
Other tributaries of Okanogan River.....	5.4	.....	.....	4	850	9	62	9	2,350
Methow River.....	4.8	1	.....	2	115	9	44	9	1,318
Entiat River.....	1.5	.....	.....	.....	.....	4	18	4	310
Wenatchee River.....	26.0	.....	.....	7	1,300	40	837	40	21,114
Crab Creek.....	34.9	3	60	111	36,285	137	2,321	145	60,270
Yakima River and tributaries.....	161.1	3	285	45	9,680	74	3,492	87	78,975
Yakima River direct.....	154.6	3	285	41	7,570	66	3,447	78	75,715
Wilson Creek.....	1.0	.....	.....	.....	.....	.....	.....	.....	.....
Naches River.....	4.1	.....	.....	1	335	2	8	3	1,285
Ahtanum Creek.....	.....	.....	.....	1	125	1	2	1	125
Other tributaries of Yakima River.....	1.4	.....	.....	2	1,350	5	35	5	1,850
Snake River and tributaries.....	94.1	8	1,100	37	13,365	64	3,559	74	47,849
Snake River direct.....	33.6	.....	.....	35	13,015	50	3,186	58	33,177
Grande Ronde River.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Asotin Creek.....	48.0	.....	.....	.....	.....	.....	.....	.....	.....
Pataha River.....	1.0	.....	.....	2	350	3	37	3	3,250
Palouse River.....	1.4	8	1,100	.....	.....	2	40	3	4,400
Other tributaries of Snake River.....	10.1	.....	.....	.....	.....	9	296	10	7,022
Walla Walla River.....	56.4	33	6,080	30	32,510	53	681	62	20,340
Klickitat River.....	2.5	.....	.....	.....	.....	5	26	5	3,875
White Salmon River.....	2.5	.....	.....	2	24	4	42	4	320
Other tributaries of Columbia River.....	70.7	8	3,010	15	4,300	54	832	56	38,315
Independent streams.....	4.1	1	.....	3	120	9	28	9	817
Dungeness River.....	1.0
McDowell Creek.....	3.1
Other independent streams.....	1	3	120	9	28	9	817

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CROPS.

TABLE 18.—ACREAGE, YIELD, AND VALUE OF 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.....	13,293	38.1	2,464	9.5	438.3	Bu.....	487,154	54.0	87,357	15.5	457.7
2	Oats.....	7,215	3.8	6,690	2.5	7.8	Bu.....	337,056	4.2	330,587	2.5	2.0
3	Winter wheat.....	8,236	0.7	6,720	0.3	553.7	Bu.....	154,116	0.6	188,855	0.5	70.6
4	Spring wheat.....	35,694	2.7				Bu.....	923,493	5.4			
5	Barley.....	5,761	6.8	1,738	1.0	231.5	Bu.....	193,568	8.6	49,143	0.8	293.9
6	Rye.....	544	1.3	(²)			Bu.....	5,646	2.4	(²)		
Hay and forage:												
7	Timothy alone.....	8,142	16.1	17,326	19.6	-53.0	Tons...	15,466	19.5	33,642	23.5	-54.0
8	Timothy and clover mixed.....	8,647	6.0	7,704	6.4	12.2	Tons...	18,140	5.9	20,991	8.3	-13.6
9	Clover alone.....	2,254	12.7	794	7.3	183.9	Tons...	4,128	11.1	2,136	9.7	93.3
10	Alfalfa.....	148,409	64.9	74,496	78.5	99.2	Tons...	494,066	75.3	296,614	82.9	66.6
11	Other tame grasses.....	17,014	32.7	1,054	3.6		Tons...	35,054	38.6	1,625	3.8	
12	Small grains cut for hay.....	11,650	2.4	5,340	1.5	118.2	Tons...	15,214	2.8	9,417	1.9	61.6
13	Wild, salt, or prairie grasses.....	1,047	3.5	2,800	9.9	-62.6	Tons...	2,075	6.2	4,891	16.0	-57.6
14	Corn cut for forage.....	2,001	8.1	(²)			Tons...	6,046	14.8	(²)		
15	Silage crops.....	2,645	11.7	(²)			Tons...	23,762	15.3	(²)		
16	Root crops for forage.....	628	8.5	(²)			Tons...	2,619	3.9	(²)		
Vegetables:												
17	Potatoes.....	8,186	14.8	9,178	15.9	-10.8	Bu.....	1,526,353	26.0	1,532,915	20.0	-0.4
Fruits:												
18	Grapes.....	* 118,892	25.4	(²)			Lbs.....	1,410,072	35.6	(²)		
19	Apples.....	* 4,633,119	58.2	(²)			Bu.....	15,823,446	70.4	(²)		
20	Peaches.....	* 455,526	70.2	(²)			Bu.....	1,259,176	81.5	(²)		
21	Pears.....	* 530,834	61.2	(²)			Bu.....	1,236,330	71.5	(²)		
22	Plums and prunes.....	* 75,084	8.6	(²)			Bu.....	127,042	16.2	(²)		
Miscellaneous:												
23	Sugar beets grown for sugar.....	4,635	86.4	246	19.4		Tons...	40,286	86.8	244	3.7	
24	Red clover seed.....	897	77.3	(²)			Bu.....	3,925	59.2	(²)		
25	Hops.....	507	44.9	(²)			Lbs.....	870,769	53.9	(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.....	25.9	19.3	36.7	141.7	191.1	\$876,877	54.0	\$65,965	16.3	
2	Oats.....	Bu.....	42.1	41.9	46.7	110.9	111.4	337,056	4.2	163,948	2.8	105.6
3	Winter wheat.....	Bu.....	21.1	21.1	18.7	85.3	85.3	324,201	0.6			
4	Spring wheat.....	Bu.....	13.0	12.6	25.9	199.2	205.6	2,013,215	5.4	173,221	0.5	
5	Barley.....	Bu.....	26.6	26.1	33.6	126.3	128.7	290,352	8.6	30,474	0.9	852.8
6	Rye.....	Bu.....	5.5	5.4	10.4	189.1	192.6	11,292	2.5	(²)		
Hay and forage:												
7	Timothy alone.....	Tons...	1.6	1.5	1.9	118.8	126.7	463,980	19.5	536,944	24.8	-13.6
8	Timothy and clover mixed.....	Tons...	2.1	2.1	2.1	100.0	100.0	444,430	5.9	325,758	9.0	36.4
9	Clover alone.....	Tons...	2.1	2.1	1.8	85.7	85.7	99,072	11.1	25,684	8.7	285.7
10	Alfalfa.....	Tons...	2.9	2.0	3.3	113.8	143.5	11,857,584	75.3	3,166,999	86.1	275.6
11	Other tame grasses.....	Tons...	1.7	1.6	2.1	143.5	131.2	735,378	33.1	22,325	3.7	
12	Small grains cut for hay.....	Tons...	1.1	1.1	1.3	118.2	118.2	418,385	2.8	123,354	2.0	239.2
13	Wild, salt, or prairie grasses.....	Tons...	1.1	1.1	2.0	181.8	181.8	89,425	6.3	65,124	21.9	-39.5
14	Corn cut for forage.....	Tons...	1.6	1.5	3.0	187.5	200.0	78,598	14.8			
15	Silage crops.....	Tons...	6.9	6.6	9.0	130.4	136.4	261,332	15.3			
16	Root crops for forage.....	Tons...	9.0	9.5	4.2	46.7	44.2	55,104	3.9			
Vegetables:												
17	Potatoes.....	Bu.....	106.4	92.5	186.5	175.2	201.7	3,205,341	26.0	505,887	16.9	533.6
Fruits:												
18	Grapes.....	Lbs.....	* 8.5	* 7.3	* 11.9	140.0	163.0	112,896	35.6	(²)		
19	Apples.....	Bu.....	* 2.3	* 1.7	* 3.4	121.4	179.0	13,697,378	46.9	(²)		
20	Peaches.....	Bu.....	* 2.4	* 1.5	* 2.8	116.7	186.7	2,707,228	61.5	(²)		
21	Pears.....	Bu.....	* 2.0	* 1.5	* 2.3	115.0	153.3	580,118	19.2	(²)		
22	Plums and prunes.....	Bu.....	* 0.9	* 0.8	* 1.7	188.9	212.5	247,732	16.2	(²)		
Miscellaneous:												
23	Sugar beets grown for sugar.....	Tons...	8.6	8.4	8.7	101.2	103.6	435,099	86.8	1,755	4.6	
24	Red clover seed.....	Bu.....	3.8	1.8	4.4	115.8	244.4	117,750	89.2	(²)		
25	Hops.....	Lbs.....	1,431.1	1,197.7	1,717.5	120.0	143.4	391,846	53.9	(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 Yield per vine.
⁶ Yield per tree.

IRRIGATION—WASHINGTON.

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.	Adams.	Asotin.	Benton.	Chelan.	Clallam.	Colum- bia.
1	Number of all farms in 1920.....	66,288	1,084	578	1,519	2,095	607	622
2	Number of farms irrigated in 1919.....	13,271	8	279	1,294	1,704	125	93
3	Per cent of all farms.....	20.0	0.7	48.3	85.3	81.3	20.6	15.0
4	Number of farms irrigated in 1909.....	7,664	20	238	768	1,189	77	56
5	Per cent of increase, 1909-1919.....	78.2	.....	17.2	68.5	43.3	.....	.....
LAND AND FARM AREA.								
6	Approximate land area.....acres..	42,775,040	1,223,680	387,840	1,069,440	1,856,000	1,104,640	549,120
7	All land in farms.....acres..	13,244,720	938,395	259,233	371,811	235,621	58,043	328,330
8	Improved land in farms.....acres..	7,129,343	727,876	96,404	201,678	65,810	20,132	192,613
9	Area irrigated in 1919.....acres..	529,899	943	3,474	39,272	38,894	6,160	2,168
10	Per cent of improved land in farms.....	7.4	0.1	8.6	19.5	59.1	30.6	1.1
11	Area irrigated in 1909.....acres..	334,378	1,523	3,179	23,437	23,620	4,265	2,174
12	Per cent of increase, 1909-1919.....	58.5	-38.1	9.3	67.6	64.7	44.4	-0.3
13	Area enterprises were capable of irrigating in 1920.....acres..	637,151	1,342	4,559	48,351	50,502	9,880	3,063
14	Area enterprises were capable of irrigating in 1910.....acres..	470,514	1,655	5,373	50,653	27,979	4,405	2,797
15	Per cent of increase, 1910-1920.....	35.4	-18.9	-15.1	-3.6	80.5	123.8	9.5
16	Area included in enterprises in 1920.....acres..	836,795	1,737	4,684	72,015	65,324	12,660	3,532
17	Area included in enterprises in 1910.....acres..	817,032	5,123	9,844	87,384	53,497	9,975	3,922
18	Per cent of increase, 1910-1920.....	2.4	-66.1	-52.4	-17.6	22.1	26.9	-9.9
19	Area of irrigated land reported as available for settlement.....acres..	61,738	.....	.....	15,756	3,750	2,500	.....
IRRIGATION WORKS.								
20	Independent enterprises:							
21	Number, 1920.....	2,692	26	21	146	379	7	52
	Number, 1910.....	1,934	19	22	74	260	7	42
22	Main ditches:							
23	Number, 1920.....	1,873	27	17	30	207	7	43
24	Number, 1910.....	1,600	12	18	50	227	7	43
25	Length, 1920.....miles..	3,851	19	16	161	394	36	36
26	Length, 1910.....miles..	2,594	24	40	130	357	17	36
27	Capacity, 1920.....second-feet..	16,242	203	39	982	1,100	570	697
28	Capacity, 1910.....second-feet..	13,178	185	76	1,099	1,219	281	211
29	Laterals:							
30	Number, 1920.....	3,179	27	1	111	89	75	44
31	Number, 1910.....	1,180	8	10	70	132	19	30
32	Length, 1920.....miles..	1,764	8	.....	185	30	32	15
33	Length, 1910.....miles..	1,298	7	64	119	122	19	4
34	Reservoirs:							
35	Number, 1920.....	205	4	1	.....	36	.....	1
36	Number, 1910.....	156	1	3	2	36	.....	.....
37	Capacity, 1920.....acre-feet..	477,789	4	100	.....	11,481	.....	1
38	Capacity, 1910.....acre-feet..	121,543	10,000	1,160	.....	12,748	.....	.....
39	Flowing wells:							
40	Number, 1920.....	60	6	.....	7	1	.....	.....
41	Number, 1910.....	55	.....	.....	4	.....	.....	.....
42	Capacity, 1920.....gallons per minute..	14,925	160	.....	6,200	10	.....	.....
43	Capacity, 1910.....gallons per minute..	18,926	.....	.....	1,290	.....	.....	.....
44	Pumped wells:							
45	Number, 1920.....	520	7	.....	101	13	.....	4
46	Number, 1910.....	128	5	.....	31	8	.....	1
47	Capacity, 1920.....gallons per minute..	227,744	5,160	.....	38,807	1,775	.....	130
48	Capacity, 1910.....gallons per minute..	60,220	1,873	.....	10,158	564	.....	1,500
49	Pumping plants:							
50	Number, 1920.....	975	12	1	144	138	.....	7
51	Number, 1910.....	391	8	1	84	54	.....	3
52	Engine capacity, 1920.....horsepower..	22,929	143	5	4,555	1,415	.....	23
53	Engine capacity, 1910.....horsepower..	13,847	133	2	5,894	2,024	.....	58
54	Pump capacity, 1920.....gallons per minute..	636,552	10,042	200	163,628	45,853	.....	355
55	Pump capacity, 1910.....gallons per minute..	365,411	3,223	42	147,059	14,777	.....	1,620
56	Average lift, 1920.....feet..	60	28	8	37	86	.....	18
CAPITAL INVESTED.								
57	Capital invested to Jan. 1, 1920.....dollars..	29,299,011	77,350	627,165	2,387,113	3,503,670	94,010	61,447
58	Capital invested to July 1, 1910.....dollars..	16,219,149	171,946	1,662,958	3,211,493	889,152	18,900	16,027
59	Per cent of increase, 1910-1920.....	80.6	-55.0	-62.3	-25.7	294.0	397.4	283.4
60	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	45.98	57.04	137.57	48.86	69.38	9.53	20.06
61	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	34.47	103.89	309.50	63.40	31.78	4.29	5.73
ESTIMATED FINAL COST.								
62	Estimated final cost of existing enterprises in 1920.....dollars..	37,684,591	87,750	627,165	3,040,479	4,080,090	97,010	64,947
63	Estimated final cost of existing enterprises in 1910.....dollars..	22,322,856	171,946	1,662,958	3,565,877	1,340,835	18,900	16,027
64	Per cent of increase, 1910-1920.....	68.8	-49.0	-62.3	-14.7	204.3	413.3	305.2
65	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	45.03	50.52	133.90	42.22	62.46	7.66	18.39
66	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	27.32	33.56	168.93	40.81	25.06	1.89	4.09

