

## **PART II**

### **SUMMARY FOR THE 19 IRRIGATION STATES AND REPORTS BY STATES WITH STATISTICS BY COUNTIES**

# SUMMARY FOR THE UNITED STATES

## INTRODUCTION

This summary for irrigation in the United States presents some of the statistics collected in the census of 1930 for the 17 arid and semiarid States comprising Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming; and for the 2 States of Arkansas and Louisiana in which irrigation is confined largely to rice growing. These statistics relate to farms irrigated and area irrigated, investment, and cost of maintenance and operation of irrigation enterprises, cost of preparing land for irrigation, drainage of irrigated land, quantity of water used, and distribution of irrigation works.

Classifications of irrigated farms by States, by tenure of operator, by size and type of farm, and value of farm products; and the acreage, yield, and value of the

principal crops grown on irrigated land are shown in Parts III and IV, pages 257 and 325, respectively.

Statistics for area irrigated and for cost of maintenance and operation of irrigation works relate to the year 1929; all other items relate to 1930. Throughout the tables, statistics for the census of 1920 are shown for purposes of comparison, although the 1920 statistics for Arkansas and Louisiana represent rice growing only; and certain data are presented also from censuses previous to that of 1920, in order to show the historical development of irrigation.

Data on number, area, and value of irrigated farms, with the tenure of the operators of these farms, were collected in 1930 on the general farm schedule; in 1920 only the number of irrigated farms was obtained in this way. All other statistics, in both censuses, were collected on special schedules for irrigation enterprises.

TABLE 1.—SUMMARY FOR THE 19 IRRIGATION STATES: 1930 AND 1920

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>		
	1930	1920	Amount	Per cent	
All farms.....	number.....	2,062,813	1,916,391	146,422	7.6
All land in farms.....	acres.....	568,693,705	505,440,954	63,252,751	12.5
Approximate land area.....	acres.....	1,223,989,120	1,223,989,120		
Farms irrigated.....	number.....	265,147	222,789	42,358	19.0
Area irrigated.....	acres.....	19,547,544	19,191,716	355,828	1.9
Area enterprises were capable of supplying with water.....	acres.....	26,101,890	26,020,477	81,413	0.3
Area in enterprises <sup>2</sup> .....	acres.....	30,699,470	35,890,821		
Proportion irrigated:					
All farms.....	per cent.....	12.9	11.6		
All land in farms.....	per cent.....	3.4	3.8		
Approximate land area.....	per cent.....	1.6	1.6		
Excess of area enterprises were capable of supplying with water over area irrigated.....	acres.....	6,554,346	6,828,761	-274,415	-4.0
Excess of area in enterprises <sup>2</sup> over area irrigated.....	acres.....	11,051,926	16,699,105		
Area in enterprises available, or to be available, for settlement.....	acres.....	1,681,698	2,267,981	-576,383	-25.5
Value of irrigated farms [land, buildings (including dwellings), and implements and machinery].....	dollars.....	4,886,802,784	( <sup>3</sup> )		
Investment in irrigation enterprises.....	dollars.....	1,032,765,700	697,657,328	335,098,462	48.0
Average, per acre, based on area enterprises were capable of supplying with water.....	dollars.....	39.57	26.81	12.76	47.6
Estimated final cost of existing enterprises.....	dollars.....	1,155,108,210	819,778,005	335,330,205	40.9
Average, per acre, based on area in enterprises <sup>2</sup> .....	dollars.....	37.75	22.84		
Average annual cost, per acre, for maintenance and operation of irrigation works.....	dollars.....	2.77	2.43	0.34	14.0

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Irrigable area, 1930; total area, 1920.

<sup>3</sup> Figures not available.

TABLE 2.—FARMS AND SPECIFIED FARM VALUES FOR THE 19 IRRIGATION STATES, BY TENURE OF FARM OPERATOR, 1930

ITEM (See definitions in Introduction)	FARMS		SPECIFIED FARM VALUES					
	Number	Area	Land and buildings		Land alone		Implements and machinery	
			Total	Per acre	Total	Per acre	Total	Per acre
		Acres	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
All farms.....	2,062,813	568,693,705	20,101,278,254	35.35	6,636,752,434	11.67	1,320,915,548	2.32
Owners and managers.....	1,074,646	402,020,202	13,098,774,518	32.58			204,835,587	3.08
Tenants.....	988,167	166,673,503	7,002,503,736	42.01			886,793,726	2.21
Irrigated farms.....	265,147	78,339,222	4,629,781,819	59.10	3,042,266,249	50.32	257,110,965	3.28
Owners and managers.....	203,825	66,612,767	3,736,423,785	56.09	3,152,977,570	47.33	156,517,741	3.51
Tenants.....	61,322	11,726,455	893,358,034	76.18	789,288,679	67.31	52,275,378	4.46
Wholly irrigated farms.....	225,271	52,908,848	3,586,144,798	67.78	3,032,440,080	57.31	197,919,182	3.74
Owners and managers.....	173,354	44,564,371	2,884,649,157	64.73	2,414,642,534	54.18	156,517,741	3.51
Tenants.....	51,917	8,344,477	701,495,631	84.07	617,797,546	74.04	41,401,441	4.96
Partly irrigated farms.....	39,876	25,430,374	1,043,637,021	41.04	909,826,169	35.78	59,191,783	2.33
Owners and managers.....	30,471	22,048,396	851,774,618	38.63	738,335,036	33.49	48,317,846	2.19
Tenants.....	9,405	3,381,978	191,862,403	56.73	171,491,133	50.71	10,873,937	3.22
Farms not irrigated.....	1,797,666	490,354,483	15,471,496,435	31.55	2,604,486,185	5.40	1,063,804,581	2.17

FARMS AND AREA IRRIGATED

TABLE 3.—FARMS AND AREA IRRIGATED FOR THE 19 IRRIGATION STATES: 1890 TO 1930

CENSUS YEAR	FARMS IRRIGATED			AREA IRRIGATED			
	Number	In-crease	Pro-portion of all farms	Area	In-crease	Pro-portion of total land area	Pro-portion of land in all farms
1930	265,147	19.0	12.9	19,547,544	1.9	1.6	3.4
1920	222,789	30.9	11.6	19,191,716	33.0	1.6	3.8
1910	162,723	43.0	9.2	14,433,285	86.4	1.2	3.5
1900	113,829	110.3	8.2	7,744,467	108.4	0.7	2.2
1890	54,136		5.8	3,715,768		0.3	2.1

TABLE 4.—AREA FOR THE 19 IRRIGATION STATES, BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION

DATE OF BEGINNING (See definitions in Introduction)	Enter-prises, 1930	AREA IRRIGATED IN 1929			Area enter-prises were capable of supplying with water, 1930	Irrigable area in enter-prises, 1930
		Area	Pro-portion of irri-gable area in enter-prises	Per cent		
Total	75,517	19,547,544	68.9	20,101,890	30,599,470	
Before 1890	752	402,237	68.2	490,463	580,544	
1890-1899	1,797	1,229,097	82.0	1,463,562	1,499,789	
1870-1879	2,879	1,770,234	69.9	2,397,552	2,532,163	
1880-1889	5,641	3,624,824	74.4	4,392,094	4,871,916	
1890-1899	4,297	2,646,077	56.8	3,586,810	4,061,700	
1900-1904	3,108	1,665,645	60.7	2,326,966	2,744,044	
1905-1909	2,938	2,845,931	61.1	4,140,387	4,659,747	
1910-1914	6,017	1,159,324	58.7	1,623,568	1,974,270	
1915-1919	6,574	1,130,368	57.8	1,680,802	1,956,174	
1920-1924	7,896	774,744	48.0	1,119,045	1,613,437	
1925-1929	11,063	813,798	50.9	1,107,095	1,599,632	
Not reported	22,555	1,485,265	78.3	1,761,546	1,896,994	

TABLE 5.—AREA FOR THE 19 IRRIGATION STATES, BY SOURCE OF WATER SUPPLY: 1929 AND 1919

SOURCE OF SUPPLY	AREA IRRIGATED				Area enter-prises were capable of sup-plying with water, 1930	Irrigable area in enter-prises, 1930	
	1929		1919				Increase <sup>1</sup>
	Acres	Per cent	Acres	Per cent			
Total	19,547,544	68.9	19,191,716	68.9	20,101,890	30,599,470	
Streams, gravity	12,980,575	66.5	14,527,060	75.8	-1,546,485	-10.6	
Streams, pumped	1,713,380	8.8	1,226,510	6.4	486,870	39.7	
Streams, gravity and pumped	258,094	1.3	199,595	1.0	58,499	29.3	
Wells, pumped	2,051,735	10.5	1,263,098	6.6	788,637	38.4	
Wells, flowing	48,479	0.2	65,856	0.3	-17,377	-26.4	
Wells, pumped and flowing	16,708	0.1	35,685	0.2	-18,887	-52.9	
Lakes, pumped	77,818	0.4	105,730	0.5	-27,912	-35.9	
Lakes, gravity	58,103	0.3	100,646	0.5	-42,543	-42.3	
Springs	217,246	1.1	198,008	1.0	19,238	9.7	
Stored storm water <sup>2</sup>	30,557	0.2	98,873	0.5	-68,316	-100.0	
City water	1,654	0.0	930	0.0	724	77.8	
Sewage	3,620	0.0	2,578	0.0	1,042	36.9	
Streams, gravity and wells, pumped	1,164,349	6.0	344,713	1.8	819,636	237.8	
Streams, gravity and wells, flowing	21,292	0.1	82,665	0.4	-61,373	-74.2	
Other mixed	866,434	4.4	996,621	5.2	-130,187	-13.1	
Other	8,069	0.0	8,069	0.0	0	0	
Not reported	20,402	0.1	13,148	0.1	7,254	35.5	
Supplemental from Pumped streams	24,871	0.1				32,787	
Pumped wells	293,026	1.5				321,748	
Flowing wells	148	0.0				255	

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> In reservoirs filled from channels which carry water only during storms and are not classed as streams.  
<sup>3</sup> Shown as "Other and not reported."  
<sup>4</sup> Not considered in totals because included in enterprises reporting other sources of supply listed above. Corresponding figures for 1919 not available.

AREA, BY CHARACTER OF ENTERPRISE

TABLE 6.—AREA FOR THE 19 IRRIGATION STATES, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

[For number of enterprises by classes, see Table 12]

ITEM AND CHARACTER (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920	Area	Per cent
AREA IRRIGATED	Acres	Acres	Acres	
Total	19,547,544	19,191,716	355,828	1.9
Individual and partnership	6,410,581	6,848,807	-438,226	-6.4
Cooperative	6,271,334	6,581,400	-310,066	-4.7
Irrigation district	3,452,275	1,822,887	1,629,388	80.4
Carey Act	89,772	523,929	-437,157	-83.4
Commercial	1,230,763	1,822,001	-591,238	-32.4
United States Bureau of Indian Affairs	331,840	284,551	47,289	16.6
United States Bureau of Reclamation	1,485,028	1,254,599	230,460	18.4
State	11,489	5,620	5,869	104.4
City	121,218	40,146	81,072	201.9
Other	146,244	7,286	139,008	
Not reported		670	-670	-100.0
AREA ENTERPRISES WERE CAPABLE OF SUPPLYING WITH WATER				
Total	26,101,890	20,020,477	81,413	0.3
Individual and partnership	7,982,142	9,255,756	-1,273,614	-13.8
Cooperative	7,861,081	8,403,298	-542,217	-6.5
Irrigation district	4,846,095	2,531,425	2,314,670	91.4
Carey Act	174,246	804,298	-630,052	-78.3
Commercial	2,160,950	2,700,563	-539,613	-22.8
United States Bureau of Indian Affairs	739,440	484,480	254,960	52.0
United States Bureau of Reclamation	1,944,825	1,080,643	864,182	15.7
State	13,600	7,379	6,221	84.8
City	146,132	44,458	101,674	228.7
Other	233,373	8,546	224,827	
Not reported		625	-625	-100.0
AREA IN ENTERPRISES <sup>2</sup>				
Total	30,599,470	35,890,821		
Individual and partnership	8,969,051	13,008,415		
Cooperative	8,698,800	10,628,543		
Irrigation district	6,013,347	3,432,109		
Carey Act	192,246	1,188,937		
Commercial	2,619,597	3,999,581		
United States Bureau of Indian Affairs	1,122,134	932,085		
United States Bureau of Reclamation	2,569,649	2,627,176		
State	14,231	9,581		
City	140,534	49,650		
Other	259,881	13,144		
Not reported		700		

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Irrigable area, 1930; total area, 1920.

Areas classified in Table 6 as "Carey Act" do not disclose the extent of the development which has been effected under the operation of that law, since most of the enterprises begun under it have reorganized and are reported in other classes. Under the operation of the Carey Act, the lands selected by the States are segregated from the public domain for specified periods during which the States undertake to cause adequate irrigation systems to be constructed and sufficient irrigation water made available, whereupon the lands are patented to the States by the Federal Government and disposed of by them to settlers. The Commissioner of the General Land Office on June 30, 1930, reported that 3,897,860 acres had been segregated and 1,174,903 acres patented. The report of June 30, 1920, shows 3,781,649 acres segregated and 888,793 acres patented. Areas credited to United States Bureau of Reclamation include projects or project units constructed by that Bureau but now operated by irrigation districts or water-users' associations. The areas so credited do not include other lands partly served by Government works in both 1929 and 1919 with water carried through private canals under Warren Act (Act of February 21, 1911) or other water-service contracts. The outside areas so partly served in 1929 are reported by the Bureau of Reclamation as totalling 1,234,230 acres. The corresponding 1919 area was somewhat in excess of 900,000 acres.

# IRRIGATION

Areas classified as "City" in 1930 include, besides other lands, several large tracts in California which in 1920 were reported under "Irrigation district" and other classifications. The status of most of these enterprises being unaltered legally, the change in classification is necessitated by the actual control now exercised by the cities.

Areas classified as "State" include 2 land-settlement enterprises in California, as well as various State institutions there and elsewhere which are not development enterprises.

Areas classified as "Other" include 3 drainage districts which operate irrigation as well as drainage systems, and a much larger number of "reclamation" districts which exercise the functions of flood control or drainage, or both, in addition to those of irrigation. Reclamation districts have no connection with United States Bureau of Reclamation enterprises.

**AREA, BY CHARACTER OF WATER RIGHTS**  
TABLE 7.—AREA IRRIGATED FOR THE 19 IRRIGATION STATES, BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1929 AND 1919

WATER RIGHTS (See definitions in Introduction)	1929		1919	
	Area	Proportion of total	Area	Proportion of total
	Acres	Per cent	Acres	Per cent
Total	19,547,544	100.0	19,191,716	100.0
Appropriation and use	1,956,467	10.0	2,521,682	13.1
Notice filed and posted	1,853,270	9.5	2,765,636	14.4
Adjudicated by court	7,871,804	40.3	7,159,954	37.3
Permit from State	2,911,931	14.9	1,960,924	10.2
Certificate or license from State	1,161,896	5.9	1,288,124	6.7
Riparian	530,912	2.7	370,890	1.9
Underground	1,756,227	9.0	1,067,606	5.6
Other	102,166	0.5	494,564	2.6
Mixed	471,455	2.4	—	—
Not reported	932,426	4.8	1,662,330	8.2

<sup>1</sup> Includes acreage for Arkansas and Louisiana.

## AREA, BY DRAINAGE BASIN

TABLE 8.—AREA FOR THE 19 IRRIGATION STATES, BY DRAINAGE BASIN: 1929 AND 1919

DRAINAGE BASIN (See definitions in Introduction)	AREA IRRIGATED			Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930	DRAINAGE BASIN (See definitions in Introduction)	AREA IRRIGATED			Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1929	1919	Increase <sup>1</sup>				1929	1919	Increase <sup>1</sup>		
	Acres	Acres	Per cent	Acres	Acres		Acres	Acres	Per cent	Acres	Acres
Total	19,547,544	19,191,716	1.9	28,101,390	30,599,470	Missouri River and tributaries—Continued					
Red River (of the North) tributaries	2,099	—	—	2,099	2,409	Little Missouri River	1,462	1,080	35.4	1,962	2,127
Souris River and tributaries	1,453	—	—	1,453	1,453	Moreau River	60	305	-80.3	60	60
Other tributaries	640	—	—	646	950	Cheyenne River and tributaries	71,550	110,143	-35.0	115,980	132,003
Missouri River and tributaries	4,185,180	4,147,278	0.9	5,472,012	6,231,873	Cheyenne River direct	—	101,200	—	—	—
Missouri River direct	24,367	27,707	-12.1	40,149	42,388	North Fork (Belle Fourche)	51,799	—	—	90,991	97,810
Jefferson River and tributaries	363,380	425,685	-14.6	403,325	470,421	South Fork and tributaries	19,740	8,844	123.2	24,888	33,988
Jefferson River direct	16,393	21,276	-23.0	18,940	19,832	South Fork direct	17,724	5,906	200.1	21,707	30,645
Beaverhead River	131,354	145,673	-9.8	142,333	155,916	Hat Creek	2,016	2,938	-31.4	3,181	3,341
Big Hole River	140,730	184,655	-20.5	102,503	160,840	Other tributaries of Cheyenne River	—	—	—	101	201
Ruby River	31,071	34,474	-9.9	33,526	36,901	White River	8,632	8,008	8.4	13,110	13,795
Other tributaries	37,526	39,007	-4.5	40,023	96,870	Niobrara River	3,831	6,138	-37.6	4,593	4,766
Madison River	30,308	34,425	-11.8	37,004	46,339	Platte River and tributaries	2,315,207	2,136,402	8.4	2,813,195	3,081,680
Gallatin River	93,753	95,053	-1.4	114,408	120,321	Platte River direct	71,290	37,532	89.9	140,459	179,011
Smith River	25,401	16,801	51.0	31,259	31,389	North Platte River and tributaries	961,359	872,140	9.1	1,198,045	1,312,827
Sun River	28,070	31,755	-11.7	67,550	121,277	North Platte River direct	441,293	361,050	25.7	529,278	549,704
Teton River	48,974	44,945	4.5	66,799	67,699	Beaver Creek	3,132	2,621	19.5	4,176	4,176
Marais River	55,300	63,758	-13.2	99,924	101,814	Grand Encampment Creek	6,906	7,053	-2.1	11,522	11,682
Judith River	7,435	15,173	-51.0	13,075	14,603	Spring Creek	10,825	13,128	-17.6	13,197	13,197
Musselshell River	59,286	45,559	30.1	84,738	95,570	Pass Creek	14,651	8,567	71.0	17,800	18,243
Milk River and tributaries	88,218	108,555	-18.7	100,218	216,098	Medicine Bow River	36,879	54,500	-32.3	42,271	44,416
Milk River direct	55,490	19,706	180.8	148,001	199,710	Sweetwater River	6,600	5,448	19.4	8,510	8,997
Snake River	60	910	-93.4	100	100	Muddy Creek	406	687	-39.1	8,409	4,400
Other tributaries	32,559	87,879	-62.8	41,307	47,122	Box Elder Creek	3,742	4,043	-9.9	8,480	8,480
Yellowstone River and tributaries	801,145	859,026	-3.1	1,210,690	1,401,212	La Poudre Creek	10,549	9,193	31.8	10,908	17,462
Yellowstone River direct	102,812	189,453	-44.3	236,401	242,693	Laporte Creek	4,333	4,370	0.2	4,820	4,876
Boulder River	11,309	—	—	12,470	12,991	Laramie River and tributaries	190,094	155,159	21.7	208,429	328,057
Clark Fork and tributaries	92,908	77,730	19.6	111,553	113,320	Laramie River direct	109,556	78,560	—	170,372	228,757
Clark Fork direct	90,650	72,525	25.0	108,858	110,625	Little Laramie River	48,942	30,800	42.4	50,972	51,177
Tributaries	2,218	5,211	-55.5	2,695	2,695	Sybilie Creek	5,237	6,183	-15.3	5,387	6,984
Shields River	32,866	25,940	26.7	49,402	59,417	North Laramie River	5,079	6,858	-12.8	6,300	11,474
Stillwater River	22,102	23,926	-7.4	31,087	32,327	Chugwater Creek	6,139	5,914	3.8	7,108	7,648
Big Horn River and tributaries	361,926	358,949	0.8	552,748	710,522	Other tributaries	19,212	3,784	—	19,227	29,067
Big Horn River direct	88,695	93,902	-5.6	129,705	143,464	Rawhide Creek	8,225	2,045	-89.0	10,225	9,225
Popo Agie River	21,131	22,073	-4.3	26,789	31,343	Horse Creek	20,594	28,369	4.3	30,920	34,688
Wind River	51,789	43,620	18.7	110,738	224,933	Other tributaries of North Platte River	156,180	224,431	-17.0	241,631	268,558
Owyo Creek	16,445	11,610	39.1	18,924	20,061	South Platte River and tributaries	1,267,604	1,224,974	3.6	1,441,367	1,555,134
No Wood River	15,254	18,416	-17.2	19,778	21,478	South Platte River direct	470,802	362,101	30.0	504,642	540,615
Greybull River	52,138	49,231	5.9	65,331	70,308	Bear Creek	22,824	8,778	46.1	12,908	12,908
Shell Creek	7,110	11,955	-40.6	13,795	13,894	Clear Creek	85,876	7,172	8.2	131,778	143,682
Shoshone River	65,630	95,091	0.6	142,902	163,768	St. Vrain Creek	179,560	244,831	-26.7	205,401	208,285
Other tributaries	12,355	1,408	16.3	2,705	2,705	Big Thompson Creek	282,409	96,878	—	100,753	100,513
Tongue River and tributaries	65,498	54,195	20.9	73,960	70,521	Catcha Poudre River	28,400	267,197	7.2	326,029	327,888
Tongue River direct	22,217	20,975	5.9	39,031	39,138	Lone Tree Creek	10,632	6,928	121.8	10,942	11,290
Goose Creek	35,455	27,627	39.9	36,834	38,489	Crow Creek	5,047	4,525	31.4	7,903	8,960
Other tributaries	7,820	5,593	39.9	8,935	8,516	Big Beaver Creek	8,470	6,420	31.7	10,470	10,520
Powder River and tributaries	50,771	59,631	-33.1	56,411	69,516	Lodgepole Creek	13,425	20,004	-32.9	17,211	18,018
Powder River direct	5,347	3,193	33.1	5,920	6,375	Other tributaries	100,696	130,241	-22.7	113,330	117,037
Red Fork Creek	5,471	3,341	38.5	6,450	6,450	Loup River	201	1,177	-75.3	812	732
Crazy Woman Creek	2,600	21,965	-88.2	4,146	4,188	Other tributaries of Platte River	24,753	579	—	32,055	33,976
Clear Creek	35,295	50,648	-30.3	35,960	38,338	Kansas River and tributaries	26,130	34,672	-24.6	32,823	36,013
Other tributaries	6,087	10,484	-41.9	9,935	10,105	Republican River	23,357	34,300	-31.9	29,086	32,872
Other tributaries of Yellowstone River	61,825	69,195	-10.7	86,569	93,915	Stokely Hill River	141	278	-49.3	320	391
						Other tributaries	2,611	34	—	3,411	3,650
						Other tributaries of Missouri River	74,342	51,989	43.0	131,164	223,408

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Belle Fourche River included in "Cheyenne River direct."

<sup>3</sup> Laramie River direct includes 11,000 acres in 1930, reported in "Other tributaries of Laramie River" in 1920.

SUMMARY FOR THE UNITED STATES

TABLE 8.—AREA FOR THE 19 IRRIGATION STATES, BY DRAINAGE BASIN: 1929 AND 1919—Continued

Main data table with columns for Drainage Basin, Area Irrigated (1929, 1919, Increase), Irrigable area in enter-prises, 1930, and Acres. Includes basins like Mississippi River and tributaries, Colorado River and tributaries, and various Great Basin Drainage basins.

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

2 Not including "Independent streams in Rio Grande Drainage Basin." 3 South Piney Creek included several projects in 1920, reported in "Other tributaries of Green River" in 1930.

TABLE 8.—AREA FOR THE 19 IRRIGATION STATES, BY DRAINAGE BASIN: 1929 AND 1919—Continued

Table with columns for Drainage Basin, Area Irrigated (1929, 1919, Increase), Area enter-prises were capable of supplying with water, 1930, and Irrigable area in enter-prises, 1930. Includes sub-sections for Great Basin Drainage, Columbia River and tributaries, and Pacific Ocean streams.

1 A minus sign (-) denotes decrease. Per cent. not shown when more than 1,000. 2 Including East Walker and West Walker Rivers.

3 Not including "Independent streams in Snake River Basin." 4 Not including "Independent streams in San Joaquin River Basin."

## SUMMARY FOR THE UNITED STATES

## INVESTMENT, AND COST OF MAINTENANCE AND OPERATION OF IRRIGATION ENTERPRISES

TABLE 9.—INVESTMENT IN ENTERPRISES FOR THE 19 IRRIGATION STATES: 1890 TO 1930

CENSUS YEAR	INVESTMENT		AVERAGE, PER ACRE <sup>1</sup>	
	Amount	Increase	Amount	Increase
	Dollars	Per cent	Dollars	Per cent
1930.....	1,032,755,790	48.0	39.57	47.6
1920.....	697,657,328	117.0	26.81	69.1
1910.....	321,454,008	359.2	15.85	75.3
1900.....	70,010,594	137.1	9.04	13.6
1890.....	29,533,921	-----	7.96	-----

<sup>1</sup> Based on area enterprises were capable of supplying with water.

TABLE 10.—INVESTMENT FOR THE 19 IRRIGATION STATES, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	INVESTMENT		
	Amount	Proportion of total	Average, per acre <sup>1</sup>
	Dollars	Per cent	Dollars
Total.....	1,032,755,790	100.0	39.57
Before 1860.....	15,694,247	1.5	31.61
1860-1869.....	14,262,037	1.4	9.74
1870-1879.....	34,408,810	3.3	14.35
1880-1889.....	79,461,911	7.7	18.09
1890-1899.....	86,572,758	8.4	24.14
1900-1904.....	73,323,337	7.1	31.51
1905-1909.....	245,887,448	23.8	59.30
1910-1914.....	70,738,038	6.9	43.57
1915-1919.....	74,026,373	7.2	44.04
1920-1924.....	144,344,584	14.0	128.99
1925-1929.....	142,944,869	13.8	129.12
Not reported.....	51,091,378	4.9	29.00

<sup>1</sup> Based on area enterprises were capable of supplying with water in 1930.

TABLE 11.—INVESTMENT, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929; FOR THE 19 IRRIGATION STATES, BY SOURCE OF WATER SUPPLY

(When water is pumped, cost of maintenance and operation includes cost of fuel and attendance)

SOURCE OF SUPPLY	INVESTMENT, 1930			MAINTENANCE AND OPERATION, 1929	
	Amount	Proportion of total	Average, per acre	Irrigated area reporting	Average, per acre <sup>1</sup>
	Dollars	Per cent	Dollars	Acres	Dollars
Total.....	1,032,755,790	100.0	39.57	18,090,184	2.77
Streams, gravity.....	452,381,562	43.8	26.44	12,392,805	1.21
Streams, pumped.....	102,027,681	9.9	37.07	1,678,550	4.30
Streams, gravity and pumped.....	20,823,588	2.0	47.63	252,784	4.41
Wells, pumped.....	271,426,464	26.3	110.07	1,021,060	9.17
Wells, flowing.....	2,366,242	0.2	42.27	22,403	2.34
Wells, pumped and flowing.....	1,543,810	0.1	74.58	10,542	9.27
Lakes, pumped.....	3,591,977	0.3	26.43	70,618	3.93
Lakes, gravity.....	4,693,943	0.5	35.61	55,527	2.70
Springs.....	3,408,382	0.3	13.27	195,502	1.02
Stored storm water.....	1,822,458	0.2	28.31	30,023	1.31
City water.....	32,300	(?)	17.85	978	7.31
Sewage.....	261,980	(?)	65.35	2,002	2.10
Streams, gravity and wells, pumped.....	99,936,110	9.7	66.20	1,159,631	4.40
Streams, gravity and wells, flowing.....	578,037	0.1	16.80	20,268	2.52
Other mixed.....	56,702,676	5.5	40.82	843,862	3.52
Other.....	199,900	(?)	24.27	7,030	1.58
Not reported.....	392,682	(?)	18.58	7,730	2.46
Supplemental from—					
Pumped streams.....	927,158	0.1	28.28	<sup>3</sup> 23,896	6.27
Pumped wells.....	9,627,598	0.9	29.92	<sup>3</sup> 276,347	5.91
Flowing wells.....	6,200	(?)	24.31	<sup>3</sup> 57	0.61

<sup>1</sup> Based on area irrigated in 1929 reporting cost.

<sup>2</sup> Less than one-tenth of 1 per cent.

<sup>3</sup> Not considered in total because included in enterprises reporting other sources of supply listed above.

TABLE 12.—INVESTMENT FOR THE 19 IRRIGATION STATES, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

CHARACTER OF ENTERPRISE (See definitions in Introduction)	Enterprises, 1930	INVESTMENT		INCREASE <sup>1</sup>		CHARACTER OF ENTERPRISE (See definitions in Introduction)	Enterprises, 1930	INVESTMENT		INCREASE <sup>1</sup>	
		1930	1920	Amount	Per cent			1930	1920	Amount	Per cent
		Dollars	Dollars	Dollars	Per cent			Dollars	Dollars	Dollars	Per cent
Total.....	75,517	1,032,755,790	697,657,328	335,098,462	48.0	United States Bureau of Indian Affairs.....	110	Dollars 31,576,920	Dollars 14,851,236	Dollars 16,725,684	112.0
Individual and partnership.....	71,173	327,867,180	154,634,169	173,233,011	112.0	United States Bureau of Reclamation.....	30	193,989,576	129,509,819	64,479,767	49.8
Cooperative.....	<sup>2</sup> 3,320	179,329,962	183,041,500	-3,711,538	-2.0	State.....	40	1,046,554	344,174	702,380	204.1
Irrigation district.....	<sup>2</sup> 363	210,733,476	88,573,514	122,159,962	137.9	City.....	45	15,511,463	2,936,678	12,574,785	428.2
Carey Act.....	13	7,565,004	32,680,695	-25,115,691	-76.8	Other.....	32	2,783,341	5,310,399	-2,527,058	-47.6
Commercial.....	391	62,351,714	85,735,470	-23,383,756	-27.3	Not reported.....			39,674	-39,674	-100.0

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Exclusive of water-users' associations or irrigation districts which operate projects or project units constructed by the United States Bureau of Reclamation (see text, second par., p. 50).

# IRRIGATION

TABLE 13.—INVESTMENT FOR THE 19 IRRIGATION STATES, BY DRAINAGE BASIN: 1930 AND 1920

DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>		DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent		1930	1920	Amount	Per cent
	Dollars	Dollars	Dollars	Per cent		Dollars	Dollars	Dollars	Per cent
<b>Total</b> .....	1,032,755,790	697,657,328	335,098,462	48.0	<b>Total</b> .....	1,032,755,790	697,657,328	335,098,462	48.0
Red River (of the North) tribu-	20,925		20,925	-----	Missouri River and tributaries—				
Souris River and tributaries.....	5,775		5,775	-----	Continued.				
Other tributaries.....	15,150		15,150	-----	Platte River and tributaries—Contd.				
<b>Missouri River and tributaries.....</b>	<b>138,506,721</b>	<b>131,553,108</b>	<b>4,953,615</b>	<b>3.8</b>	South Platte River and tributaries—				
Missouri River direct.....	1,535,899	2,300,975	-765,076	-33.3	Continued.				
Jefferson River and tributaries.....	2,417,277	5,370,454	-2,953,177	-55.0	Big Thompson Creek.....	2,317,830	1,102,316	1,215,514	110.3
Jefferson River direct.....	125,116	587,388	-462,272	-78.7	Cache la Poudre River.....	9,491,697	7,946,409	1,545,288	19.4
Beaverhead River.....	987,324	1,728,746	-736,422	-42.7	Lone Tree Creek.....	150,420	2,767,273	-2,616,853	-94.6
Big Hole River.....	699,070	1,669,767	-970,697	-58.1	Crow Creek.....	166,821	100,619	66,202	65.8
Ruby River.....	212,595	559,000	-346,405	-62.0	Big Beaver Creek.....	68,500	52,600	15,900	20.2
Other tributaries.....	393,172	830,553	-437,381	-52.7	Lodgepole Creek.....	337,680	445,738	-108,058	-24.2
Madison River.....	193,345	460,823	-267,478	-58.0	Other tributaries.....	1,105,076	4,704,691	-3,659,615	-76.8
Gallatin River.....	885,558	977,786	-92,228	-9.4	Loup River.....	10,000	21,300	-11,300	-53.0
Smith River.....	134,099	190,836	-56,737	-29.7	Other tributaries of Platte River.....	583,359	5,000	578,359	-----
Sun River.....	7,048,875	4,709,303	2,339,572	49.7	Kansas River and tributaries.....	596,747	537,605	59,142	11.0
Teton River.....	1,160,236	1,251,130	-90,894	-7.3	Republican River.....	490,429	500,285	-9,856	-2.0
Marias River.....	3,640,100	5,502,770	-1,862,670	-33.8	Smoky Hill River.....	12,460	34,953	-22,493	-64.4
Judith River.....	90,134	281,842	-191,708	-68.0	Other tributaries.....	93,858	2,367	91,491	-----
Musselshell River.....	765,729	986,755	-221,026	-22.4	Other tributaries of Missouri River.....	2,992,605	2,378,962	618,643	26.1
Milk River and tributaries.....	8,561,785	7,271,098	1,290,687	17.8	Mississippi River and tributaries,				
Milk River direct.....	5,503,687	154,208	5,349,479	-----	exclusive of Missouri River.....				
Snake River.....	800	8,600	-7,800	-90.7	Mississippi River direct.....	284,998	302,885	-17,887	-5.7
Other tributaries.....	3,057,298	7,108,290	-4,050,992	-57.0	Arkansas River and tributaries.....	21,722,223	30,241,390	-8,519,167	-28.2
Yellowstone River and tributaries.....	31,917,310	30,181,550	1,735,760	5.8	Arkansas River direct.....	11,629,246	15,092,972	-3,463,726	-22.9
Yellowstone River direct.....	7,070,112	7,508,300	-438,278	-5.8	South Fork.....	81,110	69,000	12,110	17.6
Boulder River.....	92,927	92,927	-----	-----	Mountain River.....	419,889	965,287	-545,398	-56.5
Clark Fork and tributaries.....	923,437	1,225,483	-297,046	-24.2	St. Charles River.....	133,806	241,884	-108,078	-44.9
Clark Fork direct.....	920,562	1,163,593	-243,031	-20.9	Huerfano River.....	1,590,384	3,204,519	-1,614,135	-50.4
Tributaries.....	7,875	61,890	-54,015	-87.3	Apishapa River.....	674,372	1,190,695	-596,323	-33.3
Shields River.....	397,120	424,103	-26,983	-6.4	Purgatoire or Las Animas River and	1,594,900	494,963	1,069,937	216.2
Stillwater River.....	674,220	307,873	366,347	119.0	Purgatoire or Las Animas River	1,546,150	491,450	1,054,700	214.6
Big Horn River and tributaries.....	19,775,462	16,670,257	3,105,205	18.6	Trinchera River.....	18,750	3,513	15,237	433.7
Big Horn River direct.....	3,042,013	3,635,033	-592,970	-16.3	Canadian River and tributaries.....	1,917,560	5,155,486	-3,237,926	-62.8
Popo Agie River.....	235,333	349,540	-114,213	-32.7	Canadian River direct.....	51,395	148,331	-96,936	-65.4
Wind River.....	5,949,958	2,101,819	3,848,139	183.1	Cimarron River.....	719,700	2,188,908	-1,469,208	-67.1
Owl Creek.....	110,235	52,915	57,320	108.3	Vermejo River.....	340,995	1,248,537	-907,542	-72.7
No Wood River.....	162,731	161,588	1,143	0.7	Ocate Creek.....	230,350	319,529	-89,179	-27.9
Greybull River.....	413,845	503,184	-89,339	-17.8	Mora River.....	236,645	262,575	-25,930	-9.9
Shell Creek.....	386,300	380,420	5,880	1.5	Ute Creek.....	23,500	7,000	16,500	235.7
Shoshone River.....	9,285,642	8,702,480	583,162	6.7	Other tributaries.....	314,975	980,606	-665,631	-67.9
Little Horn River.....	39,590	35,000	4,590	13.1	Cimarron River.....	203,310	416,304	-212,994	-51.2
Other tributaries.....	149,765	748,272	-598,507	-80.0	Other tributaries of Arkansas River.....	3,388,146	3,410,280	-22,134	-0.6
Tongue River and tributaries.....	1,207,250	1,419,629	-212,379	-15.0	St. Francis River.....	432,600	218,727	213,873	97.8
Tongue River direct.....	569,793	734,059	-164,266	-22.4	White River.....	4,165,818	3,992,967	172,851	4.3
Goose Creek.....	534,639	563,518	-21,121	-3.7	Ouachita River.....	2,500	1,100	1,400	127.3
Other tributaries.....	52,818	122,052	-69,234	-56.7	Red River and tributaries.....	5,206,434	398,534	4,807,900	-----
Powder River and tributaries.....	823,698	1,195,398	-371,700	-31.1	Other tributaries of Mississippi River.....	17,100	28,686	-11,586	-40.4
Powder River direct.....	167,200	187,502	-20,302	-10.8	Gulf streams other than Missis-				
Red Fork Creek.....	15,300	78,500	-63,200	-80.5	sippi River and Rio Grande.....				
Crazy Woman Creek.....	23,850	127,791	-103,941	-81.3	Atchafalaya River and tributaries.....	304,183	407,956	-103,773	-25.4
Clear Creek.....	551,488	553,475	-1,977	-0.4	Tangipahoa River and tributaries.....	97,077	97,077	-----	-----
Other tributaries.....	68,800	248,140	-182,280	-73.4	Natalbany River and tributaries.....	287,221	287,221	-----	-----
Other tributaries of Yellowstone					Vermilion River and tributaries.....	2,680,608	3,355,327	-674,719	-20.1
River.....	948,084	1,430,417	-482,333	-33.7	Calcasieu Lake, River, and tributaries.....	3,901,748	1,816,380	2,085,368	114.8
Little Missouri River.....	28,656	71,608	-42,952	-60.0	Mermentau River and tributaries.....	7,664,660	7,713,797	-49,137	-1.9
Moreau River.....	80	40,927	-40,867	-99.0	Sabine River and tributaries.....	700,643	673,935	26,708	4.0
Cheyenne River and tributaries.....	4,539,915	5,605,911	-1,065,996	-19.0	Neches River.....	2,095,128	1,596,770	1,098,358	68.8
Cheyenne River direct.....	2,535,848	5,353,848	-5,353,848	-----	Trinity River.....	480,470	1,743,621	-1,263,151	-72.4
North Fork (Belle Fourche)	(?)	(?)	-----	-----	Brazos River.....	657,555	569,543	88,012	15.5
South Fork and tributaries.....	257,131	252,063	5,068	2.0	Colorado River.....	1,914,643	3,560,916	-1,646,273	-46.2
South Fork direct.....	230,356	166,820	63,536	38.1	San Antonio River.....	3,088,635	5,087,842	-2,048,907	-40.3
Hat Creek.....	26,775	85,243	-58,468	-68.6	Nueces River.....	3,071,489	1,326,555	1,744,934	131.5
Other tributaries of Cheyenne River.....	6,250	6,250	-----	-----	Other Gulf streams.....	1,184,223	1,867,466	-683,243	-25.4
White River.....	478,392	183,349	295,043	160.9	Rio Grande and tributaries <sup>2</sup> .....				
Niobrara River.....	20,879	360,439							



SUMMARY FOR THE UNITED STATES

TABLE 13.—INVESTMENT FOR THE 19 IRRIGATION STATES, BY DRAINAGE BASIN: 1930 AND 1920—Continued

DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>		DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent		1930	1920	Amount	Per cent
<b>Colorado River and tributaries.....</b>	<b>132,350,247</b>	<b>86,686,940</b>	<b>45,663,307</b>	<b>52.7</b>	<b>Great Basin Drainage—Contd.</b>				
Colorado River direct.....	35,711,728	28,357,883	7,353,845	25.9	Independent streams.....	50,183,951	48,479,571	1,704,380	3.5
Green River and tributaries.....	8,820,435	8,592,340	228,099	2.7	Sevier River and tributaries.....	6,793,038	9,509,830	-2,716,198	-28.0
Green River direct.....	630,488	547,166	83,322	15.2	Sevier River direct.....	4,539,082	7,374,975	-2,835,293	-38.4
New Fork.....	633,415	293,043	340,372	82.0	San Pitch River.....	1,005,530	1,142,510	-136,980	-12.0
Horse Creek.....	29,641	456,827	-427,186	-93.5	Otter Creek.....	225,470	151,850	73,620	48.5
Cottonwood Creek.....	7,830	185,728	-177,898	-22.7	Other tributaries.....	1,022,956	840,501	182,455	21.7
South Piney Creek.....	28,900	39,150	-10,250	-26.2	Beaver River.....	793,337	842,305	-48,968	-5.8
La Barge River.....	12,600	33,000	-20,400	-61.8	Coal Creek.....	182,140	179,171	2,969	1.7
Fontenelle Creek.....	6,445	93,158	-86,713	-93.1	Deep Creek (Utah).....	12,277	8,844	3,433	38.8
Bitter Creek.....	208,495	566,776	-358,281	-63.2	Grouse Creek.....	27,700	28,338	-638	-2.3
Blacks Fork.....	111,750	77,320	34,430	44.5	Humboldt River and tributaries.....	2,550,497	1,751,566	807,931	46.1
Henrys Fork.....	402,000	374,140	27,860	7.6	Humboldt River direct.....	1,210,629	739,995	470,634	64.4
Duchessne River.....	2,977,463	2,428,174	549,289	22.6	East Fork of Humboldt River.....	2,050	202,071	-199,421	-98.7
Price River.....	1,140,078	458,725	681,353	148.5	La Mollie Creek.....	100,475	61,280	39,195	75.8
San Rafael River.....	258,800	288,100	-29,300	-10.2	North Fork of Humboldt River.....	20,145	57,403	-37,258	-64.0
Yampa River and tributaries.....	973,607	1,197,975	-224,368	-18.7	South Fork of Humboldt River.....	345,400	288,162	57,238	19.9
Yampa River direct.....	298,435	162,708	135,667	83.3	Pine Creek.....	20,252	2,800	17,443	621.0
Little Snake River.....	219,827	511,556	-291,729	-57.0	Reese River.....	42,075	79,120	-36,145	-46.7
Other tributaries.....	455,345	523,651	-68,306	-13.0	Little Humboldt River.....	40,740	2,544	38,196	937.5
White River.....	460,500	447,141	13,359	3.0	Other tributaries.....	710,231	288,182	422,049	146.4
Other tributaries of Green River.....	1,018,000	1,154,700	-136,700	-11.8	Truckee River and tributaries.....	1,814,690	594,187	1,220,503	205.4
Fraser River.....	12,155	55,800	-43,705	-78.2	Truckee River direct.....	1,572,525	485,900	1,086,625	223.6
Muddy Creek.....	110,650	33,122	77,528	234.1	Steamboat Creek.....	161,400	42,070	119,330	283.6
Blue River.....	115,210	116,608	-1,398	-1.2	Other tributaries.....	80,765	60,217	20,548	22.0
Eagle River.....	322,084	109,012	213,072	195.5	Carson River and tributaries.....	7,210,301	8,094,685	-884,384	-10.6
Roaring Fork.....	559,953	407,266	152,687	37.5	Carson River direct.....	2,900,302	194,395	2,705,907	74.4
Plateau Creek.....	315,135	341,755	-26,620	-7.8	Tributaries.....	6,915,459	7,900,290	-984,831	-12.5
Gunnison River and tributaries.....	10,538,635	10,745,767	-207,132	-1.9	Walker River and tributaries.....	2,213,104	1,690,050	514,105	30.3
Gunnison River direct.....	784,520	1,001,819	-217,299	-21.7	Walker River direct.....	2,182,004	1,504,464	678,200	45.1
Taylor River.....	7,700	6,900	800	11.6	Tributaries.....	30,500	194,595	-164,095	-84.3
Tomichi Creek.....	112,835	129,243	-16,408	-12.7	Steptoe Creek.....	222,870	180,980	32,884	17.3
North Fork.....	764,243	622,647	141,596	22.7	Long Valley Creek.....	2,526	171,642	-169,116	-98.5
Smith Fork.....	484,950	396,075	88,875	22.4	Tributaries of Mono Lake.....	1,281,055	5,303,858	-4,022,803	-70.1
Uncompahgre River.....	6,993,474	6,945,702	47,772	0.7	Susan River.....	1,509,048	242,246	1,266,802	522.5
Other tributaries.....	1,390,913	1,643,381	-252,468	-15.4	Mohave River.....	1,102,320	616,769	485,551	93.3
Rio Dolores.....	6,482,945	4,847,589	1,635,357	33.7	Owens River.....	325,053	5,785,132	-5,459,470	-94.4
Fremont River.....	294,955	567,050	-272,085	-48.0	San Jacinto River.....	4,489,207	2,139,257	2,349,950	109.8
Virgin River.....	708,926	1,622,997	-914,071	-56.3	Quinn River.....	68,888	50,548	18,310	36.2
San Juan River and tributaries.....	2,587,588	3,088,495	-500,907	-16.2	Deep Creek (Oregon).....	5,275	6,829	-1,554	-22.8
San Juan River direct.....	717,995	1,039,358	-321,363	-30.9	Donner and Blitzen River.....	1,804,000	131,750	1,672,250	127.6
Mancos River.....	113,355	35,477	77,878	219.5	Silvers River.....	80,114	1,005,802	-925,788	-92.0
Los Pinos River.....	561,050	524,590	36,460	7.0	Other independent streams.....	17,590,212	10,007,521	7,498,691	74.3
Animas River.....	811,597	1,148,088	-336,491	-29.3					
La Plata River.....	172,714	142,588	30,126	21.1	<b>Columbia River and tributaries.....</b>	<b>157,355,114</b>	<b>145,672,382</b>	<b>11,682,732</b>	<b>8.0</b>
Other tributaries.....	210,877	198,394	12,483	6.3	Columbia River direct.....	1,377,002	2,240,216	-863,214	-38.5
Kanab Creek.....	13,540	20,500	-6,960	-34.0	Kootenai River.....	230,535	221,076	8,559	3.9
William River.....	62,321	55,504	6,817	12.3	Clark Fork and tributaries.....	9,047,331	8,421,884	625,447	7.4
Little Colorado River and tributaries.....	1,452,187	460,206	991,981	215.6	Clark Fork direct.....	504,725	300,320	204,405	68.0
Little Colorado River direct.....	465,060	146,913	318,147	216.6	Big Blackfoot River.....	233,832	624,291	-390,459	-62.5
Nutrioso Creek.....	12,250	16,500	-4,250	-25.8	Bitter Root River.....	1,935,651	1,138,329	797,322	70.0
Concho Creek.....	52,725	49,228	3,497	7.1	Flathead River.....	5,609,512	4,737,131	866,201	18.3
Other tributaries.....	922,152	247,565	674,587	272.5	Other tributaries.....	7,709,011	1,152,333	6,556,678	56.9
Gila River and tributaries.....	62,542,801	25,236,237	37,306,564	147.8	Colville River.....	355,200	480,747	-125,547	-27.0
Gila River direct.....	14,262,958	2,888,708	11,374,250	393.7	Spokane River.....	1,352,395	1,637,743	-285,348	-17.4
San Francisco River.....	41,964	25,224	16,740	66.4	Okanogan River and tributaries.....	3,233,799	2,250,018	974,781	43.2
San Pedro River.....	184,985	359,153	-174,168	-48.5	Okanogan River direct.....	2,946,905	2,267,280	679,625	30.0
Santa Cruz River.....	2,251,988	5,168,524	-2,916,536	-56.4	Tributaries.....	2,908,894	2,031,728	867,176	47.6
Salt River and tributaries.....	36,188,493	14,939,034	21,249,459	142.2	Methow River.....	770,183	483,800	286,374	59.2
Salt River direct.....	32,193,073	14,339,874	17,853,199	124.5	Entiat River.....	184,902	73,880	111,023	150.4
Tonto Creek.....	20,550	9,468	11,082	117.0	Wenatchee River.....	1,022,367	1,808,541	-786,174	-43.5
Rio Verde.....	462,381	209,482	252,899	120.7	Crab Creek.....	55,050	859,550	-804,500	-93.5
Other tributaries.....	3,512,459	880,210	2,632,279	823.8	Yakima River and tributaries.....	25,282,348	14,840,089	10,442,259	70.3
Agua Fria River.....	7,451,130	1,428,077	6,023,053	421.8	Yakima River direct.....	22,644,214	13,012,727	9,631,487	62.8
Hassayampa River.....	29,450	51,239	-21,789	-48.4	Naches River.....	1,746,765	468,027	1,278,738	281.4
Other tributaries of Gila River.....	2,134,533	370,218	1,768,615	467.4	Ahtanum Creek.....	103,747	88,443	15,304	17.3
Other tributaries of Colorado River.....	1,698,989	2,038,763	-339,774	-16.7	Other tributaries.....	787,628	309,130	478,498	154.8
<b>Whitewater Draw and tributaries.....</b>	<b>230,906</b>	<b>289,368</b>	<b>-58,462</b>	<b>-23.0</b>	Snake River and tributaries.....	93,205,245	93,625,117	-419,872	-0.4
<b>Great Basin Drainage.....</b>	<b>72,088,281</b>	<b>66,589,376</b>	<b>5,478,905</b>	<b>8.2</b>	Snake River direct.....	33,983,494	37,228,741	-3,245,247	-8.7
Tributaries of Great Salt Lake.....	21,884,330	18,109,805	3,774,525	20.8	South Fork and tributaries.....	3,584,906	6,957,501	-3,372,595	-48.5
Bear River and tributaries.....	7,493,444	7,438,075	55,369	0.7	South Fork direct.....	3,342,586	6,603,903	-3,261,317	-50.1
Bear River direct.....	4,175,229	4,512,182	-336,953	-7.5	Gros Ventre River.....	16,475	31,225	-14,750	-47.2
Little Bear River.....	793,436	720,363	73,073	10.1	Little Gros Ventre River.....	4,800	18,746	-13,946	-74.4
Malud River.....	23,384	18,097	5,287	29.2	Salt River.....	111,308	149,207	-37,899	-25.4
Thomas Fork.....	42,830	25,359	17,471	68.7	Other tributaries.....	109,677	64,510	45,167	70.0
Mill Creek.....	91,809	21,012	70,797	336.0	Henrys Fork.....	1,925,652	2,001,841	-76,189	-3.8
Little Malud Creek.....	89,952	332,175	-242,223	-72.0	Blackfoot River.....	1,702,321	1,022,270	680,051	75.3
Other tributaries.....	2,366,804	1,808,857	557,947	30.8	Port Neuf River.....	629,201	1,141,528	-512,327	-44.0
Weber River and tributaries.....	4,955,769	2,106,048	2,849,721	135.3	Raft River.....	50,786	100,928	-50,142	-49.7
Weber River direct.....	3,713,175	1,353,323	2,359,852	174.4	Goose Creek.....	1,508,520	393,755	1,114,765	283.1
Ogden River.....	925,756	423,755	502,001	118.5	Salmon Falls River.....	2,598,895	4,152,745	-1,553,850	-37.4
East Canyon Creek.....	45,485	74,010	-28,525	-38.5	Little Wood River.....	686,350	1,016,609	-330,259	-32.5
Other tributaries.....	271,353	254,960	16,393	6.4	Big Wood River.....	9,817,833	5,395,133	4,422,700	82.0
Jordan River and Utah Lake and tributaries.....	9,435,117	8,565,682	869,435	10.2	Brunau River.....	571,321	574,955	-3,634	-0.6
Jordan River direct.....	1,897,577	746,836	1,150,741	154.1	Owyhee River.....	3,260,445	1,411,424	1,849,021	131.0
Spanish Fork River.....	3,837,653	4,126,990	-289,346	-7.0	Boise River.....	16,135,214	16,013,734	121,480	0.8
Hobble Creek.....	225,712	41,024	184,688	450.2	Malheur River.....	5,512,944	2,027,688	3,485,256	171.9
Provo River.....	1,694,118	985,979	708,139	71.8	Payette River.....	4,095,747	2,915,780	1,179,967	61.0
American Fork River.....	62,000	302,449	-240,449	-70.5	Waiser River.....	1,122,691	2,018,500	-895,759	-44.4
Little Cottonwood Creek.....	217,178	226,221	-9,043	-4.0	Bumby River.....	255,190	639,401	-384,292	-60.1
Big Cottonwood Creek.....	173,453	315,563	-142,110	-45.0	Powder River.....	1,200,723	1,552,987	-352,264	-22.7
Other tributaries.....	1,327,426	1,820,611	-493,185	-27.1	Pine Creek.....	162,140	97,522	64,618	66.0
					Innaha River.....	203,301	206,378	-3,077	-1.

TABLE 13.—INVESTMENT FOR THE 19 IRRIGATION STATES, BY DRAINAGE BASIN: 1930 AND 1920—Continued

DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent
<b>Columbia River and tributaries—Continued</b>				
<b>Snake River and tributaries<sup>2</sup>—Con.</b>				
Asotin Creek.....	250,331	606,084	-355,753	-58.7
Palouse River.....	42,595	175,100	-132,505	-75.7
Other tributaries.....	1,500,818	4,028,739	-2,527,921	-62.7
<b>Independent streams in Snake River Basin.....</b>	<b>2,575,068</b>	<b>3,828,604</b>	<b>-1,253,538</b>	<b>-32.7</b>
Camas Creek.....	546,925	578,627	-31,702	-5.5
Beaver Creek.....	8,500	7,269	1,231	17.1
Medicine Lodge Creek.....	7,535	31,690	-24,155	-70.2
Little Lost River.....	16,000	474,465	-458,465	-96.5
Big Lost River.....	1,833,725	2,709,698	-875,973	-32.3
Other.....	101,783	26,867	134,910	502.2
Walla Walla River.....	747,053	1,171,914	-424,861	-36.3
Klickitat River.....	6,125	64,423	-58,298	-90.5
White Salmon River.....	111,862	91,786	20,076	21.9
Umatilla River.....	3,752,200	4,308,892	-556,692	-12.9
Willow Creek.....	70,547	90,139	-19,498	-32.3
John Day River.....	436,492	510,248	-73,756	-14.4
Deschutes River.....	6,046,877	5,078,636	968,241	19.1
Hood River.....	957,875	807,269	150,606	18.6
Willamette River.....	311,911	100,561	211,350	210.2
Other tributaries of Columbia River.....	3,642,631	2,622,720	1,019,902	38.9
Other independent streams in Columbia River Basin.....	610,036		610,036	
<b>Pacific Ocean streams other than Colorado and Columbia Rivers.....</b>	<b>420,065,422</b>	<b>167,398,448</b>	<b>252,666,974</b>	<b>150.9</b>
<b>Dungeness River.....</b>	<b>260,126</b>	<b>94,010</b>	<b>202,116</b>	<b>215.0</b>
<b>Rogue River and tributaries.....</b>	<b>5,144,992</b>	<b>1,783,989</b>	<b>3,361,003</b>	<b>188.4</b>
Rogue River direct.....	1,605,102	165,605	1,439,497	868.9
Little Butte Creek.....	1,219,886	604,794	615,092	101.7
Bear Creek.....	1,475,733	615,878	859,855	139.6
Evans Creek.....	22,504	40,836	-18,332	-44.9
Applegate River.....	166,953	180,894	-13,941	-7.7
Illinois River.....	203,421	87,966	115,455	131.2
Other tributaries.....	451,303	87,966	363,337	413.1
<b>Klamath River and tributaries.....</b>	<b>9,430,566</b>	<b>5,502,890</b>	<b>3,927,676</b>	<b>71.4</b>
Klamath River direct.....	4,253,840	1,734,099	2,519,741	145.3
Lost River.....	4,295,740	3,451,383	844,357	24.5
Sprague River.....	259,900	32,368	227,532	703.0
Other tributaries.....	621,086	285,040	336,046	117.9
Russian River.....	534,835	162,030	372,805	228.9
<b>Sacramento River and tributaries.....</b>	<b>118,750,541</b>	<b>28,853,100</b>	<b>89,917,435</b>	<b>311.9</b>
Sacramento River direct.....	17,502,425	11,830,374	5,672,051	47.9
Pit River.....	982,284	799,913	182,371	22.8
Cow Creek.....	89,260	126,940	-37,680	-29.7
Cottonwood Creek.....	821,779	573,601	248,178	43.3
Battle Creek.....	87,685	95,139	-7,454	-7.8
Stony Creek.....	2,439,017	1,539,034	899,983	58.4
Feather River.....	82,408,623	3,937,380	78,471,243	---
Yuba River.....	3,200,008	2,518,770	681,238	27.0
Catche Creek.....	2,421,872	916,477	1,505,395	104.3
American River.....	3,437,456	2,860,134	577,322	18.9
Other tributaries.....	5,800,432	3,004,778	2,795,654	47.0
<b>San Joaquin River and tributaries<sup>3</sup>.....</b>	<b>111,540,168</b>	<b>71,694,653</b>	<b>39,845,515</b>	<b>55.6</b>
San Joaquin River direct.....	12,006,101	9,224,164	2,782,027	30.2
Kern River.....	7,050,041	17,573,637	-10,523,596	-59.1
Tulare Lake.....	817,154	3,010,020	-2,192,866	-69.1
Tule River.....	4,133,082	2,842,495	1,290,587	45.4
Kaweah River.....	11,440,116	0,186,840	5,262,276	85.1
Kings River.....	24,300,665	8,145,440	16,155,219	198.3
Fresno River.....	432,791	415,355	17,406	4.2
Mercad River.....	17,249,861	3,812,235	13,437,626	352.5
Tuolumne River.....	13,084,091	7,173,802	6,810,289	94.9
Stanislaus River.....	10,280,554	7,840,486	2,440,068	31.1
Calaveras River.....	463,580	818,995	-355,415	-43.4
Mokelumne River.....	3,709,181	1,675,137	2,034,044	121.4
Conumnes River.....	692,683	153,869	538,814	285.1
Other tributaries.....	5,070,278	1,021,512	3,148,766	163.9
<b>Independent streams in San Joaquin River Basin.....</b>	<b>906,636</b>		<b>906,636</b>	
<b>Tributaries of San Francisco Bay other than Sacramento and San Joaquin Rivers.....</b>	<b>9,405,139</b>	<b>4,940,061</b>	<b>4,465,078</b>	<b>90.4</b>
Coyote Creek.....	2,575,822	1,453,138	1,122,684	77.3
Guadalupe River.....	2,445,426	1,883,049	562,377	29.9
Other tributaries.....	4,383,891	1,603,874	2,780,017	173.3
Pajaro River.....	2,970,981	1,248,343	1,722,638	188.0
Sallinas River.....	4,774,377	2,570,351	2,204,046	85.7
Santa Maria River.....	1,044,252	573,194	471,058	82.2
Santa Ynez River.....	3,606,837	284,037	3,322,800	---
Santa Clara River.....	5,422,200	2,211,473	3,210,727	145.2
Los Angeles River.....	17,879,997	5,508,400	12,371,597	224.6
San Gabriel River.....	79,955,209	12,862,319	67,092,890	521.6
Santa Ana River.....	27,092,533	19,918,550	7,173,983	36.0
San Diego River.....	3,192,381	1,789,124	1,403,257	78.4
Other Pacific Ocean streams.....	18,117,662	7,421,338	10,696,314	144.1

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Not including "Independent streams in Snake River Basin."  
<sup>3</sup> Not including "Independent streams in San Joaquin River Basin."

COST OF PREPARING LAND FOR IRRIGATION

The costs shown in Table 14 represent estimates of expenditures already made on the areas reporting, and include clearing and grading land, and building farm laterals and farm irrigation structures. They therefore represent expenditures additional to the investment in irrigation enterprises shown in Tables 9 to 13, inclusive.

TABLE 14.—ESTIMATED COST OF PREPARING LAND FOR THE 19 IRRIGATION STATES, 1930

ITEM	1930
Area reporting.....acres.....	18,570,542
Estimated cost reported.....dollars.....	524,046,596
Average, per acre.....dollars.....	28.21

DRAINAGE OF IRRIGATED LAND

The areas in Table 15 relate only to lands within the boundaries of irrigation enterprises. "Additional area needing drainage" represents all lands so reported by the owners of the enterprises and includes lands producing partial crops as well as those wholly unproductive.

TABLE 15.—AREA WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL AREA IN NEED OF DRAINAGE, FOR THE 19 IRRIGATION STATES: 1930 AND 1920

ITEM	1930	1920
Enterprises reporting land drained or needing drainage.....number.....	3,853	3,068
Area <sup>1</sup> in enterprises reporting land drained or needing drainage.....acres.....	10,611,415	8,860,760
Area for which drains have been installed.....acres.....	3,707,354	1,519,853
Additional area needing drainage.....acres.....	1,078,566	1,476,771
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises reporting drainage.....per cent.....	34.9	17.2
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises.....per cent.....	12.1	4.2
Proportion that area for which drains have been installed plus that needing drainage is of area <sup>1</sup> in all irrigation enterprises.....per cent.....	15.6	8.3

<sup>1</sup> Irrigable area, 1930; total area, 1920.

QUANTITY OF WATER USED

The quantity of water used was reported on only part of the irrigation schedules, and all areas reporting "quantity of water entering canals" did not also report "quantity delivered to irrigators." In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in Table 16. While the data are incomplete, the reports represent sufficient acreage to serve as bases for reliable averages.

Practice among irrigation enterprises is not uniform with regard to the place to which water is delivered; some carry it to individual farms, but others only to laterals which serve several farms. The "total quantity of water delivered to irrigators," shown in Table 16, is the quantity reported in answer to a question preceded by the inquiry: "Average head of water delivered per individual irrigator."

SUMMARY FOR THE UNITED STATES

TABLE 16.—WATER USED FOR THE 19 IRRIGATION STATES: 1929 AND 1919

ITEM (See definitions in Introduction)	TOTAL		MEASURED		NOT MEASURED	
	1929	1919	1929	1919	1929	1919
Average flow of water entering canals.....sec.-ft.	133,001	234,020	103,246	109,714	20,755	124,300
Area irrigated.....acres	9,416,959	9,045,331	7,670,346	6,560,188	1,740,613	3,085,143
Average, per second-foot.....acres	71	41	74	60	50	25
Total quantity of water entering canals.....ac.-ft.	44,395,802	60,005,556	31,606,035	36,626,781	12,729,767	23,378,775
Area irrigated.....acres	10,723,726	10,379,174	7,815,218	7,771,079	2,908,508	3,107,105
Average quantity per acre.....ac.-ft.	4.1	5.5	4.0	4.7	4.4	7.5
Total quantity of water delivered to irrigators.....ac.-ft.	17,968,596	15,339,104	14,311,037	8,673,341	3,657,569	6,065,763
Area irrigated.....acres	6,474,338	6,059,953	5,054,632	3,980,026	1,410,706	2,070,927
Average quantity per acre.....ac.-ft.	2.8	2.5	2.8	2.2	2.6	3.2

IRRIGATION WORKS

TABLE 17.—DAMS FOR THE 19 IRRIGATION STATES, BY MATERIAL, 1930

MATERIAL	DAMS		MATERIAL	DAMS	
	Diversion	Storage		Diversion	Storage
	Number	Number		Number	Number
Total.....	21,947	2,940	Earth and rock.....		1,713
Concrete or masonry.....	2,380	362	Other and mixed.....		718
Timber.....	3,077		Not reported.....		15,687
					803

<sup>1</sup> Principally temporary dams, replaced annually.

TABLE 18.—LENGTH OF PIPE LINES FOR THE 19 IRRIGATION STATES, BY MATERIAL AND SIZE, 1930

MATERIAL AND SIZE (DIAMETER)	Length	MATERIAL AND SIZE (DIAMETER)	Length
	Miles		Miles
Total.....	17,363.1	Wood:	
Concrete:		1 to 12 inches.....	503.4
1 to 12 inches.....	7,519.1	13 to 30 inches.....	296.7
13 to 30 inches.....	2,641.4	More than 30 inches.....	100.7
More than 30 inches.....	140.5	Not segregated by size.....	4.0
Not segregated by size.....	123.5	Not segregated:	
Clay:		Concrete and—	
1 to 12 inches.....	235.4	Clay.....	12.2
13 to 30 inches.....	60.1	Metal.....	630.5
More than 30 inches.....	0.3	Wood.....	11.3
Not segregated by size.....	27.0	Metal and—	
Metal:		Clay.....	1.0
1 to 12 inches.....	4,019.7	Wood.....	34.0
13 to 30 inches.....	736.4	Concrete and—	
More than 30 inches.....	96.1	Clay and metal.....	49.8
Not segregated by size.....	2.5	Metal and wood.....	111.5
		Material not specified.....	93.6

TABLE 19.—IRRIGATION WORKS FOR THE 19 IRRIGATION STATES, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS				
	Diversion	Storage	Capacity	Length	Lateral canals, length	Number	Capacity		Number	Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps		
	Number	Number	Sec.-ft.	Miles	Miles	Number	Acres-ft.		Number	G. p. m.	Number	G. p. m.	Number	H. p.	Number	Capacity	
	21,947	2,940	547,314	75,375	51,427	5,122	24,508,590		17,363.1	4,811	G. p. m.	56,729	G. p. m.	59,344	H. p.	61,445	G. p. m.
Total.....	21,947	2,940	547,314	75,375	51,427	5,122	24,508,590	17,363.1	4,811	56,729	32,467,120	59,344	1,283,410	61,445	57,244,859		
Before 1860.....	600	127	11,151	2,900	1,238	138	223,066	221.3	9	356	75	60,937	89	4,456	101	90,063	
1860-1869.....	1,719	80	42,859	5,180	2,179	102	195,052	73.6	21	300	54	24,573	72	1,359	78	74,345	
1870-1879.....	3,172	165	49,725	8,166	2,994	208	262,319	230.2	107	6,574	82	68,209	105	7,064	115	818,006	
1880-1889.....	5,074	333	103,746	15,748	6,488	391	1,478,372	1,005.7	319	21,447	610	430,994	623	30,074	714	1,202,116	
1890-1899.....	3,046	321	76,228	10,809	7,371	381	1,613,410	875.2	402	64,626	794	452,875	916	39,607	900	2,710,266	
1900-1904.....	1,828	289	88,790	6,818	6,492	353	1,856,623	845.3	396	112,029	1,704	1,320,961	1,911	108,307	2,075	2,956,984	
1905-1909.....	1,337	417	27,382	4,688	3,141	740	1,647,521	2,629.7	677	116,701	5,371	3,146,633	5,602	151,797	5,945	5,394,338	
1910-1914.....	956	263	26,379	3,637	3,408	501	2,334,230	2,225.4	517	41,509	6,623	4,276,141	6,961	182,727	7,219	6,946,919	
1915-1919.....	659	198	20,694	2,565	1,765	470	2,484,764	2,732.5	672	57,419	7,902	4,587,304	8,258	171,067	8,468	9,508,745	
1920-1924.....	605	214	16,570	1,857	2,554	509	1,188,870	2,000.2	682	71,065	10,829	6,279,295	11,551	218,037	11,968	6,642,094	
1925-1929.....	1,663	211	16,274	4,684	648	824	114,514	2,593.3	686	78,086	22,425	11,661,490	22,918	336,612	23,407	8,066,689	
Not reported.....																	13,760,464

TABLE 20.—IRRIGATION WORKS FOR THE 19 IRRIGATION STATES, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Diversion	Storage	Capacity	Length	Lateral canals, length	Number	Capacity		Number	Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps	
	Number	Number	Sec.-ft.	Miles	Miles	Number	Acres-ft.		Number	G. p. m.	Number	G. p. m.	Number	H. p.	Number	Capacity
	21,947	2,940	547,314	75,375	51,427	5,122	24,508,590		17,363.1	4,811	G. p. m.	56,729	G. p. m.	59,344	H. p.	61,445
Total.....	21,947	2,940	547,314	75,375	51,427	5,122	24,508,590	17,363.1	4,811	56,729	32,467,120	59,344	1,283,410	61,445	57,244,859	
Individual and partnership.....	18,971	1,953	141,493	40,831	4,818	3,753	910,829	9,370.3	4,278	565,266	63,998	29,301,036	56,387	639,008	57,803	36,661,720
Cooperative.....	2,256	599	205,317	19,638	13,751	871	2,871,247	3,115.3	191	23,581	1,100	873,092	1,189	111,296	1,494	4,312,711
Irrigation district.....	299	136	83,630	7,038	14,102	178	3,739,285	2,083.5	302	15,315	763	1,008,612	810	108,004	1,077	7,233,209
Carey Act.....	14	13	4,118	232	412	12	481,450	2.1								
Commercial.....	146	140	41,087	3,395	4,674	175	1,613,020	589.6								
United States Bureau of Indian Affairs.....	163	28	11,947	1,384	3,773	35	1,798,499	94.6	11	5,052	424	642,082	452	73,421	873	4,922,912
United States Bureau of Reclamation.....	52	48	55,393	2,250	9,435	47	12,978,850	433.5	1	27	108	121,463	103	7,817	46	262,723
State.....	9	4	86	37	14	14	351	218.2	3	30	180	380,000	198	30,577	232	1,896,587
City.....	30	27	2,235	420	141	35	114,956	954.8			54	34,855	72	2,160	81	75,617
Other.....	7	1	2,029	144	307	2	103	1.2	1	90	101	107,080	103	5,141	94	1,007,480
									24	6	1	900	30	6,495	46	870,900

# IRRIGATION

TABLE 21.—IRRIGATION WORKS FOR THE 19 IRRIGATION STATES, BY DRAINAGE BASIN, 1930

DRAINAGE BASIN (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS			FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS				
	Diver- sion	Storage	Capacity	Length	Lateral canals, length	Number	Capacity	Pipe lines, length	Number	Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps		Av- erage lift
															Number	Capacity	
Total.....	No. 21, 947	No. 2, 949	Sec.-ft. 547, 314	Miles 75, 375	Miles 51, 427	5, 122	Acre-ft. 24, 508, 590	Miles 17, 363. 1	4, 811	G. p. m. 609, 367	56, 729	G. p. m. 32, 467, 120	59, 344	H. p. 1, 283, 419	61, 445	G. p. m. 27, 244, 859	Feet 51
Red River (of the North) tributaries.....			2	1				1. 2					8	153	8	20, 400	13
Souris River and tributaries.....													5	123	5	14, 400	13
Other tributaries.....			2	1				1. 2					3	30	3	6, 000	14
Missouri River and tributaries.....	5, 006	734	130, 173	19, 915	10, 697	743	4, 043, 135	101. 1	21	7, 218	1, 071	613, 350	1, 198	26, 788	1, 279	1, 343, 545	26
Missouri River direct.....	16	10	1, 613	82	135	8	1, 466	0. 7					10	716	10	46, 920	31
Jefferson River and tributaries.....	728	41	9, 440	1, 936	433	40	65, 327	0. 5			7	978	7	64	9	3, 230	31
Jefferson River direct.....	22		766	125	17								2	40	2	2, 250	6
Beaverhead River.....	208	12	3, 268	694	236	13	54, 025										
Big Hole River.....	287	9	3, 612	594	80	8	2, 965										
Ruby River.....	41	7	793	188	15	7	985										
Other tributaries.....	80	13	1, 011	335	85	12	7, 352	0. 5			7	978	5	24	7	980	44
Madison River.....	23	6	1, 005	263	20	7	791	0. 2									
Gallatin River.....	159	1	3, 040	583	255			0. 2					1	15	1	2, 300	13
Smith River.....	34	1	603	211	14	2	700										
Sun River.....	27	5	1, 829	145	326	4	127, 600	3. 3			2	600	12	74	10	5, 358	16
Teton River.....	19	4	1, 383	170	121	4	95, 001				2	1, 000	10	112	13	7, 800	17
Marias River.....	30	15	1, 447	129	481	18	142, 319	1. 0					5	183	6	8, 540	17
Judith River.....	38	3	423	134	21	1	1	1. 1					2	18	2	2, 450	8
Musselshell River.....	202	14	3, 153	556	59	9	30, 164	0. 4			5	2, 765	19	234	19	18, 713	14
Milk River and tributaries.....	151	74	4, 429	537	514	63	181, 400	10. 2	1	8	3	4, 176	19	454	23	56, 654	17
Milk River direct.....	25	9	2, 280	308	440	0	80, 870	10. 2					7	230	11	35, 810	14
Snake River.....						1	5										
Other tributaries.....	126	64	2, 169	229	74	50	100, 615		1	8	3	4, 176	12	224	12	20, 844	18
Yellowstone River and tributaries.....	1, 000	86	29, 539	5, 344	2, 671	90	575, 611	4. 9	6	2, 265	4	555	55	3, 284	68	273, 074	19
Yellowstone River direct.....	23	2	5, 349	597	499	2	1, 700	1. 0					27	2, 952	36	245, 240	22
Boulder River.....	3		524	87	6				1	100			2	12	2	1, 410	9
Clark Fork and tributaries.....	49	1	4, 162	650	142	1	4, 000	0. 7	1	100			2	12	2	1, 410	9
Clark Fork direct.....	49		4, 108	636	139			0. 7	1	100							
Tributaries.....			44	14	3	1	4, 000										
Shields River.....	161	1	1, 160	304	59	1	800						1	20	1	4, 000	14
Stillwater River.....	57	1	1, 168	321	111								1	9	1	160	12
Big Horn River and tributaries.....	308	29	12, 194	2, 082	1, 523	41	502, 077	2. 2	4	1, 965			5	93	5	4, 240	9
Big Horn River direct.....	23		1, 703	323	221	2	42		2	950			5	93	5	4, 240	9
Popo Agie River.....	16		721	209	35			0. 8									
Wind River.....	50	5	4, 070	303	580	5	38, 435	0. 4									
Owl Creek.....	20		342	115	20	2	400		1	1, 000							
No Wood River.....	08	4	357	157	14	10	1, 120										
Greybull River.....	26		882	238	60												
Shell Creek.....	4	3	199	98	35	1	1, 610										
Shoshone River.....	24	4	3, 529	339	538	5	459, 570	1. 0									
Little Horn River.....	8	2	30	44			206										
Other tributaries.....	69	11	361	196	8	13	694		1	15			7	118	7	6, 335	12
Tongue River and tributaries.....	84	11	1, 482	414	80	13	47, 564	1. 0					6	96	6	5, 900	12
Tongue River direct.....	34	5	629	152	11	3	85	1. 0									
Goose Creek.....	30	4	723	196	53	2	47, 510										
Other tributaries.....	20	2	130	66	22	8	9						1	22	1	435	8
Powder River and tributaries.....	62	12	1, 025	259	126	13	4, 984		1	200			3	33	4	6, 505	54
Powder River direct.....	9	3	118	22	4	4	60		1	200							
Red Fork Creek.....	4		8														
Crazy Woman Creek.....	9	3	50	24	17	3	507										
Clear Creek.....	12	3	741	131	103	2	4, 364										
Other tributaries.....	28	3	108	74	2	4	3						3	33	4	6, 505	54
Other tributaries of Yellowstone River.....	253	28	2, 479	640	119	19	14, 496				4	655	9	47	12	5, 175	15
Little Missouri River.....	14	12	54	5		4	120	2. 0									
Moreau River.....	1																
Cheyenne River and tributaries.....	116	25	2, 060	418	741	14	205, 433	8. 4	9	3, 005			5	80	5	3, 580	32
North Fork (Belle Fourche).....	57	6	1, 474	258	715	2	208, 040	7. 2	8	2, 975			2	22	2	1, 360	35
South Fork and tributaries.....	58	16	535	159	20	12	2, 393	0. 2	1	30			3	58	3	2, 220	31
South Fork direct.....	50	10	536	132	17	6	2, 057	0. 2	1	30			3	58	3	2, 220	31
Hat Creek.....	8	6	49	27	9	6	336										
Other tributaries of Cheyenne River.....	1	3	1	1				1. 0									
White River.....	22	3	100	58	24	1	12, 000	5. 5									
Niobrara River.....	18	11	43	46	8	3	675										
Platte River and tributaries.....	2, 028	371	66, 838	8, 218	4, 399	419	2, 570, 939	52. 9			956	560, 450	904	14, 787	944	723, 029	27
Platte River direct.....	3	2	3, 375	159	334	4	189	1. 0					6	37	6	3, 290	9
North Platte River and tributaries.....	1, 124	119	24, 490	4, 143	2, 398	121	1, 772, 184	27. 2			11	1, 320	41	635	44	63, 991	20
North Platte River direct.....	41	7	10, 520	1, 097	1, 928	8	1, 338, 520	24. 7			1	365	21	477	22	51, 752	21
Beaver Creek.....	14	3	211	58			286										
Grand Encampment Creek.....	16		211	58													
Spring Creek.....	32	2	302	41	1	1	832										
Pass Creek.....	37	1	123	4	1												
Medicine Bow River.....	69	4	664	286	64	2	3, 337	0. 5					1	2	1	450	
Sweetwater River.....	21	9	215	94	6	5	796	0. 6					1	30	1	1, 200	15
Muddy Creek.....	1		21	76	11		600										
Box Elder Creek.....	7	4	306	132	60	3	20, 000	0. 1									
La Poudre Creek.....	4		98	43	7												
Labonte Creek.....	9																
Laramie River and tributaries.....	426	20	6, 277	1, 035	174	23	249, 223										
Laramie River direct.....	120	5	5, 040	462	141	5	236, 500										
Little Laramie River.....	63		614	193	13	2	200										
Sybillie Creek.....	56		67	65	1		20										
North Laramie River.....	55	3	194	82	15	5	6, 574										