IRRIGATION—WASHINGTON.

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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.]

		Douglas.	Ferry.	Franklin.	Garfield.	Grant.	Kittitas.	Klickitat.	Lincoln.
1	Number of all farms in 1920.....	1,623	730	414	413	1,110	928	1,177	1,860
2	Number of farms irrigated in 1919.....	314	61	78	25	185	737	164	83
3	Per cent of all farms.....	19.3	8.4	18.8	6.0	16.7	79.4	13.9	4.5
4	Number of farms irrigated in 1909.....	146	20	21	54	49	639	169	77
5	Per cent of increase, 1909-1919.....	115.1					15.3	-8.0	
LAND AND FARM AREA.									
6	Approximate land area.....acres..	1,143,686	1,420,800	771,840	444,160	1,740,800	1,490,560	1,168,000	1,473,280
7	All land in farms.....acres..	892,223	162,888	456,056	314,182	743,518	215,918	562,331	1,329,405
8	Improved land in farms.....acres..	567,335	36,618	255,636	159,282	413,758	95,984	190,616	832,678
9	Area irrigated in 1919.....acres..	4,822	791	2,253	883	7,545	81,967	18,978	2,221
10	Per cent of improved land in farms.....	0.8	2.2	0.9	0.6	1.8	55.4	10.0	0.3
11	Area irrigated in 1909.....acres..	3,317	397	830	1,316	3,230	68,892	4,681	2,217
12	Per cent of increase, 1909-1919.....	45.4	99.2	171.4	-32.9	133.6	19.0	305.4	0.2
13	Area enterprises were capable of irrigating in 1920.....acres..	4,938	2,253	10,014	1,552	9,302	83,552	21,360	2,338
14	Area enterprises were capable of irrigating in 1910.....acres..	8,365	4,258	1,276	1,728	8,501	72,348	7,461	2,404
15	Per cent of increase, 1910-1920.....	-41.0	-47.1	684.8	-10.2	9.4	15.5	186.3	18.1
16	Area included in enterprises in 1920.....acres..	8,756	7,421	14,268	1,698	12,806	87,775	32,315	3,291
17	Area included in enterprises in 1910.....acres..	12,836	5,271	2,113	2,283	14,456	92,940	18,590	2,935
18	Per cent of increase, 1910-1920.....	-31.7	40.8	575.2	-25.6	-11.4	-5.6	73.8	12.1
19	Area of irrigated land reported as available for settlement.....acres..	1,603		10,500				500	
IRRIGATION WORKS.									
20	Independent enterprises:								
21	Number, 1920.....	86	45	48	36	172	223	93	54
22	Number, 1910.....	45	20	21	47	43	257	115	48
23	Main ditches:								
24	Number, 1920.....	14	39	4	26	79	212	67	37
25	Number, 1910.....	33	20	8	42	23	206	87	41
26	Length, 1920.....miles..	15	31	8	17	37	389	178	24
27	Length, 1910.....miles..	31	24	7	41	41	387	108	31
28	Capacity, 1920.....second-feet..	48	119	121	97	113	1,788	842	63
29	Capacity, 1910.....second-feet..	49	129	44	120	87	1,530	596	92
30	Laterals:								
31	Number, 1920.....	20	6	25	2	29	25	38	62
32	Number, 1910.....	26	4		5	22	143	65	24
33	Length, 1920.....miles..	11	1	2	1	8	41	19	7
34	Length, 1910.....miles..	8	1		1	17	56	23	3
35	Reservoirs:								
36	Number, 1920.....	8	2	2	1	18	7	18	1
37	Number, 1910.....	4	1		2	10	3	11	3
38	Capacity, 1920.....acre-feet..		151	2		4,519	384,810	415	
39	Capacity, 1910.....acre-feet..	39	700		1	84	35,000	12	
40	Flowing wells:								
41	Number, 1920.....	2	1			2		1	
42	Number, 1910.....	2							
43	Capacity, 1920.....gallons per minute..	190	1,000			7		14	
44	Capacity, 1910.....gallons per minute..	25							
45	Pumped wells:								
46	Number, 1920.....	22	3	31	1	132	1	2	9
47	Number, 1910.....	1	1	5		14		12	5
48	Capacity, 1920.....gallons per minute..	6,865	1,000	13,080	250	39,779	200	24	3,785
49	Capacity, 1910.....gallons per minute..	850	13	1,845		2,606		278	450
50	Pumping plants:								
51	Number, 1920.....	55	3	50	7	164	9	12	20
52	Number, 1910.....	18	2	22	5	26	3	19	8
53	Engine capacity, 1920.....horsepower..	1,452	9	1,100	242	3,084	193	104	361
54	Engine capacity, 1910.....horsepower..	406	12	298	90	417	207	45	184
55	Pump capacity, 1920.....gallons per minute..	38,760	153	36,478	7,750	76,924	12,575	6,100	11,805
56	Pump capacity, 1910.....gallons per minute..	12,713	278	12,335	2,690	23,785	11,700	919	3,170
57	Average lift, 1920.....feet..	95	12	48	76	79	24	46	63
CAPITAL INVESTED.									
58	Capital invested to Jan. 1, 1920.....dollars..	382,390	66,050	362,390	32,700	1,192,739	4,678,707	198,501	87,431
59	Capital invested to July 1, 1910.....dollars..	488,941	37,406	36,561	23,503	186,510	681,188	73,434	28,434
60	Per cent of increase, 1910-1920.....	-21.8	76.6	891.2	39.1	616.3	586.9	170.3	207.5
61	Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	77.44	29.32	30.19	21.07	128.22	56.00	9.29	30.81
62	Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	58.45	8.78	28.65	13.60	19.59	9.42	9.84	11.83
ESTIMATED FINAL COST.									
63	Estimated final cost of existing enterprises in 1920.....dollars..	402,008	66,950	637,390	36,000	1,301,729	5,908,707	206,851	88,431
64	Estimated final cost of existing enterprises in 1910.....dollars..	488,941	37,406	36,561	23,503	191,510	681,188	89,434	28,434
65	Per cent of increase, 1910-1920.....	-17.8	79.0		53.2	579.7	767.4	131.3	211.0
66	Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	45.91	9.02	44.67	21.20	101.65	67.32	6.40	26.87
67	Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	38.12	7.10	17.30	10.29	13.25	7.33	4.81	9.69

IRRIGATION—WASHINGTON.

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.]