SUMMARY FOR THE UNITED STATES

TABLE 21.—IRRIGATION WORKS FOR THE 19 IRRIGATION STATES, BY DRAINAGE BASIN, 1930—Continued

DRAINAGE BASIN (See definitions in Introduction)	DAMS		MAIN CANALS			Lateral canals, length	RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS						
	Diver- sion	Storage	Capacity	Length	Number		Capacity	Number		Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps		Av- er- age lift			
	No.	No.	Sec.-ft.	Miles	Miles	Acres-ft.	Miles	G. p. m.	G. p. m.	H. p.	G. p. m.	Feet	Number	Capacity						
Missouri River and tributaries—Con.																				
Platte River and tributaries—Continued.																				
South Platte River and tributaries—Con.	No.	No.	Sec.-ft.	Miles	Miles	Acres-ft.	Miles	G. p. m.	G. p. m.	H. p.	G. p. m.	Feet								
Clear Creek	17	30	2,274	218	106	21	27,068	6.2	5	354	12	54	12	7,450	29					
St. Vrain Creek	87	28	4,118	500	130	37	45,853	2.3	7	152	7	152	7	7,450	23					
Big Thompson Creek	38	22	2,080	238	31	23	90,768	6.0	3	85	3	85	3	4,200	31					
CACHE LA POUDE RIVER	159	84	5,787	547	694	85	180,300	0.2	70	25,100	44	680	44	35,630	20					
Lone Tree Creek	49	11	131	08	11	11	6,568	0.4	58	12,500	19	215	19	13,110	22					
Crow Creek	75	7	191	08	4	8	2,947	0.1	9	4,200	5	104	5	5,900	25					
Big Beaver Creek	10	1	810	39	1	1	6,710	0.1	5	1,750	2	48	2	2,750	26					
Lodgepole Creek	62	10	236	120	22	8	42,753	4.4	10	12,800	15	239	15	22,100	31					
Other tributaries	292	26	5,325	491	59	36	221	1.2	327	132,283	261	3,368	276	138,555	25					
Loup River	4	3	8	3	3	1	28	0.3	6	155	6	155	6	7,725	23					
Other tributaries of Platte River	4	3	8	3	3	8	221	1.2	438	361,878	469	8,745	490	404,758	30					
Kansas River and tributaries	28	4	445	125	0	9	53	4.3	78	36,375	111	1,805	116	97,850	30					
Republican River	21	2	401	108	0	5	40	0.6	46	26,036	67	1,120	68	62,370	28					
Smoky Hill River	1	1	8	2	2	1	5	0.4	18	2,800	3	110	3	6,200	20					
Other tributaries	6	1	36	15	2	3	2	3.3	14	7,540	41	575	45	29,280	33					
Other tributaries of Missouri River	353	48	2,729	985	469	47	32,445	5.5	5	1,940	14	5,791	32	3,964	42					
Mississippi River and tributaries, exclusive of Missouri River	814	180	49,701	3,549	1,969	209	1,523,866	114.9	7	893	2,216	2,104,316	1,742	78,378	1,804	2,418,235	54			
Mississippi River direct	1	6	719	16	0	0	104	13.2	6	1,362	64	1,038	64	82,630	15					
Arkansas River and tributaries	808	164	46,577	3,448	1,827	187	922,611	100.0	6	945	1,343	999,536	811	20,527	852	1,144,009	49			
Arkansas River direct	46	14	24,066	1,077	1,954	21	501,067	6.7	458	626,094	448	22,414	454	697,559	68					
South Fork	25	54	231	54	16	12	8,704	0.5	1	200	2	50	2	10,200	29					
Fountain River	4	1	619	180	16	12	8,704	0.5	3	250	4	73	4	3,150	23					
St. Charles River	95	1	178	87	5	15	49,471	6.4	7	5,875	7	81	7	5,875	23					
Huerfano River	133	17	3,434	474	2	5	28,052	0.2	3	4,220	3	43	3	4,270	22					
Apishapa River	29	6	5,637	86	16	5	20,000	0.2	2	50	2	50	2	3,000	14					
Purgatoire or Las Animas River and tributaries	81	7	1,553	221	53	1	20,000	0.2	2	50	2	50	2	3,000	14					
Purgatoire or Las Animas River direct	77	4	1,547	215	53	1	20,000	0.2	2	50	2	50	2	3,000	14					
Trinchera River	4	3	6	6	0	1	20,000	0.2	2	50	2	50	2	3,000	14					
Canadian River and tributaries	86	24	5,518	356	205	25	147,045	3.2	12	1,705	15	170	14	2,355	71					
Canadian River direct	3	2	40	13	2	2	2	0.2	12	1,705	15	170	14	2,355	71					
Cimarron River	9	4	989	52	65	4	96,400	1.0	4	18,340	0									
Vermejo River	4	0	3,012	46	70	0	18,340	1.0												
Ocate Creek	2	1	117	25	10	3	24,800	0.2	5	1,330	5	46	8	1,480	35					
Mora River	58	4	1,060	201	11	2	3,880	0.2	5	1,330	5	46	8	1,480	35					
Uta Creek	2	1	5	5	1	2	800	0.2	5	1,330	5	46	8	1,480	35					
Other tributaries	8	4	295	14	20	5	7,122	0.2	5	1,330	5	46	8	1,480	35					
Cimarron River	8	5	157	52	6	8	3,536	0.2	5	1,330	5	46	8	1,480	35					
Other tributaries of Arkansas River	329	90	5,184	331	150	90	109,836	82.8	6	945	864	359,862	325	6,000	358	416,117	24			
St. Francis River	1	3	1,390	22	3	7	1,076	0.6	140	203,350	134	6,178	130	201,656	34					
White River	4	4	1,009	63	130	4	600,013	0.9	63	58,830	72	2,397	75	64,324	44					
Red River and tributaries	4	4	1,009	63	130	4	600,013	0.9	63	58,830	72	2,397	75	64,324	44					
Other tributaries of Mississippi River	2	3				2	52	0.2	2	2,650	6	186	6	11,040	28					
Gulf streams other than Mississippi River and Rio Grande	99	195	18,608	2,061	1,731	321	266,264	46.5	856	62,938	2,363	2,493,111	3,197	140,298	3,526	8,929,951	46			
Atchafalaya River and tributaries	3	4	94	09	9	5	207	1.4	10	60,700	74	3,235	70	247,490	20					
Tangipahoa River and tributaries	1	1				1	60	0.2	174	8,080	157	405	240	8,125	19					
Natalbany River and tributaries	4	1	6,126	67	296	1	60	0.2	486	21,549	470	1,368	531	21,416	43					
Vermilion River and tributaries	2	1	578	180	132	4	448	0.2	55	178,350	164	8,682	179	1,442,590	21					
Calcasieu Lake, River, and tributaries	26	05	2,282	943	379	63	13,018	0.2	74	271,650	104	10,332	115	947,050	40					
Mermentau River and tributaries	4	1	1,628	56	42	1	20	0.4	575	1,397,670	733	59,119	768	2,909,458	44					
Sabine River and tributaries	1	2	1,072	45	175	1	1	0.2	7	16,800	17	2,213	17	201,600	35					
Neches River	1	2	2,257	46	15	1	1	0.2	65	9,772	60	2,461	69	326,717	19					
Trinity River	2	20	393	38	4	20	3,534	6.1	171	121,854	212	8,820	219	268,075	54					
Brazos River	15	53	1,791	409	322	33	8,828	7.0	117	26,143	374	17,507	414	1,308,649	38					
Colorado River	4	4	711	53	232	13	263,281	6.6	27	16,647	30	982	42	34,207	32					
San Antonio River	17	30	45	33	21	163	6,840	8.1	30	16,173	407	15,553	445	12,553	485	217,182	97			
Nueces River	21	14	1,631	122	54	17	27	0.6	195	208,518	345	10,080	354	602,245	34					
Other Gulf streams																				
Rio Grande and tributaries	789	85	36,370	4,647	4,193	233	3,119,157	287.2	892	273,299	381	269,453	636	45,902	743	3,651,266	36			
Rio Grande direct	71	36	20,393	1,705	2,930	68	2,711,259	265.4	300	15,000	3	2,320	219	37,194	285	3,079,305	49			
Alamosa River	19	1	1,150	105	68	1	17,500	0.3												
La Jara River	22	1	285	67	14															
Conejos River	70	1	4,312	369	45	1	6,500	0.3												
Trinchera River	21	2	198	84	53	2	24,000	0.3												
Rio Costilla	4	1	270	19	20	1	15,739	0.3												
Pueblo River	18	1	348	132	2															
Rio Chama	91	2	789	293	54	3	601	0.3												
Rio Santa Cruz	10	1	166	64	38	1	10,000	0.3												
Tasque Creek	15	1	98	74	1															
Rio Puerco	39	8	537	237	25	6	53,130	1.7												
Pecos River and tributaries	178	10	3,920	734	441	127	85,643	2.4	350	237,257	342	262,546	364	7,774	404	336,334	28			
Pecos River direct	39	6	2,974	376	357	8	81,088	0.5	13	16,800	25	15,175	52	1,138	61	64,788	31			
Gallinas River	15	1	243	44	20	2	70	0.3												
Hondo River	75	1	317	181	49	5	204	0.3	70	46,707	111	81,631	111	1,673	180	80,181	24			
Penasco River	24	1	167	47	8															
Other tributaries	26	3	219	86	27	112	4,281	1.6	261	173,750	205	165,740	200	4,943	212	180,815	29			
Other tributaries of Rio Grande	231	23	3,909	774	496	23	194,785	17.7	242	21,042	36	4,587	53	934	54	235,647	57			
Independent streams in Rio Grande Drainage Basin	135	14	2,239	507	34	73														



SUMMARY FOR THE UNITED STATES

TABLE 21.—IRRIGATION WORKS FOR THE 19 IRRIGATION STATES, BY DRAINAGE BASIN, 1930—Continued

DRAINAGE BASIN (See definitions in Introduction)	DAMS		MAIN CANALS		Lateral canals, length	RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS				
	Diver- sion	Storage	Capacity	Length		Number	Capacity		Number	Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps		Av- er- age lift
															Number	Capacity	
<b>Great Basin Drainage—Continued.</b>																	
Tributaries of Great Salt Lake—Continued.																	
Jordan River and Utah Lake and tribu- taries—Continued.	No.	No.	Sec.-ft.	Miles	Miles		Acre-ft.	Miles		G. p. m.	G. p. m.		H. p.	G. p. m.	Feet		
Provo River.....	101	13	1,731	268	176	22	14,913	0.4		130		2	1,370	23,400	145		
American Fork River.....	6		210	38	72	1	3		2	225	1		215	4,325	65		
Little Cottonwood Creek.....	21	2	395	48	07	1	590	12.0									
Big Cottonwood Creek.....	10		139	38	43		10	1.3									
Other tributaries.....	65	29	1,248	250	159	29	23,255	20.6	608	29,194	8	2,975	2,818	69,115	25		
Independent streams.....	2,694	280	33,252	5,977	1,982	693	1,543,281	1,488.8	1,459	118,775	3,043	1,497,778	2,930	60,867	3,005	2,685,084	71
Sevier River and tributaries.....	184	51	6,038	974	513	47	511,227	5.1	109	10,423	3	2,170	122	5	5,770	27	
Sevier River direct.....	50	12	3,427	449	300	9	386,860		64	6,188			3	45	1,600	10	
San Pitch River.....	49	14	1,031	267	137	14	7,503	0.1	1	900	1	1,000	2	25	1,100	40	
Other Creek.....	12	2	534	32	0	3	63,800										
Other tributaries.....	73	23	1,036	226	70	21	53,059	5.0	43	3,335	2	1,170	5	52	3,170	29	
Beaver River.....	57	7	794	149	89	5	31,905	1.7	9	81	90	32,962	89	528	89	33,412	28
Coal Creek.....	14	1	467	39	53	4	50		1	35	13	0,989	12	179	12	7,139	38
Deep Creek (Utah).....	1		37	3	2												
Grouse Creek.....	12	2	26	38	2	2	462										
Humboldt River and tributaries.....	018	13	5,253	1,198	105	21	105,611	15.3	4	65	28	13,035	28	627	20	11,770	31
Humboldt River direct.....	105	6	2,570	202	53	8	59,090	1.8	4	65	26	12,960	26	623	27	11,095	26
East Fork of Humboldt River.....	1		5	5				0.6									
La Moille Creek.....	51		275	107	13	1	487	0.6									
North Fork of Humboldt River.....	51		83	41				0.6									
South Fork of Humboldt River.....	30	1	587	287	18	2	2,150										
Pine Creek.....	23	2	76	71		3		1.5									
Reese River.....	27		57	23		1	200	0.2									
Little Humboldt River.....	27	1	260	41		1	50	1.0									
Other tributaries.....	276	3	1,340	421	39	5	43,660	3.8			2	75	2	4	76	94	
Truckee River and tributaries.....	65	5	3,137	225	125	2	1,100	0.7	3	81	2	1,125	3	47	3	1,350	20
Truckee River direct.....	31		2,939	131	125			0.6			1	225	2	22	2	450	10
Steamboat Creek.....	3	2	45	5		1	1,000										
Other tributaries.....	31	3	153	39		1	100	0.1	3	81	1	900	1	25	1	900	40
Carson River and tributaries.....	52	14	4,272	229	448	16	206,913	21.3	34	244	13	18,910	31	1,130	32	73,465	31
Carson River direct.....	43	12	748	133	3	12	2,965	8.2	13	220	12	18,825	23	770	24	30,330	33
Tributaries.....	9	2	3,524	96	445	4	294,008	13.1	21	24	1	85	8	360	8	37,135	22
Walker River and tributaries.....	58	2	1,698	305	20	3	92,002	2.7	16	576							
Walker River direct.....	53	2	1,633	299	20	2	92,000	0.2	16	570							
Tributaries.....	5		65	6		1	2	2.5									
Steptoe Creek.....	63	13	68	66	3	26	50	5.8	2	33	16	0,268	13	242	16	0,338	22
Long Valley Creek.....	1		0	0				0.8									
Tributaries of Mono Lake.....	6	0	184	25	20	6	42,801										
Susan River.....	54	7	775	50	32	9	32,476	3.0			2	4,760	2	145	2	5,500	50
Mohave River.....	7	7	143	29	4	75	179	108.8	17	7,094	240	133,557	231	3,203	233	126,776	44
Owens River.....	18	9	654	153	27	20	24,620	29.0	6	295	41	44,260	41	1,862	32	944,760	85
San Jacinto River.....	11	8	201	80	43	00	28,312	445.8	3	500	43	208,168	426	9,060	436	243,800	79
Quinn River.....	65	2	306	74		2	1,003	4.4			4	850	3	51	3	1,700	43
Deep Creek (Oregon).....	12		5	3													
Donner and Blitzen River.....	4		304	42	17												
Silvies River.....	102	4	622	91	7												
Other independent streams.....	1,290	128	8,209	2,173	474	398	379,563	846.4	1,255	98,778	2,142	1,022,274	2,037	43,575	2,106	1,121,234	77
<b>Columbia River and tributaries.....</b>																	
Columbia River direct.....	2	1	205	45	6	1	50	148.4	1	300	11	11,325	219	0,025	228	215,538	78
Kootenai River.....	85	6	260	93	13	3	6,603	4.9					4	11	4	4,050	15
Clark Fork and tributaries.....	403	58	7,112	1,959	1,439	53	153,001	35.8	37	3,798	17	5,903	40	329	41	20,755	20
Clark Fork direct.....	15	3	307	80	53	2	3,560	2.8			7	1,200	5	53	5	1,030	30
Big Blackfoot River.....	79	1	751	228	44	1	40	0.8	1	125			2	20	2	1,702	42
Bitter Root River.....	67	18	2,638	631	332	14	46,453	2.9									
Flathead River.....	87	17	1,115	263	836	18	104,828	21.8	36	3,673			18	100	18	11,160	23
Other tributaries.....	156	19	2,051	767	174	18	4,720	7.6			10	4,703	16	90	10	5,963	35
Colville River.....	18	2	61	28	6			2.4			3	708	3	15	3	775	86
Spokane River.....	6	3	289	21	4	3	1,607	98.5			80	74,059	95	3,822	105	72,534	77
Okanogan River and tributaries.....	16	12	602	89	106	11	43,085	52.7	1	50	199	27,970	320	4,079	335	104,320	45
Okanogan River direct.....	16	12	602	89	106	11	43,085	52.7	1	50	199	27,970	320	4,079	335	104,320	45
Tributaries.....	16	12	602	89	106	11	43,085	52.7	1	50	199	27,970	320	4,079	335	104,320	45
Methow River.....	41	10	1,014	185	7	8	4,374	3.8			184	25,337	205	1,764	209	40,502	45
Entiat River.....	5	1	62	32	2			6.9			2	800	21	220	22	7,464	67
Wenatchee River.....	42	10	686	160	27	9	6,203	62.1	1	10	71	0,723	230	1,853	240	34,451	66
Crab Creek.....	7	3	260	5		1	70	2.2			14	7,835	17	161	17	10,047	20
Yakima River and tributaries.....	126	8	10,155	736	1,559	8	629,487	880.6	4	3,350	58	21,768	152	7,498	100	237,593	38
Yakima River direct.....	21	0	7,294	403	1,468	7	628,437	371.0			8	1,466	88	6,510	103	200,020	24
Naches River.....	25		923	135	34			6.2			2	580	2	24	2	550	9
Ahtanum Creek.....	19		605	41	11			0.3			5	1,000	9	93	0	3,321	30
Other tributaries.....	61	2	1,333	157	46	1	1,050	3.1	4	3,350	43	17,733	53	871	55	28,612	86
Snake River and tributaries.....	3,605	195	79,204	8,774	7,416	100	5,178,689	273.0	193	23,613	217	62,046	697	38,170	783	2,167,163	29
Snake River direct.....	23	6	16,679	786	5,045	4	1,802,180	36.2			4	2,500	185	31,197	201	1,684,413	43
South Fork and tributaries.....	252	7	8,730	790	536	5	843,537	2.0					1	5	1	800	6
South Fork direct.....	102	4	7,061	371	462	2	847,200										
Gros Ventre River.....	1		91	32	17												
Little Gros Ventre River.....	62	1	332	20	4												
Salt River.....	62	1	753	191	24												
Other tributaries.....	83	2	493	176	29	2	800	2.0									
Henry's Fork.....	93	4	10,709	415	268	3	82,888	1.0	20	2,828	23	3,886	44	326	44	18,695	21
Blackfoot River.....	55	2	2,232	126	337												

# IRRIGATION

TABLE 21.—IRRIGATION WORKS FOR THE 19 IRRIGATION STATES, BY DRAINAGE BASIN, 1930—Continued

DRAINAGE BASIN (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS				Av- er- age lift	
	Diver- sion	Storage	Capacity	Length	Lateral canals, length	Number	Capacity		Number	Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps			Feet
															Number	Capacity		
Columbia River and tributaries—Con.																		
Snake River and tributaries—Continued.																		
No.	No.	Sec.-ft.	Miles	Miles			Acre-ft.	Miles	G.p.m.		G. p. m.		H. p.	G. p. m.	Feet			
153	20	4,757	564	128	24	101,125	14.5			3	645	96	1,075	101	170,161	32		
184	9	458	250	9	8	73,100	7.0		10		8	264	4	14,000	35			
342	22	2,722	866	143	10	104,120	1.1		75		150	32	377	33	14,025	25		
						3,314	6.7		1,150		10,020							
Pine Creek	52	5	343	129	15	2,664	0.1											
Imnaha River	70		212	67	8													
Salmon River	548	9	3,694	1,203	147	4,304	6.1											
Grande Ronde River	175	10	1,551	271	52	41,766												
Clearwater River	13	4	194	27	3	9,000	50.9											
Asotin Creek	1	1			1	80	12.5											
Palouse River	12		23	19	4													
Other tributaries	303	26	1,722	593	126	42,645	42.8		126		9,963	61	12,894	87	430	85	74,187	22
Independent streams in Snake River Basin																		
Camas Creek	268	10	5,960	548	166	70,884	3.1		19		8,650	17	1,270	21	173,840	19		
Beaver Creek	37	2	2,970	90	51	6,400			15		6,400	8	1,160	12	165,550	13		
Medicine Lodge Creek	35		145	10	7													
Little Lost River	27		44	48														
Big Lost River	110	5	2,462	265	82	49,013	1.6											
Other	48	2	306	118	28	16,471	1.5		4		3,150	12	8,190	7	102	7	8,190	26
Walla Walla River	126	1	652	205	25				18		10,725	264	56,042	322	1,613	320	66,560	26
Klickitat River	3		37	19	1													
White Salmon River	11		169	26	10													
Umatilla River	179	6	1,804	317	99	52,412	43.4											
Willow Creek	117	1	171	101	2													
John Day River	712	6	952	661	28	5	1,609	1.9										
Deschutes River	224	10	4,166	550	87	8	148,820	12.4										
Hood River	30	3	432	71	137													
Willamette River	68	15	72	36	2	3	1,010	43.6	4		150	187	40,367	292	2,032	311	160,749	22
Other tributaries of Columbia River	150	45	740	259	78	31	12,262	337.0	15		11,905	400	103,800	550	5,878	570	160,251	67
Other independent streams in Columbia River Basin	5	4	12	10		4	3	30.3				115	33,611	143	2,040	141	63,483	71
Pacific Ocean streams other than Colorado and Columbia Rivers																		
Dungeness River	4		414	53	46			1.3										
Rogue River and tributaries	339	14	1,710	707	422	11	45,924	10.0	1		2	13	0,292	70	73,224	30		
Rogue River direct	8		322	85	52	1	6	5.4										
Little Butte Creek	30	2	172	114	202	2	21,000	2.1										
Bear Creek	46	3	327	117	52	3	24,226	0.6										
Evans Creek	13		49	16														
Applegate River	110	0	461	186	15	5	694	1.3										
Illinois River	90	1	237	106				0.3										
Other tributaries	42		142	83	101			0.3	1		2	3	97	7	45	7	2,544	23
Klamath River and tributaries	472	20	5,000	1,271	427	32	1,110,362	21.1	23		241	14	21,442	98	6,522	123	508,985	33
Klamath River direct	411	10	2,065	812	152	23	549,256	17.7	3		200	14	21,442	59	3,342	69	233,843	36
Lost River	13	3	1,008	217	219	2	560,000	2.2										
Sprague River	9	6	327	35	3	6	1,062	0.5										
Other tributaries	39	1	1,600	207	53	1	44	0.7	25		41							
Russian River	13	10	47	21	17	6	207	47.0										
Sacramento River and tributaries	599	140	19,097	2,492	2,325	176	949,274	796.1	39		3,680	5,450	2,032,411	6,147	104,346	6,280	300,204	37
Sacramento River direct	4		8,033	465	971	8	121	75.5										
Pit River	104	32	2,125	318	54	40	132,588	1.0	14		1,185	147	142,430	810	38,207	872	4,990,652	17
Cow Creek	14	1	182	42	9	1	5											
Cottonwood Creek	15	3	131	55	33	3	5,544	1.5										
Battle Creek	48		172	80	5	1	300	1.0										
Stony Creek	20	5	607	87	110	4	101,211	4.1										
Feather River	141	50	4,591	505	459	60	177,780	287.1	12		368	1,021	938,678	1,023	21,940	1,655	1,229,301	28
Yuba River	20	11	1,046	276	397	9	91,630	17.1										
Cache Creek	3	2	679	117	110	1	420,000	10.0										
American River	33	17	360	265	138	25	14,517	135.2	4		102	410	201,733	277	5,175	288	302,383	27
Other tributaries	101	13	1,206	243	138	20	5,678	263.0	9		1,975	2,833	1,410,530	2,874	33,263	2,900	1,603,642	36
San Joaquin River and tributaries																		
San Joaquin River direct	3	1	8,210	387	944	3	90,033	91.3	2		1,800	85	108,050	289	23,994	415	540,190	28
Kern River	23	2	4,737	253	920	303	209,721	609.4	19		1,475	1,549	893,789	1,535	29,010	1,561	920,809	61
Tulare Lake			80	17	56			4.5										
Tule River	10		643	90	38	113	333	209.5										
Kaweah River	25	1	2,805	237	329	34	3,167	621.4										
Kings River	27	1	15,767	1,078	1,008	22	1,063.8	1,063.8	2		950	10,887	5,698,807	10,782	116,210	10,921	5,480,440	32
Fresno River	6	1	209	18	91	2	4	15.5										
Merced River	11	4	5,919	35	1,225	6	289,005	174.6										
Tuolumne River	20	13	4,396	121	399	7	365,498	419.9	2		3,000	188	200,712	172	3,285	173	106,421	23
Stanislaus River	7	27	1,573	143	765	25	104,178	50.9	2		102	45	267,628	69	1,190	70	84,184	22
Calaveras River	16	12	23	43		9	3,665	46.5	1		3,000	222	168,311	255	4,600	256	182,821	46
Mokelumne River	21	11	454	99	96	13	3,983	262.1	4		58	2,084	1,117,397	2,122	23,324	2,179	272,765	33
Cosumnes River	6	2	77	64	12	1	1,200	20.2										
Other tributaries	2	3	207	28		75	16,191	268.4	1		325	3,133	1,877,587	3,146	40,681	3,418	2,097,103	41
Independent streams in San Joaquin River Basin																		
Tributaries of San Francisco Bay other than Sacramento and San Joaquin Rivers	24	11	317	25	10	43	8,217	422.5	9		1,085	3,100	1,068,327	3,114	61,205	3,193	1,212,738	102
Coyote Creek	8		2	2		4	11	109.1	4		768	910	407,833	912	20,185	916	431,214	99
Guadalupe River	7		153	14	6	1	1	110.8	1		200	567	268,582	683	16,111	592	288,402	112
Other tributaries	9	11	157	9	4	38	8,205	202.6	4		119	1,627	392,412	1,644	24,909	1,715	493,122	99
Pajaro River	26	13	29	22	5	23	736	151.5	18		4,200	1,189	606,306	1,129	19,884	1,157	594,032	64
Salinas River	8	2	771	123	86	33	128	361.9	20		4,010	1,145	955,015	767	24,248	785	674,404	47
Santa Maria River	2		12	11	4	3	13	112.9	1		744	210	249,285	189	7,350	194	252,409	75
Santa Ynez River	11	13	21	9		18	287	109.8	6		1,560	212	120,725	153	3,511	104	187,660	39
Santa Clara River	18	1	101	2														



SUMMARY FOR THE UNITED STATES

STATE TABLE—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929; FOR THE 19 IRRIGATION STATES

ITEM (See definitions in Introduction)		TOTAL (19 States)	Arizona	Arkansas	California	Colorado	Idaho
<b>FARMS AND FARM OPERATORS</b>							
1	All farms.....1930.....number..	2,062,813	14,173	242,334	135,676	59,956	41,674
2	Irrigated farms.....1930.....number..	205,147	8,523	1,090	85,784	31,288	27,953
	Operated by—						
3	Owners and managers.....number..	203,825	6,750	625	71,911	20,060	20,486
4	Tenants.....number..	61,322	1,773	471	13,873	11,228	7,467
5	Irrigated farms.....1920.....number..	222,789	6,905	1,168	67,391	23,756	25,283
6	Increase, 1920-1930.....per cent..	19.0	29.0	-6.0	27.3	8.8	10.6
<b>FARM AREA AND TOTAL LAND AREA</b>							
7	Approximate land area.....1930.....acres..	1,223,989,120	72,838,400	33,616,000	99,617,280	66,341,120	53,346,560
8	Land in all farms.....1930.....acres..	568,693,705	10,526,627	10,062,982	30,442,581	28,870,171	9,346,908
9	Land in irrigated farms.....1930.....acres..	78,339,222	2,983,784	363,549	12,018,804	10,390,299	4,851,440
10	Average, per farm.....acres..	295.5	350.1	331.7	140.1	332.1	173.6
11	Operated by owners and managers.....acres..	66,612,767	2,652,388	219,101	10,169,705	8,034,879	3,055,944
12	Average, per farm.....acres..	326.8	392.9	350.6	141.4	400.5	193.1
13	Operated by tenants.....acres..	11,726,455	331,396	144,448	1,849,159	2,355,420	895,496
14	Average, per farm.....acres..	191.2	186.9	306.7	133.3	209.8	119.9
15	Area irrigated.....1929.....acres..	19,547,544	575,590	151,787	4,746,632	3,393,619	2,181,250
16	1919.....acres..	19,191,716	467,565	143,046	4,219,040	3,348,385	2,488,806
17	Increase, 1919-1929.....per cent..	1.9	23.1	5.4	12.5	1.4	-12.4
18	Area enterprises were capable of supplying with water.....1930.....acres..	26,101,800	824,152	209,942	6,816,250	4,078,712	2,617,021
19	1920.....acres..	26,020,477	627,303	179,013	5,894,466	3,856,348	3,002,810
20	Increase, 1920-1930.....per cent..	0.3	31.4	17.3	15.6	5.8	-15.4
21	Irrigable area in enterprises.....1930.....acres..	30,599,470	1,085,627	225,002	8,075,805	4,528,251	2,814,048
22	Total area in enterprises.....1920.....acres..	36,890,821	813,153	246,480	7,805,207	5,220,588	3,780,048
23	Area in enterprises available, or to be available, for settlement.....1930.....acres..	1,681,598	164,693	-----	153,687	88,731	79,972
<b>IRRIGATION WORKS</b>							
24	Enterprises.....1930.....number..	275,551	1,270	1,043	38,117	6,509	3,222
25	1920.....number..	63,298	1,388	944	24,115	6,634	3,629
26	Main canals.....1930.....length, miles..	75,375	1,732	46	7,588	15,355	7,077
27	1920.....length, miles..	103,177	1,769	68	14,437	19,022	11,144
28	1930.....capacity, sec.-ft..	547,314	13,697	1,845	84,944	123,652	76,763
29	1920.....capacity, sec.-ft..	631,079	11,707	1,205	115,237	119,558	80,273
30	Laterals.....1930.....length, miles..	51,427	2,242	5	11,014	6,026	7,267
31	1920.....length, miles..	56,687	1,599	18	12,947	8,571	6,154
32	Reservoirs.....1930.....number..	5,122	378	10	1,769	765	155
33	1920.....number..	7,538	340	16	3,030	979	240
34	1930.....capacity, ac.-ft..	24,508,590	3,410,975	7,342	3,225,675	1,024,982	3,645,873
35	1920.....capacity, ac.-ft..	21,246,436	1,510,856	20	1,091,394	2,406,372	3,493,511
36	Wells, flowing.....1930.....number..	4,811	215	-----	449	621	220
37	1920.....number..	4,606	310	-----	1,415	476	142
38	1930.....capacity, g. p. m..	609,367	13,772	-----	65,768	39,644	30,108
39	1920.....capacity, g. p. m..	635,057	14,547	-----	287,187	20,139	15,133
40	Wells, pumped.....1930.....number..	66,729	1,398	1,190	46,737	654	121
41	1920.....number..	32,094	999	1,089	25,401	527	63
42	1930.....capacity, g. p. m..	32,467,120	1,832,352	1,641,448	24,266,167	237,903	34,601
43	1920.....capacity, g. p. m..	16,396,549	1,042,590	1,470,147	10,603,476	210,094	17,749
44	Pumping plants.....1930.....number..	59,344	1,378	1,184	46,729	516	393
45	1920.....number..	29,458	744	1,041	21,561	406	143
46	1930.....engine capacity, h. p..	1,283,419	57,633	66,980	820,767	11,204	33,764
47	1920.....engine capacity, h. p..	748,971	22,014	58,332	386,200	8,635	28,364
48	1930.....pump capacity, g. p. m..	57,244,859	2,125,293	1,775,788	33,240,589	437,250	2,113,513
49	1920.....pump capacity, g. p. m..	36,275,005	1,048,030	1,654,097	16,773,692	299,726	1,397,681
50	1930.....average lift, feet..	51	46	68	53	25	32
51	1920.....average lift, feet..	41	44	50	41	23	20
<b>VALUES OF FARMS, 1930</b>							
52	Land and buildings, all farms.....dollars..	20,101,278,254	184,230,656	547,828,250	3,419,470,784	629,346,675	417,249,572
53	Land and buildings, irrigated farms.....dollars..	4,629,781,819	140,154,077	16,002,854	2,438,289,524	386,053,889	289,343,666
	Operated by—						
54	Owners and managers.....dollars..	3,730,423,785	119,493,980	10,101,159	2,074,125,516	242,084,080	214,018,772
55	Tenants.....dollars..	898,358,034	29,660,097	5,901,695	364,164,008	143,969,809	75,324,894
56	Average, land and buildings, per farm.....dollars..	17,461.19	17,500.19	14,601.14	28,423.59	12,338.72	10,361.08
57	per acre.....dollars..	59.10	49.99	44.02	202.87	37.16	59.64
58	Land (excluding buildings).....dollars..	3,942,266,249	131,238,561	12,989,124	2,145,451,026	309,266,986	233,067,280
59	Buildings (including dwellings).....dollars..	687,515,570	17,915,516	3,013,730	292,838,498	76,787,903	56,276,386
60	Implements and machinery, irrigated farms.....dollars..	257,110,965	8,136,633	2,414,628	96,785,492	28,127,021	27,305,368
61	Average, per farm.....dollars..	969.69	954.67	2,203.13	1,128.25	898.97	976.83
62	per acre.....dollars..	3.28	2.73	6.64	8.05	2.71	5.63
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>							
63	Investment to Jan. 1, 1930.....dollars..	1,032,755,790	73,328,197	6,836,648	450,967,979	87,603,240	84,500,354
64	1920.....dollars..	697,657,328	33,498,094	7,183,322	194,886,388	88,302,442	91,501,009
65	Increase, 1920-1930.....per cent..	48.0	118.9	-4.8	131.4	-0.8	-7.7
66	Average, per acre, based on area enterprises were capable of supplying with water, 1930.....dollars..	39.57	88.97	32.56	66.17	21.48	32.29
67	1920.....dollars..	26.81	53.40	40.13	33.06	22.90	29.59
68	Estimated final investment in existing enterprises, 1930.....dollars..	1,155,108,210	91,913,550	6,844,092	485,930,535	91,845,804	101,850,250
69	1920.....dollars..	819,778,005	34,615,064	7,283,522	225,799,123	95,193,423	97,019,717
70	Increase, 1920-1930.....per cent..	40.9	165.5	-6.0	108.3	-3.5	4.5
71	Average, per acre, based on estimated final investment and irrigable area, 1930.....dollars..	37.75	84.66	30.28	57.69	20.23	36.02
72	1920.....dollars..	22.84	42.57	29.55	28.93	18.24	26.67
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>							
73	Irrigated area for which cost was reported.....acres..	18,690,184	561,605	147,921	4,538,579	3,235,629	2,109,087
74	Average, per acre, based on area reporting.....dollars..	2.77	4.57	7.03	6.10	0.85	1.44

<sup>1</sup> A minus sign (-) denotes decrease.  
<sup>2</sup> Includes 34 interstate projects counted in this table as 68 independent enterprises; corresponding figures for 1920 not available. For actual number of enterprises see Tables 4 and 12, pages 50 and 54.

# IRRIGATION

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STATE TABLE—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929; FOR THE 19 IRRIGATION STATES—Con.

ITEM (See definitions in Introduction)	Kansas	Louisiana	Montana	Nebraska	Nevada	New Mexico	North Dakota
<b>FARMS AND FARM OPERATORS</b>							
1 All farms.....1930.....number.....	166,042	161,445	47,495	129,458	3,442	31,404	77,075
2 Irrigated farms.....1930.....number.....	683	5,588	11,925	4,602	3,031	14,347	113
Operated by—							
3 Owners and managers.....number.....	301	3,049	8,701	2,278	2,656	11,477	85
4 Tenants.....number.....	292	2,539	3,224	2,326	375	2,870	28
5 Irrigated farms.....1920.....number.....	504	6,471	10,807	3,021	2,718	11,890	340
6 Increase, <sup>1</sup> 1920-1930.....per cent.....	35.5	-13.6	10.3	52.3	11.5	26.0	-66.8
<b>FARM AREA AND TOTAL LAND AREA</b>							
7 Approximate land area.....1930.....acres.....	52,335,300	29,061,760	93,523,840	40,157,120	70,285,440	78,401,920	44,917,120
8 Land in all farms.....1930.....acres.....	46,975,647	9,355,437	44,659,152	44,708,665	4,080,906	30,822,034	38,657,894
9 Land in irrigated farms.....1930.....acres.....	311,174	892,604	12,032,619	1,048,339	3,102,085	5,024,868	56,654
10 Average, per farm.....acres.....	455.6	159.7	1,009.0	358.2	1,023.5	350.2	601.4
11 Operated by owners and managers.....acres.....	215,351	552,863	10,494,023	1,080,501	2,858,819	4,701,640	49,707
12 Average, per farm.....acres.....	550.8	181.3	1,204.1	474.7	1,076.4	409.7	584.8
13 Operated by tenants.....acres.....	95,823	339,741	1,538,596	567,838	243,266	323,228	6,947
14 Average, per farm.....acres.....	323.2	133.8	477.2	244.1	648.7	112.6	248.1
15 Area irrigated.....1929.....acres.....	71,290	450,901	1,594,912	532,617	486,648	527,033	9,392
16 .....1919.....acres.....	47,312	454,882	1,081,729	442,000	561,447	538,377	12,072
17 Increase, <sup>1</sup> 1919-1929.....per cent.....	50.7	-0.9	-17.3	20.3	-13.3	-2.1	-22.2
18 Area enterprises were capable of supplying with water.....1930.....acres.....	83,583	795,165	2,270,000	793,641	736,249	656,669	24,006
19 .....1920.....acres.....	87,858	728,742	2,763,498	692,468	704,708	696,119	34,235
20 Increase, <sup>1</sup> 1920-1930.....per cent.....	23.2	9.1	-17.3	25.1	4.5	-5.7	-29.9
21 Irrigable area in enterprises.....1930.....acres.....	95,719	850,401	2,622,423	763,039	983,717	741,245	24,860
22 Total area in enterprises.....1920.....acres.....	102,562	851,211	4,329,148	769,768	1,382,036	981,879	57,476
23 Area in enterprises available, or to be available, for settlement.....1930.....acres.....	-----	15,440	53,576	10,113	92,026	42,811	-----
<b>IRRIGATION WORKS</b>							
24 Enterprises.....1930.....number.....	300	2,352	4,401	721	1,245	1,065	23
25 .....1920.....number.....	209	1,373	6,035	470	1,015	2,301	30
26 Main canals.....1930.....length, miles.....	196	1,318	10,577	1,432	3,341	3,405	18
27 .....1920.....length, miles.....	271	1,584	16,411	1,780	3,123	4,469	58
28 .....1930.....capacity, sec.-ft.....	2,079	11,386	53,253	13,108	10,930	17,479	1,072
29 .....1920.....capacity, sec.-ft.....	1,667	11,889	94,429	11,065	10,554	23,432	836
30 Laterals.....1930.....length, miles.....	89	908	5,380	2,033	814	1,061	69
31 .....1920.....length, miles.....	147	1,659	6,085	1,545	1,245	1,463	93
32 Reservoirs.....1930.....number.....	19	85	282	40	209	240	8
33 .....1920.....number.....	36	74	468	59	184	328	9
34 .....1930.....capacity, ac.-ft.....	66,293	13,909	857,067	199,185	529,369	2,945,220	1,466
35 .....1920.....capacity, ac.-ft.....	391	7,632	1,671,720	197,890	504,428	2,969,718	1,110
36 Wells, flowing.....1930.....number.....	1	807	40	-----	273	340	-----
37 .....1920.....number.....	6	9	41	-----	124	556	-----
38 .....1930.....capacity, g. p. m.....	75	31,961	4,100	-----	19,131	223,257	-----
39 .....1920.....capacity, g. p. m.....	500	6,255	4,608	-----	21,942	376,222	-----
40 Wells, pumped.....1930.....number.....	772	1,389	49	537	147	680	-----
41 .....1920.....number.....	710	812	22	34	129	461	-----
42 .....1930.....capacity, g. p. m.....	323,500	1,958,811	18,653	428,058	54,162	481,898	-----
43 .....1920.....capacity, g. p. m.....	266,797	1,607,637	11,085	24,701	6,798	265,618	-----
44 Pumping plants.....1930.....number.....	281	1,790	108	610	157	702	13
45 .....1920.....number.....	198	1,250	253	51	64	472	4
46 .....1930.....engine capacity, h. p.....	6,221	86,413	9,095	10,991	2,671	14,483	216
47 .....1920.....engine capacity, h. p.....	6,946	85,628	10,841	959	409	8,488	2,008
48 .....1930.....pump capacity, g. p. m.....	393,526	5,914,799	523,494	536,752	115,648	555,063	24,900
49 .....1920.....pump capacity, g. p. m.....	297,975	4,968,686	453,231	73,686	35,296	304,789	61,250
50 .....1930.....average lift, feet.....	26	37	22	29	31	40	24
51 .....1920.....average lift, feet.....	30	32	20	24	22	40	38
<b>VALUES OF FARMS, 1930</b>							
52 Land and buildings, all farms.....dollars.....	2,281,101,631	418,191,773	527,610,002	2,495,203,071	64,111,000	207,859,492	951,225,446
53 Land and buildings, irrigated farms.....dollars.....	12,294,425	45,496,283	190,057,936	85,097,442	59,956,787	87,868,916	1,304,150
Operated by—							
54 Owners and managers.....dollars.....	8,085,175	29,532,898	151,420,935	46,944,404	53,688,915	69,372,388	1,080,400
55 Tenants.....dollars.....	4,209,250	15,963,385	38,637,001	38,153,038	6,267,872	18,496,528	217,750
56 Average, land and buildings, per farm.....dollars.....	18,000.62	8,141.78	16,937.77	18,491.40	19,781.19	6,124.55	11,641.15
57 .....per acre.....dollars.....	39.51	50.97	15.80	51.63	19.33	17.49	23.02
58 Land (excluding buildings).....dollars.....	10,108,835	37,467,395	156,067,215	70,533,599	50,145,484	73,630,223	948,396
59 Buildings (including dwellings).....dollars.....	2,185,590	8,028,888	33,990,721	14,563,843	9,811,303	14,238,693	355,754
60 Implements and machinery, irrigated farms.....dollars.....	800,644	5,179,941	14,969,479	6,676,291	4,041,264	5,291,569	148,185
61 Average, per farm.....dollars.....	1,172.25	924.98	1,255.30	1,450.74	1,333.31	368.83	1,311.37
62 .....per acre.....dollars.....	2.57	5.80	1.24	4.05	1.30	1.05	2.62
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>							
63 Investment to Jan. 1, 1930.....dollars.....	1,685,652	15,744,743	50,319,204	21,386,319	15,457,931	19,834,380	1,267,314
64 .....1920.....dollars.....	2,067,381	14,063,181	52,143,303	13,909,185	14,754,280	18,210,412	1,857,118
65 Increase, <sup>1</sup> 1920-1930.....per cent.....	-18.5	12.0	-3.5	53.8	4.8	8.9	-31.8
66 Average, per acre, based on area enterprises were capable of supplying with water, 1930.....dollars.....	20.17	19.80	22.11	30.39	21.00	30.20	52.79
67 .....1920.....dollars.....	30.47	19.30	18.94	24.73	20.94	26.16	54.25
68 Estimated final investment in existing enterprises, 1930.....dollars.....	1,723,872	15,771,003	58,489,575	21,465,772	18,489,603	21,942,450	1,843,911
69 .....1920.....dollars.....	2,195,981	14,264,178	70,079,028	18,030,154	22,648,747	20,440,646	2,072,766
70 Increase, <sup>1</sup> 1920-1930.....per cent.....	-21.5	10.6	-16.5	19.1	-18.4	7.3	-35.2
71 Average, per acre, based on estimated final investment and irrigable area, 1930.....dollars.....	18.01	18.55	22.30	28.13	18.50	29.60	54.06
72 Average, per acre, based on estimated final investment and total area, 1920.....dollars.....	21.41	16.76	16.19	23.51	16.39	21.25	36.06
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>							
73 Irrigated area for which cost was reported.....acres.....	64,983	431,337	1,476,854	524,260	474,422	493,228	8,773
74 Average, per acre, based on area reporting.....dollars.....	1.53	4.09	0.87	1.54	0.91	2.15	1.97

<sup>1</sup> A minus sign (-) denotes decrease.

SUMMARY FOR THE UNITED STATES

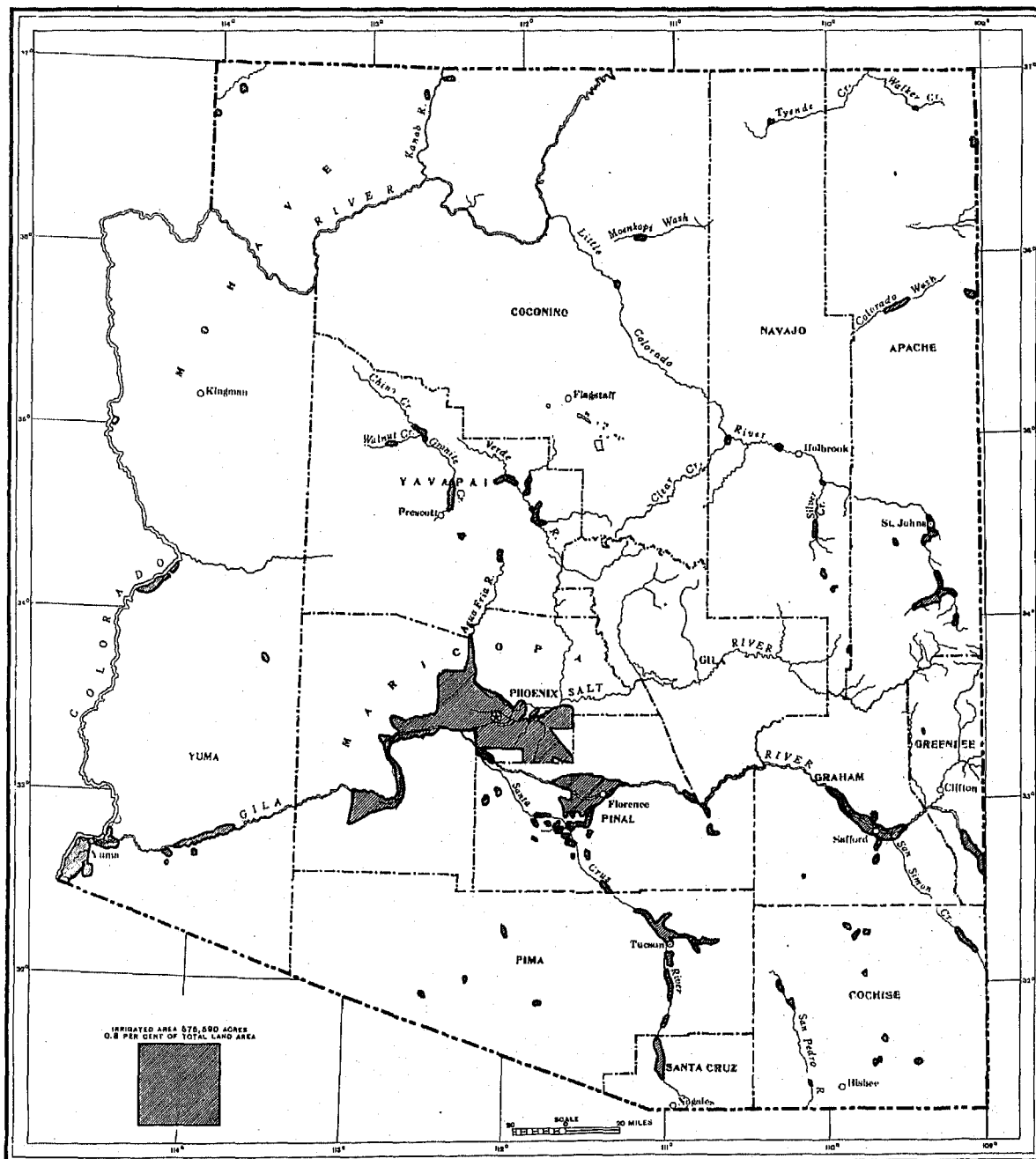
STATE TABLE—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929; FOR THE 19 IRRIGATION STATES—Con.

ITEM (See definitions in Introduction)		Oklahoma	Oregon	South Dakota	Texas	Utah	Washington	Wyoming
<b>FARMS AND FARM OPERATORS</b>								
1	All farms.....1930.....number..	203,866	55,163	83,167	495,489	27,150	70,904	10,011
2	Irrigated farms.....1930.....number..	90	11,387	763	10,861	23,847	15,940	7,308
Operated by—								
3	Owners and managers.....number..	69	9,330	463	6,056	20,886	13,120	5,420
4	Tenants.....number..	30	2,048	310	4,805	2,961	2,820	1,882
5	Irrigated farms.....1920.....number..	73	9,164	1,198	5,974	22,218	13,271	6,449
6	Increase, <sup>1</sup> 1920-1930.....per cent..	35.0	24.4	-30.3	81.8	7.3	20.2	13.3
<b>FARM AREA AND TOTAL LAND AREA</b>								
7	Approximate land area.....1930.....acres..	44,424,900	61,188,480	49,105,520	167,934,720	52,597,700	42,775,040	62,430,720
8	Land in all farms.....1930.....acres..	33,790,817	16,548,678	36,470,083	124,707,130	5,613,101	13,533,778	23,525,234
9	Land in irrigated farms.....1930.....acres..	57,367	6,306,825	379,270	1,899,240	4,137,021	1,923,337	9,959,883
10	Average, per farm.....acres..	679.6	653.9	497.1	174.9	173.5	120.6	1,362.9
11	Operated by owners and managers.....acres..	52,107	5,606,140	267,826	1,475,014	3,779,080	1,639,945	8,807,734
12	Average, per farm.....acres..	755.2	600.3	591.2	243.6	180.9	124.9	1,623.2
13	Operated by tenants.....acres..	5,260	700,685	111,444	424,226	357,941	283,392	1,152,149
14	Average, per farm.....acres..	175.3	342.1	359.5	88.3	120.9	100.5	612.2
15	Area irrigated.....1929.....acres..	1,573	898,713	67,107	798,917	1,324,125	499,283	1,236,155
16	.....1919.....acres..	2,969	986,162	100,682	586,120	1,371,651	520,800	1,207,932
17	Increase, <sup>1</sup> 1919-1929.....per cent..	-47.0	-8.9	-33.3	36.3	-3.5	-5.8	2.3
18	Area enterprises were capable of supplying with water.....1930.....acres..	7,331	1,158,210	109,550	1,177,415	1,542,475	631,511	1,655,008
19	.....1920.....acres..	9,672	1,844,046	160,914	1,150,542	1,700,550	637,161	1,831,030
20	Increase, <sup>1</sup> 1920-1930.....per cent..	-24.2	-13.8	-27.4	2.3	-0.3	-0.9	-0.6
21	Irrigable area in enterprises.....1930.....acres..	7,344	1,478,128	122,510	1,569,876	1,739,860	915,370	1,958,147
22	Total area in enterprises.....1920.....acres..	11,742	1,925,987	188,382	1,687,447	2,359,244	836,795	2,564,068
23	Area in enterprises available, or to be available, for settlement.....1930.....acres..		330,475	5,000	80,323	199,449	195,041	104,361
<b>IRRIGATION WORKS</b>								
24	Enterprises.....1930.....number..	77	4,060	121	1,728	2,714	2,080	2,631
25	.....1920.....number..	33	4,710	292	1,371	2,403	2,692	3,504
26	Main canals.....1930.....length, miles..	23	5,839	354	1,643	5,614	1,774	8,043
27	.....1920.....length, miles..	38	7,115	653	1,524	6,343	3,851	9,517
28	.....1930.....capacity, sec.-ft..	77	25,906	1,995	21,020	30,648	14,937	35,811
29	.....1920.....capacity, sec.-ft..	344	28,897	5,427	23,261	29,447	10,242	30,000
30	Laterals.....1930.....length, miles..	1	2,338	728	3,236	3,023	1,861	2,732
31	.....1920.....length, miles..	19	1,966	605	2,949	5,334	1,704	2,534
32	Reservoirs.....1930.....number..	7	120	5	325	533	413	214
33	.....1920.....number..	8	266	110	368	476	205	874
34	.....1930.....capacity, ac.-ft..	293	1,698,428	203,124	935,985	1,098,252	690,807	3,051,745
35	.....1920.....capacity, ac.-ft..	52	1,905,037	212,264	392,999	1,600,595	477,789	2,911,748
36	Wells, flowing.....1930.....number..	1	69	13	1	42	6	7
37	.....1920.....number..	1	65	4	135	1,256	60	2,205
38	.....1930.....capacity, g. p. m..	100	0,535	4,825	36,920	104,670	27,290	40
39	.....1920.....capacity, g. p. m..	18	11,968	2,750	62,364	96,371	14,625	11
40	Wells, pumped.....1930.....number..	18	568	1	1,102	1,019	620	10
41	.....1920.....number..	19	208	5	601	192	308,800	8,280
42	.....1930.....capacity, g. p. m..	2,716	139,699	375	614,395	120,333	308,800	8,280
43	.....1920.....capacity, g. p. m..	3,643	47,026	800	638,565	39,059	227,744	8,020
44	Pumping plants.....1930.....number..	25	1,091	8	1,828	429	1,951	61
45	.....1920.....number..	22	673	25	1,369	250	975	57
46	.....1930.....engine capacity, h. p..	229	21,257	92	95,933	11,381	33,187	912
47	.....1920.....engine capacity, h. p..	184	13,760	408	80,511	11,392	22,929	1,304
48	.....1930.....pump capacity, g. p. m..	8,855	1,022,213	4,027	6,404,999	877,942	693,505	86,905
49	.....1920.....pump capacity, g. p. m..	7,668	600,045	23,320	6,825,998	783,538	630,652	39,725
50	.....1930.....average lift, feet..	33	27	27	65	36	59	21
51	.....1920.....average lift, feet..	59	28	21	45	25	60	31
<b>VALUES OF FARMS, 1930</b>								
52	Land and buildings, all farms.....dollars..	1,242,723,526	630,827,927	1,285,153,538	3,597,406,986	221,223,172	773,662,602	209,852,171
53	Land and buildings, irrigated farms.....dollars..	1,671,866	160,937,926	10,520,455	180,145,521	109,983,735	105,394,180	120,208,187
Operated by—								
54	Owners and managers.....dollars..	1,356,220	136,987,981	6,417,810	129,362,069	176,941,680	168,250,045	97,153,418
55	Tenants.....dollars..	315,646	23,949,945	4,102,645	50,783,452	23,042,055	27,144,135	23,054,769
56	Average, land and buildings, per farm.....dollars..	16,887.54	14,133.48	13,788.28	16,686.46	8,386.12	12,251.19	19,448.85
57	.....per acre.....dollars..	20.14	25.52	27.74	10.85	48.34	101.59	12.07
58	Land (excluding buildings).....dollars..	1,215,461	130,246,175	8,312,305	159,716,101	157,832,148	154,326,847	99,704,088
59	Buildings (including dwellings).....dollars..	456,405	30,681,751	2,208,150	20,429,420	42,151,587	41,067,333	20,504,090
60	Implements and machinery, irrigated farms.....dollars..	99,517	10,981,075	1,055,845	9,995,783	12,274,514	13,343,847	9,483,809
61	Average, per farm.....dollars..	1,095.22	964.35	1,383.81	920.34	514.72	836.66	1,207.74
62	.....per acre.....dollars..	1.73	1.74	2.78	6.26	2.97	6.04	0.96
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>								
63	Investment to Jan. 1, 1930.....dollars..	160,099	38,754,548	4,502,117	49,022,164	35,669,819	40,561,895	35,153,187
64	.....1920.....dollars..	151,325	28,929,151	5,465,248	35,072,739	32,037,351	29,299,011	34,326,325
65	Increase, <sup>1</sup> 1920-1930.....per cent..	5.8	34.0	-17.0	39.8	11.3	38.4	2.4
66	Average, per acre, based on area enterprises were capable of supplying with water, 1930.....dollars..	21.84	33.46	41.10	41.64	23.13	64.23	21.24
67	.....1920.....dollars..	16.65	21.52	36.21	30.48	18.84	45.98	18.75
68	Estimated final investment in existing enterprises, 1930.....dollars..	167,909	60,039,939	5,174,417	59,555,024	37,857,011	53,232,477	41,970,416
69	.....1920.....dollars..	102,775	41,685,742	5,500,748	39,860,871	33,835,641	37,684,591	51,500,288
70	Increase, <sup>1</sup> 1920-1930.....per cent..	3.2	44.4	-5.9	49.4	11.9	41.3	-18.6
71	Average, per acre, based on estimated final investment and irrigable area, 1930.....dollars..	23.86	40.62	42.24	38.01	21.76	58.15	21.43
72	Average, per acre, based on estimated final investment and total area, 1920.....dollars..	13.80	21.59	20.20	23.62	14.34	45.03	20.08
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>								
73	Irrigated area for which cost was reported.....acres..	935	893,985	65,783	772,160	1,301,098	487,077	1,131,867
74	Average, per acre, based on area reporting.....dollars..	7.62	1.41	1.33	4.74	1.00	4.14	0.84

<sup>1</sup> A minus sign (-) denotes decrease.

# ARIZONA

## APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND



# ARIZONA

## INTRODUCTION

Statistics are presented in the following pages on farms irrigated and area irrigated, investment and cost of maintenance and operation of irrigation enterprises, cost of preparing land for irrigation, drainage of irrigated land, quantity of water used, and distribution of irrigation works, with specialized information relating to dams, pipe lines, and pumping equipment. Data on area irrigated, investment, and irrigation works are given in detail by drainage basins. Classifications of irrigated farms by type of farm, size of farm, and value of farm products; and the acreage, yield, and value of the principal crops grown on irrigated land, for all irrigation States, are shown in Parts III and IV, pages 257 and 325, respectively, of this volume.

Statistics for area irrigated and for cost of maintenance and operation of irrigation works relate to the year 1929; all other items relate to 1930.

For purposes of comparison, statistics for the census of 1920 are shown, where available; and for the purpose of showing the historical development of irrigation certain data are presented from censuses previous to that of 1920.

Data on number, area, and value of wholly and partly irrigated farms with the tenure of the operators of these farms were collected in 1930 on the general farm schedule; in 1920 only the number of irrigated farms was obtained in this way. All other statistics, in both censuses, were collected on special schedules for irrigation enterprises.

STATE TABLE 1.—SUMMARY FOR THE STATE: 1930 AND 1920

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE	
	1930	1920	Amount	Per cent
All farms.....number.....	14, 173	0, 975	4, 198	42. 1
All land in farms.....acres.....	10, 526, 627	5, 802, 126	4, 724, 501	81. 4
Approximate land area of State.....acres.....	72, 838, 400	72, 838, 400		
Farms irrigated.....number.....	8, 523	6, 605	1, 918	29. 0
Area irrigated.....acres.....	575, 590	467, 565	108, 025	23. 1
Area enterprises were capable of supplying with water.....acres.....	824, 152	627, 303	196, 849	31. 4
Area in enterprises <sup>1</sup> .....acres.....	1, 085, 627	813, 153		
Proportion irrigated:				
All farms.....percent.....	60. 1	66. 2		
All land in farms.....percent.....	5. 5	8. 1		
Approximate land area of State.....percent.....	0. 8	0. 6		
Excess of area enterprises were capable of supplying with water over area irrigated.....acres.....	248, 562	150, 738	88, 824	55. 0
Excess of area in enterprises <sup>1</sup> over area irrigated.....acres.....	510, 037	345, 588		
Area in enterprises available, or to be available, for settlement.....acres.....	164, 693	24, 341	140, 352	576. 0
Value of irrigated farms [land, buildings (including dwellings), and implements and machinery].....dollars.....	157, 290, 710	(?)		
Investment in irrigation enterprises.....dollars.....	73, 328, 197	33, 498, 094	39, 830, 103	118. 0
Average, per acre, based on area enterprises were capable of supplying with water.....dollars.....	88. 97	53. 40	35. 57	60. 0
Estimated final cost of existing enterprises.....dollars.....	91, 913, 550	34, 615, 064	57, 298, 486	165. 5
Average, per acre, based on area in enterprises <sup>1</sup> .....dollars.....	84. 66	42. 57		
Average annual cost, per acre, for maintenance and operation of irrigation works.....dollars.....	4. 57	3. 27	1. 30	30. 8

<sup>1</sup> Irrigable area, 1930; total area, 1920.

<sup>2</sup> Figures not available.

STATE TABLE 2.—FARMS AND SPECIFIED FARM VALUES, BY TENURE OF FARM OPERATOR, 1930

ITEM (See definitions in Introduction)	FARMS		SPECIFIED FARM VALUES					
	Number	Area	Land and buildings		Land alone		Implements and machinery	
			Total	Per acre	Total	Per acre	Total	Per acre
All farms.....	14, 173	10, 526, 627	184, 230, 656	17. 50	160, 853, 773	15. 28	10, 413, 814	0. 99
Owners and managers.....	11, 842	9, 517, 484	149, 228, 859	15. 08			8, 490, 266	0. 80
Tenants.....	2, 331	1, 009, 143	35, 001, 797	34. 08			1, 923, 548	1. 91
Irrigated farms.....	8, 523	2, 983, 784	149, 154, 077	49. 99	131, 238, 561	43. 98	8, 136, 033	2. 73
Owners and managers.....	6, 750	2, 652, 288	119, 493, 980	45. 05	103, 897, 045	39. 17	6, 593, 038	2. 49
Tenants.....	1, 773	331, 396	29, 660, 097	89. 50	27, 341, 518	82. 50	1, 542, 995	4. 06
Wholly irrigated farms.....	8, 321	2, 734, 002	147, 816, 499	54. 07	130, 182, 895	47. 61	8, 015, 891	2. 93
Owners and managers.....	6, 557	2, 403, 566	118, 189, 712	49. 17	102, 847, 904	42. 79	6, 474, 566	2. 60
Tenants.....	1, 764	330, 436	29, 626, 717	89. 66	27, 314, 991	82. 66	1, 541, 325	4. 06
Partly irrigated farms.....	202	249, 782	1, 337, 648	5. 36	1, 075, 666	4. 31	120, 742	0. 48
Owners and managers.....	193	248, 822	1, 304, 268	5. 24	1, 049, 141	4. 22	119, 072	0. 48
Tenants.....	9	960	33, 380	34. 77	26, 525	27. 63	1, 670	1. 74
Farms not irrigated.....	5, 650	7, 542, 843	35, 076, 570	4. 65	29, 615, 212	3. 93	2, 277, 181	0. 30

FARMS AND AREA IRRIGATED

In State Table 3 and in other tables "Number of farms irrigated" is equivalent to "Number of irrigators" used in census reports previous to 1910.

STATE TABLE 3.—FARMS AND AREA IRRIGATED: 1890 TO 1930

CENSUS YEAR	FARMS IRRIGATED			AREA IRRIGATED			
	Number	Increase	Proportion of all farms	Area	Increase	Proportion of total land area of State	
						of land in all farms	of land in all farms
						Per cent	Per cent
1930	8,523	29.0	60.1	575,590	23.1	0.8	5.5
1920	6,605	36.4	60.2	467,595	46.1	0.6	8.1
1910	4,841	62.4	52.5	320,051	72.6	0.4	25.7
1900	2,981	177.3	51.3	185,396	181.7	0.3	9.6
1890	1,076		75.4	65,821		0.1	5.1

STATE TABLE 4.—AREA, BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION

DATE OF BEGINNING (See definitions in Introduction)	Enterprises, 1930	AREA IRRIGATED IN 1929		Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
		Area	Proportion of irrigable area in enterprises		
	Number	Acres	Per cent	Acres	Acres
Total	1,270	575,590	53.0	824,152	1,085,627
Before 1860	5	1,474	61.2	2,404	2,409
1860-1869	11	1,332	79.0	1,686	1,686
1870-1879	30	37,663	78.0	47,815	49,546
1880-1889	64	30,594	68.1	39,017	44,923
1890-1899	92	35,209	25.6	103,346	137,278
1900-1904	49	6,611	45.7	7,061	14,454
1905-1909	52	285,206	92.1	802,664	309,611
1910-1914	131	16,400	13.5	25,222	121,319
1915-1919	151	23,084	45.2	37,750	51,080
1920-1924	194	58,372	25.9	150,065	225,442
1925-1929	187	47,252	63.7	60,246	74,121
Not reported	374	32,387	60.2	46,886	53,758

STATE TABLE 5.—AREA, BY SOURCE OF WATER SUPPLY: 1929 AND 1919

SOURCE OF SUPPLY	AREA IRRIGATED				Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1929	1919	Increase <sup>1</sup>			
			Area	Per cent		
	Acres	Acres	Acres	Per cent	Acres	Acres
Total	575,590	467,595	108,025	23.1	824,152	1,085,627
Streams, gravity	162,621	189,782	-27,161	-14.3	264,087	312,720
Streams, pumped	8,123	6,671	1,452	21.8	12,380	146,670
Streams, gravity and pumped	53		53		70	105
Wells, pumped	104,637	89,694	64,943	163.6	149,093	183,097
Wells, flowing	1,107	1,558	-451	-28.9	1,768	2,040
Wells, pumped and flowing	258	558	-300	-53.8	438	440
Lakes, pumped		5	-5	-100.0		
Springs	3,056	2,578	478	18.5	3,724	4,807
Stored storm water <sup>2</sup>	755	510	245	48.0	1,823	3,645
Sewage	342	195	147	75.4	342	342

STATE TABLE 5.—AREA, BY SOURCE OF WATER SUPPLY: 1929 AND 1919—Continued

SOURCE OF SUPPLY	AREA IRRIGATED				Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1929	1919	Increase <sup>1</sup>			
			Area	Per cent		
	Acres	Acres	Acres	Per cent	Acres	Acres
Streams, gravity and wells, pumped	292,681	217,790	74,892	34.4	358,891	390,424
Streams, gravity and wells, flowing	40	525	-485	-92.4	40	40
Other mixed	1,887	7,600	-5,803	-75.5	31,550	41,165
Not reported	30		30		36	36
Supplemental <sup>3</sup> from—						
Pumped streams	80				98	156
Pumped wells	1,592				1,595	1,595
Flowing wells	53				56	56

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> In reservoirs filled from channels which carry water only during storms and are not classed as streams.  
<sup>3</sup> Not considered in totals because included in enterprises reporting other sources of supply listed above.

AREA, BY CHARACTER OF ENTERPRISE

In State Table 6 the acreage of a water-users' association, operating the Salt River project, is included in the areas credited to the Bureau of Reclamation.

Carey Act segregations, approximating 13,750 acres, have been made, but reclamation of the areas has not been effected.

The areas reported under "City" represent a municipal sewage utilization farm.

STATE TABLE 6.—AREA, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

[For number of enterprises by classes, see State Table 12]

ITEM AND CHARACTER (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920	Area	Per cent
	Acres	Acres	Acres	Per cent
<b>AREA IRRIGATED</b>				
Total	575,590	467,595	108,025	23.1
Individual and partnership	73,836	80,511	-6,675	-8.3
Cooperative	58,733	114,482	-55,749	-48.7
Irrigation district	117,869	300	117,569	
Commercial	32,600	14,500	18,100	124.8
United States Bureau of Indian Affairs	13,555	8,733	4,822	55.2
United States Bureau of Reclamation	278,584	248,814	29,770	12.0
State	111		111	
City	301	260	101	60.5
Other	1	25	-24	-96.0
<b>AREA ENTERPRISES WERE CAPABLE OF SUPPLYING WITH WATER</b>				
Total	824,152	627,303	196,849	31.4
Individual and partnership	107,220	195,331	-88,111	-45.1
Cooperative	58,427	130,903	-72,476	-55.4
Irrigation district	191,186	300	190,886	
Commercial	76,500	20,000	56,500	282.5
United States Bureau of Indian Affairs	98,692	10,833	82,759	764.0
United States Bureau of Reclamation	296,738	209,091	27,047	10.0
State	186		186	
City	301	220	81	36.8
Other	2	25	-23	-92.0
<b>AREA IN ENTERPRISES<sup>2</sup></b>				
Total	1,085,627	813,153		
Individual and partnership	141,045	288,510		
Cooperative	65,181	157,849		
Irrigation district	214,666	450		
Commercial	100,600	31,000		
United States Bureau of Indian Affairs	223,948	20,058		
United States Bureau of Reclamation	339,680	314,691		
State	196			
City	301	300		
Other	10	295		

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Irrigable area, 1930; total area, 1920.

AREA, BY CHARACTER OF WATER RIGHTS

In State Table 7 the classification "Other and mixed" includes areas of enterprises holding rights of more than one of the listed classes.

Riparian rights are not recognized in the State of Arizona.

The acreage irrigated in 1929 under adjudicated water rights exceeded all other classes combined.

STATE TABLE 7.—AREA IRRIGATED, BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1929 AND 1919

WATER RIGHTS (See definitions in Introduction)	1929		1919	
	Area	Proportion of total	Area	Proportion of total
Total.....	575,590	100.0	467,565	100.0
Appropriation and use.....	24,350	4.2	226,846	48.5
Notice filed and posted.....	93,366	16.2	97,130	20.8
Adjudicated by court.....	335,137	58.2	84,978	18.2
Permit from State.....	7,648	1.3	10	( <sup>1</sup> )
Certificate or license from State.....	3,720	0.7		
Underground.....	93,825	16.3	41,624	8.9
Other and mixed.....	9,535	1.7	625	0.1
Not reported.....	8,009	1.4	16,452	3.5

<sup>1</sup> Less than one-tenth of 1 per cent.

AREA, BY DRAINAGE BASIN

STATE TABLE 8.—AREA, BY DRAINAGE BASIN: 1929 AND 1919

DRAINAGE BASIN (See definitions in Introduction)	AREA IRRIGATED			Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1929	1919	Increase <sup>1</sup>		
Total.....	575,590	467,565	23.1	824,152	1,085,627
Colorado River and tributaries.....	572,289	461,694	24.0	819,399	1,080,057
Colorado River direct.....	54,732	48,326	13.3	67,102	203,105
Kanab Creek.....	322	450	-28.4	667	822
Virgin River.....	444	379	17.2	690	702
Williams River.....	1,111	1,663	-32.8	1,475	2,020
Little Colorado River and tributaries.....	13,652	17,036	-19.9	21,796	29,116
Little Colorado River direct.....	7,249	10,260	-29.3	11,937	14,683
Nutriso Creek.....	222	636	-65.1	260	260
Concho Creek.....	823	244	237.3	823	1,197
Other tributaries.....	5,358	5,896	-9.1	8,776	12,976
Gila River and tributaries.....	500,169	391,417	27.8	724,283	837,443
Gila River direct.....	104,309	76,982	35.5	218,275	271,475
San Francisco River.....	781	429	82.0	851	1,191
San Pedro River.....	3,956	7,773	-49.1	4,428	6,584
Santa Cruz River.....	24,718	33,019	-25.1	39,920	43,945
Salt River and tributaries.....	311,264	247,260	25.9	345,045	356,219
Salt River direct.....	294,740	235,825	12.3	290,479	297,012
Tonto Creek.....	442	502	-12.0	442	446
Rio Verde.....	6,844	6,564	4.3	9,655	13,779
Other tributaries.....	39,238	4,369	798.1	44,439	44,982
Agua Fria River.....	25,104	18,824	33.4	62,753	83,801
Hassayampa River.....	432	956	-54.8	650	865
Other tributaries of Gila River.....	29,605	6,174	379.5	52,361	73,363
Other tributaries of Colorado River.....	1,859	2,438	-23.6	3,386	6,849
Whitewater Draw and tributaries.....	3,301	5,871	-43.8	4,753	5,570

<sup>1</sup> A minus sign (-) denotes decrease.

INVESTMENT, AND COST OF MAINTENANCE AND OPERATION OF IRRIGATION ENTERPRISES

STATE TABLE 9.—INVESTMENT IN ENTERPRISES: 1890 TO 1930

CENSUS YEAR	INVESTMENT		AVERAGE, PER ACRE <sup>1</sup>	
	Amount	Increase	Amount	Increase
1930.....	Dollars 73,328,197	Per cent 118.9	Dollars 88.97	Per cent 66.6
1920.....	33,498,094	89.5	53.40	17.1
1910.....	17,677,966	298.3	45.60	90.5
1900.....	4,438,352	854.5	23.94	238.6
1890.....	465,000		7.07	

<sup>1</sup> Based on area enterprises were capable of supplying with water.

STATE TABLE 10.—INVESTMENT, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	INVESTMENT		
	Amount	Proportion of total	Average, per acre <sup>1</sup>
Total.....	Dollars 73,328,197	Per cent 100.0	Dollars 88.97
Before 1890.....	84,893	( <sup>2</sup> )	14.61
1860-1869.....	16,030	( <sup>2</sup> )	9.51
1870-1879.....	907,831	1.2	13.99
1880-1889.....	890,268	1.2	22.82
1890-1899.....	9,287,941	12.7	89.87
1900-1904.....	144,464	0.2	20.46
1905-1909.....	37,448,645	51.1	123.73
1910-1914.....	1,455,193	2.0	57.70
1915-1919.....	3,090,207	4.2	81.07
1920-1924.....	13,615,145	18.6	99.73
1925-1929.....	4,135,183	5.6	68.64
Not reported.....	2,332,897	3.2	49.75

<sup>1</sup> Based on area enterprises were capable of supplying with water in 1930.

<sup>2</sup> Less than one-tenth of 1 per cent.

STATE TABLE 11.—INVESTMENT, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929; BY SOURCE OF WATER SUPPLY

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

SOURCE OF SUPPLY	INVESTMENT, 1930			MAINTENANCE AND OPERATION, 1929	
	Amount	Proportion of total	Average, per acre	Irrigated area reporting	Average, per acre <sup>1</sup>
Total.....	Dollars 73,328,197	Per cent 100.0	Dollars 88.97	Acres 561,605	Dollars 4.67
Streams, gravity.....	20,016,538	27.3	75.80	156,393	3.20
Streams, pumped.....	1,459,527	2.0	117.89	8,074	9.83
Streams, gravity and pumped.....	2,550	( <sup>2</sup> )	36.43	43	3.49
Wells, pumped.....	8,747,182	11.9	58.70	99,740	10.76
Wells, flowing.....	111,500	0.2	63.07	968	0.27
Wells, pumped and flowing.....	28,750	( <sup>2</sup> )	65.64	165	10.64
Springs.....	177,191	0.2	47.58	1,991	1.98
Stored storm water.....	64,450	0.1	35.35	731	1.98
Sewage.....	50,116	0.1	146.54	1	
Streams, gravity and wells, pumped.....	37,553,267	51.2	104.64	291,769	3.06
Streams, gravity and wells, flowing.....	5,500	( <sup>2</sup> )	137.50	40	3.75
Other mixed.....	5,049,225	6.9	160.04	1,660	5.69
Not reported.....	601	( <sup>2</sup> )	16.69	30	9.17
Supplemental from—					
Pumped streams.....	10,200	( <sup>2</sup> )	104.08	30	14.63
Pumped wells.....	48,600	( <sup>2</sup> )	30.47	1,592	2.44
Flowing wells.....	3,000	( <sup>2</sup> )	53.57	53	

<sup>1</sup> Based on area irrigated in 1929 reporting cost.

<sup>2</sup> Less than one-tenth of 1 per cent.

<sup>3</sup> Not considered in total because included in enterprises reporting other sources of supply listed above.

STATE TABLE 12.—INVESTMENT, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

CHARACTER OF ENTERPRISE (See definitions in Introduction)	ENTERPRISES, 1930	INVESTMENT		INCREASE <sup>1</sup>	
		1930	1920	Amount	Per cent
		Dollars	Dollars	Dollars	
Total	Number 1,270	73,328,197	33,498,094	39,830,103	118.9
Individual and partnership	1,178	5,913,408	5,598,625	314,783	5.0
Cooperative	42	1,337,982	3,171,406	-1,833,424	-57.8
Irrigation district	15	13,721,792	100,000	13,621,792	---
Commercial	3	4,857,759	3,693,400	1,164,359	31.5
United States Bureau of Indian Affairs	24	9,738,963	585,029	9,153,934	---
United States Bureau of Reclamation	3	37,091,293	20,277,919	17,413,374	85.9
State	4	27,000	---	27,000	---
City	1	50,000	71,500	-21,500	-30.1
Other	---	---	215	-215	-100.0

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

STATE TABLE 13.—INVESTMENT, BY DRAINAGE BASIN: 1930 AND 1920

DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent
	Dollars	Dollars	Dollars	
Total	73,328,197	33,498,094	39,830,103	118.9
Colorado River and tributaries	73,067,891	33,108,726	39,959,165	120.2
Colorado River direct	9,546,192	7,381,891	2,164,301	29.3
Kamih Creek	15,540	20,500	-6,960	-34.0
Virgin River	17,710	7,474	10,236	137.5
Williams River	62,321	55,504	6,817	12.3
Little Colorado River and tributaries	821,056	460,306	360,750	78.4
Little Colorado River direct	465,060	146,913	318,147	216.6
Nutrisan Creek	12,250	16,500	-4,250	-23.8
Comcho Creek	52,725	49,228	3,497	7.1
Other tributaries	291,021	247,565	43,456	17.6
Gila River and tributaries	62,420,801	25,165,814	37,255,047	148.0
Gila River direct	14,160,908	2,841,326	11,319,582	395.4
San Francisco River	22,540	15,415	7,124	46.9
San Pedro River	184,985	339,153	-154,168	-48.5
Santa Cruz River	2,291,988	5,198,524	-2,906,536	-56.4
Salt River and tributaries	36,188,493	14,930,034	21,249,459	142.2
Salt River direct	32,193,073	14,339,874	17,853,199	124.5
Tonto Creek	20,500	9,408	11,092	117.0
Rio Verde	462,381	209,482	252,899	120.7
Other tributaries	3,512,489	380,210	3,132,279	823.8
Agua Fria River	7,431,130	1,428,077	6,003,053	421.8
Hassayampum River	26,480	51,399	-24,919	-48.4
Other tributaries of Gila River	2,134,258	362,786	1,771,472	488.3
Other tributaries of Colorado River	215,871	107,337	108,534	101.1
Whitewater Draw and tributaries	290,600	299,398	-88,792	-23.0

<sup>1</sup> A minus sign (-) denotes decrease.

**COST OF PREPARING LAND FOR IRRIGATION**

The costs shown in State Table 14 represent estimates of expenditures already made on areas reporting, and include clearing and grading land, and building farm laterals and farm irrigation structures.

STATE TABLE 14.—ESTIMATED COST OF PREPARING LAND, 1930

ITEM	1930
Area reporting.....acres	405,920
Estimated cost reported.....dollars	18,903,670
Average, per acre.....dollars	38.12

**DRAINAGE OF IRRIGATED LAND**

The areas in State Table 15 relate only to lands within the boundaries of irrigation enterprises. "Additional area needing drainage" represents all lands so reported by the owners of the enterprises and includes lands producing partial crops as well as those wholly unproductive.

STATE TABLE 15.—AREA WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL AREA IN NEED OF DRAINAGE: 1930 AND 1920

ITEM	1930	1920
Enterprises reporting land drained or needing drainage.....number	26	31
Area <sup>1</sup> in enterprises reporting land drained or needing drainage.....acres	568,254	382,028
Area for which drains have been installed.....acres	123,013	25,173
Additional area needing drainage.....acres	47,165	71,357
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises reporting drainage.....per cent	21.6	6.0
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises.....per cent	11.3	3.1
Proportion that area for which drains have been installed plus that needing drainage is of area <sup>1</sup> in all irrigation enterprises.....per cent	16.7	11.0

<sup>1</sup> Irrigable area, 1930; total area, 1920.

**QUANTITY OF WATER USED**

The quantity of water used was reported on only part of the irrigation schedules, and all areas reporting "quantity of water entering canals" did not also report "quantity delivered to irrigators." In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in State Table 16.

Some irrigation enterprises carry water to individual farms, but others only to laterals which serve several farms. The "total quantity of water delivered to irrigators," shown in State Table 16, is the quantity reported in answer to a question preceded by the inquiry: "Average head of water delivered per individual irrigator."

STATE TABLE 16.—WATER USED: 1929 AND 1919

ITEM (See definitions in Introduction)	TOTAL		MEASURED		NOT MEASURED	
	1929	1919	1929	1919	1929	1919
Average flow of water entering canals.....sec.-ft.	5,380	4,100	5,253	2,967	127	1,232
Area irrigated.....acres	453,590	330,393	444,170	268,200	9,420	78,133
Average, per second-foot.....acres	84	80	85	87	74	63
Total quantity of water entering canals.....ac.-ft.	2,667,608	1,830,089	2,586,474	1,402,101	81,224	437,588
Area irrigated.....acres	453,575	358,383	452,170	283,376	10,406	76,007
Average quantity per acre.....ac.-ft.	5.8	5.1	5.7	4.9	7.8	5.8
Total quantity of water delivered to irrigators.....ac.-ft.	1,214,751	876,016	1,011,736	690,083	203,015	185,933
Area irrigated.....acres	387,286	291,637	348,751	233,400	38,635	58,168
Average quantity per acre.....ac.-ft.	3.1	3.0	2.9	3.0	5.3	3.2



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STATE TABLE 17.—DAMS, BY MATERIAL, 1930

MATERIAL	DAMS	
	Diver-sion	Storage
Total.....	Number 267	Number 78
Concrete or masonry.....	34	9
Timber.....	4	—
Earth and rock.....	197	57
Other and mixed.....	—	4
Not reported.....	32	8

<sup>1</sup> Principally temporary dams, replaced annually.

STATE TABLE 18.—LENGTH OF PIPE LINES, BY MATERIAL AND SIZE, 1930

MATERIAL AND SIZE (DIAMETER)	Length
Total.....	Miles 189.3
Concrete:	
1 to 12 inches.....	14.0
13 to 30 inches.....	52.7
More than 30 inches.....	4.3
Metal:	
1 to 12 inches.....	52.5
13 to 30 inches.....	4.1
More than 30 inches.....	1.5
Wood:	
1 to 12 inches.....	21.5
13 to 30 inches.....	18.1
More than 30 inches.....	2.2
Clay (vitrified):	
1 to 12 inches.....	0.4
Not segregated (concrete and metal).....	18.0

STATE TABLE 19.—PUMPING EQUIPMENT, BY KIND OF POWER AND PUMP, 1930

ITEM	ENGINES OR MOTORS		PUMPS				
	Capacity	Pro-portion of total	Number	Pro-portion of total	Capacity	Pro-portion of total	Average lift
KIND OF POWER	H. p.	Per cent	Number	Per cent	G. p. m.	Per cent	Feet
Total.....	57,633	100.0	1,364	100.0	2,125,293	100.0	46
Electricity.....	45,109	78.3	706	51.8	1,633,730	76.9	60
Internal combustion.....	8,084	14.0	428	31.4	339,867	16.0	36
Steam.....	2,080	3.6	39	2.9	2,000	0.1	40
Wind.....	126	0.2	65	4.8	863	( <sup>1</sup> )	48
Water.....	19	( <sup>1</sup> )	4	0.3	1,530	0.1	36
Electricity and—							
Internal combustion.....	1,680	2.9	25	1.8	135,640	6.4	48
Wind.....	8	( <sup>1</sup> )	2	0.1	75	( <sup>1</sup> )	42
Internal combustion and wind.....	478	0.8	85	6.2	10,436	0.5	53
Not reported.....	49	( <sup>1</sup> )	10	0.7	1,152	( <sup>1</sup> )	59
KIND OF PUMP							
Centrifugal.....	27,127	47.1	663	48.6	1,016,985	47.9	34
Turbine.....	20,221	35.1	334	24.5	768,621	36.2	62
Rotary.....	7,159	12.4	132	9.7	182,642	8.6	61
Screw.....	995	1.7	7	0.5	106,200	5.0	17
Plunger.....	438	0.8	123	9.4	5,017	0.2	58
Reciprocating.....	89	0.1	16	1.2	991	( <sup>1</sup> )	68
Centrifugal and—							
Turbine.....	471	0.8	8	0.6	7,600	0.4	110
Rotary.....	328	0.6	9	0.7	10,130	0.5	33
Plunger.....	134	0.2	28	2.0	3,312	0.2	28
Reciprocating.....	90	0.2	5	0.4	883	( <sup>1</sup> )	43
Turbine and plunger.....	49	0.1	6	0.4	1,510	0.1	36
Other and not reported.....	532	0.9	28	2.0	21,402	1.0	65

<sup>1</sup> Less than one-tenth of 1 per cent.