	Okanogan.	Spokane.	Stevens. ¹	Walla Walla.	Whitman.	Yakima.	Other counties. ²
1 Number of all farms in 1920.....	2,856	4,830	2,727	1,502	2,957	5,755	30,901
2 Number of farms irrigated in 1919.....	1,103	775	18	654	14	5,354	203
3 Per cent of all farms.....	38.6	16.0	0.7	43.5	0.5	93.0	0.6
4 Number of farms irrigated in 1909.....	397	287	126	273	48	2,951	61
5 Per cent of increase, 1909-1919.....	177.8	170.0	.....	139.6	.....	81.4	.....
LAND AND FARM AREA.							
6 Approximate land area..... acres..	3,341,440	1,123,840	1,603,200	809,600	1,349,120	3,237,780	15,466,240
7 All land in farms..... acres..	689,796	811,206	472,490	703,251	1,252,485	479,629	1,999,909
8 Improved land in farms..... acres..	212,497	449,537	139,391	474,161	1,033,579	261,806	701,622
9 Area irrigated in 1919..... acres..	35,899	16,154	8,990	23,575	2,099	230,033	2,778
10 Per cent of improved land in farms.....	16.9	3.6	6.4	5.0	0.2	87.8	.....
11 Area irrigated in 1909..... acres..	15,238	12,143	3,510	10,008	1,377	148,630	394
12 Per cent of increase, 1909-1919.....	135.6	33.0	.....	135.6	52.4	54.8	.....
13 Area enterprises were capable of irrigating in 1920..... acres..	52,315	20,995	18,238	39,040	2,536	242,726	7,315
14 Area enterprises were capable of irrigating in 1910..... acres..	31,670	17,140	13,235	20,954	1,705	189,050	557
15 Per cent of increase, 1910-1920.....	65.2	22.5	.....	86.3	48.7	30.5	.....
16 Area included in enterprises in 1920..... acres..	71,780	39,458	28,605	45,803	4,138	309,235	10,014
17 Area included in enterprises in 1910..... acres..	53,012	52,330	15,510	39,622	3,057	331,455	887
18 Per cent of increase, 1910-1920.....	35.4	—24.6	.....	14.3	35.4	—6.7	.....
19 Area of irrigated land reported as available for settlement..... acres..	7,995	3,638	575	9,587	.....	3,334	2,000
IRRIGATION WORKS.							
Independent enterprises:							
20 Number, 1920.....	353	107	199	280	29	252	54
21 Number, 1910.....	255	55	91	136	36	280	61
Main ditches:							
22 Number, 1920.....	306	49	179	237	20	238	35
23 Number, 1910.....	238	50	91	100	36	242	28
24 Length, 1920..... miles..	421	94	240	1,099	27	624	30
25 Length, 1910..... miles..	321	124	133	140	30	504	8
26 Capacity, 1920..... second-feet..	1,851	752	477	959	48	5,152	191
27 Capacity, 1910..... second-feet..	1,845	625	374	913	68	3,615	14
Laterals:							
28 Number, 1920.....	149	84	181	1,813	19	360	19
29 Number, 1910.....	171	44	78	68	14	247	.....
30 Length, 1920..... miles..	186	136	29	79	4	956	20
31 Length, 1910..... miles..	96	93	10	105	4	546	.....
Reservoirs:							
32 Number, 1920.....	49	32	7	5	.....	3	10
33 Number, 1910.....	38	18	3	10	2	2	7
34 Capacity, 1920..... acre-feet..	30,789	5,663	800	.....	.....	39,000	54
35 Capacity, 1910..... acre-feet..	25,727	1,536	20	4	11	34,500	1
Flowing wells:							
36 Number, 1920.....	1	.....	.....	33	5	.....	1
37 Number, 1910.....	.....	5	.....	13	.....	27	1
38 Capacity, 1920..... gallons per minute..	.....	.....	.....	6,080	1,000	285	.....
39 Capacity, 1910..... gallons per minute..	.....	1	.....	12,502	.....	5,069	18
Pumped wells:							
40 Number, 1920.....	52	49	2	45	.....	43	3
41 Number, 1910.....	2	30	.....	1	.....	9	3
42 Capacity, 1920..... gallons per minute..	13,613	58,646	45	36,240	.....	8,225	120
43 Capacity, 1910..... gallons per minute..	188	33,929	.....	4,500	.....	1,382	84
Pumping plants:							
44 Number, 1920.....	131	75	9	65	11	51	11
45 Number, 1910.....	25	32	2	36	6	18	19
46 Engine capacity, 1920..... horsepower..	1,885	3,316	41	2,775	340	1,735	151
47 Engine capacity, 1910..... horsepower..	299	1,633	23	1,152	63	270	37
48 Pump capacity, 1920..... gallons per minute..	54,461	79,688	9,156	25,885	8,434	47,002	1,303
49 Pump capacity, 1910..... gallons per minute..	9,983	42,646	275	62,987	2,179	11,812	1,248
50 Average lift, 1920..... feet..	43	83	48	24	56	38	.....
CAPITAL INVESTED.							
51 Capital invested to Jan. 1, 1920..... dollars..	2,874,338	1,668,838	641,580	990,667	225,933	8,807,058	248,934
52 Capital invested to July 1, 1910..... dollars..	1,119,447	946,307	244,466	1,166,120	53,720	5,159,024	23,632
53 Per cent of increase, 1910-1920.....	156.8	76.4	.....	—15.0	320.6	72.4	.....
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920..... dollars..	54.94	79.49	35.18	25.38	89.09	36.05	34.03
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910..... dollars..	35.35	55.21	18.47	55.65	31.61	27.73	42.43
ESTIMATED FINAL COST.							
56 Estimated final cost of existing enterprises in 1920..... dollars..	4,797,308	2,699,388	1,002,330	1,340,767	237,533	10,670,024	291,734
57 Estimated final cost of existing enterprises in 1910..... dollars..	1,229,118	940,307	244,466	1,393,370	53,720	10,078,743	23,632
58 Per cent of increase, 1910-1920.....	290.3	185.2	.....	—3.8	342.2	5.9	.....
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920..... dollars..	66.85	68.41	35.04	29.60	57.40	34.50	29.13
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910..... dollars..	23.19	18.08	15.76	35.17	17.57	30.41	26.64

¹ Part taken to form Pend Oreille County in 1911.

² Includes Clarke, Jefferson, King, Kitsap, Lewis, Pend Oreille, Pierce, Skagit, Skamania, Thurston, and Whatcom Counties. No irrigation is reported for the other counties of the state.

WYOMING.

INTRODUCTION.

The following pages present the statistics of irrigation for the state of Wyoming 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.

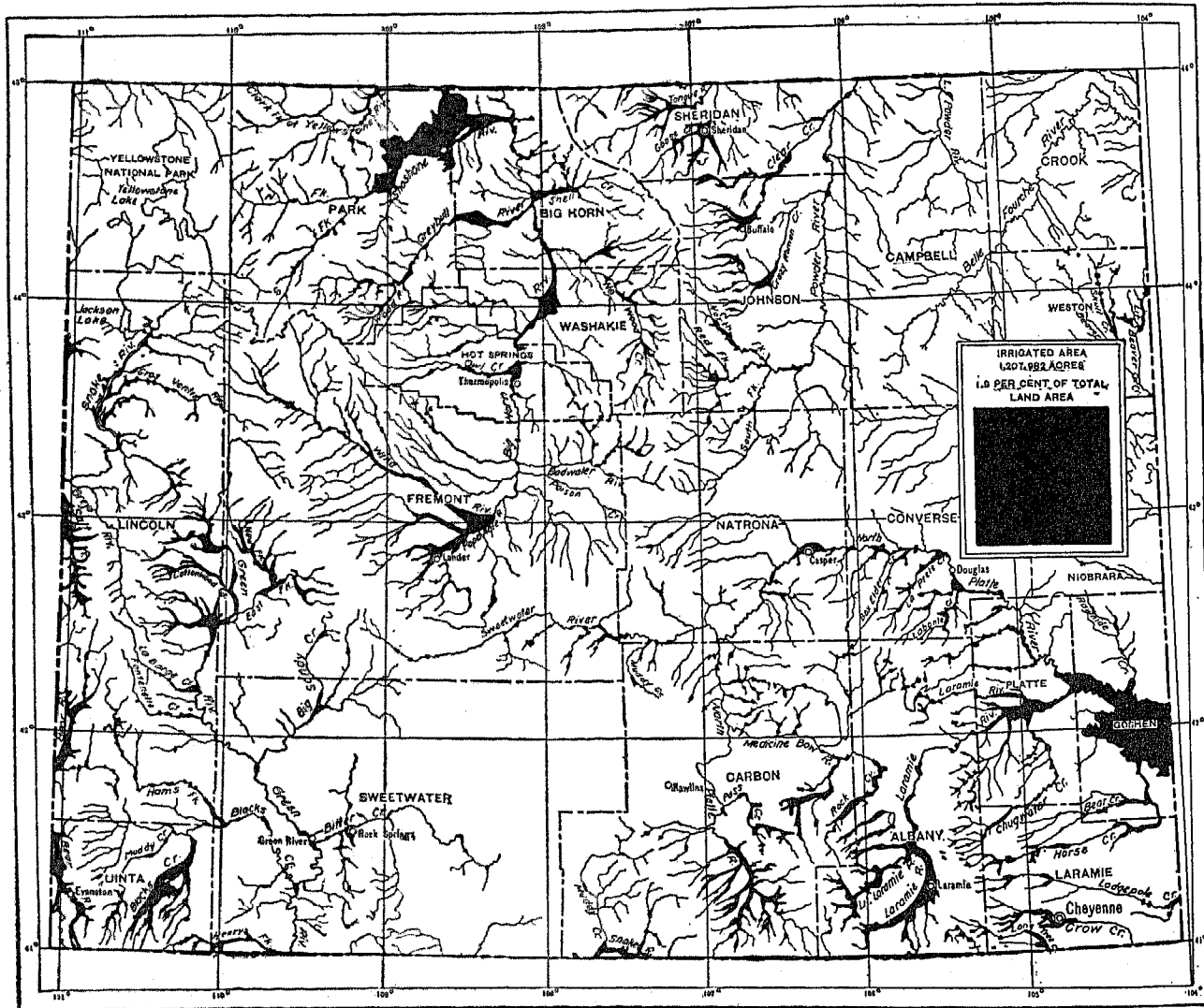
ITEM.	CENSUS OF—		INCREASE. ¹	
	1920	1910	Amount.	Per cent.
Number of all farms.....	15,748	10,987	4,761	43.3
Approximate land area of the state.....acres..	62,430,720	62,460,160	² -29,440	(³)
All land in farms.....acres..	11,809,351	8,543,010	3,266,341	38.2
Improved land in farms.....acres..	2,102,005	1,256,160	845,845	67.3
Number of farms irrigated.....	6,449	6,297	152	2.4
Area irrigated.....acres..	1,207,982	1,133,302	74,680	6.6
Area enterprises were capable of irrigating.....acres..	1,831,039	1,639,510	191,529	11.7
Area included in enterprises.....acres..	2,564,668	2,224,298	340,370	15.3
Per cent irrigated:				
Number of all farms.....	41.0	57.3	-16.3	.....
Approximate land area of the state.....	1.9	1.8	0.1	.....
Land in farms.....	10.2	13.3	-3.1	.....
Improved land in farms.....	57.5	90.2	-32.7	.....
Excess of area enterprises were capable of irrigating over area irrigated.....acres..	623,057	506,208	116,849	23.1
Excess of area included in enterprises over area irrigated.....acres..	1,356,686	1,090,996	265,690	24.4
Area of irrigated land reported as available for settlement.....acres..	197,326	(⁴)	.....	.....
Capital invested.....	\$34,326,328	\$17,700,980	\$16,625,348	93.9
Average per acre enterprises were capable of irrigating.....	\$18.75	\$10.80	\$7.95	73.6
Estimated final cost of existing enterprises.....	\$51,500,288	\$20,425,890	\$31,074,398	152.1
Average per acre included in enterprises.....	\$20.08	\$9.18	\$10.90	118.7
Average cost of operation and maintenance per acre.....	\$1.04	\$0.86	\$0.18	20.9
IRRIGATION WORKS.				
Number of enterprises.....	3,564	5,577	-2,013	-36.1
Number of main ditches.....	5,007	5,593	-586	-10.5
Length of main ditches.....miles..	9,517	10,933	-1,416	-13.0
Capacity of main ditches.....second-feet..	39,009	42,630	-3,621	-8.5
Number of lateral ditches.....	2,777	2,340	437	18.7
Length of lateral ditches.....miles..	2,534	2,298	236	10.3
Number of reservoirs.....	374	414	-40	-9.7
Capacity of reservoirs.....acre-feet..	2,911,748	2,550,937	360,811	14.1
Number of flowing wells.....	7	2	5	.....
Capacity of flowing wells.....gallons per minute..	46	250	-204	-81.6
Number of pumped wells.....	16	3	13	.....
Capacity of pumped wells.....gallons per minute..	8,020	835	7,185	860.5
Number of pumping plants.....	57	34	23	.....
Engine capacity.....horsepower..	1,304	705	599	85.0
Pump capacity.....gallons per minute..	39,725	142,529	-102,804	-72.1
Average lift.....feet..	31	(⁴)	31	.....

¹ A minus sign (—) denotes decrease. Per cent not shown when base is less than 100.
² Decrease due to building of Pathfinder and Shoshone Reservoirs.

³ Less than one-tenth of 1 per cent decrease.
⁴ Not reported in 1910.

WYOMING

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND.



CLIMATIC CONDITIONS.

The surface of Wyoming consists of high, rolling prairies broken by mountain ranges. The main ranges of the Rocky Mountains pass through the state forming the Continental Divide, while many broken ranges occur, cutting the state into many more or less isolated valleys. The broken topography produces a variety in climatic conditions.

Except for small areas in the high mountains, no part of the state receives more than 20 inches of precipitation in normal years. Along the eastern border of the state the normal annual precipitation is from 15 to 20 inches and crops are grown without irrigation. Immediately west of this, and occupying nearly one-half the area of the state, is a wide zone in which the normal precipitation is from 10 to 15 inches. In this section there is little agriculture except in the stream valleys where irrigation is practiced. The grazing of cattle and sheep on the natural grasses forms the principal industry.

In the southwest part of the state is a large section—the Red Desert—where the precipitation is less than 10 inches and the same condition prevails in the Big Horn Basin in the northern part of the state.

In the valleys of the extreme western part of the state the normal annual precipitation varies from about 10 inches in the Green River Valley to about 18 inches in Jackson's Hole, near Yellowstone Park.

The year 1919 was the driest on record, except 1902. During the first eight months of the year, which includes the growing season for crops, the precipitation was only about one-half the normal. In many places dry-farm crops were a total failure, and in many sections irrigated crops suffered because of shortage of water.

WATER SUPPLY FOR IRRIGATION.

Since Wyoming lies along the Continental Divide, the rivers rising in its mountains flow into adjoining states on all four sides. Crossing the eastern border to South Dakota and Nebraska are Belle Fourche, Cheyenne, and North Platte Rivers, and Lodgepole Creek. Flowing to the south are only small streams except Green River; while from the south the state receives the North Platte and the Laramie. Bear River and Snake River flow to the west into Idaho; and to the north into Montana flow Yellowstone, Clark Fork of the Yellowstone, Big Horn, Tongue, Powder, and Little Missouri Rivers and many smaller streams.

The streams flowing to the east, except the North Platte, do not carry large volumes of water except in flood periods, and they flow through a country where crops can be grown with some success without irrigation. Storage is necessary if these streams are to be used extensively for irrigation.

The North Platte rises in north central Colorado, flows in a northerly direction about half way across

Wyoming, turns abruptly to the east, and flows in a southeasterly direction to the Wyoming-Nebraska line. Throughout most of its course in Wyoming the North Platte flows through a rough mountainous country where there is little opportunity to use its water for irrigation. Its principal tributaries in Wyoming are the Medicine Bow, coming from the east; the Sweetwater, coming from the west, and the Laramie, coming from the south. Just below the mouth of the Sweetwater the United States Reclamation Service has built the Pathfinder Reservoir, having a capacity of about 1,000,000 acre-feet, which is about two-thirds of the average total annual discharge of the river at that point. Since a large part of the annual discharge is used as it comes, this reservoir has sufficient capacity to control the flow of the stream except in years of abnormal flood discharge. Water is diverted from both sides of the North Platte about 30 miles west of the Wyoming-Nebraska line, for use on lands in both states. The canal on the south side is under construction, and much additional land will be irrigated from the North Platte in that section. Stored water from Pathfinder Reservoir is supplied to a large area under private canals, mainly in Nebraska.

Laramie River, a tributary of the North Platte, like the main stream, rises in the mountains of northern Colorado and flows into Wyoming. Some of its waters are diverted from its drainage basin into the tributaries of the South Platte in Colorado, and there are large projects on the stream in Wyoming. Litigation between the parties taking water from the stream in Colorado and in Wyoming is pending in the United States Supreme Court.

Very little land is irrigated from the streams along the southern border of the state. The country is largely rough and undeveloped, and far from transportation. Green River rises in high mountains that receive a very heavy snowfall, and carries a large volume of unused water, but the valleys through which it flows are undeveloped and lack transportation facilities. Green River is one of the principal tributaries of Colorado River, and possible storage and use of its water is being studied in connection with the whole Colorado River System.

Bear River, which rises in Utah, flows into Wyoming and crosses and recrosses into Utah and Idaho, and finally discharges into Great Salt Lake, flows principally through high mountain valleys in Wyoming. It is not susceptible of much larger use in Wyoming.

SNAKE RIVER rises in the southern part of Yellowstone National Park, and some of its headwater tributaries rise in very close proximity to those of Green River. There is not much opportunity to use this river in Wyoming as its course is through high mountain valleys. Jackson Lake lies along the course of Snake River, and is used as a reservoir to store flood water for use along the course of the river in Idaho.

Yellowstone River rises in the mountains to the southeast of Yellowstone National Park, flows into Yellowstone Lake within the park, and thence into Montana. There is practically no opportunity to use this stream for irrigation in Wyoming.

Big Horn River and its tributaries drain the whole north central part of Wyoming. Their headwaters rise in the mountains southeast of Yellowstone National Park, near those of Green, Snake, and Yellowstone Rivers. The larger of the tributaries are Wind, Greybull, and Shoshone Rivers. All of these streams are used for irrigation, but only on the Shoshone has provision been made for storing the flood waters on a large scale. On that stream the United States Reclamation Service has built the Shoshone Reservoir, which has a capacity of 456,600 acre-feet. This is less than one-half of the average annual run-off of the river at this point, and there is opportunity for additional storage.

The other streams flowing north into Montana flow through the high plains, where there is little irrigation and where some crops can be grown in most years without irrigation.

The supply of water in streams has met the demands for irrigation so far and there has been little attempt to develop ground water.

FARMS AND ACREAGE IRRIGATED.

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

CENSUS YEAR.	FARMS IRRIGATED.			AREA IRRIGATED.				
	Num-ber.	Per cent of in-crease.	Per cent of all farms.	Acres.	Per cent of in-crease.	Per cent of total land area.	Per cent of im-proved land in farms.	Per cent of im-proved land in farms.
1920.....	6,449	2.4	41.0	1,207,982	6.6	1.9	10.2	57.5
1910.....	6,297	69.2	57.3	1,133,302	87.1	1.8	13.3	90.2
1900.....	3,721	94.1	61.1	605,878	163.8	1.0	7.5	76.5
1890.....	1,917	.....	61.3	229,676	.....	0.4	12.5	48.2

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

DATE OF BEGINNING.	Num-ber of enter-prises.	Area in-cluded in enter-prises, 1920 (acres).	AREA IRRIGATED IN 1919.		Area enter-prises were ca-pable of irrigat-ing in 1920 (acres).
			Acres.	Per cent of acre-age in enter-prises.	
Total.....	3,564	2,564,668	1,207,982	47.1	1,831,039
Before 1860.....	2	640	320	50.0	320
1860-1869.....	14	10,005	9,288	92.8	9,880
1870-1879.....	152	141,117	77,228	54.7	104,503
1880-1889.....	931	702,056	406,196	57.9	618,857
1890-1899.....	613	395,655	239,800	60.5	337,220
1900-1904.....	566	330,740	163,542	48.4	298,831
1905-1909.....	442	519,421	169,976	32.7	327,299
1910-1914.....	366	140,116	55,288	39.5	97,482
1915-1919.....	252	216,585	18,642	8.6	53,627
Not reported.....	226	108,327	68,201	63.0	83,020

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

CLASS.	AREA IRRIGATED (ACRES).				Area enter-prises were ca-pable of irrigat-ing in 1920 (acres).	Area in-cluded in enter-prises, 1920 (acres).
	1919	1909	Increase. ¹			
			Amount.	Per cent.		
Total.....	1,207,982	1,133,302	74,680	6.6	1,831,039	2,564,668
Streams, gravity.....	1,155,696	1,112,234	43,362	3.9	1,707,269	2,417,882
Streams, pumped.....	1,525	1,540	-15	-1.0	3,448	4,700
Wells, pumped.....	147	75	72	.....	148	148
Wells, flowing.....	19	64	-45	.....	40	65
Lakes, gravity.....	355	120	235	195.8	381	545
Springs.....	5,985	5,008	977	19.5	10,268	12,527
Stored storm water.....	10,852	14,261	-3,409	-23.9	40,728	51,822
Streams, gravity, and pumped wells.....	400	(²)	400	.....	634	854
Other mixed.....	33,043	(²)	33,043	.....	62,063	76,065
Other and not reported.....	60	(²)	60	.....	60	60

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.

Wyoming accepted the conditions of the Federal Carey Act (act of Congress, Aug. 18, 1894), in 1895. The original act granted to each of the states containing arid land 1,000,000 acres, and an amendment granted to Wyoming an additional area of 1,000,000 acres.

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.....	1,207,982	1,133,302	74,680	6.6
Individual and partnership.....	724,620	813,823	-89,203	-11.0
Cooperative.....	286,702	116,317	170,385	146.6
Irrigation district.....	22,935	11,800	11,135	94.4
Carey Act.....	36,230	86,232	-50,022	-58.0
Commercial.....	57,500	87,025	-30,135	-34.3
U. S. Reclamation Service.....	53,555	12,905	40,650	315.0
U. S. Indian Service.....	22,000	4,270	17,730	415.2
State.....	2,120	(²)	2,120	.....
City.....	2,020	(²)	2,020	.....
ACREAGE ENTERPRISES WERE CAPABLE OF IRRIGATING.				
Total.....	1,831,039	1,639,510	191,529	11.7
Individual and partnership.....	1,008,379	1,024,137	-15,758	-1.5
Cooperative.....	432,956	185,478	247,480	136.6
Irrigation district.....	54,017	27,050	26,967	99.7
Carey Act.....	72,215	205,974	-133,759	-64.9
Commercial.....	121,310	133,305	-11,995	-9.0
U. S. Reclamation Service.....	93,022	34,869	58,153	166.8
U. S. Indian Service.....	45,000	48,699	-3,699	-7.6
State.....	2,120	(²)	2,120	.....
City.....	2,020	(²)	2,020	.....
ACREAGE INCLUDED IN ENTERPRISES.				
Total.....	2,564,668	2,224,298	340,370	15.3
Individual and partnership.....	1,339,116	1,159,378	185,738	16.1
Cooperative.....	532,206	189,894	342,312	180.3
Irrigation district.....	56,617	27,050	29,567	109.3
Carey Act.....	98,190	426,472	-328,282	-77.0
Commercial.....	146,478	195,967	-49,489	-25.8
U. S. Reclamation Service.....	299,789	167,580	131,909	78.6
U. S. Indian Service.....	87,940	68,657	24,283	38.1
State.....	2,155	(²)	2,155	.....
City.....	2,177	(²)	2,177	.....

¹ A minus sign (-) denotes decrease.

² Not included in classification in 1910.

An irrigation district law was enacted in 1907. This law has been utilized both for the financing of new enterprises and for buying in enterprises originally organized in some other form.

The areas reported under United States Reclamation Service in Table 5 include land watered by a Carey Act enterprise supplied under contract.

ACREAGE, BY CHARACTER OF WATER RIGHTS.

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

Wyoming was organized as a territory in 1868 and the first territorial legislature adopted the common law of England so far as it was "not inapplicable." The supreme court of the state has held that this enactment did not establish in Wyoming the common law of riparian rights, since it is "unsuited to our requirements and necessities" (Moyer v. Preston, 6 Wyo. 308).

In 1875 the territory enacted a law providing that persons holding land along any stream were entitled to use the water for irrigation and to the right of way for canals over the land of others.

In 1886 there was enacted a law to regulate the use of water for irrigation and other purposes. It divided the territory into districts, gave the district courts jurisdiction over water rights, required all parties claiming rights to water to file statements of their claims with the clerks of the proper courts, required all parties wishing to acquire rights to file statements before beginning construction of works, and provided that whenever any party interested in any ditch, canal, or reservoir desired a determination of the priority of rights to water from the source from which water was obtained, he might apply to the proper district court for an adjudication.

The law of 1886 declared "The water of every natural stream not heretofore appropriated within this territory is hereby declared to be the property of the public, and the same is dedicated to the use of the people, subject to appropriation as herein provided."

Wyoming was admitted to the Union as a state in 1890, and the constitution of the state contained the following general declarations regarding water:

"The water of all natural streams, springs, lakes, or other collections of still water within the boundaries of the state are hereby declared to be the property of the state." (Art. 8, sec. 1.)

"Priority of appropriation for beneficial uses shall give the better right. No appropriation shall be denied except when such denial is demanded by the public interests." (Art. 8, sec. 3.)

The constitution provided also for the office of state engineer, and a board of control of which the engineer is president, to which was assigned "supervision of the waters of the state and of their appropriation, distribution, and diversion."

The first state legislature enacted the laws necessary to the carrying out of the constitutional provisions referred to, and the system adopted at that time is still in effect.

Persons wishing to acquire rights are required to make application to the state engineer for permits and are to submit proof of the completion of irrigation works in accordance with the permits, and the board of control is to issue certificates defining the rights acquired.

Rights previously acquired are adjudicated by the board of control, and certificates defining rights in accordance with the decisions of the board are issued.