STATE TABLE 20.—IRRIGATION WORKS, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Intro- duction)	DAMS		MAIN CANALS		Lateral canals, length	RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Diver-sion	Storage	Capac-ity	Length		Number	Capacity		Number	Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps	
	Number	Number	Sec.-ft.	Miles	Miles	Number	Ac.-ft.	Miles	Number	G. p. m.	Number	G. p. m.	Number	H. p.	Number	G. p. m.
Total.....	267	78	13,697	1,732	2,242	378	3,410,975	189.3	215	13,772	1,398	1,832,352	1,378	57,633	1,304	2,125,293
Before 1860.....	4	—	56	20	—	—	—	0.5	—	—	1	60	1	1	1	90
1860-1869.....	4	—	37	14	10	—	—	0.1	—	—	2	80	2	2	2	80
1870-1879.....	31	6	1,070	252	11	16	3,104	2.2	—	—	4	105	4	10	4	105
1880-1889.....	45	12	985	200	25	17	8,370	0.6	—	—	5	2,325	7	59	7	2,875
1890-1899.....	40	5	1,528	174	283	13	92,888	5.6	8	391	26	33,600	22	1,025	24	22,572
1900-1904.....	17	2	164	47	—	10	1,313	9.2	11	5,958	5	3,010	8	151	9	0,450
1905-1909.....	21	9	6,408	265	1,056	32	2,018,320	5.0	31	810	201	387,140	183	12,142	190	548,320
1910-1914.....	27	15	389	96	89	64	40,659	23.1	24	1,720	98	34,274	111	1,887	112	113,559
1915-1919.....	15	13	405	88	37	71	44,786	77.6	32	1,595	218	248,272	243	6,843	243	205,705
1920-1924.....	18	5	1,003	216	486	44	1,201,177	22.0	19	1,298	280	415,911	242	12,740	178	459,825
1925-1929.....	20	7	674	176	141	35	251	22.8	5	125	253	398,742	261	10,908	264	398,867
Not reported.....	25	4	318	184	104	76	98	20.7	85	1,875	305	308,797	294	11,865	330	270,845

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STATE TABLE 21.—IRRIGATION WORKS, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS			FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Diver-sion	Storage	Capac-ity	Length	Lateral canals, length	Num-ber	Capacity	Pipe lines, length	Num-ber	Capac-ity	Num-ber	Capacity	Num-ber	Engi-ne or motor capacity	Pumps	
															Num-ber	Capacity
Total	Number 267	Number 78	Sec.-ft. 13,687	Miles 1,732	Miles 2,242	378	Ac.-ft. 3,410,975	Miles 189.3	215	G. p. m. 13,772	1,398	G. p. m. 1,832,352	1,378	H. p. 57,633	1,364	G. p. m. 2,125,293
Individual and partnership	192	53	1,521	626	96	341	37,582	127.2	215	13,772	876	778,907	965	25,429	908	852,403
Cooperative	34	17	1,026	283	47	21	57,141	23.5			6	5,900	7	370	7	6,600
Irrigation district	20	2	2,750	407	353	5	97,100	2.3			195	472,915	149	11,010	157	473,050
Commercial	1		875	57	280			11.0			53	77,500	18	2,700	53	27,450
United States Bureau of Indian Affairs	17	2	1,481	169	420	7	1,203,652	5.6			84	114,100	82	4,540	14	181,610
United States Bureau of Reclamation	2	4	6,035	210	1,046	4	2,015,500	9.0			180	380,000	154	12,919	162	581,150
State	1							6.7			2	3,030	3	65	3	3,030
City								4.0								

STATE TABLE 22.—IRRIGATION WORKS, BY DRAINAGE BASIN, 1930

DRAINAGE BASIN (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS			FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS				
	Diver-sion	Storage	Capac-ity	Length	Lateral canals, length	Num-ber	Capacity	Pipe lines, length	Num-ber	Capac-ity	Num-ber	Capacity	Num-ber	Engi-ne or motor capacity	Pumps		Average lift
															Num-ber	Capacity	
Total	Number 267	Number 78	Sec.-ft. 13,687	Miles 1,732	Miles 2,242	378	Ac.-ft. 3,410,975	Miles 189.3	215	G. p. m. 13,772	1,398	G. p. m. 1,832,352	1,378	H. p. 57,633	1,364	G. p. m. 2,125,293	Feet 46
Colorado River and tributaries	280	74	13,687	1,725	2,242	288	3,410,835	185.2	204	13,342	1,188	1,769,895	1,164	55,608	1,149	2,065,786	45
Colorado River direct	1		2,426	39	284			12.5			1	1,000	12	2,545	19	233,700	38
Kanab Creek	2	1	60	5	1	6	508				3	17	3	2	3	17	55
Virgin River	2		17	9	2	3	2	3.0			4	49	4	4	4	49	24
Williams River	9	2	36	28		14	34	3.7	1	10	44	8,094	41	326	44	10,209	24
Little Colorado River and tributaries	31	20	314	193	27	37	72,795	2.1									
Little Colorado River direct	9	7	129	112	4	10	41,648										
Nutrios Creek	4	2	3	2		3	1,001										
Concho Creek	2	2	16	2		2	1,107										
Other tributaries	18	18	166	77	23	22	28,040	2.1									
Gila River and tributaries	200	40	10,716	1,412	1,919	214	3,315,572	150.0	202	13,314	1,119	1,745,297	1,080	52,391	1,055	1,808,044	46
Gila River direct	30	2	3,422	440	603	1	1,200,000	2.3			89	147,300	95	4,653	23	141,010	38
San Francisco River	31		14	3				4.4					4	30	5	4,190	25
San Pedro River	12	6	112	144	1	61	98	3.0	105	3,106	24	9,310	27	283	28	12,210	24
Santa Cruz River	11	2	420	73	116	4	12	47.9			154	146,530	121	6,994	155	101,890	58
Salt River and tributaries	56	12	5,350	404	1,067	23	2,020,233	31.3			343	778,540	283	20,257	201	835,630	54
Salt River direct	2	4	4,475	240	936	4	2,015,500	0.1			227	537,500	153	13,835	100	587,750	33
Tonto Creek			1	1							5	165	6	47	6	185	38
Rio Verde	46	0	460	128	16	13	4,721	5.7			22	6,591	32	637	33	13,096	47
Other tributaries	8	2	423	35	115	6	12	25.5			89	234,284	92	5,738	92	234,599	89
Agua Fria River	11	10	935	186	106	22	92,086	26.1			186	278,876	214	8,681	214	322,942	52
Hassayampa River	0		45	15		2	2	3.0	1	150	10	3,144	14	121	14	4,708	29
Other tributaries of Gila River	43	8	409	147	26	101	3,141	31.4	96	10,058	313	381,507	322	11,372	325	383,464	44
Other tributaries of Colorado River	15	2	112	39	9	14	21,924	13.9	1	18	17	15,438	24	340	24	15,767	53
Whitewater Draw and tributaries	7	4	10	7		90	140	4.1	11	430	210	62,457	214	2,025	215	59,507	48

IRRIGATION—ARIZONA

COUNTY TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929

ITEM (See definitions in Introduction)		THE STATE	Apache	Cochise	Coconino	Gila
<b>FARMS AND FARM OPERATORS</b>						
1	All farms.....1930.....number..	14,173	1,444	927	789	300
2	Irrigated farms.....1930.....number..	8,523	495	361	110	105
3	Operated by—					
4	Owners and managers.....number..	6,750	460	277	117	93
5	Tenants.....number.....	1,773	35	84	2	12
6	Irrigated farms.....1920.....number..	6,605	181	507	50	117
	Increase, <sup>1</sup> 1920-1930.....per cent..	29.0	173.5	-28.8	138.0	-10.2
<b>FARM AREA AND TOTAL LAND AREA</b>						
7	Approximate land area.....1930.....acres..	72,838,400	7,282,500	3,948,800	11,018,720	3,007,360
8	Land in all farms.....1930.....acres..	10,526,627	1,026,912	1,018,156	1,000,190	120,142
9	Land in irrigated farms.....1930.....acres..	2,983,784	508,096	377,010	9,084	9,161
10	Average, per farm.....acres.....	350.1	1,026.4	1,044.3	76.3	87.2
11	Operated by owners and managers.....acres..	2,652,388	399,402	347,889	8,924	8,202
12	Average, per farm.....acres.....	392.9	895.3	1,255.9	70.3	85.2
13	Operated by tenants.....acres.....	331,396	108,694	20,121	160	959
14	Average, per farm.....acres.....	185.9	3,105.5	346.7	80.0	79.0
15	Area irrigated.....1929.....acres.....	575,590	9,302	6,305	1,206	1,207
16	.....1919.....acres.....	467,565	12,070	12,982	1,479	1,797
17	Increase, <sup>1</sup> 1919-1929.....per cent..	23.1	-22.9	-51.4	-18.5	-27.8
18	Area enterprises were capable of supplying with water.....1930.....acres..	824,152	17,248	8,767	1,752	1,482
19	.....1920.....acres.....	627,303	16,150	19,130	1,902	2,370
20	Increase, <sup>1</sup> 1920-1930.....per cent..	31.4	6.7	-54.2	-7.0	-37.7
21	Irrigable area in enterprises.....1930.....acres..	1,085,627	23,028	11,111	2,232	2,200
22	Total area in enterprises.....1920.....acres..	813,153	27,571	33,099	2,040	7,012
23	Area in enterprises available, or to be available, for settlement.....1930.....acres..	164,693	1,422	40	360	
<b>IRRIGATION WORKS</b>						
24	Enterprises.....1930.....number..	1,271	33	311	19	76
25	.....1920.....number..	1,388	39	328	21	83
26	Main canals.....1930.....length, miles..	1,732	135	136	20	12
27	.....1920.....length, miles..	1,769	97	266	24	93
28	.....1930.....capacity, sec.-ft..	13,697	291	80	42	26
29	.....1920.....capacity, sec.-ft..	11,707	249	837	40	162
30	Laterals.....1930.....length, miles..	2,242	21	3	18	
31	.....1920.....length, miles..	1,599	27	23	11	2
32	Reservoirs.....1930.....number..	378	27	198	4	7
33	.....1920.....number..	340	36	165	4	2
34	.....1930.....capacity, ac.-ft..	3,410,975	57,905	318	603	1,307,312
35	.....1920.....capacity, ac.-ft..	1,510,866	45,614	80,017	13	1
36	Wells, flowing.....1930.....number..	215	2	159		
37	.....1920.....number..	310		204		
38	.....1930.....capacity, g. p. m..	13,772	35	6,016		
39	.....1920.....capacity, g. p. m..	14,547		9,643		
40	Wells, pumped.....1930.....number..	1,398		251		18
41	.....1920.....number..	999		2		18
42	.....1930.....capacity, g. p. m..	1,832,352		74,902		899
43	.....1920.....capacity, g. p. m..	1,042,590	1,000	90,581		5,930
44	Pumping plants.....1930.....number..	1,378		202		17
45	.....1920.....number..	744		241	2	19
46	.....1930.....engine capacity, h. p..	57,633		2,536		129
47	.....1920.....engine capacity, h. p..	22,014		2,009	50	146
48	.....1930.....pump capacity, g. p. m..	2,125,293		80,912		1,234
49	.....1920.....pump capacity, g. p. m..	1,048,030	1,000	94,566	30	5,900
50	.....1930.....average lift, feet..	46		42		49
51	.....1920.....average lift, feet..	44	30	43	22	24
<b>VALUES OF FARMS, 1930</b>						
52	Land and buildings, all farms.....dollars..	184,230,656	3,324,522	8,460,274	3,408,724	1,698,285
53	Land and buildings, irrigated farms.....dollars..	149,154,077	1,810,145	2,799,296	362,462	647,405
54	Operated by—					
55	Owners and managers.....dollars..	119,493,980	1,643,867	2,313,071	328,462	590,905
56	Tenants.....dollars.....	29,660,097	175,278	486,225	24,000	56,500
57	Average, land and buildings, per farm.....dollars..	17,500.19	3,075.04	7,754.28	2,961.86	6,165.76
58	Land (excluding buildings).....dollars..	49.99	3.58	7.42	38.80	70.07
59	Buildings (including dwellings).....dollars..	131,238,661	1,355,815	2,193,826	219,147	405,175
60	Implements and machinery, irrigated farms.....dollars..	8,136,633	145,019	280,045	33,818	58,065
61	Average, per farm.....dollars.....	954.67	292.97	778.24	284.18	553.00
62	per acre.....dollars.....	2.73	0.28	0.74	3.72	6.34
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>						
63	Investment to Jan. 1, 1930.....dollars..	73,328,197	622,600	470,611	30,073	153,073
64	.....1920.....dollars.....	33,498,094	275,010	611,883	72,317	59,749
65	Increase, <sup>1</sup> 1920-1930.....per cent..	118.9	126.4	-23.1	-46.0	166.2
66	Average, per acre, based on area enterprises were capable of supplying with water, 1930.....dollars..	88.97	36.10	53.74	22.30	103.29
67	.....1920.....dollars.....	53.40	17.02	31.99	38.02	25.12
68	Estimated final investment in existing enterprises, 1930.....dollars..	91,913,550	631,650	479,761	40,073	154,613
69	.....1920.....dollars.....	34,615,064	283,240	635,248	72,317	60,749
70	Increase, <sup>1</sup> 1920-1930.....per cent..	165.5	123.0	-24.5	-44.6	154.5
71	Average, per acre, based on estimated final investment and irrigable area, 1930.....dollars..	84.66	27.43	43.18	17.95	69.99
72	.....1920.....dollars.....	42.57	10.27	18.68	35.45	8.66
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>						
73	Irrigated area for which cost was reported.....acres..	561,605	7,994	6,041	1,109	662
74	Average, per acre, based on area reporting.....dollars..	4.57	1.41	8.04	2.38	4.76

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Includes 1 intercounty project counted in this table as 2 independent enterprises; corresponding figures for 1920 not available. For actual number of enterprises see State Tables 4 and 12.

IRRIGATION—ARIZONA

1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, NANCE AND OPERATION, 1929

Graham	Greenlee	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma	
749	257	4,597	384	1,287	757	1,008	220	675	773	1
579	189	4,382	115	344	261	523	29	324	607	2
398	124	3,442	99	319	217	432	18	258	496	3
181	65	940	18	25	44	91	11	66	201	4
533	199	3,384	59	183	228	213	63	329	559	5
8.6	-5.0	29.5	94.9	88.0	14.5	145.5	-54.0	-1.5	24.7	6
2,963,200	1,201,920	5,090,240	8,569,600	6,335,300	6,083,200	3,443,200	786,560	5,216,000	6,391,680	7
498,607	55,158	578,350	521,492	952,690	949,409	385,560	253,637	2,105,833	91,476	8
136,413	20,521	510,057	252,219	389,591	280,555	75,743	4,985	329,031	80,718	9
235.6	108.0	116.5	2,193.2	1,132.5	1,074.9	144.8	171.9	1,015.5	115.8	10
117,480	16,987	400,888	247,453	386,065	272,145	53,618	4,342	323,264	60,723	11
295.2	137.0	119.1	2,490.5	1,210.2	1,254.1	124.1	241.2	1,253.0	114.4	12
18,927	3,534	100,769	4,766	3,526	8,410	22,125	643	5,767	23,995	13
104.6	54.4	107.2	297.9	141.0	191.1	243.1	58.5	87.4	119.4	14
34,623	6,958	383,422	1,403	4,755	18,780	37,044	1,040	7,966	61,399	15
32,400	9,974	282,130	2,342	5,832	16,833	28,647	2,608	11,666	49,855	16
6.9	-0.2	35.9	-36.3	-18.5	11.2	29.3	-60.1	-31.1	23.2	17
46,405	7,167	498,790	2,190	6,850	31,750	105,136	2,103	11,137	84,376	18
34,355	8,086	394,599	2,672	6,596	25,443	34,706	3,413	13,382	64,481	19
35.1	-11.4	26.4	-18.0	-11.3	24.8	202.9	-38.4	-16.8	30.9	20
47,804	7,707	562,634	2,576	9,150	36,720	132,198	2,296	12,662	233,000	21
41,938	15,288	406,907	3,395	11,956	40,978	65,799	7,162	17,108	128,940	22
	200	103,400	40	2,000	7,612			6	48,654	23
47	48	86	89	14	112	140	27	178	82	24
100	69	105	93	18	125	167	10	224	27	25
214	40	463	31	78	99	109	6	257	132	26
190	70	305	34	59	129	229	28	159	86	27
938	187	7,154	102	83	381	1,264	4	590	2,646	28
883	232	6,371	46	94	440	940	102	492	801	29
2	10	1,418	2	1	110	357		10	289	30
181		1,019	2	14	61	15		11	233	31
46		11	16	11	7	3		43	5	32
50	2	5	5	8	18	9	6	23	1	33
1,838		740,295	13	15,990	21,926	1,200,002		4,817	41	34
1,471		1,367,395	338	2,410	360	57	51	7,209	10	35
50		1	2		1					36
95				2		1		2		37
7,043		150	28		6	500				38
4,054			38			360				39
5	2	538	31			160	21	61	97	40
4	14	236	11			248	16	26	30	41
1,022	788	1,146,898	8,941	1	107,136	298,941	21,900	10,278	160,647	42
1,820	3,125	288,330	1,515		456,766	149,099	15,600	5,460	23,345	43
7	9	496	40		135	210	21	73	108	44
10	21	95	11	1	130	124	14	36	33	45
38	67	32,327	539		5,122	10,287	254	637	5,997	46
104	126	7,945	90		3,990	4,940	343	191	1,165	47
1,292	8,003	1,233,211	15,194		63,886	209,621	15,950	18,280	387,700	48
11,030	8,735	243,334	1,780		408,581	148,924	15,200	6,005	102,945	49
24	22	72	40		43	59	24	28	40	50
18	20	72	20		38	48	25	37	29	51
8,012,090	1,272,197	104,900,930	1,910,420	2,861,828	7,740,995	13,698,912	1,837,427	10,126,071	14,968,981	52
6,839,270	1,036,875	101,884,337	1,103,088	1,724,367	4,182,967	8,570,250	234,500	3,507,604	14,452,511	53
4,934,635	721,275	82,888,308	1,006,088	1,634,307	3,665,417	5,829,090	166,700	3,162,894	10,608,061	54
1,904,635	315,600	18,996,029	97,000	90,080	517,550	2,741,160	67,800	344,710	3,848,550	55
11,812.21	5,486.11	23,250.65	9,692.07	5,012.69	16,026.69	10,386.71	8,086.21	10,825.94	20,735.31	56
50.14	50.53	199.52	4.37	4.43	14.91	113.15	47.04	10.66	179.05	57
5,872,195	813,545	90,633,894	958,463	1,315,535	3,514,097	7,818,515	193,520	2,747,829	13,197,015	58
967,075	223,330	11,250,443	144,635	408,832	668,870	751,735	40,980	759,775	1,255,496	59
427,733	71,755	4,750,252	76,803	100,629	362,203	642,766	23,190	210,746	952,619	60
738.74	379.66	1,084.04	667.86	292.53	1,388.10	1,229.00	799.66	650.45	1,366.74	61
3.14	3.50	9.30	0.30	0.26	1.29	8.49	4.65	0.64	11.80	62
856,777	305,227	47,812,637	111,082	300,626	2,152,665	9,522,328	28,235	494,021	10,458,342	63
945,403	75,158	17,491,021	86,612	246,783	4,549,400	891,345	116,050	523,638	7,553,725	64
-9.4	306.1	173.4	28.3	21.8	-52.7	903.3	-75.7	-5.5	38.5	65
18.46	42.50	95.80	50.72	51.39	67.78	90.57	13.43	44.44	123.95	66
27.52	9.29	44.33	32.41	37.41	173.81	25.68	34.00	39.13	117.15	67
890,027	312,727	48,579,087	115,312	318,626	2,367,345	11,051,403	30,235	590,621	26,362,070	68
995,803	77,758	17,617,921	86,112	294,283	4,595,575	893,345	119,050	655,888	8,355,775	69
-10.6	302.2	177.3	30.9	20.6	-48.5		-74.6	-10.0	215.4	70
18.62	40.58	86.30	44.70	34.82	64.47	83.60	13.17	46.65	113.10	71
23.74	5.09	42.73	25.95	22.10	112.15	13.58	16.62	38.34	64.80	72
34,464	6,412	377,599	1,435	4,755	15,733	35,933	859	7,874	60,828	73
1.49	2.95	4.24	10.40	2.64	13.91	4.81	3.84	3.65	6.26	74

# ARKANSAS

## APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND



# ARKANSAS

## INTRODUCTION

Statistics are presented in the following pages on farms irrigated and area irrigated, investment and cost of maintenance and operation of irrigation enterprises, cost of preparing land for irrigation, drainage of irrigated land, quantity of water used, and distribution of irrigation works. Classifications of irrigated farms by type of farm, size of farm, and value of farm products; and the acreage, yield, and value of the principal crops grown on irrigated land, for all irrigation States, are shown in Parts III and IV, pages 257 and 325, respectively, of this volume.

Statistics for area irrigated and for cost of maintenance and operation of irrigation works relate to the year 1929; all other items relate to 1930.

Statistics for the census of 1930 are not strictly comparable with those of preceding censuses, which represented only rice irrigation, but statistics for the census of 1920 are shown throughout the tables because rice continues to be the only irrigated crop except on a few farms; and certain data are presented also from censuses previous to that of 1920, in order to show the historical development of irrigation.

Data on number, area, and value of irrigated farms with the tenure of the operators of these farms were collected in 1930 on the general farm schedule; in 1920 only the number of irrigated farms was obtained in this way. All other statistics, in both censuses, were collected on special schedules for irrigation enterprises.

STATE TABLE 1.—SUMMARY FOR THE STATE: 1930 AND 1920

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920 <sup>2</sup>	Amount	Per cent
All farms.....number.....	242,334	232,604	9,730	4.2
All land in farms.....acres.....	16,052,962	17,456,760	-1,403,788	-8.0
Approximate land area of State.....acres.....	33,616,000	33,616,000		
Farms irrigated.....number.....	1,096	1,160	-70	-6.0
Area irrigated.....acres.....	151,787	143,946	7,841	5.4
Area enterprises were capable of supplying with water.....acres.....	209,042	170,013	39,029	17.3
Area in enterprises <sup>3</sup> .....acres.....	225,092	240,480		
Proportion irrigated:				
All farms.....per cent.....	0.5	0.5		
All land in farms.....per cent.....	0.9	0.8		
Approximate land area of State.....per cent.....	0.5	0.4		
Excess of area enterprises were capable of supplying with water over area irrigated.....acres.....	58,155	35,067	23,088	65.8
Excess of area in enterprises <sup>3</sup> over area irrigated.....acres.....	74,205	102,534		
Value of irrigated farms [land, buildings (including dwellings), and implements and machinery].....dollars.....	18,417,482	( <sup>4</sup> )		
Investment in irrigation enterprises.....dollars.....	6,836,648	7,183,322	-346,674	-4.8
Average, per acre, based on area enterprises were capable of supplying with water.....dollars.....	32.56	40.13	-7.57	-18.9
Estimated final cost of existing enterprises.....dollars.....	6,844,092	7,283,522	-439,430	-6.0
Average, per acre, based on area in enterprises <sup>3</sup> .....dollars.....	30.28	29.55		
Average annual cost, per acre, for maintenance and operation of irrigation works.....dollars.....	7.03	13.67	-6.64	-48.6

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Rice irrigation only. See text in "Introduction."

<sup>3</sup> Irrigable area, 1930; total area, 1920.

<sup>4</sup> Figures not available.

STATE TABLE 2.—FARMS AND SPECIFIED FARM VALUES, BY TENURE OF FARM OPERATOR, 1930

ITEM (See definitions in Introduction)	FARMS		SPECIFIED FARM VALUES					
	Number	Area	Land and buildings		Land alone		Implements and machinery	
			Total	Per acre	Total	Per acre	Total	Per acre
All farms.....	242,334	16,052,962	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Owners and managers.....	89,643	9,282,048	547,828,250	34.13	407,919,798	25.41	33,116,340	2.06
Tenants.....	152,691	6,770,914	272,792,628	29.39			20,204,403	2.18
			275,036,622	40.62			12,851,847	1.90
Irrigated farms.....	1,096	363,549	16,002,854	44.02	12,980,124	35.73	2,414,628	6.64
Owners and managers.....	625	219,101	10,101,159	46.10	8,127,084	37.09	1,513,985	6.91
Tenants.....	471	144,448	5,901,695	40.86	4,862,040	33.66	900,643	6.24
Wholly irrigated farms.....	348	93,326	4,046,994	43.36	3,338,659	35.77	694,275	7.44
Owners and managers.....	168	46,815	2,075,489	44.33	1,688,439	36.07	347,732	7.43
Tenants.....	180	46,511	1,971,505	42.39	1,650,220	35.48	346,543	7.45
Partly irrigated farms.....	748	270,223	11,955,860	44.24	9,650,465	35.71	1,720,353	6.37
Owners and managers.....	457	172,286	8,025,670	46.53	6,438,645	37.37	1,166,263	6.77
Tenants.....	291	97,937	3,930,190	40.13	3,211,820	32.79	554,100	5.66
Farms not irrigated.....	241,238	15,689,413	531,825,396	33.90	394,930,674	25.17	30,701,712	1.96

FARMS AND AREA IRRIGATED

In State Table 3 and in other tables "Number of farms irrigated" is equivalent to "Number of irrigators" used in census reports previous to 1910.

STATE TABLE 3.—FARMS AND AREA IRRIGATED: 1890 TO 1930

CENSUS YEAR	FARMS IRRIGATED			AREA IRRIGATED			
	Number	Increase <sup>1</sup>	Proportion of all farms	Area	Increase <sup>1</sup>	Proportion of total land area of State	Proportion of land in all farms
1930.....	1,090	--0.0	0.5	151,787	5.4	0.5	0.9
1920 <sup>2</sup> .....	1,166	492.6	0.5	143,046	418.7	0.4	0.8
1910 <sup>2</sup> .....	232		0.1	27,753		0.1	0.2
1900 <sup>2</sup> .....	20		( <sup>3</sup> )	25	177.8	( <sup>3</sup> )	( <sup>3</sup> )
1890 <sup>2</sup> .....				0		( <sup>3</sup> )	( <sup>3</sup> )

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Rice irrigation only. See text in "Introduction."  
<sup>3</sup> Less than one-tenth of 1 per cent.

STATE TABLE 4.—AREA, BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION

DATE OF BEGINNING (See definitions in Introduction)	Enterprises, 1930	AREA IRRIGATED IN 1929		Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
		Area	Proportion of irrigable area in enterprises		
Total.....	1,043	151,787	67.2	200,042	225,992
1900-1904.....	3	100	21.2	600	660
1905-1909.....	11	1,506	38.9	3,251	4,021
1910-1914.....	80	17,070	67.6	23,364	25,239
1915-1919.....	248	38,464	60.1	54,551	58,166
1920-1924.....	198	29,978	68.3	39,357	43,858
1925-1929.....	206	29,105	74.8	36,014	38,911
Not reported.....	291	35,446	64.3	52,745	55,137

STATE TABLE 5.—AREA, BY SOURCE OF WATER SUPPLY: 1920 AND 1919

SOURCE OF SUPPLY	AREA IRRIGATED				Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1920	1919 <sup>1</sup>	Increase <sup>2</sup>			
			Area	Per cent		
Total.....	151,787	143,946	7,841	5.4	200,042	225,992
Streams, gravity.....		120	--120	--100.0		
Streams, pumped.....	1,502	0,009	-4,507	-75.0	1,717	2,422
Wells, pumped.....	142,978	136,260	7,718	5.7	199,849	215,144
Lakes, pumped.....	75	450	-375	-83.3	200	
Stored storm water <sup>3</sup> .....		40	--40	--100.0		
Streams, gravity and wells, pumped.....		250	--250	--100.0		
Other mixed.....	6,750	1,817	4,933	271.5	7,694	7,694
Not reported.....	482		482		482	482

<sup>1</sup> Rice irrigation only. See text in "Introduction."  
<sup>2</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>3</sup> In reservoirs filled from channels which carry water only during storms and are not classed as streams.

AREA, BY CHARACTER OF ENTERPRISE

No irrigation district, Carey Act, United States Bureau of Reclamation, or United States Bureau of Indian Affairs enterprises operate in Arkansas.

STATE TABLE 6.—AREA, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

[For number of enterprises by classes, see State Table 11]

ITEM AND CHARACTER (See definitions in Introduction)	CENSUS OF -		INCREASE <sup>1</sup>	
	1930	1920 <sup>2</sup>	Area	Per cent
AREA IRRIGATED				
Total.....	151,787	143,946	7,841	5.4
Individual and partnership.....	145,487	140,471	5,016	3.6
Cooperative.....		1,075	--1,075	--100.0
Commercial.....	6,300	2,400	3,900	162.5
AREA ENTERPRISES WERE CAPABLE OF SUPPLYING WITH WATER				
Total.....	200,042	179,013	30,929	17.3
Individual and partnership.....	203,442	175,338	28,104	16.0
Cooperative.....		1,275	--1,275	--100.0
Commercial.....	6,600	2,400	4,100	176.8
AREA IN ENTERPRISES <sup>3</sup>				
Total.....	225,992	246,480		
Individual and partnership.....	218,992	242,380		
Cooperative.....		1,500		
Commercial.....	7,000	2,600		

<sup>1</sup> A minus sign (-) denotes decrease.  
<sup>2</sup> Rice irrigation only. See text in "Introduction."  
<sup>3</sup> Irrigable area, 1930; total area, 1920.

AREA, BY DRAINAGE BASIN

STATE TABLE 7.—AREA, BY DRAINAGE BASIN: 1929 AND 1919

DRAINAGE BASIN (See definitions in Introduction)	AREA IRRIGATED			Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1930	1919 <sup>1</sup>	Increase <sup>2</sup>		
Total.....	151,787	143,946	7,841	200,042	225,992
Red River.....	75	500	--85.0	75	75
Ouchitla River.....	100	42	138.1	100	100
White River.....	85,884	74,918	14.6	119,560	130,476
Arkansas River.....	52,446	63,521	--17.4	68,008	71,734
St. Francis River.....	13,282	4,965	167.5	21,599	23,587

<sup>1</sup> Rice irrigation only. See text in "Introduction."  
<sup>2</sup> A minus sign (-) denotes decrease.

INVESTMENT, AND COST OF MAINTENANCE AND OPERATION OF IRRIGATION ENTERPRISES

STATE TABLE 8.—INVESTMENT IN ENTERPRISES: 1910 TO 1930

CENSUS YEAR	INVESTMENT		AVERAGE, PER ACRE <sup>1</sup>	
	Amount	Increase <sup>2</sup>	Amount	Increase <sup>2</sup>
1930.....	6,836,048	--4.8	32.56	--18.9
1920 <sup>3</sup> .....	7,183,322		40.13	221.8
1910 <sup>3</sup> .....	687,834		12.47	

<sup>1</sup> Based on area enterprises were capable of supplying with water.  
<sup>2</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>3</sup> Rice irrigation only. See text in "Introduction."

STATE TABLE 9.—INVESTMENT, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	INVESTMENT		
	Amount	Proportion of total	Average, per acre <sup>1</sup>
Total.....	Dollars 6, 836, 648	Per cent 100.0	Dollars 82.56
1900-1904.....	11,000	0.2	16.67
1905-1909.....	98,500	1.5	30.30
1910-1914.....	672,255	9.8	28.77
1915-1919.....	1,880,950	27.5	34.48
1920-1924.....	1,345,625	19.7	34.19
1925-1929.....	1,102,938	16.1	30.62
Not reported.....	1,725,380	25.2	32.71

<sup>1</sup> Based on area enterprises were capable of supplying with water in 1930.

STATE TABLE 10.—INVESTMENT, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929; BY SOURCE OF WATER SUPPLY

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

SOURCE OF SUPPLY	INVESTMENT, 1930			MAINTENANCE AND OPERATION, 1929	
	Amount	Proportion of total	Average, per acre	Irrigated area reporting	Average, per acre <sup>1</sup>
Total.....	Dollars 6, 836, 648	Per cent 100.0	Dollars 82.56	Acres 147,921	Dollars 7.03
Streams, pumped.....	30,675	0.5	17.86	1,502	6.27
Wells, pumped.....	6,640,773	97.1	33.23	139,594	7.04
Lakes, pumped.....	1,900	( <sup>2</sup> )	0.50	75	3.49
Other mixed.....	151,250	2.2	19.66	6,750	6.99
Not reported.....	12,050	0.2	25.00		

<sup>1</sup> Based on area irrigated in 1929 reporting cost.  
<sup>2</sup> Less than one-tenth of 1 per cent.

STATE TABLE 11.—INVESTMENT, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

CHARACTER OF ENTERPRISE (See definitions in Introduction)	Enter-prises, 1930	INVESTMENT		INCREASE <sup>1</sup>	
		1930	1920 <sup>2</sup>	Amount	Per cent
Total.....	Number 1,043	Dollars 6, 836, 648	Dollars 7, 183, 322	Dollars -346, 674	-4.8
Individual and partnership.....	1,041	6, 711, 648	7, 073, 297	-361, 640	-5.1
Cooperative.....			60, 013	-60, 013	-100.0
Commercial.....	2	125, 000	50, 012	74, 988	149.9

<sup>1</sup> A minus sign (-) denotes decrease.  
<sup>2</sup> Rice irrigation only. See text in "Introduction."

STATE TABLE 12.—INVESTMENT, BY DRAINAGE BASIN: 1930 AND 1920

DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>	
	1930	1920 <sup>2</sup>	Amount	Per cent
Total.....	Dollars 6, 836, 648	Dollars 7, 183, 322	Dollars -346, 674	-4.8
Red River.....	1, 875	20, 006	-18, 131	-90.6
Ouachita River.....	2, 500	1, 400	1, 100	127.3
White River.....	4, 165, 818	3, 992, 967	172, 851	4.3
Arkansas River.....	2, 238, 855	2, 950, 522	-716, 667	-24.3
St. Francis River.....	432, 600	218, 727	213, 873	97.8

<sup>1</sup> A minus sign (-) denotes decrease.  
<sup>2</sup> Rice irrigation only. See text in "Introduction."

COST OF PREPARING LAND FOR IRRIGATION

The costs shown in State Table 13 represent estimates of expenditures already made on the areas reporting, and include clearing and grading land, and building farm laterals and farm irrigation structures.

STATE TABLE 13.—ESTIMATED COST OF PREPARING LAND, 1930

ITEM	1930
Area reporting.....	150, 073 acres
Estimated cost reported.....	1, 013, 754 dollars
Average, per acre.....	10.34 dollars

DRAINAGE OF IRRIGATED LAND

The areas in State Table 14 relate only to lands within the boundaries of irrigation enterprises. "Additional area needing drainage" represents all lands so reported by the owners of the enterprises and includes lands producing partial crops as well as those wholly unproductive.

STATE TABLE 14.—AREA WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL AREA IN NEED OF DRAINAGE: 1930 AND 1920

ITEM	1930	1920
Enterprises reporting land drained or needing drainage.....	597	134
Area <sup>1</sup> in enterprises reporting land drained or needing drainage.....	124, 79 acres	37, 574 acres
Area for which drains have been installed.....	107, 001	27, 350
Additional area needing drainage.....	1, 873	2, 821
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises reporting drainage.....	86.2	72.8
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises.....	47.6	11.1
Proportion that area for which drains have been installed plus that needing drainage is of area <sup>1</sup> in all irrigation enterprises.....	48.4	12.2

<sup>1</sup> Irrigable area, 1930; total area, 1920.

IRRIGATION WORKS

STATE TABLE 15.—PUMPING EQUIPMENT, BY KIND OF POWER AND PUMP, 1930

ITEM	ENGINES OR MOTORS		PUMPS				
	Capacity	Proportion of total	Number	Proportion of total	Capacity	Proportion of total	Average lift
KIND OF POWER	H. p.	Per cent		Per cent	G. p. m.	Per cent	Feet
Total.....	66, 980	100.0	1, 206	100.0	1, 775, 788	100.0	68
Electricity.....	14, 765	22.0	332	27.5	411, 675	23.2	70
Internal combustion.....	44, 220	66.0	695	57.6	900, 063	51.2	69
Steam.....	2, 861	4.3	64	5.3	98, 400	5.6	47
Electricity and—							
Internal combustion.....	3, 729	5.6	76	6.3	158, 750	8.9	69
Steam.....	330	0.5	7	0.6	6, 000	0.4	37
Internal combustion and steam.....	315	0.5	6	0.5	9, 100	0.5	42
Electricity, internal combustion, and steam.....	600	0.9	24	2.0	180, 000	10.1	82
Not reported.....	160	0.2	2	0.2	2, 200	0.1	133
KIND OF PUMP							
Centrifugal.....	66, 875	99.8	1, 201	99.6	1, 769, 638	99.7	68
Rotary.....	20	( <sup>1</sup> )	1	0.1	150	( <sup>1</sup> )	130
Reciprocating.....	25	( <sup>1</sup> )	2	0.2	500	( <sup>1</sup> )	85
Centrifugal and rotary.....	60	0.1	2	0.2	5, 500	0.3	42

<sup>1</sup> Less than one-tenth of 1 per cent.



# IRRIGATION—ARKANSAS

STATE TABLE 16.—IRRIGATION WORKS, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS			PUMPED WELLS		PUMPING PLANTS			
	Diver- sion <sup>1</sup>	Stor- age <sup>2</sup>	Capac- ity	Length	Lateral canals, length	Num- ber	Capac- ity	Pipe lines, length <sup>3</sup>	Number	Capacity	Number	Engine or motor capacity	Pumps	
													Number	Capacity
Total.....	Number 1	Number 6	Sec.-ft. 1,845	Miles 46	Miles 5	10	Ac.-ft. 7,342	Miles 1.0	1,190	G. p. m. 1,641,448	1,184	H. p. 66,980	1,206	G. p. m. 1,775,788
1900-1904.....									3	4,600	4	220	7	4,000
1905-1909.....									14	24,500	13	895	14	27,750
1910-1914.....		3	456	22	4	6	5,047	0.1	120	300,550	122	6,467	129	823,800
1915-1919.....			40	8	1	2	42	0.5	280	359,127	279	13,100	276	404,087
1920-1924.....		1	130	8		1	3		218	295,250	218	13,054	218	285,220
1925-1929.....	1	2	1,212	5		1	2,250	0.4	217	247,695	224	11,090	233	285,106
Not reported.....			7	3					338	430,720	324	17,154	329	445,726

<sup>1</sup> Material, timber.      <sup>2</sup> Material, earth.      <sup>3</sup> Material and size (diameter): Metal, 1 to 12 inches, 0.9 mile; and 12 to 30 inches, 0.1 mile.

STATE TABLE 17.—IRRIGATION WORKS, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS			PUMPED WELLS		PUMPING PLANTS			
	Diver- sion <sup>1</sup>	Stor- age <sup>2</sup>	Capac- ity	Length	Lateral canals, length	Num- ber	Capac- ity	Pipe lines, length <sup>3</sup>	Number	Capacity	Number	Engine or motor capacity	Pumps	
													Number	Capacity
Total.....	Number 1	Number 6	Sec.-ft. 1,845	Miles 46	Miles 5	10	Ac.-ft. 7,342	Miles 1.0	1,190	G. p. m. 1,641,448	1,184	H. p. 66,980	1,206	G. p. m. 1,775,788
Individual and partnership.....	1	5	1,410	27	3	9	3,342	1.0	1,170	1,461,448	1,158	60,080	1,180	1,580,788
Commercial.....		1	426	19	2	1	4,000		20	180,000	20	900	20	195,000

<sup>1</sup> Material, timber.      <sup>2</sup> Material, earth.      <sup>3</sup> Material and size (diameter): Metal, 1 to 12 inches, 0.9 mile; and 12 to 30 inches, 0.1 mile.

STATE TABLE 18.—IRRIGATION WORKS, BY DRAINAGE BASIN, 1930

DRAINAGE BASIN (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS			PUMPED WELLS		PUMPING PLANTS				
	Diver- sion <sup>1</sup>	Stor- age <sup>2</sup>	Capac- ity	Length	Lateral canals, length	Num- ber	Capac- ity	Pipe lines, length <sup>3</sup>	Number	Capacity	Number	Engine or motor capacity	Pumps		Aver- age lift
													Number	Capacity	
Total.....	Number 1	Number 6	Sec.-ft. 1,845	Miles 46	Miles 5	10	Ac.-ft. 7,342	Miles 1.0	1,190	G. p. m. 1,641,448	1,184	H. p. 66,980	1,206	G. p. m. 1,775,788	Feet 68
White River.....	1	3	1,306	22	3	7	1,070	0.6	602	838,588	655	30,052	677	613,982	72
Arkansas River.....		3	449	24	2	3	6,260	0.4	388	599,510	395	21,750	309	600,150	74
St. Francis River.....									140	203,350	134	6,178	130	201,650	34

<sup>1</sup> Material, timber.      <sup>2</sup> Material, earth.      <sup>3</sup> Material and size (diameter): Metal, 1 to 12 inches, 0.9 mile; and 12 to 30 inches, 0.1 mile.