Many suits attacking the law of 1890 have been decided by the state supreme court, and the law has been upheld by the court.

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.....	1,207,982	100.0	100.0
Appropriation and use.....	25,062	2.1	8.7
Notice filed and posted.....	60,792	5.0	0.8
Adjudicated by court.....	132,185	13.4	4.3
Permit from state.....	466,020	38.6	28.3
Certificate or license from state.....	457,038	37.8	57.9
Underground.....	276	(1)	(2)
Other and mixed.....	637	0.1	(2)
Not reported.....	35,345	2.9	(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.

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.....	1,207,982	773,111	56.2	2,564,668	1,831,039
Missouri River drainage.....	809,845	580,631	49.8	1,895,348	1,308,438
Clark Fork (of Yellowstone) and tributaries.....	8,897	4,587	94.8	15,640	14,121
Clark Fork direct.....	3,685	2,860	28.9	5,869	5,312
Tributaries of Clark Fork.....	5,211	1,707	205.3	10,271	8,809
Big Horn River and tributaries.....	307,846	113,875	170.3	750,261	468,198
Big Horn River direct.....	42,799	2,502	.....	70,295	56,945
Pope Agie River.....	22,073	14,340	53.9	34,723	34,375
Wind River.....	43,620	3,787	.....	228,338	77,122
Poison Creek.....	5	2,690	-99.8	10	10
Owl Creek.....	11,610	6,553	77.0	14,546	12,951
No Wood Creek.....	18,416	10,099	82.4	26,193	22,080
Greybull River.....	49,231	35,552	38.5	93,543	79,134
Shell Creek.....	11,955	4,319	178.8	24,005	22,406
Shoshone River.....	95,061	26,311	261.4	217,998	134,431
Little Horn River.....	1,408	4,761	-70.4	11,853	4,840
Other tributaries of Big Horn River.....	11,638	2,950	293.7	29,257	24,404
Tongue River and tributaries.....	43,025	35,623	20.8	69,167	59,290
Tongue River direct.....	9,805	7,285	34.6	11,679	10,771
Goose Creek.....	27,627	20,653	33.8	43,817	37,749
Other tributaries of Tongue River.....	5,593	17,685	-27.2	13,671	10,770
Powder River and tributaries.....	88,903	64,357	38.1	132,985	112,340
Powder River direct.....	2,465	.....	.....	4,975	4,962
Red Fork Creek.....	3,341	2,610	28.0	4,271	3,385
Crazy Woman Creek.....	21,965	6,950	216.0	29,684	24,151
Clear Creek.....	50,648	47,801	6.0	71,690	63,735
Other tributaries of Powder River.....	10,484	6,996	49.9	22,495	16,107
Little Missouri River.....	60	115	-68.6	60	60
Tributaries of Cheyenne River.....	7,872	14,291	-44.9	16,818	11,631
Belle Fourche River.....	1,966	6,173	-68.2	5,054	3,621
South Fork.....	5,906	7,906	-25.3	11,764	7,910
Other tributaries of Cheyenne River.....	.....	212	-100.0	.....	.....

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

² Includes springs and wells.

IRRIGATION—WYOMING.

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		
Missouri River drainage—Con.					
Niobrara River.....	445	* 975	-54.4	445	445
North Platte River and tributaries.....	402,993	336,840	19.6	888,419	628,233
North Platte River direct.....	56,794	39,570	43.5	120,195	76,966
Beaver Creek.....	2,621	7,370	-64.4	3,666	3,186
Grand Encampment Creek.....	7,053	6,622	6.5	10,173	7,293
Spring Creek.....	13,123	7,679	70.9	18,702	18,177
Sage Creek.....	375	1,634	-77.1	570	570
Pass Creek.....	8,557	8,390	2.0	12,500	11,373
Medicine Bow River.....	54,500	40,661	34.0	139,599	67,103
Sweetwater River.....	5,448	11,403	-52.2	14,166	10,593
Muddy Creek.....	657	1,525	-66.9	1,112	677
Box Elder Creek.....	4,648	4,740	-1.9	7,916	7,696
La Prele Creek.....	9,103	4,524	101.2	21,697	15,690
Labonte Creek.....	4,376	3,639	20.3	6,525	5,756
Laramie River and tributaries.....	149,999	138,176	8.6	366,928	291,993
Laramie River direct.....	72,400	67,335	26.3	171,554	122,960
Little Laramie River.....	30,890	53,106	-41.9	42,832	33,144
Sybilie Creek.....	6,183	7,234	-14.5	9,519	8,044
North Laramie River.....	6,858	5,721	19.9	20,144	11,749
Chugwater Creek.....	6,914	3,907	51.4	9,853	9,258
Other tributaries of Laramie River.....	27,784	* 10,874	155.5	113,006	106,842
Rawhide Creek.....	2,045	4,187	-51.2	3,051	2,481
Horse Creek.....	28,369	15,524	82.7	71,188	39,702
Other tributaries of North Platte River.....	* 55,325	* 41,196	34.3	89,831	68,977
Tributaries of South Platte River.....	9,804	9,888	-0.8	21,553	14,220
Lodgepole Creek.....	1,775	3,694	-51.9	10,184	3,694
Crow Creek.....	2,580	3,643	-29.2	5,590	4,867
Lone Tree Creek.....	1,960	1,444	35.7	2,040	1,965
Cachela Poudre River.....	3,489	1,077	224.0	3,739	3,694
Other tributaries of South Platte River.....		* 30	-100.0		
Other tributaries of Missouri River.....		* 50	-100.0		
Colorado River drainage.....	211,507	118,566	78.4	473,116	353,731
Green River and tributaries.....	211,507	118,566	78.4	473,116	353,731
Green River direct.....	20,285	11,351	78.7	32,492	28,034
New Fork.....	27,743	10,975	152.8	53,918	43,614
Horse Creek.....	15,520	6,599	136.3	21,670	19,453
Cottonwood Creek.....	17,437	4,673	272.7	32,317	29,283
South Piney Creek.....	11,928	16,179	-26.3	30,924	26,397
La Barge Creek.....	5,459	5,055	8.0	11,700	7,725
Fontenelle Creek.....	4,428	3,241	36.6	5,858	5,033
Bitter Creek.....	2,395	1,405	70.5	12,495	11,447
Blacks Creek.....	65,980	28,139	134.5	175,970	104,305
Henrys Fork.....	8,298	6,813	21.8	25,940	23,694
Little Snake River.....	18,463	17,363	-22.5	18,038	16,358
Other tributaries of Green River.....	18,571	* 6,803	173.0	51,794	38,388
Great Salt Lake drainage.....	63,665	32,764	94.3	91,842	82,470
Bear River and tributaries.....	63,665	32,764	94.3	91,842	82,470
Bear River direct.....	37,306	25,160	48.3	49,027	45,412
Tributaries of Bear River.....	26,359	* 7,604	246.6	42,815	37,058
Columbia River drainage.....	62,965	41,150	53.0	104,362	86,400
Snake River and tributaries.....	62,965	41,150	53.0	104,362	86,400
Snake River direct.....	912	1,050	-13.1	2,202	1,879
Gros Ventre River.....	6,718	3,523	90.7	9,896	7,493
Little Gros Ventre River.....	6,243	3,599	73.5	9,157	6,997
Salt River.....	24,338	22,570	52.1	57,288	46,234
Tributaries of Pierre River.....		5,372	-100.0		
Other tributaries of Snake River.....	14,754	* 5,036	193.0	25,840	23,797

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.....	\$34,326,328	93.9	\$19.06	70.5
1910.....	17,700,980	345.5	10.80	64.6
1900.....	3,973,165	377.9	6.56	81.2
1890.....	831,427		3.62	

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

DATE OF BEGINNING.	Amount.	Per cent of total.	Average per acre.
Total.....	\$34,326,328	100.0	\$18.75
Before 1890.....	1,250	(¹)	3.91
1890-1899.....	45,731	0.1	4.63
1870-1879.....	978,368	2.9	9.96
1830-1839.....	5,459,654	15.9	10.52
1890-1899.....	3,109,641	9.1	9.22
1900-1904.....	4,844,972	14.1	16.21
1905-1909.....	14,962,407	43.6	45.71
1910-1914.....	1,621,916	4.7	18.64
1915-1919.....	2,337,484	6.8	43.69
Not reported.....	964,905	2.8	11.62

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.....	\$34,326,328	100.0	\$18.75	869,581	\$1.04
Streams, gravity.....	33,025,460	96.2	19.34	826,086	1.03
Streams, pumped.....	99,914	0.3	28.98	985	9.91
Wells, pumped.....	10,460	(²)	70.68	122	7.79
Wells, flowing.....	4,630	(²)	115.75	12	9.68
Lakes, gravity.....	4,935	(²)	12.95	60	0.83
Springs.....	66,299	0.2	6.46	2,983	0.60
Stored storm water.....	407,055	1.2	8.71	10,055	0.73
Streams, gravity, and pumped wells.....	16,770	(²)	26.45	125	1.20
Other mixed.....	690,705	2.0	11.13	29,153	1.25
Other and not reported.....	100	(²)	1.67		

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.....	\$34,326,328	\$4,701,049	\$29,625,279	630.2
Missouri River drainage.....	29,818,236	3,901,748	25,916,488	664.2
Clark Fork (of Yellowstone) and tributaries.....	117,292	40,475	76,817	189.8
Clark Fork direct.....	55,402	26,150	29,252	111.9
Tributaries of Clark Fork.....	61,890	* 14,325	47,565	332.0
Big Horn River and tributaries.....	14,380,800	919,433	13,461,367	
Big Horn River direct.....	1,295,870	22,000	1,273,870	
Pope Agie River.....	349,646	72,264	277,382	383.7
Wind River.....	2,101,819	17,904	2,083,915	
Poison Creek.....	1,000	18,700	-17,700	-94.7
Owl Creek.....	62,915	40,154	12,761	31.8
No Wood Creek.....	161,588	81,078	79,610	97.1
Greybull River.....	503,184	204,604	298,580	145.9
Shell Creek.....	380,420	32,730	347,690	
Shoshone River.....	8,702,480	378,278	8,324,202	
Little Horn River.....	35,000	31,695	3,305	10.4
Other tributaries of Big Horn River.....	747,272	* 19,126	728,146	
Tongue River and tributaries.....	811,125	218,405	592,720	271.4
Tongue River direct.....	125,555	50,750	74,805	147.4
Goose Creek.....	563,518	127,100	436,418	343.4
Other tributaries of Tongue River.....	122,052	* 40,555	81,497	201.0
Powder River and tributaries.....	1,159,996	285,084	874,912	306.9
Powder River direct.....	152,100		152,100	
Red Fork Creek.....	78,500	12,800	65,700	513.3
Crazy Woman Creek.....	127,791	22,275	105,516	473.7
Clear Creek.....	553,465	188,375	365,090	192.3
Other tributaries of Powder River.....	248,140	* 60,634	187,506	309.2
Little Missouri River.....	726	* 950	-224	-23.6
Tributaries of Cheyenne River.....	242,888	102,877	140,000	136.1
Belle Fourche River.....	76,066	50,165	25,901	51.6
South Fork.....	166,820	49,272	117,548	238.6
Other tributaries of Cheyenne River.....		* 3,440	-3,440	-100.0
Niobrara River.....	10,565	* 4,200	6,365	151.5

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

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

DRAINAGE BASIN.	1920	1902	INCREASE. ¹	
			Amount.	Per cent.
Missouri River drainage—Con.				
North Platte River and tributaries.....	12,931,901	2,227,217	10,704,684	480.6
North Platte River direct.....	5,920,923	306,084	5,614,839	—
Beaver Creek.....	37,497	51,168	—13,671	—26.7
Grand Encampment Creek.....	72,692	50,828	21,864	43.0
Spring Creek.....	184,290	38,496	145,794	378.7
Sage Creek.....	4,206	13,790	—9,584	—22.5
Paseo Creek.....	50,051	41,877	8,174	19.5
Medicine Bow River.....	346,664	244,287	102,377	41.9
Sweetwater River.....	87,322	54,701	32,621	60.6
Muddy Creek.....	7,770	6,546	1,224	18.7
Box Elder Creek.....	104,676	37,655	67,021	178.0
La Poudre Creek.....	327,411	37,500	289,911	773.1
Labonte Creek.....	71,826	32,640	39,186	120.1
Laramie River and tributaries.....	4,334,896	888,096	3,446,800	388.1
Laramie River direct.....	923,041	661,206	261,835	39.6
Little Laramie River.....	48,753	119,122	—70,369	—50.1
Sybilie Creek.....	65,041	32,200	32,841	102.0
North Laramie River.....	396,708	13,886	382,822	—
Chugwater Creek.....	83,155	30,945	52,210	168.7
Other tributaries of Laramie River.....	2,818,198	230,737	2,787,461	—
Rawhide Creek.....	27,330	49,445	—22,115	—44.7
Horse Creek.....	536,475	132,847	403,628	303.8
Other tributaries of North Platte River.....	817,872	241,257	576,615	239.0
Tributaries of South Platte River.....	212,945	102,907	110,038	106.9
Lodgepole Creek.....	327,411	39,500	287,911	125.4
Crow Creek.....	48,919	43,925	4,994	11.4
Lone Tree Creek.....	36,173	17,380	18,793	108.1
Cachela Foudre River.....	38,816	1,997	36,819	—
Other tributaries of South Platte River.....		105	—105	—100.0
Other tributaries of Missouri River.....		200	—200	—100.0
Colorado River drainage.....	3,064,797	579,190	2,485,607	428.2
Green River and tributaries.....	3,064,797	579,190	2,485,607	428.2
Green River direct.....	170,841	31,750	139,091	438.1
New Fork.....	293,043	27,253	265,790	975.3
Horse Creek.....	51,163	13,350	37,813	283.2
Cottonwood Creek.....	456,827	11,000	445,827	—
South Piney Creek.....	85,728	38,761	46,967	121.2
La Barge Creek.....	39,150	20,365	18,785	92.2
Fontenelle Creek.....	33,000	9,777	23,223	237.5
Bitter Creek.....	93,158	4,500	88,658	—
Blacks Creek.....	566,776	68,296	498,480	729.9
Henrys Fork.....	77,320	11,291	66,029	584.8
Little Snake River.....	274,302	325,107	—50,805	—15.6
Other tributaries of Green River.....	923,489	17,740	905,749	—
Great Salt Lake drainage.....	679,405	118,340	561,065	474.1
Bear River and tributaries.....	679,405	118,340	561,065	474.1
Bear River direct.....	294,588	87,355	207,233	237.2
Tributaries of Bear River.....	384,817	30,985	353,832	—
Columbia River drainage.....	763,890	101,771	662,119	650.6
Snake River and tributaries.....	763,890	101,771	662,119	650.6
Snake River direct.....	500,202	8,570	491,632	—
Gros Ventre River.....	31,225	14,802	16,423	111.0
Little Gros Ventre River.....	18,748	13,330	5,418	40.6
Salt River.....	149,207	41,724	107,483	257.6
Tributaries of Pierre River.....		12,595	—12,595	—100.0
Other tributaries of Snake River.....	64,510	10,750	53,760	500.1

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 from reservoirs in Wyoming to enterprises controlled by agencies of most of the other classes shown in the table, in Nebraska and Idaho, as well as in Wyoming, 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.....	\$34,326,328	100.0	869,581	\$1.04
Individual and partnership.....	8,738,886	25.5	439,726	1.04
Cooperative.....	6,701,990	19.5	244,642	0.95
Irrigation district.....	1,441,312	4.2	21,417	0.77
Carey Act.....	2,434,791	7.1	33,706	1.84
Commercial.....	780,562	2.3	56,800	0.55
U. S. Reclamation Service.....	12,863,870	37.5	50,631	1.87
U. S. Indian Service.....	1,339,887	3.9	22,000	1.19
State.....	15,060	(²)	1,140	0.61
City.....	9,980	(²)	20	142.60

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.....	144
Acreage included in enterprises reporting land drained or needing drainage.....	513,347
Acreage for which drains have been installed.....	68,086
Additional acreage needing drainage.....	75,183
Per cent that acreage for which drains have been installed is of total acreage included in enterprises reporting drainage.....	13.3
Per cent that acreage for which drains have been installed is of total acreage included in irrigation enterprises in the state.....	2.7
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.....	5.6

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-foot.....	9,890	3,706	6,184
Area irrigated in 1919.....acres.....	454,615	228,539	226,076
Average number of acres per second-foot.....	46	62	37
Total quantity of water entering canals.....acre-feet.....	1,310,560	491,047	819,513
Area irrigated in 1919.....acres.....	645,265	230,729	314,536
Average quantity per acre.....acre-feet.....	2.4	2.1	2.6
Total quantity of water delivered.....acre-feet.....	393,985	274,206	119,785
Area irrigated in 1919.....acres.....	186,328	128,021	58,307
Average quantity per acre.....acre-feet.....	2.1	2.1	2.1

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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-foot).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total.....	2,066	301	5,007	39,009	9,517	2,777	2,534	374	2,911,748
Before 1860.....	1	.....	2	2	2	.....	.....	.....	.....
1860-1869.....	16	.....	24	135	55	1	10	.....	.....
1870-1879.....	96	10	327	1,617	538	24	24	16	11,962
1880-1889.....	679	46	1,557	9,640	2,720	815	682	55	156,162
1890-1899.....	383	32	910	7,189	1,753	695	537	31	7,507
1900-1904.....	311	46	718	6,111	1,474	224	170	62	983,034
1905-1909.....	219	62	526	8,422	1,290	673	356	102	1,718,235
1910-1914.....	163	49	408	2,947	791	152	99	61	28,662
1915-1919.....	103	41	290	2,131	525	123	82	34	8,075
Not reported.....	95	15	245	915	369	70	68	13	741

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.....	17.9	7	46	16	8,020	57	1,304	70	39,725
Before 1860.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1860-1869.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1870-1879.....	1.0	2	.....	1	.....	1	8	1	.....
1880-1889.....	1.1	1	.....	4	3,000	5	185	5	8,200
1890-1899.....	3.6	.....	.....	.....	.....	2	40	2	3,470
1900-1904.....	2.9	.....	.....	3	2,500	8	324	9	3,720
1905-1909.....	4.2	.....	.....	.....	.....	4	81	4	6,050
1910-1914.....	0.8	.....	.....	2	1,435	17	483	17	11,652
1915-1919.....	0.2	2	40	3	185	11	91	14	4,776
Not reported.....	4.1	2	6	3	900	9	92	18	1,857

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-foot).	Length (miles).	Number.	Length (miles).	Number.	Capacity (acre-feet).
Total.....	2,066	301	5,007	39,009	9,517	2,777	2,534	374	2,911,748
Individual and partnership.....	1,942	267	4,782	24,337	7,808	2,050	1,078	333	70,733
Cooperative.....	95	17	180	8,702	1,181	287	534	13	86,803
Irrigation district.....	2	1	7	708	100	20	70	2	43,947
Carey Act.....	7	6	14	1,298	133	40	149	10	67,466
Commercial.....	11	3	13	1,543	187	68	221	8	266,002
U. S. Reclamation Service.....	2	5	4	2,345	93	281	473	6	2,376,385
U. S. Indian Service.....									
State.....	7	1	6	20	7	31	14	1	411
City.....		1	1	6	8			1	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.....	17.9	7	46	16	8,020	57	1,304	70	39,725
Individual and partnership.....	11.7	7	46	16	8,020	55	1,239	57	39,725
Cooperative.....	2.6					1	15	11	
Irrigation district.....	0.5								
Carey Act.....									
Commercial.....	0.1								
U. S. Reclamation Service.....	1.9								
U. S. Indian Service.....									
State.....	0.8								
City.....	0.3					1	50	2	

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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.....	2,066	301	5,007	39,009	9,517	2,777	2,534	374	2,911,748
Missouri River drainage.....	1,546	252	3,429	27,977	6,671	1,750	1,932	321	2,039,572
Clark Fork (of Yellowstone) and tributaries.....	4	.....	58	214	90	6	7	4	2,704
Clark Fork direct.....	4	.....	4	38	12	2	6	.....	.....
Tributaries of Clark Fork.....	4	.....	54	176	78	4	1	4	2,704
Big Horn River and tributaries.....	266	30	732	8,202	2,029	494	696	70	460,867
Big Horn River direct.....	10	1	27	712	143	36	47	1	2
Popo Agie River.....	37	.....	122	605	270	20	34	1	112
Wind River.....	7	1	88	1,005	233	12	13	2	2,050
Poison Creek.....	.....	.....	1	.....	.....	.....	.....	1	3
Owl Creek.....	6	.....	12	279	89	12	16	6	275
No Wood Creek.....	21	5	94	388	206	8	5	4	60
Graybull River.....	46	1	100	1,276	327	20	71	4	181
Shell Creek.....	31	5	53	433	145	10	20	5	1,637
Shoshone River.....	38	.....	64	3,079	327	294	448	17	480,806
Little Horn River.....	2	.....	7	46	42	15	1	1	25
Other tributaries of Big Horn River.....	68	8	164	379	247	67	41	28	1,716
Tongue River and tributaries.....	160	25	201	1,534	452	113	98	27	11,227
Tongue River direct.....	20	.....	23	359	101	48	7	.....	.....
Goose Creek.....	91	21	99	874	229	30	58	16	10,879
Other tributaries of Tongue River.....	49	4	79	301	122	35	33	11	648
Powder River and tributaries.....	135	19	224	2,509	656	73	122	15	4,062
Powder River direct.....	1	.....	1	72	17	1	1	.....	.....
Red Fork Creek.....	19	.....	25	60	50	1	1	.....	.....
Crazy Woman Creek.....	17	.....	49	525	113	18	10	4	37
Clear Creek.....	46	2	83	1,463	312	40	94	3	3,389
Other tributaries of Powder River.....	52	8	66	384	164	13	14	8	636
Little Missouri River.....	.....	1	1	.....	1	.....	.....	.....	.....
Tributaries of Cheyenne River.....	71	40	118	1,203	166	245	98	39	6,479
Belle Fourche River.....	24	25	49	397	75	108	19	26	2,433
South Fork.....	47	15	69	806	91	137	79	13	4,046
Niobrara River.....	3	2	7	8	4	.....	.....	.....	.....
North Platte River and tributaries.....	865	113	1,933	13,878	3,082	783	898	141	1,544,370
North Platte River direct.....	24	4	78	3,134	260	197	197	2	1,070,005
Beaver Creek.....	12	2	20	50	62	1	1	3	673
Grand Encampment Creek.....	13	1	31	106	52	7	7	1	150
Spring Creek.....	3	2	48	343	79	63	45	3	3,596
Sage Creek.....	2	.....	4	3	4	.....	.....	.....	.....
Pass Creek.....	112	13	54	263	84	18	9	1	2,000
Medicine Bow River.....	42	1	283	927	414	68	58	9	7,459
Sweetwater River.....	42	1	85	174	141	37	20	9	2,474
Muddy Creek.....	1	.....	5	12	7	.....	.....	.....	.....
Box Elder Creek.....	13	3	33	44	68	5	16	3	86
La Prele Creek.....	11	3	47	326	81	13	62	2	20,012
Labonte Creek.....	40	.....	42	54	76	24	24	.....	.....
Laramie River and tributaries.....	358	40	624	5,933	909	150	334	48	396,031
Laramie River direct.....	40	7	69	1,718	287	93	228	7	263,350
Little Laramie River.....	42	11	98	435	141	26	15	.....	.....
Sybilie Creek.....	98	.....	122	297	119	4	3	10	260
North Laramie River.....	101	6	128	462	86	9	15	6	8,019
Chugwater Creek.....	37	10	100	152	107	10	.....	8	394
Other tributaries of Laramie River.....	40	6	107	2,869	169	8	73	17	124,008
Rawhide Creek.....	13	2	13	42	13	33	9	2	46
Horse Creek.....	46	26	121	774	169	32	41	26	27,335
Other tributaries of North Platte River.....	172	16	445	1,663	663	135	76	32	14,553
Tributaries of South Platte River.....	42	22	155	429	191	36	13	25	3,803
Lodgepole Creek.....	9	11	33	256	47	28	13	7	2,633
Crow Creek.....	8	4	53	115	47	8	.....	7	473
Lone Tree Creek.....	16	4	34	55	12	.....	.....	6	710
Cache la Poudre River.....	9	3	35	3	85	.....	.....	5	47
Colorado River drainage.....	361	40	1,019	7,495	1,908	823	503	40	24,772
Green River and tributaries.....	361	40	1,019	7,495	1,908	823	503	40	24,772
Green River direct.....	23	1	56	1,403	171	14	9	2	114
New Fork.....	9	2	78	1,011	241	133	86	1	.....
Horse Creek.....	6	.....	41	403	82	.....	.....	.....	.....
Cottonwood Creek.....	19	.....	83	485	131	125	75	.....	.....
South Piney Creek.....	26	1	110	221	163	333	116	.....	.....
La Barge Creek.....	22	.....	19	131	44	.....	.....	.....	.....
Fontenelle Creek.....	20	.....	24	73	44	8	6	.....	.....
Bitter Creek.....	3	1	21	25	28	1	4	16	1,105
Blacks Creek.....	156	9	325	1,867	532	54	114	11	3,333
Henrys Fork.....	46	22	110	301	143	74	42	3	23
Little Snake River.....	8	.....	58	289	127	4	1	2	458
Other tributaries of Green River.....	24	4	94	1,280	211	71	48	5	19,739
Great Salt Lake drainage.....	54	7	219	1,306	380	59	40	11	324
Bear River and tributaries.....	54	7	219	1,306	380	59	40	11	324
Bear River direct.....	11	.....	86	703	170	13	7	.....	.....
Tributaries of Bear River.....	43	7	133	603	210	46	33	11	324
Columbia River drainage.....	105	2	340	2,231	558	145	59	2	847,080
Snake River and tributaries.....	105	2	340	2,231	558	145	59	2	847,080
Snake River direct.....	1	.....	9	42	12	10	.....	1	847,000
Gros Ventre River.....	20	.....	29	118	64	1	1	.....	.....
Little Gros Ventre River.....	14	.....	32	103	50	.....	.....	.....	.....
Salt River.....	50	2	169	1,355	297	116	64	1	80
Other tributaries of Snake River.....	20	.....	101	613	135	18	4	.....	.....