## IRRIGATION—ARKANSAS

COUNTY TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930 AND 1920<sup>1</sup>; AREAS IRRIGATED, 1929 AND 1919<sup>1</sup>; TENURE OF FARM OPERATORS AND VALUE OF FARMS, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929

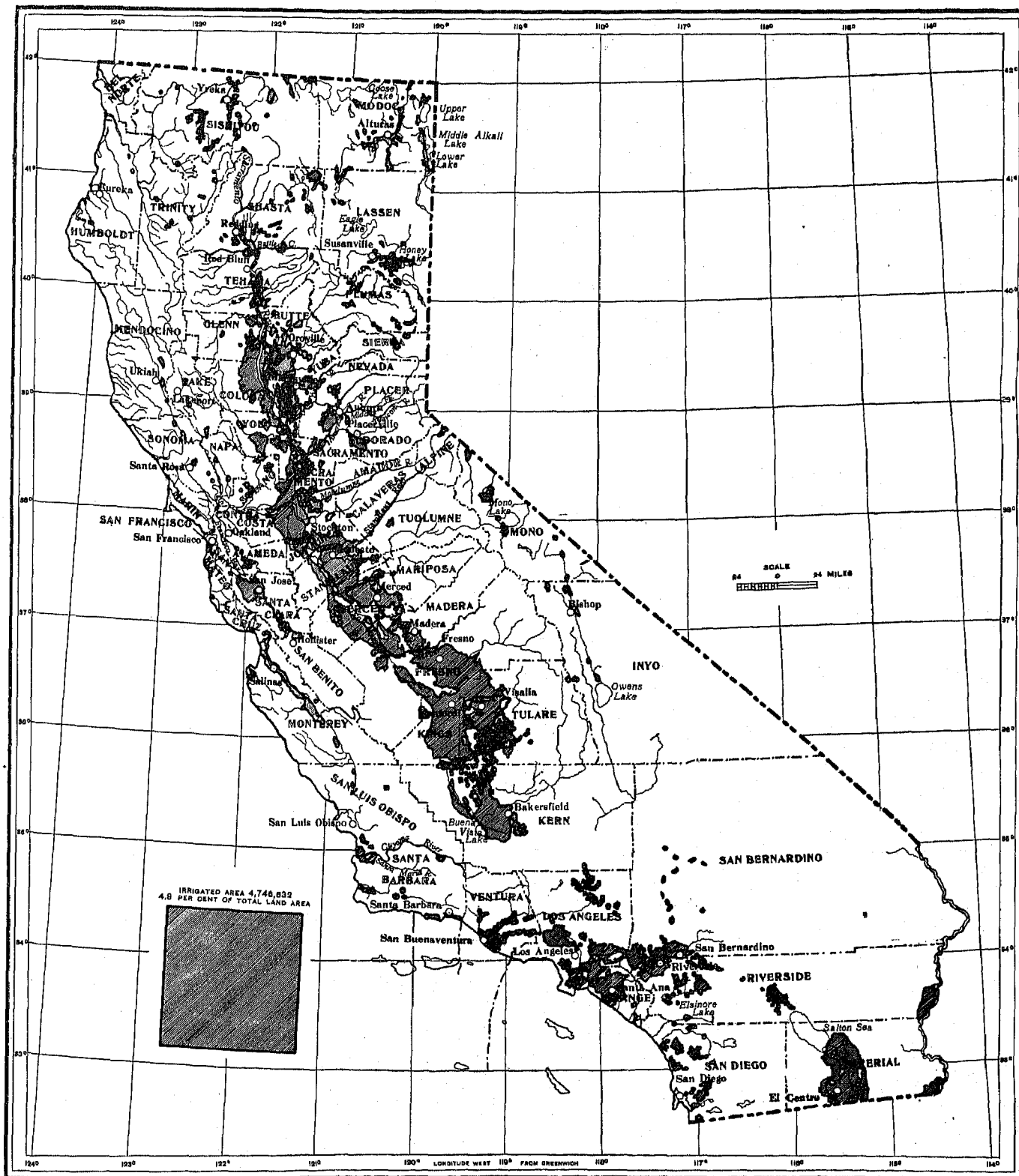
ITEM (See definitions in Introduction)		THE STATE	Arkansas	Clay	Craighead	Cross	Lee
<b>FARMS AND FARM OPERATORS</b>							
1	All farms.....1930..number..	242,334	2,301	3,435	4,757	4,398	5,569
2	Irrigated farms.....1930..number..	1,096	546	9	40	36	9
3	Operated by—						
4	Owners and managers.....number..	625	299	4	27	24	2
5	Tenants.....number..	471	247	5	13	12	7
6	Irrigated farms.....1920..number..	1,166	609	4	26	40	(?)
	Increase, <sup>2</sup> 1920-1930.....per cent..	-6.0	-10.3	125.0	53.8	-10.0	-----
<b>FARM AREA AND TOTAL LAND AREA</b>							
7	Approximate land area.....1930..acres..	33,616,000	640,000	418,560	439,680	396,160	384,640
8	Land in all farms.....1930..acres..	10,052,962	315,722	234,411	260,148	182,613	224,432
9	Land in irrigated farms.....1930..acres..	363,549	186,624	2,075	8,375	8,116	7,589
10	Average, per farm.....acres..	331.7	341.8	230.6	209.4	225.4	821.0
11	Operated by owners and managers.....acres..	219,101	111,306	1,200	6,160	6,165	2,351
12	Average, per farm.....acres..	144,448	75,318	875	2,215	1,951	5,038
13	Operated by tenants.....acres..	306.7	304.9	175.0	170.4	102.6	719.7
14	Average, per farm.....acres..						
15	Area irrigated.....1929..acres..	151,787	84,662	795	3,489	3,698	2,255
16	1919.....acres..	143,946	76,511	345	3,100	3,410	(?)
17	Increase, 1919-1929.....per cent..	5.4	10.6	130.4	9.4	8.4	-----
18	Area enterprises were capable of supplying with water.....1930..acres..	209,942	106,588	1,137	4,725	6,828	4,275
19	1920.....acres..	179,013	80,546	905	5,047	4,655	(?)
20	Increase, <sup>3</sup> 1920-1930.....per cent..	17.3	10.0	25.6	-6.4	46.7	-----
21	Irrigable area in enterprises.....1930..acres..	225,992	112,563	1,447	4,910	7,048	4,275
22	Total area in enterprises.....1920..acres..	246,480	117,822	1,040	6,869	11,830	(?)
<b>IRRIGATION WORKS</b>							
23	Enterprises.....1930.....number..	1,043	504	7	35	52	10
24	1920.....number..	944	464	4	44	35	(?)
25	Main canals.....1930.....length, miles..	46	35	-----	-----	-----	3
26	1920.....length, miles..	68	22	7	6	-----	(?)
27	1930.....capacity, sec.-ft..	1,845	507	-----	-----	-----	7
28	1920.....capacity, sec.-ft..	1,206	166	15	820	-----	(?)
29	Laterals.....1930.....length, miles..	5	2	-----	-----	-----	(?)
30	1920.....length, miles..	18	4	-----	-----	-----	-----
31	Reservoirs.....1930.....number..	10	3	-----	1	-----	-----
32	1920.....number..	16	-----	-----	-----	-----	-----
33	1930.....capacity, ac.-ft..	7,342	7,260	-----	40	-----	-----
34	1920.....capacity, ac.-ft..	20	-----	-----	-----	-----	-----
35	Wells, pumped.....1930.....number..	1,190	693	6	39	53	24
36	1920.....number..	1,089	496	4	63	41	(?)
37	1930.....capacity, g. p. m..	1,641,448	835,660	11,500	40,460	76,900	34,000
38	1920.....capacity, g. p. m..	1,470,147	573,524	9,700	66,000	63,650	(?)
39	Pumping plants.....1930.....number..	1,184	603	7	38	53	24
40	1920.....number..	1,041	497	4	51	36	(?)
41	1930.....engine capacity, h. p..	66,980	35,686	370	1,306	2,512	1,001
42	1920.....engine capacity, h. p..	58,332	29,299	180	1,987	2,013	(?)
43	1930.....pump capacity, g. p. m..	1,775,788	947,070	14,000	40,800	75,900	34,000
44	1920.....pump capacity, g. p. m..	1,654,097	749,074	9,000	67,500	61,350	(?)
45	1930.....average lift, feet..	68	78	35	33	27	48
46	1920.....average lift, feet..	50	61	20	30	27	-----
<b>VALUES OF FARMS, 1930</b>							
47	Land and buildings, all farms.....dollars..	547,528,250	12,156,369	8,614,858	15,977,233	9,068,316	9,048,648
48	Land and buildings, irrigated farms.....dollars..	10,002,854	8,883,269	76,100	375,615	299,900	293,080
49	Operated by—						
50	Owners and managers.....dollars..	10,101,159	5,596,444	37,200	283,115	233,300	125,050
51	Tenants.....dollars..	5,901,695	3,286,815	38,900	92,500	66,600	167,130
52	Average, land and buildings, per farm.....dollars..	14,601.14	10,269.70	8,455.56	9,390.38	8,330.58	32,504.44
53	per acre.....dollars..	44.02	47.60	36.67	44.85	36.95	39.66
54	Land (excluding buildings).....dollars..	12,989,124	7,116,074	64,100	310,715	272,600	235,380
55	Buildings (including dwellings).....dollars..	3,013,730	1,767,185	12,000	64,900	27,300	57,700
56	Implements and machinery, irrigated farms.....dollars..	2,414,628	1,199,095	5,975	99,450	61,740	70,700
57	Average, per farm.....dollars..	2,203.13	2,196.14	663.89	2,486.25	1,715.00	7,855.56
	per acre.....dollars..	6.64	6.42	2.88	11.87	7.61	9.57
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>							
58	Investment to Jan. 1, 1930.....dollars..	6,836,648	3,732,165	28,400	119,100	143,000	123,700
59	1920.....dollars..	7,183,322	3,402,391	47,414	140,375	174,628	(?)
60	Increase, <sup>1</sup> 1920-1930.....per cent..	-4.8	6.9	-40.1	-15.2	-18.1	-----
61	Average, per acre, based on area enterprises were capable of supplying with water, 1930.....dollars..	32.56	35.01	24.98	25.21	20.94	28.94
62	1920.....dollars..	40.13	39.00	52.39	27.81	37.51	-----
63	Estimated final investment in existing enterprises, 1930.....dollars..	6,844,092	3,733,965	28,400	119,100	143,000	123,700
64	1920.....dollars..	7,283,522	3,564,791	47,414	140,375	174,628	(?)
65	Increase, <sup>1</sup> 1920-1930.....per cent..	-6.0	4.7	-40.1	-15.2	-18.1	-----
66	Average, per acre, based on estimated final investment and irrigable area, 1930.....dollars..	30.28	33.17	19.63	24.26	20.29	28.94
67	Average, per acre, based on estimated final investment and total area, 1920.....dollars..	29.55	30.26	45.59	20.44	14.76	-----
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>							
68	Irrigated area for which cost was reported.....acres..	147,921	83,737	675	3,418	3,568	2,255
69	Average, per acre, based on area reporting.....dollars..	7.03	8.82	7.69	5.20	5.99	7.61

<sup>1</sup> Rice irrigation only reported in the census of 1920. See text in "Introduction." <sup>2</sup> Included in "All other counties." <sup>3</sup> A minus sign (-) denotes decrease.



# CALIFORNIA

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND



# CALIFORNIA

## INTRODUCTION

Statistics are presented in the following pages on farms irrigated and area irrigated, investment and cost of maintenance and operation of irrigation enterprises, cost of preparing land for irrigation, drainage of irrigated land, quantity of water used, and distribution of irrigation works, with specialized information relating to dams, pipe lines, and pumping equipment. Data on area irrigated, investment, and irrigation works are given in detail by drainage basins. Classifications of irrigated farms by type of farm, size of farm, and value of farm products; and the acreage, yield, and value of the principal crops grown on irrigated land, for all irrigation States, are shown in Parts III and IV, pages 257 and 325, respectively, of this volume.

Statistics for area irrigated and for cost of maintenance and operation of irrigation works relate to the year 1929; all other items relate to 1930.

For purposes of comparison, statistics for the census of 1920 are shown, where available; and for the purpose of showing the historical development of irrigation certain data are presented from censuses previous to that of 1920.

Data on number, area, and value of wholly and partly irrigated farms with the tenure of the operators of these farms were collected in 1930 on the general farm schedule; in 1920 only the number of irrigated farms was obtained in this way. All other statistics, in both censuses, were collected on special schedules for irrigation enterprises.

STATE TABLE 1.—SUMMARY FOR THE STATE: 1930 AND 1920

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>		
	1930	1920	Amount	Per cent	
All farms.....	number	135, 076	117, 070	18, 006	15.3
All land in farms.....	acres	30, 442, 581	29, 365, 697	1, 076, 884	3.7
Approximate land area of State.....	acres	99, 617, 280	99, 617, 280		
Farms irrigated.....	number	85, 784	67, 391	18, 393	27.3
Area irrigated.....	acres	4, 746, 632	4, 219, 040	527, 592	12.5
Area enterprises were capable of supplying with water.....	acres	6, 815, 250	5, 804, 466	920, 784	15.0
Area in enterprises <sup>2</sup> .....	acres	8, 075, 805	7, 805, 207		
Proportion irrigated:					
All farms.....	per cent.	63.2	57.3		
All land in farms.....	per cent.	15.6	14.4		
Approximate land area of State.....	per cent.	4.8	4.2		
Excess of area enterprises were capable of supplying with water over area irrigated.....	acres	2, 068, 618	1, 675, 420	393, 192	23.5
Excess of area in enterprises <sup>2</sup> over area irrigated.....	acres	3, 329, 293	3, 586, 167		
Area in enterprises available, or to be available, for settlement.....	acres	168, 687	533, 981	-375, 294	-76.3
Value of irrigated farms [land, buildings (including dwellings), and implements and machinery].....	dollars	2, 535, 075, 016	( <sup>3</sup> )		
Investment in irrigation enterprises.....	dollars	450, 967, 979	194, 886, 388	256, 081, 691	131.4
Average, per acre, based on area enterprises were capable of supplying with water.....	dollars	66.17	33.00	33.11	100.2
Estimated final cost of existing enterprises.....	dollars	465, 930, 535	225, 799, 123	240, 131, 412	106.3
Average, per acre, based on area in enterprises <sup>2</sup> .....	dollars	57.69	28.93		
Average annual cost, per acre, for maintenance and operation of irrigation works.....	dollars	6.10	4.40	1.70	38.6

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Irrigable area, 1930; total area, 1920.

<sup>3</sup> Figures not available.

STATE TABLE 2.—FARMS AND SPECIFIED FARM VALUES, BY TENURE OF FARM OPERATOR, 1930

ITEM (See definitions in Introduction)	FARMS		SPECIFIED FARM VALUES					
	Number	Area	Land and buildings		Land alone		Implements and machinery	
			Total	Per acre	Total	Per acre	Total	Per acre
		Acres	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
All farms.....	135, 076	30, 442, 581	3, 419, 470, 764	112.33	2, 976, 154, 574	97.76	135, 741, 365	4.46
Owners and managers.....	111, 274	24, 295, 135	2, 788, 167, 035	114.76			112, 266, 222	4.62
Tenants.....	24, 402	6, 147, 446	631, 303, 729	102.69			23, 475, 143	3.82
Irrigated farms.....	85, 784	12, 018, 864	2, 438, 289, 524	202.87	2, 145, 451, 028	178.51	96, 785, 492	8.05
Owners and managers.....	71, 911	10, 169, 705	2, 074, 125, 516	208.95	1, 810, 197, 705	178.00	83, 061, 618	8.17
Tenants.....	13, 873	1, 849, 159	364, 164, 008	196.93	335, 253, 321	181.30	13, 723, 874	7.42
Wholly irrigated farms.....	74, 623	6, 875, 244	1, 847, 402, 785	268.70	1, 613, 610, 881	234.68	72, 348, 221	10.52
Owners and managers.....	62, 562	5, 592, 672	1, 573, 785, 944	281.40	1, 362, 731, 659	243.06	61, 790, 669	11.05
Tenants.....	12, 061	1, 282, 572	273, 616, 841	213.33	250, 779, 202	195.53	10, 557, 552	8.23
Partly irrigated farms.....	11, 161	5, 143, 620	590, 886, 739	114.88	531, 940, 165	103.42	24, 437, 271	4.75
Owners and managers.....	9, 349	4, 577, 033	500, 339, 572	109.32	447, 466, 046	97.76	21, 270, 949	4.65
Tenants.....	1, 812	566, 587	90, 547, 167	159.81	84, 474, 119	149.09	3, 166, 322	5.59
Farms not irrigated.....	49, 892	18, 423, 717	981, 181, 240	53.26	830, 703, 548	45.00	38, 955, 873	2.11

FARMS AND AREA IRRIGATED

STATE TABLE 3.—FARMS AND AREA IRRIGATED: 1890 TO 1930

CENSUS YEAR	FARMS IRRIGATED			AREA IRRIGATED			
	Number	Increase	Proportion of all farms	Area	Increase	Proportion of total land area of State	Proportion of land in all farms
1890.....	85,784	27.3	63.2	4,746,632	12.5	4.8	15.0
1920.....	67,391	71.3	57.3	4,219,640	58.4	4.2	14.4
1910.....	39,352	53.3	44.0	2,664,104	84.2	2.7	9.5
1900.....	25,675	87.0	35.4	1,446,114	44.0	1.5	5.9
1890.....	13,732	.....	26.0	1,004,233	.....	1.0	4.7

STATE TABLE 4.—AREA, BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION

DATE OF BEGINNING (See definitions in Introduction)	Enterprises, 1930	AREA IRRIGATED IN 1929				Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
		Area	Proportion of irrigable area in enterprises	Acres	Per cent		
Total.....	39,117	4,746,632	54.8	6,815,250	8,075,895		
Before 1860.....	160	163,820	48.9	152,371	212,493		
1860-1869.....	207	255,207	78.1	321,193	328,061		
1870-1879.....	295	322,811	51.3	951,671	1,019,169		
1880-1889.....	361	310,151	49.2	567,025	649,119		
1890-1899.....	428	712,408	47.1	986,762	1,513,484		
1900-1909.....	581	116,877	46.0	196,253	254,211		
1910-1919.....	794	196,760	59.8	301,833	331,777		
1920-1929.....	2,979	493,367	66.2	671,314	745,054		
1915-1919.....	3,695	461,125	58.2	746,211	792,162		
1920-1924.....	5,279	354,610	65.9	478,171	537,664		
1925-1929.....	7,020	462,673	87.6	611,766	803,163		
Not reported.....	16,331	747,643	84.0	830,680	880,678		

STATE TABLE 5.—AREA, BY SOURCE OF WATER SUPPLY: 1929 AND 1919

SOURCE OF SUPPLY	AREA IRRIGATED				Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1929	1919	Increase <sup>1</sup>			
			Area	Per cent		
Total.....	4,746,632	4,219,640	527,992	12.5	6,815,250	8,075,895
Streams, gravity.....	1,699,599	2,664,445	-864,846	-33.7	2,718,277	3,532,609
Streams, pumped.....	469,944	295,673	174,271	58.9	818,604	935,878
Streams, gravity and pumped.....	85,160	60,278	24,891	41.3	200,955	248,015
Wells, pumped.....	1,453,272	826,846	626,426	75.8	1,846,280	1,800,944
Wells, flowing.....	1,927	17,653	-15,726	-80.1	3,350	4,412
Wells, pumped and flowing.....	9,791	23,581	-13,800	-58.0	11,442	12,528
Lakes, pumped.....	4,097	4,198	-1,101	-1.7	4,524	4,884
Lakes, gravity.....	17,097	48,084	-30,987	-64.4	62,633	92,663
Springs.....	23,999	27,698	-3,699	-13.4	30,738	32,401
Stored storm water.....	10,754	20,351	-9,597	-47.2	16,339	20,744
City water.....	641	515	126	24.5	670	680
Sewage.....	732	1,385	-653	-47.1	1,137	1,171
Streams, gravity and wells, pumped.....	780,960	87,807	693,663	788.5	1,022,720	1,039,420
Streams, gravity and wells, flowing.....	2,222	4,255	-2,033	-47.8	3,083	4,463
Other mixed.....	186,458	228,424	-41,966	-18.4	275,072	346,973
Other and not reported.....	.....	7,807	-7,807	-100.0	.....	.....
Supplemental <sup>2</sup> from—						
Pumped streams.....	2,453	.....	.....	.....	4,046	4,160
Pumped wells.....	287,130	.....	.....	.....	314,399	342,814

<sup>1</sup> A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> In reservoirs filled from channels which carry water only during storms and are not classed as streams.  
<sup>3</sup> Not considered in totals because included in enterprises reporting other sources of supply listed above.

Areas shown, in State Table 5, as irrigated by "supplemental" pumping from streams or wells are included in large enterprises and are irrigated principally with water diverted by gravity from sources which usually, or occasionally, are depleted in midsummer. In such emergencies the pumps are operated by individual or partnership water users to supplement the depleted gravity supplies. There are 64 "supplemental" enterprises that pump from streams, and 6,534 that pump from wells. Nearly 90 per cent of the latter are in Fresno and Tulare Counties.

AREA, BY CHARACTER OF ENTERPRISE

STATE TABLE 6.—AREA, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

[For number of enterprises by classes, see State Table 11]

ITEM AND CHARACTER (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920	Area	Per cent
	Acres	Acres	Acres	Per cent
<b>AREA IRRIGATED</b>				
Total.....	4,746,632	4,219,640	527,992	12.5
Individual and partnership.....	1,735,457	1,662,870	232,687	15.5
Cooperative.....	853,547	1,215,696	-362,149	-29.8
Irrigation district.....	1,698,830	777,168	1,621,662	177.0
Commercial.....	312,313	873,490	-561,180	-64.2
United States Bureau of Indian Affairs.....	2,938	697	2,241	317.2
United States Bureau of Reclamation.....	81,998	36,622	-45,376	-12.6
State.....	9,186	2,036	6,250	212.0
City.....	79,590	6,213	73,377	.....
Other.....	122,863	3,064	119,799	.....
Not reported.....	.....	275	-275	-100.0
<b>AREA ENTERPRISES WERE CAPABLE OF SUPPLYING WITH WATER</b>				
Total.....	6,815,250	5,894,466	920,784	15.0
Individual and partnership.....	2,687,308	1,919,663	117,645	6.1
Cooperative.....	1,359,477	1,705,647	-346,170	-20.3
Irrigation district.....	2,386,910	899,785	1,487,124	165.3
Commercial.....	668,892	1,307,698	-638,806	-48.9
United States Bureau of Indian Affairs.....	5,222	980	4,242	426.0
United States Bureau of Reclamation.....	44,688	42,805	1,883	4.2
State.....	11,004	4,210	6,794	161.4
City.....	164,470	9,073	155,406	.....
Other.....	197,001	4,054	192,947	.....
Not reported.....	.....	275	-275	-100.0
<b>AREA IN ENTERPRISES <sup>2</sup></b>				
Total.....	8,075,895	7,805,207	270,688	3.5
Individual and partnership.....	2,288,593	2,698,798	-410,205	-15.2
Cooperative.....	1,488,050	2,148,711	-660,661	-26.1
Irrigation district.....	3,142,415	1,101,220	2,041,195	185.3
Commercial.....	799,995	1,778,135	-978,140	-54.5
United States Bureau of Indian Affairs.....	5,570	5,262	308	5.9
United States Bureau of Reclamation.....	62,188	47,669	14,519	30.5
State.....	11,004	6,259	4,745	76.5
City.....	95,431	10,445	84,986	.....
Other.....	202,661	8,168	194,493	.....
Not reported.....	.....	350	-350	-100.0

<sup>1</sup> A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Irrigable area, 1930; total area, 1920.

Increase in areas credited, in State Table 6, to "Individual and partnership" enterprises is almost wholly attributable to the growth of pumping from wells since 1920. Decline in areas credited to "Cooperative" and "Commercial" enterprises is largely accounted for by the more than balancing increase in areas of "Irrigation districts," as many districts organized since 1920 have taken over areas previously irrigated by cooperative and commercial enterprises.

California has accepted the terms of the Federal Carey Act, but no lands have been reclaimed under this law.

"State" enterprises include 2 land settlement projects, as well as several State institutions not engaged in land settlement.

"City" enterprises include, besides others, several projects in Inyo and Los Angeles Counties which are controlled by the City of Los Angeles. Some of these, in Los Angeles County, were reported in the census of 1920 as municipal improvement districts and their statistics were included in the irrigation district







**COST OF PREPARING LAND FOR IRRIGATION**

The costs shown in State Table 14 represent estimates of expenditures already made on the areas reporting, and include clearing and grading land, and building farm laterals and farm irrigation structures. They therefore represent expenditures additional to the investment in irrigation enterprises shown in State Tables 9 to 13, inclusive.

STATE TABLE 14.—ESTIMATED COST OF PREPARING LAND, 1930

ITEM	1930
Area reporting.....acres.....	4,800,350
Estimated cost reported.....dollars.....	220,320,734
Average, per acre.....dollars.....	45.90

**QUANTITY OF WATER USED**

The quantity of water used was reported on only part of the irrigation schedules, and all areas reporting "quantity of water entering canals" did not also report "quantity delivered to irrigators." In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in State Table 15. While the data are incomplete, the reports represent sufficient acreage to serve as bases for reliable averages.

STATE TABLE 15.—WATER USED: 1929 AND 1919

ITEM (See definitions in Introduction)	TOTAL		MEASURED		NOT MEASURED	
	1929	1919	1929	1919	1929	1919
Average flow of water entering canals.....sec.-ft.....	20,365	29,110	17,660	13,190	2,705	15,920
Area irrigated.....acres.....	1,822,758	1,511,038	1,051,727	1,137,205	171,031	373,833
Average, per second-foot.....acres.....	90	52	94	86	63	23
Total quantity of water entering canals.....ac.-ft.....	10,109,851	14,793,033	9,272,130	10,581,929	837,712	4,212,004
Area irrigated.....acres.....	2,527,416	2,107,485	2,296,780	1,785,976	230,630	881,509
Average quantity per acre.....ac.-ft.....	4.0	6.8	4.0	5.9	3.6	11.0
Total quantity of water delivered to irrigators.....ac.-ft.....	5,631,710	3,409,367	4,049,809	1,627,316	1,581,901	1,782,051
Area irrigated.....acres.....	1,993,373	1,433,699	1,492,989	751,327	500,384	687,372
Average quantity per acre.....ac.-ft.....	2.8	2.4	2.7	2.2	3.2	2.6

Some irrigation enterprises carry water to individual farms, but others only to laterals which serve several farms. The "total quantity of water delivered to irrigators," shown in State Table 15, is the quantity reported in answer to a question preceded by the inquiry: "Average head of water delivered per individual irrigator."

**DRAINAGE OF IRRIGATED LAND**

The areas in State Table 16 relate only to lands within the boundaries of irrigation enterprises. "Additional area needing drainage" represents all lands so

reported by the owners of the enterprises and includes lands producing partial crops as well as those wholly unproductive.

STATE TABLE 16.—AREA WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL AREA IN NEED OF DRAINAGE: 1930 AND 1920

ITEM	1930	1920
Enterprises reporting land drained or needing drainage.....number.....	933	545
Area <sup>1</sup> in enterprises reporting land drained or needing drainage.....acres.....	3,105,549	1,623,830
Area for which drains have been installed.....acres.....	1,522,338	319,673
Additional area needing drainage.....acres.....	285,900	409,933
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises reporting drainage.....per cent.....	49.0	19.7
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises.....per cent.....	18.9	4.1
Proportion that area for which drains have been installed plus that needing drainage is of area <sup>1</sup> in all irrigation enterprises.....per cent.....	21.8	9.3

<sup>1</sup> Irrigable area, 1930; total area, 1920.

**IRRIGATION WORKS**

STATE TABLE 17.—DAMS, BY MATERIAL, 1930

MATERIAL	DAMS	
	Diversion	Storage
Total.....	Number 1,654	Number 421
Concrete or masonry.....	319	98
Timber.....	265	156
Earth and rock.....	1,025	143
Other and mixed.....	45	24
Not reported.....		

<sup>1</sup> Principally temporary dams, replaced annually.

STATE TABLE 18.—LENGTH OF PIPE LINES, BY MATERIAL AND SIZE, 1930

MATERIAL AND SIZE (DIAMETER)	Length
Total.....	Miles 14,683.0
Concrete:	
1 to 12 inches.....	7,199.4
13 to 30 inches.....	2,187.2
More than 30 inches.....	82.3
Not segregated by size.....	116.5
Clay:	
1 to 12 inches.....	78.7
13 to 30 inches.....	32.0
Metal:	
1 to 12 inches.....	3,333.4
13 to 30 inches.....	680.3
More than 30 inches.....	78.0
Not segregated by size.....	2.5
Wood:	
1 to 12 inches.....	138.9
13 to 30 inches.....	63.4
More than 30 inches.....	25.2
Not segregated:	
Concrete and—	
Clay.....	10.2
Metal.....	620.8
Wood.....	6.3
Clay and metal.....	1.9
Metal and wood.....	4.7
Concrete, clay, and metal.....	49.8
Concrete, metal, and wood.....	61.5
Material not specified.....	10.0

IRRIGATION—CALIFORNIA

STATE TABLE 19.—PUMPING EQUIPMENT, BY KIND OF POWER AND PUMP, 1930

ITEM	ENGINES OR MOTORS		PUMPS				ITEM	ENGINES OR MOTORS		PUMPS					
	Capacity	Proportion of total	Number	Proportion of total	Capacity	Proportion of total		Average lift	Capacity	Proportion of total	Number	Proportion of total	Capacity	Proportion of total	Average lift
<b>KIND OF POWER</b>															
Total	820,767	100.0	47,994	100.0	33,240,689	100.0	63								
Electricity	680,263	82.9	38,589	80.4	28,003,431	84.2	57								
Internal combustion	94,126	11.5	6,683	13.9	3,538,723	10.6	34								
Wind	448	0.1	123	0.3	9,744	(1)	48								
Water	433	0.1	17	(1)	18,370	0.1	48								
Steam	266	(1)	7	(1)	15,475	(1)	34								
Electricity and—															
Internal combustion	35,452	4.3	2,103	4.6	1,502,582	4.5	41								
Wind	1,025	0.1	142	0.3	36,052	0.1	51								
Water	123	(1)	7	(1)	13,001	(1)	90								
Steam	4,495	0.5	35	0.1	34,095	0.1	235								
Internal combustion and—															
Wind	597	0.1	115	0.2	23,083	(1)	35								
Steam	1,128	0.1	8	(1)	10,300	(1)	87								
Electricity, internal combustion, and—															
Wind	204	(1)	25	0.1	7,997	(1)	32								
Steam	1,840	0.2	14	(1)	12,200	(1)	130								
Not reported	308	(1)	30	0.1	9,336	(1)	69								
<b>KIND OF PUMP</b>															
Centrifugal	352,273	42.9	24,558	51.2	18,787,933	56.5	34								
Turbine	271,426	33.1	12,762	26.6	7,692,410	23.1	75								
Rotary	85,527	10.4	3,589	7.5	2,590,989	7.8	68								
Reciprocating	3,073	0.4	492	1.0	60,975	0.2	88								
Plunger	15,164	1.8	2,277	4.7	219,342	0.7	109								
Air lift	983	0.1	59	0.1	18,519	0.1	33								
Water (rams)	15	(1)	1	(1)	149	(1)	6								
Bucket	40	(1)	1	(1)	3,000	(1)	6								
Not reported	2,532	0.3	132	0.3	61,001	0.2	76								
Centrifugal and—															
Turbine	45,444	5.5	2,248	4.7	1,650,477	5.0	54								
Rotary	7,306	0.9	404	0.8	262,780	0.8	53								
<b>KIND OF PUMP—continued</b>															
Centrifugal and—Continued.															
Reciprocating	7,913	1.0	203	0.4	121,251	0.4	94								
Plunger	3,083	0.4	316	0.7	65,712	0.2	68								
Screw	3,688	0.4	21	(1)	589,600	1.8	6								
Air lift	234	(1)	40	0.1	9,855	(1)	34								
Bucket	60	(1)	4	(1)	4,606	(1)	11								
Not reported	3,486	0.4	86	0.2	28,462	0.1	148								
Turbine and—															
Rotary	2,348	0.3	52	0.1	40,118	0.1	88								
Reciprocating	1,227	0.1	43	(1)	14,512	(1)	164								
Plunger	6,795	0.8	467	1.0	91,071	0.3	107								
Screw	125	(1)	4	(1)	2,520	(1)	100								
Air lift	232	(1)	14	(1)	4,345	(1)	88								
Not reported	307	(1)	25	0.1	7,435	(1)	130								
Rotary and—															
Reciprocating	1,550	0.2	37	0.1	20,079	(1)	133								
Plunger	709	0.1	70	0.1	12,485	(1)	77								
Screw	45	(1)	2	(1)	1,308	(1)	70								
Air lift	35	(1)	3	(1)	366	(1)	221								
Not reported	2	(1)	2	(1)	30	(1)	12								
Plunger and not reported	39	(1)	11	(1)	406	(1)	63								
Air lift and bucket	90	(1)	2	(1)	275	(1)	140								
Centrifugal, turbine, and—															
Rotary	45	(1)	3	(1)	1,700	(1)	40								
Reciprocating	28	(1)	3	(1)	690	(1)	60								
Plunger	600	0.1	40	0.1	12,880	(1)	138								
Screw	3,025	0.4	10	(1)	810,000	2.4	6								
Air lift	137	(1)	13	(1)	3,222	(1)	37								
Centrifugal, rotary, and—															
Reciprocating	12	(1)	3	(1)	300	(1)	20								
Plunger	60	(1)	11	(1)	1,840	(1)	70								
Turbine, plunger, and not reported	513	0.1	11	(1)	41,290	0.1	81								

1 Less than one-tenth of 1 per cent.

STATE TABLE 20.—IRRIGATION WORKS, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	DAMS		MAIN CANALS		Lateral canals, length	RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Diver-sion	Storage	Capacity	Length		Number	Capacity		Number	Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps	
	Number	Number	Sec.-ft.	Miles	Miles	Number	Ac.-ft.	Miles	Number	G. p. m.	Number	G. p. m.	Number	H. p.	Number	G. p. m.
Total	1,654	421	84,944	7,588	11,014	1,760	3,225,675	14,633.0	440	65,768	46,737	24,266,167	46,729	820,767	47,994	33,240,689
Before 1860	103	85	2,685	900	479	102	205,850	179.9	1	20	61	59,754	70	4,064	71	72,703
1860-1869	148	7	3,208	651	322	10	5,327	10.6	8	15	20	11,398	29	651	29	24,403
1870-1879	298	24	14,053	1,221	1,136	28	52,771	202.2	34	749	61	60,974	64	4,181	66	209,746
1880-1889	207	26	8,155	799	869	74	421,642	1,019.7	35	4,645	234	169,912	205	20,070	294	1,029,579
1890-1899	148	32	18,437	599	2,695	64	391,270	810.1	7	730	543	367,561	459	15,641	499	374,850
1900-1904	63	24	3,475	243	314	56	139,457	360.9	60	7,122	683	320,011	651	16,791	687	577,066
1905-1909	59	18	4,419	508	547	72	660,208	1,533.9	35	2,090	1,147	593,179	1,140	29,113	1,201	811,134
1910-1914	73	34	5,707	514	1,280	235	602,541	2,196.0	78	19,231	4,385	2,209,679	4,227	90,993	4,437	3,241,052
1915-1919	80	41	9,242	603	1,041	201	11,747	1,702.3	17	4,369	5,142	2,672,044	5,135	109,331	5,311	6,223,670
1920-1924	94	45	7,743	645	470	245	172,505	2,485.1	30	3,136	6,429	3,856,628	6,455	113,799	6,640	4,534,428
1925-1929	81	44	5,076	345	1,725	253	557,363	1,730.6	38	7,990	8,095	4,627,281	8,140	150,501	8,313	5,193,295
Not reported	240	41	2,684	500	136	429	3,704	2,439.7	102	15,701	19,937	9,913,946	20,088	205,662	20,447	10,948,090

STATE TABLE 21.—IRRIGATION WORKS, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE (See definitions in Introduction)	DAMS		MAIN CANALS		Lateral canals, length	RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Diver-sion	Storage	Capacity	Length		Number	Capacity		Number	Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps	
	Number	Number	Sec.-ft.	Miles	Miles	Number	Ac.-ft.	Miles	Number	G. p. m.	Number	G. p. m.	Number	H. p.	Number	G. p. m.
Total	1,654	421	84,944	7,588	11,014	1,760	3,225,675	14,633.0	440	65,768	46,737	24,266,167	46,729	820,767	47,994	33,240,689
Individual and partnership	1,413	270	16,289	2,629	365	1,353	239,770	8,734.8	406	60,201	44,730	22,649,002	44,827	668,467	45,685	25,908,292
Cooperative	121	24	19,407	1,484	1,466	210	155,760	2,753.9	39	5,135	1,033	777,258	988	33,339	1,209	2,246,461
Irrigation district	44	31	34,363	1,981	7,002	65	1,364,907	1,605.5	2	315	555	510,747	504	42,093	650	2,821,206
Commercial	48	76	10,574	999	1,651	102	679,416	488.4			200	192,492	214	13,519	232	343,262
United States Bureau of Indian Affairs	6		82	28	</											

IRRIGATION—CALIFORNIA

STATE TABLE 22.—IRRIGATION WORKS, BY DRAINAGE BASIN, 1930

DRAINAGE BASIN (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS				Average lift
	Di- ver- sion	Stor- age	Ca- pac- ity	Length	Lateral canals, length	Num- ber	Capac- ity		Num- ber	Ca- pac- ity	Num- ber	Ca- pac- ity	Num- ber	Engi- ne or mo- tor cap- acity	Pumps		
															Num- ber	Capac- ity	
Total.....	Number 1,654	Number 421	Sec.-ft. 84,944	Miles 7,588	Miles 11,014	Number 1,799	Ac.-ft. 3,225,675	Miles 14,683.0	Number 449	G.p.m. 65,768	Number 40,737	G.p.m. 24,266,167	Number 46,729	H.p. 820,767	Number 47,994	G.p.m. 33,240,689	Feet 53
Colorado River.....			10,200	103	2,163						1	700	3	415	4	140,200	22
Independent streams, northern																	
California.....	206	16	2,309	353	96	45	261,491	78.5	93	1,037	336	106,823	338	7,212	341	251,710	105
Carson River.....			25	10													
Long Valley Creek.....	1		9	2				0.8									
Tributaries of Mono Lake.....	6	6	134	25	20	0	42,801										
Susan River.....	54	7	775	50	32	9	32,476	3.0			2	4,750	2	145	2	5,500	50
Walker River.....	15		383	52	8												
White River.....						20	739	74.1			307	170,956	304	6,108	306	171,530	110
Other.....	130	3	938	219	36	10	185,475	0.6	63	1,037	27	15,117	82	959	33	74,680	56
Independent streams, southern																	
California.....	52	28	1,967	364	108	254	53,468	1,306.0	156	27,200	2,016	1,326,954	2,488	54,808	2,540	2,269,386	78
Mohave River.....	7	7	143	29	4	75	179	108.8	17	7,664	240	133,557	231	3,203	233	120,776	44
Owens River.....	18	9	654	153	27	20	24,620	29.0	9	295	41	44,260	41	1,802	32	944,750	85
San Jacinto River.....	11	8	201	80	43	60	23,312	445.8	3	500	443	208,168	426	9,600	436	243,830	79
Other.....	16	4	969	102	34	99	10,357	724.4	127	18,747	1,892	940,969	1,790	40,743	1,845	954,030	83
Pacific Ocean streams north of San Francisco Bay																	
Francisco Bay.....	431	26	2,910	820	169	29	549,463	78.1	4	205	221	112,534	337	5,743	304	370,862	27
Klamath River.....	405	10	2,851	790	152	23	549,256	17.6	3	200	14	21,442	42	2,902	50	199,696	38
Russian River.....	13	10	47	21	17	6		47.6			188	79,472	249	2,193	267	144,027	27
Other.....	13	6	12	9				12.9	1	5	19	11,620	46	648	47	27,139	21
Pacific Ocean streams south of San Francisco Bay																	
Francisco Bay.....	165	122	2,094	833	262	519	248,685	8,253.8	145	21,835	9,649	5,317,927	8,866	244,459	9,357	5,023,408	71
Palato River.....	26	13	29	22	5	23	736	151.5	18	4,200	1,189	506,306	1,129	19,884	1,157	594,032	64
Salinas River.....	8	2	771	123	89	33	128	361.9	20	4,010	1,145	955,015	707	24,246	785	974,404	47
Santa Maria River.....			12	11	4	3	13	112.9	1	744	210	249,285	189	7,369	194	252,409	75
Santa Ynez River.....	11	13	21	9		18	287	109.8	6	1,550	212	120,725	158	3,511	104	187,669	39
Santa Clara River.....	18	1	101	29	11	18	83	496.7	1	50	550	451,019	545	19,109	584	455,338	78
Los Angeles River.....	10	3	398	65	100	69	15,126	905.4			391	254,008	376	14,948	393	258,982	70
San Gabriel River.....	10	3	398	65	100	69	15,126	905.4			391	254,008	376	14,948	393	258,982	70
Santa Ana River.....	22	17	826	200	38	132	79,082	2,814.1	90	10,542	2,379	1,526,546	2,290	89,251	2,407	1,009,257	82
San Diego River.....	3	2	27	33	8	19	18,039	312.5			433	83,812	311	2,034	324	73,430	62
Other.....	63	61	415	88	15	156	99,499	1,728.0	8	694	2,261	599,226	2,232	31,806	2,381	699,980	73
Sacramento River and tributaries.....	599	140	19,097	2,492	2,325	176	940,274	796.1	39	3,630	5,450	2,932,411	6,147	104,346	6,280	3,300,204	30
Sacramento River direct.....	4		8,033	465	971	3	121	75.5			147	142,430	110	38,297	872	4,990,652	17
Pit River.....	194	32	2,125	318	54	40	132,588	1.6	14	1,185	4	252	45	440	40	45,760	13
Cow Creek.....	14	1	152	42	9	1	5				2	700	8	71	8	5,545	15
Cottonwood Creek.....	15	3	131	55	33	3	5,544	1.5			8	1,123	14	76	14	3,183	31
Battle Creek.....	48		172	80	5	1	800	1.0			2	1,000	2	35	2	1,000	43
Stony Creek.....	29	5	607	67	110	4	101,211	4.1			48	25,950	51	516	51	28,415	17
Feather River.....	141	56	4,591	565	459	60	177,780	287.1	12	368	1,621	938,678	1,623	21,946	1,655	1,220,301	28
Yuba River.....	20	11	1,045	275	397	9	91,530	17.1			11	1,900	13	54	13	2,205	16
Cache Creek.....	3	2	679	117	110	1	420,000	10.0			410	291,733	277	5,175	288	302,883	27
American River.....	33	17	356	295	39	25	14,517	135.2	4	102	364	111,215	430	4,524	440	193,128	20
Other tributaries.....	101	13	1,206	243	138	29	5,675	263.0	9	1,975	2,833	1,416,630	2,874	33,293	2,900	1,503,642	36
San Joaquin River and tributaries.....	177	78	45,150	2,593	5,881	708	1,150,077	3,748.0	33	10,770	25,364	13,310,491	25,436	342,489	25,900	15,003,081	43
San Joaquin River direct.....	3	1	8,210	367	944	3	90,033	91.3	2	1,809	85	108,050	289	23,994	415	1,540,199	28
Kern River.....	23	2	4,737	253	920	393	209,721	509.4	19	1,475	1,549	893,789	1,595	29,610	1,561	920,999	61
Tulare Lake.....			80	17	56			4.5			68	48,735	67	2,591	71	49,235	111
Tule River.....	10		90	38	113		333	209.5			1,341	566,316	1,348	19,004	1,374	576,241	78
Kaweah River.....	25	1	2,865	237	329	34	3,157	621.4			4,644	1,884,312	4,555	54,656	4,604	1,896,946	68
Kings River.....	27	1	15,757	1,078	1,006	22	109	1,063.8	2	950	10,887	5,698,807	10,782	116,216	10,921	5,489,446	32
Frasno River.....	6	1	209	18	91	2	4	15.5			266	182,675	267	4,008	267	158,865	41
Marcedo River.....	11	4	5,919	35	1,225	6	289,005	174.6			448	337,607	415	5,930	431	365,202	23
Tuolumne River.....	20	13	4,396	121	399	7	365,498	419.9	2	3,000	188	200,712	172	3,285	173	196,421	23
Stanislaus River.....	7	27	1,573	143	765	25	164,178	50.9	2	162	45	27,528	69	1,199	70	84,184	22
Calaveras River.....	16	12	23	43		9	3,665	46.5	1	3,000	222	168,311	255	4,606	256	182,821	46
Mokelumne River.....	21	11	454	99	96	13	3,983	252.1	4	68	2,084	1,117,897	2,122	23,324	2,179	1,272,765	33
Cosumnes River.....	6	2	77	64	12	1	1,200	20.2			404	219,665	414	4,385	418	233,754	43
Other tributaries.....	2	3	207	28		75	19,191	268.4	1	325	3,183	1,877,887	3,140	49,681	3,100	2,097,103	41
Tributaries of San Francisco Bay, other than Sacramento and San Joaquin Rivers.....	24	11	317	25	10	43	8,217	422.5	9	1,085	3,100	1,068,327	3,114	61,205	3,193	1,212,738	102
Coyote Creek.....	8		2	2		4	11	109.1	4	766	916	407,333	912	20,185	916	431,214	99
Gnadalupe River.....	7		158	14	6	1	1	110.8	1	200	557	268,582	568	16,111	562	288,402	112
Other tributaries.....	9	11	157	9	4	38	8,205	202.6	4	119	1,627	392,412	1,644	24,909	1,715	493,122	99