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.....	2,738	7.1	1,176	12.7	132.8	Bu.....	51,839	13.3	25,297	14.3	104.9
2 Oats.....	23,684	40.4	76,302	61.5	-69.0	Bu.....	512,262	50.9	2,176,203	64.7	-78.4
3 Winter wheat.....	2,466	7.2	26,326	62.7	63.1	Bu.....	35,513	17.4	490,400	66.4	35.7
4 Spring wheat.....	40,470	27.5	4,982	58.2	-37.8	Bu.....	630,098	50.8	112,099	59.6	-47.9
5 Barley.....	3,099	38.9	375	24.7	44.3	Bu.....	58,741	50.8	6,121	29.9	-27.9
6 Rye.....	541	1.3				Bu.....	4,415	2.3			
Other grains and seeds:											
7 Clover and alfalfa seed ²	2,389	53.1	(³)			Bu.....	7,584	47.9	(³)		
Hay and forage:											
8 Timothy alone.....	18,645	61.3	18,265	62.1	2.1	Tons.....	18,324	63.9	28,136	63.0	-33.1
9 Timothy and clover mixed.....	25,601	75.9	4,086	50.7	526.6	Tons.....	32,359	77.3	8,149	49.9	297.1
10 Clover alone.....	1,638	42.6	242	67.2	576.9	Tons.....	1,811	45.0	586	72.5	209.0
11 Alfalfa.....	176,295	53.4	162,447	95.3	8.5	Tons.....	284,423	55.3	379,933	95.5	-25.1
12 Other tame grasses.....	50,923	76.1	83,456	75.0	-39.0	Tons.....	47,484	79.7	97,849	71.9	-51.5
13 Annual legumes cut for hay.....	778	33.7	4,930	25.2	100.0	Tons.....	1,011	54.9	5,835	24.5	40.0
14 Small grains cut for hay.....	9,081	9.0				Tons.....	7,160	14.4			
15 Wild, salt, or prairie grasses.....	142,760	62.9	189,271	78.0	-24.6	Tons.....	116,168	67.1	182,033	79.8	-36.2
16 Silage crops.....	653	54.5	(³)			Tons.....	3,787	58.7	(³)		
17 Corn cut for forage.....	951	2.8	(³)			Tons.....	2,317	9.4	(³)		
Vegetables:											
18 Potatoes.....	4,532	38.4	4,768	57.2	-4.9	Bu.....	532,511	62.6	620,667	66.6	-14.2
Miscellaneous:											
19 Sugar beets grown for sugar.....	2,714	27.3	1,100	93.1	146.7	Tons.....	23,067	23.8	11,198	84.6	106.0

¹ A minus sign (-) denotes decrease.² Not including red clover seed.³ Not reported separately in 1909.

IRRIGATION—WYOMING.

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.	Albany.	Big Horn. ¹	Campbell. ²	Carbon.	Converse. ³	Crook. ⁴
1 Number of all farms in 1920.....	15,748	441	998	1,072	413	804	1,098
2 Number of farms irrigated in 1919.....	6,449	280	952	8	313	157	21
3 Per cent of all farms.....	41.0	63.5	95.4	0.7	75.8	18.2	1.9
4 Number of farms irrigated in 1909.....	6,297	339	1,018	.....	442	219	80
5 Per cent of increase, 1909-1919.....	2.4	-17.4	.....	.....	-29.2	.....	.....
LAND AND FARM AREA.							
6 Approximate land area.....acres..	62,430,720	2,815,360	1,990,400	3,047,040	5,124,480	2,615,120	1,834,240
7 All land in farms.....acres..	11,899,351	847,732	190,445	880,748	843,520	770,484	949,975
8 Improved land in farms.....acres..	2,102,005	110,815	93,661	98,289	102,113	71,885	126,607
9 Area irrigated in 1919.....acres..	1,207,982	114,248	108,754	1,066	121,293	30,821	951
10 Per cent of improved land in farms.....	57.5	95.4	116.1	1.1	118.8	42.9	0.8
11 Area irrigated in 1909.....acres..	1,133,802	151,926	93,779	.....	131,749	40,607	6,712
12 Per cent of increase, 1909-1919.....	6.6	-24.8	.....	.....	-7.9	.....	.....
13 Area enterprises were capable of irrigating in 1920.....acres..	1,831,039	218,270	161,341	2,220	150,485	43,818	1,689
14 Area enterprises were capable of irrigating in 1910.....acres..	1,639,510	221,225	195,094	.....	163,394	52,159	8,017
15 Per cent of increase, 1910-1920.....	11.7	-1.3	.....	.....	-7.9	.....	.....
16 Area included in enterprises in 1920.....acres..	2,564,668	332,455	213,937	3,278	193,532	53,592	1,925
17 Area included in enterprises in 1910.....acres..	2,224,298	355,033	237,003	.....	191,486	85,713	11,038
18 Per cent of increase, 1910-1920.....	15.3	-6.4	.....	.....	1.1	.....	.....
19 Area of irrigated land reported as available for settlement.....acres..	197,326	1,000	19,900	.....	4,500	.....	.....
IRRIGATION WORKS.							
Independent enterprises:							
20 Number, 1920.....	3,564	303	198	19	380	118	29
21 Number, 1910.....	5,577	436	430	.....	629	336	94
Main ditches:							
22 Number, 1920.....	5,007	587	178	20	642	174	30
23 Number, 1910.....	5,593	487	418	.....	640	336	80
24 Length, 1920.....miles..	9,517	781	594	29	1,065	366	36
25 Length, 1910.....miles..	10,933	1,037	1,388	.....	1,005	485	91
26 Capacity, 1920.....second-feet..	39,009	4,669	2,904	109	3,057	2,259	350
27 Capacity, 1910.....second-feet..	42,630	6,831	5,124	.....	3,801	1,364	257
Laterals:							
28 Number, 1920.....	2,777	103	114	8	156	53	41
29 Number, 1910.....	2,340	290	100	.....	173	87	73
30 Length, 1920.....miles..	2,534	142	208	5	121	115	7
31 Length, 1910.....miles..	2,298	588	140	.....	142	62	28
Reservoirs:							
32 Number, 1920.....	374	30	12	14	25	10	13
33 Number, 1910.....	414	33	15	.....	86	23	62
34 Capacity, 1920.....acre-feet..	2,911,748	132,114	2,293	2,438	10,336	20,798	56
35 Capacity, 1910.....acre-feet..	2,530,937	372,888	1,060	.....	38,973	37,353	1,916
Flowing wells:							
36 Number, 1920.....	7	.....	.....	.....	1	1	.....
37 Number, 1910.....	2	.....	.....	.....	1	.....	.....
38 Capacity, 1920.....gallons per minute..	46	.....	.....	.....	.....	40	.....
39 Capacity, 1910.....gallons per minute..	250	.....	.....	.....	100	.....	.....
Pumped wells:							
40 Number, 1920.....	16	.....	1	2	5	1	.....
41 Number, 1910.....	5	.....	.....	.....	.....	.....	.....
42 Capacity, 1920.....gallons per minute..	8,020	.....	900	2,005	.....	180	.....
43 Capacity, 1910.....gallons per minute..	835	.....	.....	.....	.....	.....	.....
Pumping plants:							
44 Number, 1920.....	57	.....	6	2	6	3	3
45 Number, 1910.....	34	.....	9	.....	2	2	1
46 Engine capacity, 1920.....horsepower..	1,304	.....	202	82	40	51	23
47 Engine capacity, 1910.....horsepower..	705	.....	143	.....	21	312	1
48 Pump capacity, 1920.....gallons per minute..	39,725	.....	2,250	2,005	1,287	1,782	1,391
49 Pump capacity, 1910.....gallons per minute..	142,529	.....	6,090	.....	1,500	123,560	7
50 Average lift, 1920.....feet..	31	.....	14	70	17	35	13
CAPITAL INVESTED.							
51 Capital invested to Jan. 1, 1920.....dollars..	34,326,328	3,975,710	4,495,690	85,100	1,193,535	892,217	20,912
52 Capital invested to July 1, 1910.....dollars..	17,700,980	2,682,679	2,310,660	.....	737,851	1,729,146	89,578
53 Per cent of increase, 1910-1920.....	93.9	48.2	.....	.....	61.8	.....	.....
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	18.75	18.21	27.86	38.33	7.93	19.68	12.38
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	10.80	12.13	11.84	.....	4.52	33.15	10.80
ESTIMATED FINAL COST.							
56 Estimated final cost of existing enterprises in 1920.....dollars..	51,500,288	3,998,180	6,104,440	88,100	1,253,535	914,867	20,912
57 Estimated final cost of existing enterprises in 1910.....dollars..	20,425,890	4,114,507	2,370,693	.....	738,776	2,264,508	89,578
58 Per cent of increase, 1910-1920.....	152.1	-2.8	.....	.....	69.7	.....	.....
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	20.08	12.03	28.53	26.88	6.48	17.07	10.86
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	9.18	11.59	10.00	.....	3.86	26.42	7.84

¹ Part taken to form Park County in 1911; parts taken to form parts of Hot Springs and Washakie Counties in 1913.

² Campbell County formed from parts of Crook and Weston Counties in 1913.

³ Part taken to form Niobrara County in 1913.

⁴ Includes 1,899,720 acres in Yellowstone National Park.

⁵ Entire capacity and cost of Pathfinder Reservoir reported in Natrona County although reservoir lies in Carbon and Natrona Counties. Incorrectly reported in Laramie County in 1910.

IRRIGATION—WYOMING.

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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.]

	Fremont. ¹	Goshen. ²	Hot Springs. ³	Johnson.	Laramie. ⁴	Lincoln. ⁵	Natrona.
1 Number of all farms in 1920.....	969	1,511	197	624	1,178	923	183
2 Number of farms irrigated in 1919.....	827	324	127	227	64	749	52
3 Per cent of all farms.....	85.3	21.4	64.5	36.4	5.4	81.1	28.4
4 Number of farms irrigated in 1909.....	610			247	577		183
5 Per cent of increase, 1909-1919.....				-8.1			-71.6
LAND AND FARM AREA.							
6 Approximate land area.....acres..	7,847,040	1,399,040	1,296,000	2,664,960	1,713,920	5,724,800	3,406,080
7 All land in farms.....acres..	449,331	890,778	117,309	472,611	1,008,343	441,212	220,062
8 Improved land in farms.....acres..	120,291	205,765	24,644	71,232	250,630	182,091	14,285
9 Area irrigated in 1919.....acres..	115,067	55,481	16,443	63,383	24,165	168,428	10,385
10 Per cent of improved land in farms.....	95.7	27.0	66.7	89.0	9.6	92.5	72.7
11 Area irrigated in 1909.....acres..	78,783			54,838	122,021		22,498
12 Per cent of increase, 1909-1919.....				15.6			-53.8
13 Area enterprises were capable of irrigating in 1920.....acres..	197,406	85,142	21,125	82,933	29,990	245,723	14,920
14 Area enterprises were capable of irrigating in 1910.....acres..	170,946			75,501	166,909		29,255
15 Per cent of increase, 1910-1920.....				10.1			-49.0
16 Area included in enterprises in 1920.....acres..	370,472	138,452	23,333	97,830	50,590	288,057	21,918
17 Area included in enterprises in 1910.....acres..	211,834			104,492	177,282		36,887
18 Per cent of increase, 1910-1920.....				-6.4			-40.5
19 Area of irrigated land reported as available for settlement.....acres..	72,440	27,453				1,213	
IRRIGATION WORKS.							
Independent enterprises:							
20 Number, 1920.....	385	69	72	150	90	586	61
21 Number, 1910.....	396			221	462		273
Main ditches:							
22 Number, 1920.....	494	103	52	174	212	820	84
23 Number, 1910.....	384			224	459		277
24 Length, 1920.....miles..	1,148	236	160	513	260	1,410	142
25 Length, 1910.....miles..	892			529	827		334
26 Capacity, 1920.....second-feet..	4,323	1,803	431	1,724	618	5,299	238
27 Capacity, 1910.....second-feet..	3,449			2,050	5,852		1,049
Laterals:							
28 Number, 1920.....	342	130	15	68	47	693	6
29 Number, 1910.....	136			39	200		230
30 Length, 1920.....miles..	228	195	19	113	18	308	14
31 Length, 1910.....miles..	250			31	270		114
Reservoirs:							
32 Number, 1920.....	31	30	9	8	28	14	17
33 Number, 1910.....	10			6	60		52
34 Capacity, 1920.....acre-feet..	6,314	27,728	488	3,871	*3,932	847,718	*1,081,264
35 Capacity, 1910.....acre-feet..	2,168			5,125	1,196,215		6,119
Flowing wells:							
36 Number, 1920.....	1						
37 Number, 1910.....							
38 Capacity, 1920.....gallons per minute..							
39 Capacity, 1910.....gallons per minute..							
Pumped wells:							
40 Number, 1920.....					2		
41 Number, 1910.....	1						
42 Capacity, 1920.....gallons per minute..			50		735		3,000
43 Capacity, 1910.....gallons per minute..	120						
Pumping plants:							
44 Number, 1920.....	5		6	3	2		4
45 Number, 1910.....	2			3	3		5
46 Engine capacity, 1920.....horsepower..	82		58	49	20		166
47 Engine capacity, 1910.....horsepower..	13			31	66		76
48 Pump capacity, 1920.....gallons per minute..	2,480		4,020	1,100	735		8,850
49 Pump capacity, 1910.....gallons per minute..	340			1,455	3,278		3,211
50 Average lift, 1920.....feet..	90		26	33	12		19
CAPITAL INVESTED.							
51 Capital invested to Jan. 1, 1920.....dollars..	3,784,769	3,680,421	141,450	861,860	*267,853	1,694,382	*2,207,139
52 Capital invested to July 1, 1910.....dollars..	1,099,025			552,515	2,467,260		201,416
53 Per cent of increase, 1910-1920.....				56.0			*995.8
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars..	19.17	43.23	6.70	10.39	8.93	(?)	(?)
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars..	6.43			7.34	14.78		6.88
ESTIMATED FINAL COST.							
56 Estimated final cost of existing enterprises in 1920.....dollars..	11,646,044	6,596,902	146,450	878,536	*268,853	1,741,382	*2,208,139
57 Estimated final cost of existing enterprises in 1910.....dollars..	1,122,491			552,515	3,139,090		201,416
58 Per cent of increase, 1910-1920.....				59.0			*996.3
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars..	31.44	47.65	6.28	8.98	5.31	(?)	(?)
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars..	5.30			5.29	17.71		5.47

¹ Part taken to form part of Hot Springs County in 1913.

² Formed from part of Laramie County in 1913.

³ Formed from parts of Big Horn, Fremont, and Park Counties in 1913.

⁴ Parts taken to form Goshen and Platte Counties in 1913.

⁵ Formed from part of Uinta County in 1913.

* Entire capacity and cost of Pathfinder Reservoir reported in Natrona County although reservoir lies in Carbon and Natrona Counties. Incorrectly reported in Laramie County in 1910.

⁷ Average not shown because most of land served by storage works lies in another state.

IRRIGATION—WYOMING.

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.]

	Niobrara. ¹	Park. ²	Platte. ³	Sheridan.	Sweetwater.	Uinta. ⁴	Washakie. ⁵	Weston. ⁶
1 Number of all farms in 1920.....	739	839	1,146	972	139	408	318	721
2 Number of farms irrigated in 1919.....	2	756	404	420	90	359	275	42
3 Per cent of all farms.....	0.3	90.1	35.3	43.2	64.7	88.0	86.5	5.8
4 Number of farms irrigated in 1909.....		602		679	135	1,123		43
5 Per cent of increase, 1909-1919.....				-38.1	-33.3			
LAND AND FARM AREA.								
6 Approximate land area.....acres.	1,666,560	3,332,480	1,360,000	1,647,360	6,716,800	1,340,160	1,434,240	1,537,920
7 All land in farms.....acres.	633,708	286,198	974,429	625,796	61,245	324,475	93,379	747,576
8 Improved land in farms.....acres.	60,614	89,683	180,303	113,385	13,938	56,551	37,007	68,616
9 Area irrigated in 1919.....acres.	759	77,527	66,753	68,311	14,010	102,695	41,179	6,263
10 Per cent of improved land in farms.....	1.3	86.4	37.0	60.2	100.5	181.6	109.5	9.1
11 Area irrigated in 1909.....acres.		58,853		94,141	10,798	260,020		6,577
12 Per cent of increase, 1909-1919.....				-27.4	29.7			
13 Area enterprises were capable of irrigating in 1920.....acres.	1,102	121,465	108,639	90,198	46,805	148,553	50,597	8,618
14 Area enterprises were capable of irrigating in 1910.....acres.		108,478		114,285	22,667	303,704		8,076
15 Per cent of increase, 1910-1920.....				-21.1	106.5			
16 Area included in enterprises in 1920.....acres.	1,427	180,716	131,362	108,667	57,591	222,643	60,349	12,542
17 Area included in enterprises in 1910.....acres.		265,255		117,563	90,614	330,103		10,075
18 Per cent of increase, 1910-1920.....				-7.6	-36.4			
19 Area of irrigated land reported as available for settlement.....acres.			46,000		20,480	1,140	3,200	
IRRIGATION WORKS.								
Independent enterprises:								
20 Number, 1920.....	7	202	178	203	82	308	70	54
21 Number, 1910.....		313		526	107	1,306		48
Main ditches:								
22 Number, 1920.....	15	175	289	239	127	437	84	71
23 Number, 1910.....		302		537	102	1,296		51
24 Length, 1920.....miles.	17	601	451	606	212	701	189	100
25 Length, 1910.....miles.		813		939	151	2,369		73
26 Capacity, 1920.....second-feet.	161	2,668	1,869	2,189	606	2,474	559	669
27 Capacity, 1910.....second-feet.		3,870		2,111	1,269	5,381		222
Laterals:								
28 Number, 1920.....		228	293	131	76	53	22	198
29 Number, 1910.....		77		252	15	634		84
30 Length, 1920.....miles.		348	289	106	61	116	35	88
31 Length, 1910.....miles.		103		240	5	316		9
Reservoirs:								
32 Number, 1920.....	4	24	24	28	26	9	2	16
33 Number, 1910.....		12		78	13	7		17
34 Capacity, 1920.....acre-feet.	457	463,641	270,895	11,252	19,505	2,864	60	3,724
35 Capacity, 1910.....acre-feet.		461,020		2,361	24,716	400,099		924
Flowing wells:								
36 Number, 1920.....				2	2			
37 Number, 1910.....						1		
38 Capacity, 1920.....gallons per minute.				6				
39 Capacity, 1910.....gallons per minute.						150		
Pumped wells:								
40 Number, 1920.....			3	2				
41 Number, 1910.....				1	1			
42 Capacity, 1920.....gallons per minute.			1,150					
43 Capacity, 1910.....gallons per minute.				660	55			
Pumping plants:								
44 Number, 1920.....			8	4	3		1	1
45 Number, 1910.....		1		2	2	1		1
46 Engine capacity, 1920.....horsepower.			72	373	44		26	16
47 Engine capacity, 1910.....horsepower.		1		18	16	1		6
48 Pump capacity, 1920.....gallons per minute.			5,120	4,900	1,505		1,200	1,100
49 Pump capacity, 1910.....gallons per minute.		6		1,300	855	17		250
50 Average lift, 1920.....feet.			21	42	39		58	10
CAPITAL INVESTED.								
51 Capital invested to Jan. 1, 1920.....dollars.	23,195	5,640,280	1,642,905	1,096,497	892,577	729,264	859,652	170,920
52 Capital invested to July 1, 1910.....dollars.		4,233,566		550,599	129,949	867,034		52,101
53 Per cent of increase, 1910-1920.....				99.1	586.9			
54 Average cost per acre based on area enterprises were capable of supplying with water in 1920.....dollars.	21.05	46.44	15.12	12.16	19.07	4.91	10.99	19.83
55 Average cost per acre based on area enterprises were capable of supplying with water in 1910.....dollars.		39.03		4.82	5.73	2.86		6.45
ESTIMATED FINAL COST.								
56 Estimated final cost of existing enterprises in 1920.....dollars.	27,170	9,882,433	1,907,805	1,040,157	910,727	744,344	921,952	219,560
57 Estimated final cost of existing enterprises in 1910.....dollars.		4,233,566		550,599	129,949	867,101		52,101
58 Per cent of increase, 1910-1920.....				88.9	600.8			
59 Average cost per acre based on estimated final cost and area included in enterprises in 1920.....dollars.	19.04	54.57	14.52	9.57	15.81	3.84	15.28	17.51
60 Average cost per acre based on estimated final cost and area included in enterprises in 1910.....dollars.		15.96		4.68	1.43	2.63		5.17

¹ Formed from part of Converse County in 1913.

² Formed from part of Big Horn County in 1911; part taken to form part of Hot Springs County in 1913.

³ Formed from part of Laramie County in 1913.

⁴ Part taken to form Lincoln County in 1913.

⁵ Formed from part of Big Horn County in 1913.

⁶ Part taken to form Campbell County in 1913.