# IRRIGATION—CALIFORNIA

**COUNTY TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929**

ITEM (See definitions in Introduction)		THE STATE	Alameda	Alpine	Amador	Butte	Calaveras	Colusa
<b>FARMS AND FARM OPERATORS</b>								
1	All farms..... 1930..... number	1 135, 676	2, 027	19	371	2, 003	481	894
2	Irrigated farms..... 1930..... number	85, 784	545	15	08	1, 445	170	359
3	Operated by—							
4	Owners and managers..... number	71, 911	484	13	57	1, 263	161	275
5	Tenants..... number	13, 873	111	2	11	132	9	84
6	Irrigated farms..... 1920..... number	67, 391	473	18	101	989	306	325
6	Increase, <sup>1</sup> 1920-1930..... per cent.	27.3	15.2	-16.7	-32.7	46.1	-44.4	10.5
<b>FARM AREA AND TOTAL LAND AREA</b>								
7	Approximate land area..... 1930..... acres	1 99, 017, 230	468, 480	406, 640	384, 640	1, 030, 720	657, 280	729, 600
8	Land in all farms..... 1930..... acres	1 30, 442, 581	315, 848	11, 530	313, 719	619, 584	370, 970	481, 604
9	Land in irrigated farms..... 1930..... acres	12, 018, 804	42, 209	7, 978	51, 360	204, 379	114, 211	120, 004
10	Average, per farm..... acres	140.1	77.4	531.9	755.3	183.0	671.8	334.3
11	Operated by owners and managers..... acres	10, 169, 705	31, 201	7, 578	47, 492	230, 807	108, 906	92, 853
12	Average, per farm..... acres	141.4	71.9	532.9	833.2	187.5	676.4	337.6
13	Operated by tenants..... acres	1, 849, 159	11, 008	400	3, 868	27, 572	5, 305	27, 151
14	Average, per farm..... acres	133.3	99.2	200.0	351.6	151.5	589.4	323.2
15	Area irrigated..... 1929..... acres	4, 746, 632	8, 494	1, 925	678	67, 038	1, 996	58, 369
16	Increase, <sup>2</sup> 1919-1929..... per cent.	4, 219, 040	9, 346	4, 459	326	93, 559	2, 859	44, 097
17	Area enterprises were capable of supplying with water..... 1930..... acres	6, 815, 250	9, 079	2, 455	824	150, 017	3, 776	172, 604
18	Increase, <sup>3</sup> 1920-1930..... per cent.	5, 894, 466	13, 357	4, 810	489	114, 754	33, 328	60, 149
19	Average, per farm..... acres	15.6	-32.0	-49.1	68.5	38.6	-68.8	149.6
20	Irrigable area in enterprises..... 1930..... acres	8, 075, 895	9, 165	2, 595	863	204, 297	6, 071	180, 100
21	Total area in enterprises..... 1920..... acres	7, 805, 207	16, 543	7, 027	1, 093	123, 524	42, 093	88, 948
23	Area in enterprises available, or to be available, for settlement..... 1930..... acres	158, 637				000		
<b>IRRIGATION WORKS</b>								
24	Enterprises..... 1930..... number	* 38, 148	327	8	33	464	139	88
25	Increase, <sup>1</sup> 1920-1930..... per cent.	24, 115	264	15	35	197	140	90
26	Main canals..... 1930..... length, miles	7, 588	1	10	56	256	128	174
27	Increase, <sup>1</sup> 1920-1930..... per cent.	14, 437	12	20	64	225	247	258
28	Average, per farm..... capacity, sec.-ft.	84, 944	30	25	34	3, 289	810	1, 709
29	Operated by owners and managers..... capacity, sec.-ft.	115, 237	23	52	53	2, 751	408	2, 605
30	Average, per farm..... length, miles	11, 014	18	1	18	204	98	222
31	Operated by tenants..... length, miles	12, 947	19	1	30	27	131	120
32	Reservoirs..... 1930..... number	1, 769	7	2	4	5	18	2
33	Increase, <sup>1</sup> 1920-1930..... per cent.	3, 030	10	10	18	8	47	1
34	Average, per farm..... capacity, ac.-ft.	3, 225, 675	8, 005	3, 010	17, 022	32, 514	51, 000	51, 000
35	Operated by owners and managers..... capacity, ac.-ft.	1, 091, 394	1	4	196	30	10, 935	51, 000
36	Wells, flowing..... 1930..... number	449	3				4	
37	Increase, <sup>1</sup> 1920-1930..... per cent.	1, 415	5				5	
38	Average, per farm..... capacity, g. p. m.	65, 768	74				58	
39	Operated by owners and managers..... capacity, g. p. m.	287, 187					65	
40	Average, per farm..... number	45, 737	451	13	18	402	25	43
41	Operated by tenants..... number	25, 401	382	4	4	153	20	66
42	Average, per farm..... capacity, g. p. m.	24, 266, 167	105, 362	2, 810	299, 157	1, 502	45, 300	45, 300
43	Operated by owners and managers..... capacity, g. p. m.	10, 608, 476	95, 320	150	53, 890	1, 205	48, 735	48, 735
44	Average, per farm..... number	46, 729	428	16	490	55	93	93
45	Operated by tenants..... number	21, 561	290	9	167	32	103	103
46	Average, per farm..... engine capacity, h. p.	820, 767	4, 374	152	8, 701	402	9, 843	9, 843
47	Operated by owners and managers..... engine capacity, h. p.	350, 200	3, 797	34	2, 863	234	6, 931	6, 931
48	Average, per farm..... pump capacity, g. p. m.	33, 240, 539	115, 677	6, 214	362, 497	7, 572	947, 395	947, 395
49	Operated by tenants..... pump capacity, g. p. m.	16, 773, 692	112, 503	1, 890	113, 036	7, 086	528, 610	528, 610
50	Average, per farm..... average lift, feet	53	30	25	28	45	29	29
51	Operated by owners and managers..... average lift, feet	41	40	32	24	41	25	25
<b>VALUES OF FARMS, 1930</b>								
52	Land and buildings, all farms..... dollars	1 3, 419, 470, 764	52, 965, 126	428, 855	6, 250, 483	48, 302, 761	6, 315, 990	33, 797, 533
53	Land and buildings, irrigated farms..... dollars	2, 438, 289, 524	16, 958, 693	311, 000	1, 423, 360	29, 700, 173	2, 294, 588	14, 647, 043
54	Operated by—							
55	Owners and managers..... dollars	2, 074, 125, 513	13, 303, 663	304, 000	1, 268, 619	20, 669, 433	2, 180, 368	12, 074, 333
56	Tenants..... dollars	364, 164, 008	3, 655, 020	7, 000	154, 750	3, 030, 740	108, 220	2, 573, 310
57	Average, land and buildings, per farm..... dollars	28, 423.59	31, 116.85	20, 733.33	20, 031.90	20, 553.75	13, 497.58	40, 801.23
58	Average, per acre..... dollars	202.87	401.78	38.98	27.71	112.34	20.09	122.06
59	Land (excluding buildings)..... dollars	2, 145, 451, 026	14, 618, 187	280, 160	1, 209, 117	24, 837, 787	1, 744, 938	12, 664, 338
60	Buildings (including dwellings)..... dollars	292, 838, 498	2, 340, 496	60, 840	214, 262	4, 812, 386	649, 050	1, 982, 805
61	Implements and machinery, irrigated farms..... dollars	96, 786, 492	828, 719	16, 600	59, 312	1, 876, 738	134, 550	767, 721
62	Average, per farm..... dollars	1, 128.25	1, 520.59	1, 106.07	872.24	1, 208.77	791.47	2, 138.50
62	Average, per acre..... dollars	8.05	19.63	2.08	1.15	7.10	1.18	6.40
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>								
63	Investment to Jan. 1, 1930..... dollars	450, 967, 979	687, 678	2, 250	698, 108	6, 111, 209	343, 525	4, 006, 824
64	Increase, <sup>1</sup> 1920-1930..... dollars	194, 886, 388	530, 058	40, 385	91, 295	3, 383, 046	1, 315, 617	2, 594, 164
65	Average, per acre, based on area enterprises were capable of supplying with water, 1930..... dollars	131.4	29.7	-04.4	604.7	80.6	-73.9	54.5
66	Average, per acre, based on area enterprises were capable of supplying with water, 1920..... dollars	66.17	75.74	0.92	847.22	38.43	90.98	23.21
67	Estimated final investment in existing enterprises, 1930..... dollars	33.06	39.68	8.38	186.70	29.49	38.89	37.52
68	Increase, <sup>1</sup> 1920-1930..... dollars	465, 930, 535	688, 528	2, 250	700, 103	7, 320, 184	371, 725	4, 167, 013
69	Average, per acre, based on estimated final investment and irrigable area, 1930..... dollars	225, 799, 123	538, 538	41, 385	91, 295	3, 776, 271	1, 320, 119	2, 881, 964
70	Average, per acre, based on estimated final investment and total area, 1920..... dollars	106.3	27.9	-04.6	666.9	93.8	-72.0	44.6
71	Average, per acre, based on estimated final investment and irrigable area, 1930..... dollars	57.69	75.13	0.87	811.25	35.83	53.32	21.91
72	Average, per acre, based on estimated final investment and total area, 1920..... dollars	28.93	32.55	5.89	83.53	30.57	31.58	32.40
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>								
73	Irrigated area for which cost was reported..... acres	4, 538, 579	6, 633	1, 925	423	66, 297	1, 605	57, 386
74	Average, per acre, based on area reporting..... dollars	6.10	11.73	0.40	47.33	4.78	3.37	2.91

<sup>1</sup> Includes Del Norte County, for which no irrigation was reported.

<sup>2</sup> A minus sign (-) denotes decrease.

<sup>3</sup> Includes 26 intercounty projects counted in this table as 57 independent enterprises; corresponding figures for 1920 not available. For actual number of enterprises see State Tables 4 and 11.

IRRIGATION—CALIFORNIA

COUNTY TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930; AND COST OF MAINTENANCE

ITEM (See definitions in Introduction)		Contra Costa	Eldorado	Fresno	Glenn	Humboldt	Imperial	Inyo	Kern
<b>FARMS AND FARM OPERATORS</b>									
1	All farms.....1930.....number..	1,890	886	10,334	1,463	2,045	3,176	218	2,307
2	Irrigated farms.....1930.....number..	456	412	9,440	997	133	2,875	195	2,020
3	Operated by—								
4	Owners and managers.....number..	362	401	8,131	848	97	1,718	79	1,497
5	Tenants.....number.....	94	11	1,318	149	36	1,157	116	523
6	Irrigated farms.....1920.....number..	131	393	7,792	897	53	2,707	329	1,474
	Increase, <sup>1</sup> 1920-1930.....per cent..	248.1	4.8	21.3	11.1	150.9	6.2	-40.7	37.0
<b>FARM AREA AND TOTAL LAND AREA</b>									
7	Approximate land area.....1930.....acres..	456,900	1,111,680	3,808,000	855,680	2,288,000	2,616,960	6,394,240	5,121,920
8	Land in all farms.....1930.....acres..	379,338	324,818	1,493,477	536,411	797,160	403,063	94,567	1,706,625
9	Land in irrigated farms.....1930.....acres..	102,061	69,607	678,042	135,392	17,193	380,374	89,022	683,947
10	Average, per farm.....acres.....	225.8	168.9	71.9	185.9	129.3	132.3	456.5	338.6
11	Operated by owners and managers.....acres..	70,398	65,314	585,025	150,988	11,300	245,952	38,386	614,134
12	Average, per farm.....acres.....	194.5	162.9	71.9	178.1	116.5	143.2	485.9	410.2
13	Operated by tenants.....acres.....	32,563	4,293	93,017	34,404	5,893	134,422	50,636	69,813
14	Average, per farm.....acres.....	346.4	390.3	71.3	230.9	163.7	116.2	436.5	133.5
15	Area irrigated.....1920.....acres..	53,169	10,134	533,992	60,306	1,506	432,240	27,488	180,106
16	1919.....acres.....	33,079	6,731	547,587	105,004	355	415,304	74,958	223,593
17	Increase, <sup>1</sup> 1919-1920.....per cent..	60.7	50.6	-2.5	-42.6	324.2	4.1	-63.3	-10.4
18	Area enterprises were capable of supplying with water.....1930.....acres..	70,943	29,058	659,545	131,354	1,919	529,560	16,142	421,109
19	1920.....acres.....	46,432	9,833	333,043	126,992	500	467,815	79,771	320,773
20	Increase, <sup>1</sup> 1920-1930.....per cent..	62.6	201.6	-21.3	3.4	283.8	15.7	-79.8	27.7
21	Irrigable area in enterprises.....1930.....acres..	72,200	44,064	726,944	143,602	2,417	1,014,559	9,214	427,979
22	Total area in enterprises.....1920.....acres..	67,876	16,348	1,093,755	202,399	684	630,355	97,998	475,645
23	Area in enterprises available, or to be available, for settlement.....1930.....acres..	5,522		1,900	3,820				606
<b>IRRIGATION WORKS</b>									
24	Enterprises.....1930.....number..	157	82	6,813	274	81	3	48	1,430
25	1920.....number.....	56	91	2,963	213	33	17	87	875
26	Main canals.....1930.....length, miles..	26	270	868	136	27	87	202	337
27	1920.....length, miles.....	186	1,208	1,339	181	34	637	132	445
28	1930.....capacity, sec.-ft.....	280	156	9,206	2,723	73	9,200	604	4,749
29	1920.....capacity, sec.-ft.....	339	390	10,765	2,515	200	10,575	1,368	6,314
30	Laterals.....1930.....length, miles..	260	14	555	231		1,963	27	920
31	1920.....length, miles.....	175	110	2,003	329	6	2,690	4	140
32	Reservoirs.....1930.....number..	2	11	46	6	6		20	415
33	1920.....number.....	1	35	72	9	3		18	536
34	1930.....capacity, ac.-ft.....	101	11,110	143	50,215	22		44,619	209,794
35	1920.....capacity, ac.-ft.....	5	19,966	141	8	6		1,006	61,133
36	Wells, flowing.....1930.....number..		4	2				0	19
37	1920.....number.....	2	59					23	27
38	1930.....capacity, g. p. m.....		102	950				295	1,475
39	1920.....capacity, g. p. m.....			18,400				537	17,643
40	Wells, pumped.....1930.....number..	162	9	8,658	295	14		23	1,844
41	1920.....number.....	49	6	2,281	263		1	9	983
42	1930.....capacity, g. p. m.....	46,800	740	4,782,984	200,228	7,060		27,945	1,026,277
43	1920.....capacity, g. p. m.....	5,897	780	1,280,347	176,251		900	4,088	415,412
44	Pumping plants.....1930.....number..	196	24	8,557	315	31		23	1,818
45	1920.....number.....	59	6	2,130	215	3	1	13	869
46	1930.....engine capacity, h. p.....	6,215	151	95,813	11,643	458		1,261	30,393
47	1920.....engine capacity, h. p.....	3,236	15	32,361	9,214	36	38	137	12,504
48	1930.....pump capacity, g. p. m.....	302,421	3,230	4,866,219	1,751,068	14,904		927,895	1,054,207
49	1920.....pump capacity, g. p. m.....	74,004	830	1,442,383	1,005,729	2,000	900	4,558	1,210,402
50	1930.....average lift, feet.....	55	37	31	26	24		53	67
51	1920.....average lift, feet.....	44	56	22	23	11	70	24	53
<b>VALUES OF FARMS, 1930</b>									
52	Land and buildings, all farms.....dollars..	49,590,350	10,608,289	142,982,077	38,230,411	33,074,680	62,874,056	13,559,534	74,497,010
53	Land and buildings, irrigated farms.....dollars..	17,523,288	6,072,253	127,854,801	23,133,660	1,603,950	60,746,779	12,907,584	56,900,757
54	Operated by—								
55	Owners and managers.....dollars.....	13,893,358	5,985,158	112,798,381	20,522,790	907,950	42,734,457	5,207,073	46,810,447
56	Tenants.....dollars.....	3,629,930	87,100	15,056,420	2,610,870	694,000	18,012,322	7,700,511	10,141,310
57	Average, per acre, based on area enterprises were capable of supplying with water, 1930.....dollars..	38,428.26	14,738.49	13,531.04	23,203.27	12,059.77	21,129.31	66,192.74	28,198.39
58	Land (excluding buildings).....dollars.....	170.19	87.24	188.31	124.78	93.20	159.70	144.09	83.28
59	Buildings (including dwellings).....dollars..	15,408,503	4,742,303	106,980,037	19,335,071	1,311,950	56,922,951	11,575,549	51,207,541
60	1920.....dollars.....	2,116,785	1,329,950	20,894,704	3,793,589	292,000	3,323,828	1,332,035	5,753,216
61	Implements and machinery, irrigated farms.....dollars..	1,025,934	375,313	6,889,474	1,523,028	120,145	3,231,430	244,528	2,335,945
62	Average, per farm.....dollars.....	2,247.88	910.95	729.12	1,527.61	903.35	1,123.98	1,253.99	1,403.93
	per acre.....dollars.....	9.99	5.39	10.15	8.22	6.99	8.50	2.76	4.15
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>									
63	Investment to Jan. 1, 1930.....dollars.....	2,838,120	939,937	18,112,479	6,451,120	106,238	16,656,841	220,754	8,673,199
64	1920.....dollars.....	1,580,210	499,269	8,067,930	5,586,804	37,298	14,223,585	2,487,561	18,419,752
65	Increase, <sup>1</sup> 1920-1930.....per cent..	105.6	88.3	124.5	15.5	184.8	17.1	-91.1	-52.9
66	Average, per acre, based on area enterprises were capable of supplying with water, 1930.....dollars..	40.01	31.09	27.46	49.11	55.36	31.45	13.68	20.60
67	1920.....dollars.....	29.69	50.77	9.63	43.99	74.60	31.07	31.18	55.86
68	Estimated final investment in existing enterprises, 1930.....dollars..	2,843,745	1,644,487	18,427,677	6,470,610	108,573	16,656,841	252,254	8,812,564
69	1920.....dollars.....	1,587,960	702,269	9,249,614	7,283,303	37,798	14,323,585	2,607,111	18,329,815
70	Increase, <sup>1</sup> 1920-1930.....per cent..	79.4	134.2	99.2	-11.2	187.2	16.3	-90.3	-53.2
71	Average, per acre, based on estimated final investment and irrigable area, 1930.....dollars..	39.46	37.32	25.35	45.06	44.92	16.42	27.38	20.59
72	Average, per acre, based on estimated final investment and total area, 1920.....dollars..	23.40	41.03	8.42	35.93	56.92	26.93	26.60	39.59
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>									
73	Irrigated area for which cost was reported.....acres..	40,267	9,805	527,900	60,129	944	432,240	4,156	175,522
74	Average, per acre, based on area reporting.....dollars..	4.63	10.53	4.14	5.93	7.61	3.37	2.60	7.21

<sup>1</sup> A minus sign (-) denotes decrease.

# IRRIGATION—CALIFORNIA

1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, AND OPERATION, 1929—Continued

Kings	Lake	Lassen	Los Angeles	Madera	Marin	Mariposa	Mendocino	Merced	Modoc	Mono	Monterey	Napa	Nevada
2,156	1,057	472	12,653	1,529	690	285	1,672	3,830	621	70	1,891	1,686	539
1,790	110	241	8,537	1,118	26	18	174	3,389	418	60	803	92	368
1,420	100	199	7,247	851	20	17	153	2,493	360	55	463	74	314
379	10	42	1,290	267	6	1	21	896	58	5	340	18	54
1,634	71	306	9,102	930	14	48	92	2,354	441	00	451	39	311
10.1	54.9	-21.2	-6.2	20.2	36.7	-62.5	89.1	45.2	-5.2	-9.1	78.0	135.9	18.3
741,760	792,320	2,899,840	2,633,600	1,351,680	338,500	936,320	2,264,960	1,276,800	2,446,720	1,939,200	2,131,200	501,120	623,360
575,426	240,445	473,268	527,124	626,537	264,559	228,126	939,221	829,377	450,139	66,073	1,305,001	323,963	145,596
358,663	52,476	303,248	314,542	173,356	1,030	5,769	87,648	464,605	310,471	52,842	416,819	25,101	94,604
199.4	477.1	1,258.3	36.8	153.1	39.6	319.9	603.7	134.1	742.8	880.7	519.1	272.8	257.2
303,272	60,105	282,895	262,740	141,721	570	5,400	72,717	361,922	285,973	52,103	336,006	23,501	32,812
213.6	501.7	1,421.0	36.3	169.5	28.8	817.6	475.3	141.2	794.4	647.3	725.7	317.6	203.7
55,399	2,311	20,863	51,802	31,635	454	359	14,931	102,633	24,498	739	80,313	1,600	11,852
146.2	231.1	484.6	40.2	118.5	75.7	359.0	711.0	114.6	422.4	147.8	237.7	88.9	219.5
269,994	1,916	39,893	205,837	140,637	86	26	3,663	318,244	70,025	29,542	80,981	1,836	6,255
187,808	1,107	53,884	248,412	100,220	504	06	1,255	212,861	82,845	46,112	47,336	660	3,441
43.7	73.1	-26.0	-17.1	40.3	-84.8	-60.6	191.0	49.5	-15.5	-35.8	71.1	185.8	81.8
589,332	3,345	67,735	274,206	104,886	69	42	5,532	411,039	88,031	30,166	88,903	2,991	10,442
376,906	1,517	71,532	319,368	118,672	704	89	11,566	288,157	89,801	89,335	56,159	1,284	5,002
55.6	120.5	-5.4	-14.1	64.2	-90.2	-62.8	-52.2	42.7	-1.9	-66.2	53.8	132.9	108.8
639,135	4,272	76,375	291,970	210,151	91	42	7,586	420,614	95,140	34,191	91,780	3,384	133,684
490,835	1,831	85,873	364,574	101,032	713	109	11,680	467,494	112,200	121,878	59,669	1,405	5,601
		18,500	1,000										
992	104	121	1,380	1,108	12	9	99	616	334	42	632	97	94
345	70	175	1,863	689	4	9	64	470	376	73	189	32	96
299	7	126	199	119			21	167	358	103	126	2	193
366	18	404	332	63		3	13	384	655	223	168	1	342
8,911	10	1,038	1,392	2,731			47	8,026	1,607	619	776	40	400
13,586	242	2,732	5,059	2,066		6	50	3,972	3,078	1,520	528	20	454
415		47	107	12			17	1,467	2,066	23	86	4	208
387	2	114	107	126			365	552	101	14	98		3
6	1	221	147	107	1		2	36	40	6	14	8	15
20	9	81	411	15	1	3	10	64	71	12	9	3	25
27	422,000	40,331	101,000	32	1		128	379,045	501,030	42,801	34	77	90,286
6,663	131	194,422	37,591	418	3		296	20,651	80,285	44,740	54	1	50,021
	4	2	0				1	1	70			1	2
13	7	10	8	1			13	1	71		1	1	3
	550	200	2,215				5	1,500	1,532			45	270
2,180	950	233	41,336	2,100				3,212	5,607		400	1,000	38
1,345	70	8	1,919	1,459	11	2	44	813	3	12	1,179	70	8
498	17	4	2,223	753	7		14	543	7	10	606	11	5
769,951	26,920	6,215	1,188,066	941,356	303	400	21,860	607,767	2,007	5,620	1,012,242	16,982	1,965
202,067	5,545	1,305	1,131,797	189,456	303		1,869	299,305	675	5,919	407,310	0,005	148
1,360	83	9	1,881	1,476	10	5	93	799	5	12	855	16	44
346	33	11	1,864	701	4		39	539	9	9	203	21	8
19,603	713	247	64,622	29,088	63	17	863	12,945	159	316	25,331	1,020	69
5,225	241	93	45,752	8,307	19		481	6,094	59	214	9,631	314	38
779,329	36,935	7,415	1,223,821	1,141,943	768	800	61,710	689,547	3,055	6,160	1,023,793	43,586	3,180
283,330	13,111	6,990	1,166,131	306,483	325		18,424	349,580	3,250	5,919	406,617	21,126	464
37	23	27	86	49	23	21	22	34	33	96	47	35	44
23	18	22	60	33	27		33	22	30	34	33	24	31
38,650,696	18,083,720	9,963,619	477,943,028	27,932,089	16,132,165	3,265,473	30,771,843	68,013,273	11,443,086	2,603,638	70,249,094	36,518,495	5,005,843
36,098,163	4,208,150	7,641,479	391,498,741	16,642,720	588,463	108,940	5,876,516	58,630,660	9,211,569	2,316,078	42,663,000	5,167,317	3,936,743
20,717,263	3,930,150	7,045,479	323,955,166	12,622,740	358,763	98,840	5,222,566	42,473,760	8,374,466	2,247,078	24,810,193	4,870,402	3,520,963
5,380,955	278,000	596,000	67,543,575	4,019,980	229,700	10,000	653,950	16,156,900	837,100	69,000	17,352,816	296,915	415,760
19,509,82	38,255.91	31,707.38	45,859.05	14,880.15	22,633.19	6,040.67	33,773.08	17,300.28	22,037.24	38,601.30	53,129.53	56,166.49	10,697.67
97.86	80.19	25.20	1,244.69	96.00	671.32	18.90	67.05	128.97	20.67	43.83	102.35	205.86	41.59
31,163,000	3,745,895	6,305,379	355,861,979	14,371,087	498,981	77,540	4,909,958	49,661,854	7,633,549	2,068,278	38,624,454	4,342,773	2,884,093
3,930,163	462,255	1,276,100	35,636,765	2,271,633	119,482	31,300	966,568	8,968,306	1,578,017	247,800	4,038,555	824,544	1,052,650
2,114,737	189,490	442,270	7,432,439	1,059,977	33,295	6,182	359,589	3,050,239	552,273	90,481	2,257,518	232,267	212,487
1,175.51	1,722.64	1,835.15	870.62	945.42	1,280.58	343.44	2,066.60	900.04	1,321.23	1,508.02	2,811.35	2,742.03	577.41
5.90	3.61	1.46	23.03	6.10	32.33	1.07	4.10	6.71	1.78	1.71	5.42	10.05	2.24
8,373,919	227,899	1,693,616	102,205,278	2,470,625	4,186	3,860	331,469	22,519,291	1,107,372	2,083,515	4,582,435	217,875	2,376,379
3,989,358	116,286	519,656	21,038,616	1,351,854	15,731	3,786	582,640	6,614,674	665,660	5,679,375	2,450,643	70,168	2,190,790
109.9	96.0	225.9	385.8	83.4	-73.4	2.0	-43.1	240.4	66.9	-63.3	87.0	210.5	99.6
14.28	68.13	25.00	372.73	12.72	60.65	91.90	59.92	54.78	12.57	60.07	51.54	72.84	227.58
10.58	76.66	7.26	65.83	11.30	22.35	42.54	50.38	22.96	7.39	63.57	43.64	54.65	238.06
8,533,394	238,040	1,814,716	102,690,243	2,483,496	4,585	3,860	352,319	23,583,521	1,123,872	2,083,515	4,826,590	233,375	1,883,921
4,362,178	216,346	583,456	23,271,909	1,366,599	15,731	3,786	583,040	13,106,429	760,436	7,045,375	2,460,643	72,668	1,190,790
95.6	10.0	211.0	341.3	81.7	-70.9	2.0	-40.1	79.9	47.8	-70.4	96.2	221.2	100.6
13.35	55.72	23.76	351.72	11.82	50.38	91.90	46.44	56.07	11.81	60.94	52.59	68.96	17.87
8.89	118.16	6.79	63.83	8.49	22.06	34.73	50.32	28.65	6.78	57.81	41.25	51.72	212.60
269,327	1,445	36,325	194,191	135,779	62	26	3,487	317,426	60,947	28,857	74,550	1,625	6,075
3.20	8.42	0.67	11.84	3.73	13.48	30.96	9.78	6.71	0.26	0.50	7.94	9.03	11.25

IRRIGATION—CALIFORNIA

COUNTY TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930; AND COST OF MAINTENANCE

ITEM (See definitions in Introduction)		Orange	Placer	Plumas	Riverside	Sacramento	San Benito	San Bernardino	San Diego
<b>FARMS AND FARM OPERATORS</b>									
1	All farms..... 1930..... number..	4,960	1,628	178	4,746	3,882	1,077	7,062	3,902
2	Irrigated farms..... 1930..... number..	4,603	1,005	119	3,779	2,613	572	6,148	2,415
Operated by—									
3	Owners and managers..... number..	4,230	820	97	3,809	2,214	509	5,010	2,209
4	Tenants..... number..	278	176	22	880	390	63	238	203
5	Irrigated farms..... 1920..... number..	3,846	814	108	2,070	1,747	349	3,350	1,688
6	Increase, 1920-1930..... per cent..	17.1	23.5	10.2	41.5	49.6	63.0	83.5	42.2
<b>FARM AREA AND TOTAL LAND AREA</b>									
7	Approximate land area..... 1930..... acres..	508,800	903,040	1,659,520	4,622,720	629,120	890,880	12,912,000	2,701,440
8	Land in all farms..... 1930..... acres..	287,967	350,718	167,446	633,932	573,025	659,209	295,748	833,336
9	Land in irrigated farms..... 1930..... acres..	224,367	79,078	98,066	415,088	352,023	150,749	239,464	423,022
10	Average, per farm..... acres..	49.8	78.7	829.1	108.8	134.7	283.5	88.0	175.2
11	Owned by owners and managers..... acres..	195,935	68,802	80,924	381,076	306,455	130,218	226,054	395,908
12	Average, per farm..... acres..	46.8	83.0	834.3	112.4	138.4	255.8	88.2	179.3
13	Operated by tenants..... acres..	28,432	10,276	17,142	33,112	45,568	20,531	13,410	27,024
14	Average, per farm..... acres..	104.1	58.4	806.5	87.1	114.2	325.9	50.3	131.2
15	Area irrigated..... 1929..... acres..	112,025	30,041	16,774	135,617	98,607	20,237	108,482	42,510
16	1919..... acres..	87,330	27,520	22,852	106,212	72,960	12,468	105,306	24,999
17	Increase, 1919-1929..... per cent..	28.3	9.2	-26.6	27.7	35.2	62.3	3.0	70.1
18	Area enterprises were capable of supplying with water..... 1930..... acres..	129,496	35,845	20,637	206,720	126,001	24,440	127,564	76,223
19	1920..... acres..	102,076	27,520	25,478	128,788	103,271	17,180	120,798	32,148
20	Increase, 1920-1930..... per cent..	26.0	30.3	-10.0	60.5	22.0	42.2	5.6	137.1
21	Irrigable area in enterprises..... 1930..... acres..	140,414	46,471	24,776	255,215	141,045	26,749	150,020	90,585
22	Total area in enterprises..... 1920..... acres..	113,026	40,000	28,265	226,927	141,275	23,017	184,024	68,401
23	Area in enterprises available, or to be available, for settlement..... 1930..... acres..	354			3,916	3,225		2,376	2,251
<b>IRRIGATION WORKS</b>									
24	Enterprises..... 1930..... number..	1,085	53	116	1,034	2,083	383	930	776
25	1920..... number..	1,012	64	102	807	1,159	217	622	637
26	Main canals..... 1930..... length, miles..	43	176	88	240	91	22	101	67
27	1920..... length, miles..	82	131	135	235	209	64	141	137
28	1930..... capacity, sec.-ft..	375	511	614	1,720	1,560	29	334	187
29	1920..... capacity, sec.-ft..	780	657	1,369	2,049	1,937	264	1,291	1,693
30	Laterals..... 1930..... length, miles..	21	166	3	270	151	3	17	5
31	1920..... length, miles..	73	216	6	196	148	29	30	18
32	Reservoirs..... 1930..... number..	45	44	2	125	19	7	130	77
33	1920..... number..	27	17	1	201	7	10	99	134
34	1930..... capacity, ac.-ft..	3,953	277,215	5,640	25,782	4,620	538	72,957	56,959
35	1920..... capacity, ac.-ft..	1,044	10,112	240	113,006	698	5,906	1,399	22,142
36	Wells, flowing..... 1930..... number..	21			163	4	17	52	1
37	1920..... number..	365		6	306		4	124	5
38	1930..... capacity, g. p. m..	1,240			21,397	1,400	4,000	13,186	10
39	1920..... capacity, g. p. m..	34,199		476	69,110		600	20,310	231
40	Wells, pumped..... 1930..... number..	1,377	21	2	1,471	2,344	444	1,107	1,319
41	1920..... number..	1,151	31		837	1,433	365	675	1,122
42	1930..... capacity, g. p. m..	804,155	4,225	25	730,830	954,129	202,077	709,801	213,697
43	1920..... capacity, g. p. m..	549,010	4,532		378,010	430,229	104,800	400,293	147,860
44	Pumping plants..... 1930..... number..	1,321	40	3	1,361	2,701	410	1,100	996
45	1920..... number..	1,002	44	2	628	1,465	183	583	661
46	1930..... engine capacity, h. p..	40,961	249	11	30,492	26,202	7,892	43,075	9,013
47	1920..... engine capacity, h. p..	24,495	276	170	15,473	17,283	4,009	20,120	5,190
48	1930..... pump capacity, g. p. m..	837,770	6,875	175	932,097	1,651,969	226,727	731,627	223,812
49	1920..... pump capacity, g. p. m..	604,769	8,131	0,000	404,046	788,172	114,300	423,835	161,517
50	1930..... average lift, feet..	70	44	15	60	34	71	90	58
51	1920..... average lift, feet..	51	29	25	58	28	34	82	52
<b>VALUES OF FARMS, 1930</b>									
52	Land and buildings, all farms..... dollars..	273,604,880	25,088,134	3,738,229	115,516,901	78,559,760	30,162,468	170,909,580	84,447,001
53	Land and buildings, irrigated farms..... dollars..	255,640,609	16,906,994	2,734,229	100,631,031	58,395,305	18,998,899	159,111,779	58,621,197
Operated by—									
54	Owners and managers..... dollars..	234,056,769	13,860,199	2,280,669	94,180,665	47,361,969	17,171,399	153,823,759	53,445,671
55	Tenants..... dollars..	21,583,850	3,048,795	497,600	6,470,416	11,639,340	1,827,500	5,285,020	5,176,520
56	Average, land and buildings, per farm..... dollars..	56,771.18	16,322.83	22,076.71	26,029.02	22,347.99	33,214.86	25,830.25	24,273.79
57	Land (excluding buildings)..... dollars..	1,139.39	213.80	27.71	242.43	165.88	129.03	604.45	139.58
58	Buildings (including dwellings)..... dollars..	237,633,243	13,939,274	2,199,329	88,605,518	48,284,217	16,251,169	138,416,031	49,747,555
59	1920..... dollars..	17,077,366	2,967,720	564,900	12,025,663	10,111,038	2,747,730	20,095,748	8,373,042
60	Implements and machinery, irrigated farms..... dollars..	5,124,323	699,494	128,950	3,113,354	3,276,444	1,352,903	4,052,932	1,041,123
61	Average, per farm..... dollars..	1,137.93	696.01	1,083.61	823.86	1,253.90	2,365.22	659.23	803.78
62	per acre..... dollars..	22.84	8.85	1.31	7.50	9.31	8.97	16.93	4.59
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>									
63	Investment to Jan. 1, 1930..... dollars..	7,987,096	4,246,132	94,720	17,454,534	5,440,853	1,406,248	15,592,270	12,451,607
64	1920..... dollars..	6,501,903	1,162,774	226,717	12,478,520	3,810,695	754,861	8,738,603	4,948,939
65	Increase, 1920-1930..... per cent..	22.8	265.2	-58.2	39.9	42.8	86.3	78.4	151.6
66	Average, per acre, based on area enterprises were capable of supplying with water, 1930..... dollars..	61.68	118.46	4.50	84.44	43.18	57.54	122.23	163.36
67	1920..... dollars..	63.70	42.25	8.90	96.85	36.00	43.02	72.34	153.94
68	Estimated final investment in existing enterprises, 1930..... dollars..	8,364,813	4,249,807	94,720	18,460,584	5,602,672	1,423,898	16,373,415	12,838,986
69	1920..... dollars..	6,758,018	1,163,209	226,717	14,796,051	4,291,620	767,701	8,938,516	5,592,564
70	Increase, 1920-1930..... per cent..	23.8	265.4	-58.2	24.8	30.5	85.5	83.2	129.6
71	Average, per acre, based on estimated final investment and irrigable area, 1930..... dollars..	59.57	91.46	3.82	72.33	39.72	55.30	102.96	141.73
72	Average, per acre, based on estimated final investment and total area, 1920..... dollars..	59.70	29.08	3.02	65.20	30.38	33.35	48.57	81.77
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>									
73	Irrigated area for which cost was reported..... acres..	106,702	29,880	11,536	130,581	86,670	19,062	107,683	41,101
74	Average, per acre, based on area reporting..... dollars..	10.62	4.89	0.50	15.75	6.41	8.07	15.45	15.15

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

IRRIGATION—CALIFORNIA

1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, AND OPERATION, 1929—Continued

San Francisco	San Joaquin	San Luis Obispo	San Mateo	Santa Barbara	Santa Clara	Santa Cruz	Shasta	Sierra	Siskiyou	Solano	Sonoma	Stanislaus	Sutter	
112	5,730	1,923	841	1,408	6,237	1,855	1,213	92	1,155	1,479	6,562	5,743	1,758	1
59	4,368	373	403	551	3,708	317	809	54	744	339	247	5,172	1,257	2
31	3,505	237	244	416	3,294	223	701	50	658	273	208	4,211	1,137	3
28	863	159	159	135	414	94	108	4	86	66	89	961	120	4
23	3,047	143	205	437	2,640	145	698	62	584	278	113	4,091	669	5
160.5	43.4	160.8	90.6	20.1	40.0	118.0	35.3	-12.9	27.4	21.9	118.6	20.4	87.9	6
26,880	920,720	2,133,760	286,080	1,753,600	849,920	273,400	2,409,120	590,720	4,003,840	526,080	1,012,480	928,000	389,120	7
1,272	697,740	1,466,373	186,523	1,066,756	516,974	124,481	607,833	119,579	627,704	431,401	775,121	772,625	343,654	8
600	431,662	222,080	32,736	170,863	201,882	17,497	386,847	53,340	415,855	122,987	72,423	428,311	185,410	9
11.7	98.8	595.4	81.2	310.1	54.4	55.2	478.2	937.8	558.9	362.8	293.2	32.8	147.5	10
172	287,672	182,885	13,733	120,620	170,616	12,888	357,874	51,208	369,651	104,801	68,135	347,862	159,707	11
5.5	82.1	771.7	56.3	290.0	63.7	57.3	510.5	1,025.4	561.8	384.1	327.6	32.0	140.5	12
518	143,990	30,195	19,003	50,243	24,917	4,809	23,973	2,072	46,204	18,126	4,288	80,449	25,643	13
18.5	106.8	288.2	110.5	372.2	60.2	49.0	268.3	518.0	537.3	274.6	109.9	83.7	213.7	14
585	231,620	12,013	8,362	35,418	96,130	5,136	41,173	9,104	58,655	30,370	2,530	241,712	98,771	15
372	183,923	5,302	7,142	15,335	70,312	1,294	50,215	15,202	65,602	23,650	2,126	197,249	47,805	16
57.3	53.1	126.6	17.1	122.9	36.7	206.0	-18.0	-40.5	-10.6	28.4	19.0	22.5	103.8	17
603	340,221	13,476	8,599	50,078	102,243	5,832	60,253	9,110	90,183	32,513	3,379	340,827	122,526	18
412	231,125	10,872	8,104	34,403	75,348	2,069	58,903	15,873	70,687	28,702	3,091	300,362	96,984	19
40.4	49.8	24.0	5.3	45.5	35.7	181.9	2.3	-42.6	39.7	13.3	9.3	10.2	26.3	20
606	357,408	14,329	9,287	53,793	104,434	6,512	70,150	10,070	123,016	36,642	3,595	355,721	168,207	21
412	324,404	11,229	9,449	37,795	86,761	2,700	110,332	18,547	130,654	36,078	11,256	375,270	102,945	22
	1,283						14,600		17,600			69,500		23
50	2,572	328	353	510	2,207	182	402	16	383	314	234	81	1,008	24
33	1,233	123	206	275	1,561	67	336	70	465	251	93	106	487	25
	116	10	5	31	21	1	289	14	670	5		132	129	26
	1,089	20	7	31	30	2	550	80	850	45	2	607	100	27
	2,413	8	149	96	242	1	1,910	103	2,630	27		5,341	1,116	28
	2,009	53	13	312	323	7	3,070	282	4,265	111	6	6,150	1,168	29
	624	1	1	5	6	2	143		162	3		893	339	30
	888			7	21		151	15	109	36		1,074	182	31
	8	26	44	43	13	5	10	3	20	4	6	15	4	32
	25	15	157	83	8	10	12	1	20	4	4	4	4	33
	92,646	111	223	308	13	189	12,477	14	133,199	8	80	421,793	1,168	34
	36,937	21	1,244	14,052	21	38	6,312		4,591			76,150	2	35
	2	20	2	7	6		5	10	3			4		36
	3	19	17	33	80	1	8		8		1	1	2	37
	3,300	4,010	9	2,294	1,100		490	98	200			3,375		38
	180	3,808	25,723	4,841	13,075	125	150		1,350			400	800	39
	58	3,037	363	697	2,662	189	30		14	356		176	1,425	40
	48	1,370	101	229	2,159	44	4	1	26	322		100	742	41
	2,370	1,751,843	141,177	33,078	378,410	60,056	6,020		22,802	154,261	73,166	216,418	857,617	42
	1,725	630,697	35,862	27,009	101,925	11,073	1,340	500	9,995	145,982	28,381	84,205	310,535	43
	60	3,212	307	463	630	213	108		42	411		237	1,473	44
	48	1,371	119	251	235	59	51	1	45	281		115	623	45
	280	44,440	4,002	4,652	13,917	2,395	984		3,281	5,381	1,855	11,181	24,329	46
	154	18,987	1,092	2,219	33,721	685	594		2,903	4,547	614	4,803	10,541	47
	3,306	2,525,498	199,011	81,731	403,885	69,084	72,522		250,081	335,762	99,804	400,016	1,730,400	48
	1,807	997,850	62,519	26,400	543,273	780,874	19,378		125,074	199,392	33,524	232,786	826,030	49
	98	32	37	100	80	100	72		39	46		33	20	50
	83	28	25	78	51	56	42		40	31		31	21	51
4,736,665	138,488,521	56,922,480	23,325,740	80,115,499	154,966,325	29,100,940	14,734,346	1,444,736	17,068,175	45,107,090	107,403,153	97,699,528	57,300,157	52
3,170,200	112,080,491	13,455,531	9,556,020	38,938,965	106,205,774	6,922,500	11,174,436	955,479	12,982,275	10,775,466	9,016,911	84,526,738	45,426,705	53
700,100	33,922,193	9,114,376	5,562,764	31,533,390	96,213,491	5,254,050	10,068,011	898,829	11,591,375	13,217,591	8,010,911	67,807,913	40,432,835	54
2,479,100	28,153,998	4,341,155	3,993,865	7,400,575	9,992,283	1,668,450	1,166,475	66,650	1,390,400	3,557,875	1,006,000	16,718,825	4,993,870	55
53,884.75	25,659.45	36,073.81	23,713.72	70,069.63	23,642.33	21,837.54	13,812.71	17,094.06	17,449.29	49,485.15	30,505.71	16,343.14	30,138.99	56
4,607.54	4,259.65	60.69	201.93	227.90	526.21	395.64	28.89	17.91	31.22	136.40	124.50	197.35	245.01	57
2,959,075	97,273,801	11,925,535	7,737,304	34,043,138	90,282,189	5,904,059	9,005,501	708,429	10,541,788	14,384,786	7,251,431	69,088,042	40,160,766	58
220,125	14,806,690	1,529,996	1,819,325	4,295,827	15,943,585	1,018,441	2,168,985	247,050	2,440,537	2,390,680	1,755,480	15,438,096	5,205,939	59
60,315	5,310,729	552,809	440,380	1,406,478	5,006,994	301,546	550,950	60,295	773,113	1,039,843	492,871	4,434,768	2,370,033	60
1,022.29	1,215.83	1,482.06	1,092.32	2,552.69	1,350.32	951.25	681.03	1,114.91	1,039.13	3,067.33	1,995.43	857.46	2,290.40	61
87.41	12.30	2.49	18.45	8.23	24.81	17.23	1.42	1.13	1.89	8.45	6.81	10.35	15.53	62
112,075	12,927,594	1,027,917	975,360	6,943,723	3,379,870	405,568	2,462,056	25,000	4,029,713	616,992	282,856	17,206,732	76,308,195	63
70,831	7,432,763	304,119	483,556	1,418,022	4,364,303	388,145	3,020,700	100,810	1,589,073	535,848	107,814	9,639,519	2,931,118	64
58.2	73.9	238.0	99.5	339.7	92.0	4.5	-18.5	-76.2	163.6	15.8	163.6	78.5		65
185.86	37.34	76.28	113.43	138.66	81.96	69.54	40.87	2.74	40.63	18.98	83.71	50.49	622.79	66
171.92	32.10	27.97	59.88	41.21	57.93	187.60	51.28	0.35	22.39	18.65	34.72	31.16	30.22	67
113,200	13,050,129	1,053,867	976,727	7,199,523	3,390,475	411,168	2,672,036	25,000	4,793,538	618,992	290,306	22,405,085	76,399,095	68
70,831	7,516,649	317,729	491,556	1,498,233	4,551,153	388,645	3,344,079	101,940	1,814,803	560,348	125,064	17,006,504	3,239,043	69
59.8	73.0	231.7	98.8	330.5	84.4	5.8	-20.1	-75.5	164.1	10.5	164.1	81.7		70
136.80	36.51	73.55	105.17	133.84	80.34	63.14	38.09	2.48	38.97	16.89	80.75	62.98	454.20	71
171.92	23.17	28.30	52.00	39.64	52.46	143.94	30.30	5.50	13.89	15.53	11.11	45.32	31.46	72
536	263,922	10,389	7,554	33,828	88,704	3,591	38,224	7,984	55,410	20,373	2,285	241,618	96,225	



IRRIGATION—CALIFORNIA

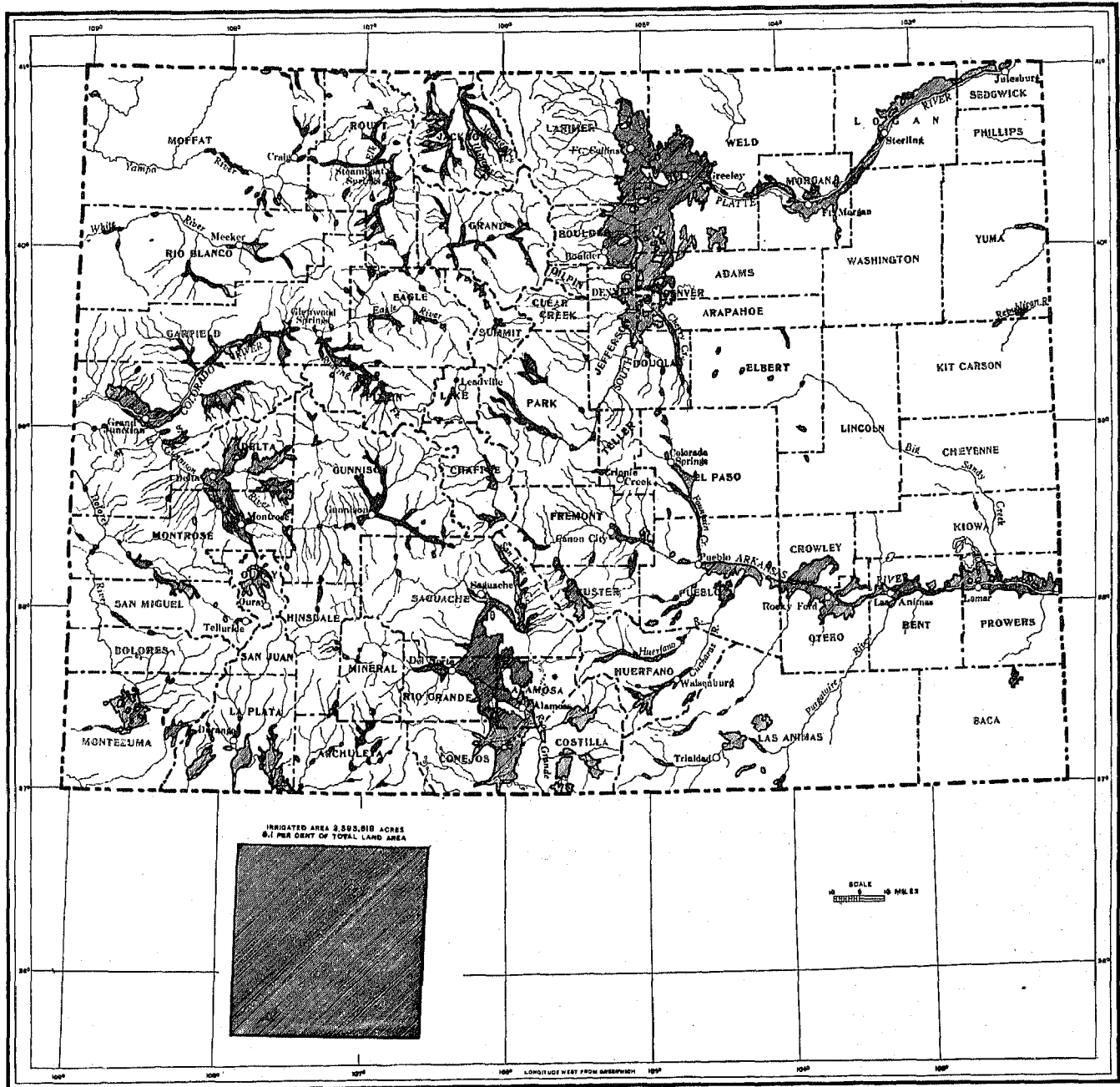
COUNTY TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929—Continued

ITEM (See definitions in Introduction)		Tehama	Trinity	Tulare	Tuolumne	Ventura	Yolo	Yuba
<b>FARMS AND FARM OPERATORS</b>								
1	All farms.....1930.....number	1,805	325	7,154	293	1,656	1,641	548
2	Irrigated farms.....1930.....number	953	193	6,239	198	1,199	820	335
3	Operated by—							
4	Owners and managers.....number	861	168	5,016	192	1,052	647	288
5	Tenants.....number	92	25	1,223	6	147	173	47
6	Irrigated farms.....1920.....number	640	217	5,184	149	818	688	242
	Increase, <sup>1</sup> 1920-1930.....per cent.	48.9	-11.1	20.4	32.9	48.6	19.2	38.4
<b>FARM AREA AND TOTAL LAND AREA</b>								
7	Approximate land area.....1930.....acres	1,872,000	1,981,440	3,107,840	1,401,600	1,189,120	648,960	404,480
8	Land in all farms.....1930.....acres	1,195,796	184,523	1,192,432	206,615	444,136	488,252	260,186
9	Land in irrigated farms.....1930.....acres	394,095	46,553	635,032	138,271	259,491	214,548	147,076
10	Average, per farm.....acres	413.5	241.2	511.8	698.3	216.4	261.6	439.0
11	Operated by owners and managers.....acres	369,388	43,273	483,452	136,927	233,819	187,795	116,249
12	Average, per farm.....acres	429.0	257.6	466.4	713.2	222.3	280.3	403.6
13	Operated by tenants.....acres	24,707	3,280	151,580	1,344	25,672	26,753	30,827
14	Average, per farm.....acres	268.6	131.2	123.0	224.0	174.6	154.6	655.9
15	Area irrigated.....1929.....acres	32,110	5,263	410,683	1,596	88,519	84,856	30,248
16	.....1919.....acres	23,153	5,810	398,662	2,892	31,716	42,493	20,773
17	Increase, <sup>1</sup> 1919-1929.....per cent.	38.7	-9.4	3.0	-44.8	179.1	99.7	45.6
18	Area enterprises were capable of supplying with water.....1930.....acres	48,685	7,460	581,730	7,830	100,965	153,811	51,199
19	.....1920.....acres	39,415	9,041	688,386	2,943	35,875	65,440	24,049
20	Increase, <sup>1</sup> 1920-1930.....per cent.	23.5	-17.5	-19.2	166.1	181.4	135.0	112.9
21	Irrigable area in enterprises.....1930.....acres	50,313	8,351	548,859	25,835	110,440	192,104	79,473
22	Total area in enterprises.....1920.....acres	44,870	15,010	704,733	25,371	50,737	104,716	71,995
23	Area in enterprises available, or to be available, for settlement.....1930.....acres			6,767		447		4,000
<b>IRRIGATION WORKS</b>								
24	Enterprises.....1930.....number	482	185	5,545	85	607	411	175
25	.....1920.....number	333	222	3,570	53	180	254	78
26	Main canals.....1930.....length, miles	137	156	343	53	44	152	184
27	.....1920.....length, miles	193	245	770	63	42	139	188
28	.....1930.....capacity, sec.-ft.	689	772	3,003	79	116	1,726	1,066
29	.....1920.....capacity, sec.-ft.	1,111	1,538	8,018	261	169	1,641	788
30	Laterals.....1930.....length, miles	127	18	590	81	21	285	190
31	.....1920.....length, miles	226	15	1,252	130	30	155	105
32	Reservoirs.....1930.....number	3	6	198	20	44	3	7
33	.....1920.....number	14	41	527	15	23	3	9
34	.....1930.....capacity, ac.-ft.	123	35	4,318	6,533	323	116	1,570
35	.....1920.....capacity, ac.-ft.	185	90,458	112,806	6,086	2,749	151	6,651
36	Wells, flowing.....1930.....number	1			1	2		
37	.....1920.....number					42		
38	.....1930.....capacity, g. p. m.			23		185		
39	.....1920.....capacity, g. p. m.	25			112	185		
40	Wells, pumped.....1930.....number	521	2	7,173		11,435		239
41	.....1920.....number	281	2	3,066	10	824	540	49
42	.....1930.....capacity, g. p. m.	255,961	5	4,515	2	149	285	48
43	.....1920.....capacity, g. p. m.	96,556	160	3,277,594	693	564,417	405,118	153,488
44	Pumping plants.....1930.....number	541	8	1,776,335	25	86,734	160,098	30,551
45	.....1920.....number	261	8	7,964	19	823	536	232
46	.....1930.....engine capacity, h. p.	4,995	160	3,768	4	105	276	41
47	.....1920.....engine capacity, h. p.	2,100	69	98,590	84	28,589	15,992	3,800
48	.....1930.....pump capacity, g. p. m.	265,013	8,425	45,032	12	5,692	8,852	2,865
49	.....1920.....pump capacity, g. p. m.	109,285	3,990	3,310,741	3,148	587,253	1,423,790	212,008
50	.....1930.....average lift, feet	31	25	2,331,179	25	94,130	549,814	20,852
51	.....1920.....average lift, feet	27	15	65	20	97	30	30
				43	36	82	26	24
<b>VALUES OF FARMS, 1930</b>								
52	Land and buildings, all farms.....dollars	80,078,182	3,024,567	151,032,619	3,531,485	144,962,522	67,574,316	16,709,768
53	Land and buildings, irrigated farms.....dollars	19,142,340	1,605,450	137,883,634	2,603,610	126,986,591	42,180,508	12,923,170
54	Operated by—							
55	Owners and managers.....dollars	14,794,555	1,430,050	117,779,824	2,567,610	115,122,611	36,035,243	12,082,070
56	Tenants.....dollars	1,347,775	174,800	20,104,010	30,000	11,863,980	6,145,265	841,100
57	Average, land and buildings, per farm.....dollars	16,938.45	8,318.39	22,100.28	13,149.55	105,910.42	51,439.64	38,576.63
58	per acre.....dollars	40.96	34.49	217.13	18.83	439.37	196.60	87.87
59	Land (excluding buildings).....dollars	13,355,206	1,112,660	121,538,844	1,061,300	116,940,945	37,151,208	11,427,394
60	Buildings (including dwellings).....dollars	2,787,134	492,800	16,344,790	642,310	10,045,646	5,029,305	1,495,776
61	Implements and machinery, irrigated farms.....dollars	868,747	112,481	6,921,069	162,623	4,821,804	2,211,782	708,518
62	Average, per farm.....dollars	911.50	582.80	1,109.32	821.33	4,021.60	2,697.30	2,114.98
	per acre.....dollars	2.20	2.42	10.90	1.18	18.58	10.31	4.82
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>								
63	Investment to Jan. 1, 1930.....dollars	1,849,577	217,513	20,330,935	665,901	9,162,945	6,682,734	1,625,633
64	.....1920.....dollars	1,048,959	206,875	12,629,432	965,667	2,661,027	2,008,591	1,486,568
65	Increase, <sup>1</sup> 1920-1930.....per cent.	76.3	5.1	62.3	-31.0	243.5	233.5	9.4
66	Average, per acre, based on area enterprises were capable of supplying with water, 1930.....dollars	37.99	29.16	38.24	35.04	90.75	43.45	31.75
	.....1920.....dollars	26.61	22.88	10.03	328.12	75.01	30.62	61.82
67	Estimated final investment in existing enterprises, 1930.....dollars	1,877,992	226,413	20,372,856	667,401	9,488,354	6,804,434	1,858,133
68	.....1920.....dollars	1,081,145	215,025	12,973,985	965,667	3,066,207	3,629,826	1,931,373
69	Increase, <sup>1</sup> 1920-1930.....per cent.	73.7	5.3	57.0	-30.9	209.5	87.6	-6.5
70	Average, per acre, based on estimated final investment and irrigable area, 1930.....dollars	37.33	27.11	37.12	25.83	85.91	35.42	23.32
71	.....1920.....dollars	24.20	14.33	16.97	38.06	60.43	34.60	27.52
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>								
72	Irrigated area for which cost was reported.....acres	30,800	5,142	378,163	1,662	86,685	78,087	29,808
73	.....1920.....acres	4.39	2.24	8.47	20.69	10.12	2.80	4.64

<sup>1</sup> A minus sign (-) denotes decrease.

# COLORADO

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND



# COLORADO

## INTRODUCTION

Statistics are presented in the following pages on farms irrigated and area irrigated, investment and cost of maintenance and operation of irrigation enterprises, cost of preparing land for irrigation, drainage of irrigated land, quantity of water used, and distribution of irrigation works, with specialized information relating to dams, pipe lines, and pumping equipment. Data on area irrigated, investment, and irrigation works are given in detail by drainage basins. Classifications of irrigated farms by type of farm, size of farm, and value of farm products; and the acreage, yield, and value of the principal crops grown on irrigated land, for all irrigation States, are shown in Parts III and IV, pages 257 and 325, respectively, of this volume.

Statistics for area irrigated and for cost of maintenance and operation of irrigation works relate to the year 1929; all other items relate to 1930.

For purposes of comparison, statistics for the census of 1920 are shown, where available; and for the purpose of showing the historical development of irrigation certain data are presented from censuses previous to that of 1920.

Data on number, area, and value of wholly and partly irrigated farms with the tenure of the operators of these farms were collected in 1930 on the general farm schedule; in 1920 only the number of irrigated farms was obtained in this way. All other statistics, in both censuses, were collected on special schedules for irrigation enterprises.

STATE TABLE 1.—SUMMARY FOR THE STATE: 1930 AND 1920

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent
All farms..... number.....	50,956	60,084	22	
All land in farms..... acres.....	23,876,171	24,462,014	4,414,157	18.0
Approximate land area of State..... acres.....	66,341,120	66,341,120		
Farms irrigated..... number.....	31,288	28,760	2,528	8.8
Area irrigated..... acres.....	3,393,019	3,348,385	46,234	1.4
Area enterprises were capable of supplying with water..... acres.....	4,078,712	3,855,348	223,364	5.8
Area in enterprises <sup>2</sup> ..... acres.....	4,528,251	5,220,588		
Proportion irrigated:				
All farms..... per cent.....	52.2	48.0		
All land in farms..... per cent.....	11.8	13.7		
Approximate land area of State..... per cent.....	5.1	5.0		
Excess of area enterprises were capable of supplying with water over area irrigated..... acres.....	685,093	506,063	178,130	36.1
Excess of area in enterprises <sup>2</sup> over area irrigated..... acres.....	1,134,632	1,872,203		
Area in enterprises available, or to be available, for settlement..... acres.....	88,731	274,282	-185,551	-67.6
Value of irrigated farms [land, buildings (including dwellings), and implements and machinery]..... dollars.....	414,180,910	( <sup>3</sup> )		
Investment in irrigation enterprises..... dollars.....	87,603,240	88,302,442	-699,202	-0.8
Average, per acre, based on area enterprises were capable of supplying with water..... dollars.....	21.45	22.90	-1.42	-6.2
Estimated final cost of existing enterprises..... dollars.....	91,845,804	95,198,423	-3,352,619	-3.5
Average, per acre, based on area in enterprises <sup>2</sup> ..... dollars.....	20.28	18.24		
Average annual cost, per acre, for maintenance and operation of irrigation works..... dollars.....	0.85	0.87	-0.02	-2.3

<sup>1</sup> Per cent not shown when less than one-tenth of 1 per cent. A minus sign (-) denotes decrease. <sup>2</sup> Irrigable area, 1930; total area, 1920. <sup>3</sup> Figures not available.

STATE TABLE 2.—FARMS AND SPECIFIED FARM VALUES, BY TENURE OF FARM OPERATOR, 1930

ITEM (See definitions in Introduction)	FARMS		SPECIFIED FARM VALUES					
	Number	Area	Land and buildings		Land alone		Implements and machinery	
			Total	Per acre	Total	Per acre	Total	Per acre
All farms.....	50,956	Acres 28,876,171	Dollars 629,346,075	Dollars 21.79	Dollars 510,954,728	Dollars 17.69	Dollars 50,241,437	Dollars 1.74
Owners and managers.....	39,264	21,707,342	413,053,020	19.03			33,619,842	1.65
Tenants.....	20,692	7,168,829	216,293,055	30.17			16,621,595	2.32
Irrigated farms.....	31,288	10,390,209	386,053,889	37.16	309,265,980	29.76	28,127,021	2.71
Owners and managers.....	20,060	8,034,879	242,084,080	30.13	187,913,509	23.39	18,093,845	2.25
Tenants.....	11,228	2,355,420	143,969,809	61.12	121,352,477	51.52	10,033,470	4.26
Wholly irrigated farms.....	27,277	7,909,878	316,282,247	39.99	251,337,913	31.78	23,135,491	2.92
Owners and managers.....	17,596	6,135,017	197,604,139	32.19	151,618,607	24.71	14,743,646	2.40
Tenants.....	9,681	1,774,861	118,778,108	66.92	99,719,306	56.18	8,391,845	4.73
Partly irrigated farms.....	4,011	2,480,421	69,771,642	28.13	57,928,073	23.35	4,991,530	2.01
Owners and managers.....	2,464	1,890,862	44,579,941	23.46	36,294,902	19.10	3,349,899	1.76
Tenants.....	1,547	589,559	25,191,701	43.39	21,633,171	37.26	1,641,631	2.88
Farms not irrigated.....	28,668	18,485,872	243,292,786	13.16	201,688,742	10.91	22,114,416	1.20

FARMS AND AREA IRRIGATED

STATE TABLE 3.—FARMS AND AREA IRRIGATED: 1890 TO 1930

CENSUS YEAR	FARMS IRRIGATED			AREA IRRIGATED			
	Number	Increase	Proportion of all farms	Area	Increase	Proportion of total land area of State	Proportion of land in all farms
1930.....	31,288	8.8	52.2	3,393,619	1.4	5.1	11.8
1920.....	28,756	11.2	48.0	3,348,385	19.9	5.0	13.7
1910.....	25,857	46.8	56.0	2,792,032	73.3	4.2	20.6
1900.....	17,613	82.3	71.3	1,611,271	80.9	2.4	17.0
1890.....	9,650		58.9	890,735		1.3	19.4

STATE TABLE 4.—AREA, BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION

DATE OF BEGINNING (See definitions in Introduction)	Enterprises, 1930	AREA IRRIGATED IN 1929		Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
		Area	Proportion of irrigable area in enterprises		
Total.....	Number 6,509	Acres 3,303,619	Per cent 74.0	Acres 4,078,712	Acres 4,528,251
Before 1860.....	38	33,093	89.1	36,305	87,154
1860-1869.....	412	500,311	80.3	545,944	560,211
1870-1879.....	956	491,078	85.0	558,053	571,386
1880-1889.....	1,643	1,190,662	83.2	1,334,791	1,451,603
1890-1899.....	830	350,325	72.3	422,073	484,815
1900-1904.....	574	272,038	61.0	302,686	445,649
1905-1909.....	364	273,020	45.0	486,261	607,121
1910-1914.....	370	87,138	69.0	109,000	120,317
1915-1919.....	258	22,081	58.7	31,190	37,622
1920-1924.....	204	15,141	44.6	18,835	33,950
1925-1929.....	220	17,679	74.0	20,838	23,766
Not reported.....	640	141,155	83.7	151,830	168,667

STATE TABLE 5.—AREA, BY SOURCE OF WATER SUPPLY: 1929 AND 1919

SOURCE OF SUPPLY	AREA IRRIGATED				Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1929	1919	Increase <sup>1</sup>			
Total.....	Acres 3,303,619	Acres 3,348,385	Acres 45,234	Per cent 1.4	Acres 4,078,712	Acres 4,528,251
Streams, gravity.....	3,138,966	3,028,787	110,179	3.6	3,777,873	4,100,508
Streams, pumped.....	27,705	12,747	15,018	117.8	48,331	60,801
Streams, gravity and pumped.....	2,828	9,430	-6,602	-70.0	3,032	3,052
Wells, pumped.....	12,143	10,114	2,029	20.1	15,469	18,621
Wells, flowing.....	3,786	4,191	-405	-9.7	4,581	4,731
Wells, pumped and flowing.....		85	-85	-100.0		
Lakes, pumped.....	405	871	-466	-53.5	410	410
Lakes, gravity.....	9,857	2,867	6,990	243.8	10,597	11,937
Springs.....	10,609	10,856	-250	-2.3	13,184	15,537
Stored storm water <sup>2</sup> .....	5,675	16,909	-11,234	-68.4	10,856	16,110
City water.....	85	11	74	672.7	85	85
Sewage.....	220	195	25	12.8	280	280
Streams, gravity and wells, pumped.....	3,956	16,258	-7,302	-44.0	9,412	9,680
Streams, gravity and wells, flowing.....	3,700	67,880	-59,180	-87.2	16,270	16,430
Other mixed.....	158,539	165,825	-7,286	-4.4	163,291	174,611
Other.....	5,088	1,359	3,729	274.4	5,047	6,458
Supplemental <sup>4</sup> from:						
Pumped streams.....	527				542	592
Pumped wells.....	1,343				2,220	2,416

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> In reservoirs filled from channels which carry water only during storms and are not classed as streams.  
<sup>3</sup> Tabulated as "Other and not reported."  
<sup>4</sup> Not considered in totals because included in enterprises reporting other sources of supply listed above.

AREA, BY CHARACTER OF ENTERPRISE

The areas credited to the United States Bureau of Reclamation in State Table 6 include not only the

project units still operated by that Bureau, but also the Orchard Mesa irrigation district, which now operates a unit of the Government-built Grand Valley project. The areas do not include other lands partly served by Government works in 1929 and 1919 with water carried through private canals under Warren Act or other water-service contracts.

STATE TABLE 6.—AREA, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

[For number of enterprises by classes, see State Table 12]

ITEM AND CHARACTER (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920	Area	Per cent
AREA IRRIGATED				
Total.....	Acres 3,393,619	Acres 3,348,385	Acres 45,234	1.4
Individual and partnership.....	969,708	1,014,412	-44,704	-4.4
Cooperative.....	1,789,909	1,789,385	524	(?)
Irrigation district.....	230,400	248,409	-18,009	-7.2
Carey Act.....	3,000	2,480	520	23.5
Commercial.....	286,846	212,138	74,708	35.2
United States Bureau of Indian Affairs.....	4,813	4,265	548	12.8
United States Bureau of Reclamation.....	31,882	71,145	10,738	15.1
State.....			80	-100.0
City.....	26,700	5,825	20,875	358.4
Other.....	360		360	
Not reported.....		265	-295	-100.0
AREA ENTERPRISES WERE CAPABLE OF SUPPLYING WITH WATER				
Total.....	4,078,712	3,866,348	223,364	5.8
Individual and partnership.....	1,194,132	1,194,422	-290	(?)
Cooperative.....	2,065,779	1,993,361	72,418	3.6
Irrigation district.....	344,153	269,604	74,649	27.7
Carey Act.....	4,000	15,000	-11,000	-73.3
Commercial.....	311,873	226,641	85,232	37.6
United States Bureau of Indian Affairs.....	15,681	14,900	781	5.2
United States Bureau of Reclamation.....	116,034	135,265	-19,231	-14.2
State.....			80	-100.0
City.....	26,700	5,825	20,875	358.4
Other.....	360		360	
Not reported.....		350	-350	-100.0
AREA IN ENTERPRISES <sup>3</sup>				
Total.....	4,528,251	5,220,588		
Individual and partnership.....	1,334,545	1,730,635		
Cooperative.....	2,314,837	2,419,267		
Irrigation district.....	383,051	504,973		
Carey Act.....	4,000	34,000		
Commercial.....	319,473	358,243		
United States Bureau of Indian Affairs.....	15,681	16,100		
United States Bureau of Reclamation.....	126,154	150,515		
State.....			80	
City.....	30,150	6,425		
Other.....	360			
Not reported.....		350		

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Less than one-tenth of 1 per cent.  
<sup>3</sup> Irrigable area, 1930; total area, 1920.

AREA, BY CHARACTER OF WATER RIGHTS

Colorado requires the filing of maps and plans of proposed irrigation systems in the office of the State engineer, but the filings are not applications for permission to appropriate water, no such permission being required; hence State Table 7 does not show rights classified elsewhere as "Permit from State" or "Certificate or license from State."

STATE TABLE 7.—AREA IRRIGATED, BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1929 AND 1919

WATER RIGHTS (See definitions in Introduction)	1929		1919	
	Area	Proportion of total	Area	Proportion of total
Total.....	Acres 3,393,619	Per cent 100.0	Acres 3,348,385	Per cent 100.0
Appropriation and use.....	195,551	5.8	114,616	3.4
Notice filed and posted.....	150,620	4.6	209,262	6.2
Adjudicated by court.....	3,003,119	88.5	2,018,383	87.2
Underground.....	15,697	0.5	14,558	0.4
Other.....	365	( <sup>1</sup> )	12,275	0.4
Not reported.....	22,387	0.6	79,291	2.4

<sup>1</sup> Less than one-tenth of 1 per cent.

<sup>2</sup> "Other and mixed."

IRRIGATION—COLORADO

AREA, BY DRAINAGE BASIN

STATE TABLE 8.—AREA, BY DRAINAGE BASIN: 1929 AND 1919

DRAINAGE BASIN (See definitions in Introduction)	AREA IRRIGATED			Area enter- prises were ca- pable of supplying with water, 1930	Irrigable area in enter- prises, 1930
	1929	1919	In- crease <sup>1</sup>		
	Acres	Acres	Per cent		
Total.....	3,393,619	3,348,385	1.4	4,078,712	4,628,251
South Platte River and tribu- taries.....	1,223,423	1,179,880	3.7	1,389,161	1,501,146
South Platte River direct.....	466,917	345,130	32.4	468,897	524,025
Bear Creek.....	12,824	8,778	46.1	12,908	12,008
Clear Creek.....	85,676	79,172	8.2	131,778	148,682
St. Vrain Creek.....	179,569	214,831	-20.7	205,401	208,295
Big Thompson Creek.....	92,704	90,678	-4.1	100,783	100,818
Big Beaver Creek.....	8,470	6,429	31.7	10,470	10,520
Cache la Poudre River.....	285,160	203,708	31.1	324,523	377,179
Lone Tree Creek.....	1,447	2,908	-51.2	1,467	1,805
Crow Creek.....	996	1,945	-48.8	1,220	1,640
Other tributaries.....	99,600	130,241	-23.6	111,748	115,865
Republican River and tributa- ries.....	3,375	8,441	-00.0	4,465	4,655
Smoky Hill River and tributa- ries.....	30	30	0.0	30	30
Arkansas River and tributaries.....	558,072	641,470	-13.0	690,955	762,208
Arkansas River direct.....	346,178	421,051	-17.8	373,943	395,067
South Fork.....	10,008	10,401	-3.8	10,985	12,000
Fountain River.....	22,604	20,465	10.7	35,356	35,736
St. Charles River.....	10,177	11,855	-14.2	11,330	11,734
Huerfano River.....	54,183	55,528	-2.4	76,051	97,692
Pishapa River.....	5,109	8,292	-37.3	25,609	28,550
Purgatoire or Las Animas River.....	32,799	43,533	-24.7	48,089	52,500
Cimarron River.....	139	139	0.0	140	293
Other tributaries.....	70,716	70,351	0.0	109,852	128,028
Rio Grande and tributaries.....	551,142	519,563	6.1	674,106	736,197
Rio Grande direct.....	350,069	326,688	0.0	379,874	413,175
Alamosa River.....	30,216	35,601	-15.1	43,675	44,175
La Jara River.....	9,180	10,627	-13.0	10,540	10,540
Conchos River.....	80,918	88,676	-8.7	99,808	112,313
Trinchera River.....	14,838	12,486	18.8	33,228	33,530
Other tributaries.....	50,921	45,488	31.7	77,071	92,468
San Juan River and tributaries.....	129,811	87,228	48.8	159,187	170,781
San Juan River direct.....	2,282	1,451	57.3	2,876	2,917
Los Pinos River.....	42,881	28,762	40.1	57,832	63,177
Animas River.....	27,283	17,819	53.1	29,374	35,214
La Plata River.....	24,308	17,174	41.5	39,920	38,255
Mancos River.....	13,167	9,040	45.7	16,200	17,945
Other tributaries.....	19,890	12,982	53.2	22,086	27,273
Upper Colorado River and tribu- taries.....	622,714	585,301	6.4	786,042	925,455
Upper Colorado River direct.....	64,855	71,968	-9.9	96,029	124,876
Fraser River.....	4,164	9,331	-55.4	4,652	5,882
Muddy Creek.....	6,448	5,050	27.7	8,509	9,919
Blue River.....	10,725	10,541	1.7	15,675	15,869
Eagle River.....	12,590	15,118	-16.7	13,623	13,677
Roaring Fork.....	36,283	30,738	18.0	47,055	49,971
Plateau Creek.....	64,833	26,260	146.9	68,480	78,034
Gunnison River and tribu- taries.....	258,872	250,913	3.2	322,837	347,969
Gunnison River direct.....	20,302	16,813	20.8	22,256	24,451
Taylor River.....	380	560	-32.1	580	580
Tomichi Creek.....	17,380	21,752	-20.3	22,407	22,839
North Fork.....	38,725	31,006	24.9	51,977	53,395
Smith Fork.....	19,329	15,814	26.2	23,876	26,161
Uncompahgre River.....	89,079	86,119	4.1	109,767	118,174
Other tributaries.....	73,121	79,349	-7.8	91,974	102,369
Rio Dolores.....	80,436	74,916	7.4	106,457	159,796
Other tributaries of Upper Colorado River.....	83,608	90,470	-7.7	102,219	119,472
Tributaries of Green River.....	103,888	94,003	10.5	137,120	155,944
Yampa River and tributaries.....	74,753	68,198	9.6	103,940	117,951
Yampa River direct.....	22,138	18,029	22.8	28,187	34,096
Little Snake River.....	7,884	9,617	-18.0	11,003	11,423
Other tributaries.....	44,731	40,562	10.3	64,750	71,532
White River.....	27,773	25,625	8.4	31,648	36,268
Other tributaries.....	1,362	180	656.7	1,532	1,730
North Platte River and tribu- taries.....	124,915	143,102	-12.7	151,550	175,580
North Platte River direct.....	7,470	2,520	196.4	7,870	9,376
Laramie River.....	11,075	6,160	79.8	11,075	12,850
Other tributaries.....	106,370	134,422	-20.9	132,605	153,360
Independent streams.....	76,249	89,361	-14.7	86,006	87,255
Saguache River.....	20,221	38,932	-46.8	25,501	25,661
San Luis River.....	37,691	51,329	-26.8	42,068	43,167
Other.....	18,437	18,437	0.0	18,437	18,437

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

INVESTMENT, AND COST OF MAINTENANCE AND OPERATION OF IRRIGATION ENTERPRISES

STATE TABLE 9.—INVESTMENT IN ENTERPRISES: 1890 TO 1930

CENSUS YEAR	INVESTMENT		AVERAGE, PER ACRE <sup>1</sup>	
	Amount	Increase <sup>2</sup>	Amount	Increase <sup>2</sup>
	Dollars	Per cent	Dollars	Per cent
1930.....	87,603,240	-0.8	21.48	-0.2
1920.....	88,302,442	55.9	22.90	01.4
1910.....	56,630,443	381.7	14.19	04.4
1900.....	11,768,703	84.6	7.30	2.1
1890.....	6,368,755	-----	7.15	-----

<sup>1</sup> Based on area enterprises were capable of supplying with water.  
<sup>2</sup> A minus sign (-) denotes decrease.

STATE TABLE 10.—INVESTMENT, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	INVESTMENT		
	Amount	Proportion of total	Average, per acre <sup>1</sup>
	Dollars	Per cent	Dollars
Total.....	87,603,240	100.0	21.48
Before 1890.....	428,625	0.5	11.75
1890-1899.....	5,213,823	6.0	9.55
1870-1879.....	9,675,437	11.0	17.34
1880-1889.....	20,071,053	22.9	15.04
1890-1899.....	7,225,131	8.2	17.12
1900-1904.....	12,701,634	14.6	35.27
1905-1909.....	23,792,200	27.2	48.03
1910-1914.....	5,013,051	6.4	61.08
1915-1919.....	317,890	0.4	10.19
1920-1924.....	869,998	1.0	40.17
1925-1929.....	337,722	0.4	16.21
Not reported.....	1,267,861	1.4	8.35

<sup>1</sup> Based on area enterprises were capable of supplying with water in 1930.

STATE TABLE 11.—INVESTMENT, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929; BY SOURCE OF WATER SUPPLY

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

SOURCE OF SUPPLY	INVESTMENT, 1930			MAINTENANCE AND OPERATION, 1929	
	Amount	Proportion of total	Average, per acre	Irrigated area report- ing	Average, per acre <sup>1</sup>
	Dollars	Per cent	Dollars	Acres	Dollars
Total.....	87,603,240	100.0	21.48	3,235,620	0.85
Streams, gravity.....	78,071,382	90.1	20.90	2,080,081	0.82
Streams, pumped.....	5,451,389	6.2	112.70	27,848	3.89
Streams, gravity and pumped.....	90,300	0.1	20.80	2,828	2.72
Wells, pumped.....	474,053	0.5	30.60	11,403	5.56
Wells, flowing.....	55,000	0.1	12.20	3,781	0.20
Lakes, pumped.....	13,100	(*)	31.95	401	3.21
Lakes, gravity.....	184,943	0.2	17.45	8,506	0.89
Springs.....	163,808	0.2	11.67	8,939	1.06
Stored storm water.....	274,862	0.3	25.32	5,517	0.70
City water.....	5,200	(*)	01.18	83	12.08
Sewage.....	2,050	(*)	7.32	220	0.55
Streams, gravity and wells, pumped.....	212,058	0.2	22.53	8,956	1.74
Streams, gravity and wells, flowing.....	241,271	0.3	14.83	8,700	4.89
Other mixed.....	1,287,838	1.4	7.70	155,729	0.26
Other.....	92,936	0.1	18.41	4,107	0.89
Supplemental from— Pumped streams.....	67,000	0.1	123.62	527	0.16
Pumped wells.....	55,350	0.1	24.83	1,100	5.17

<sup>1</sup> Based on area irrigated in 1929 reporting cost.  
<sup>2</sup> Less than one-tenth of 1 per cent.  
<sup>3</sup> Not considered in total because included in enterprises reporting other sources of supply listed above.

# IRRIGATION—COLORADO

**STATE TABLE 12.—INVESTMENT, BY CHARACTER OF ENTERPRISE: 1930 AND 1920**

CHARACTER OF ENTERPRISE (See definitions in Introduction)	Enter- prises, 1930	INVESTMENT		INCREASE <sup>1</sup>	
		1930	1920	Amount	Per cent
		Dollars	Dollars	Dollars	
Total	Number 6,500	87,603,240	88,302,442	-699,202	-0.8
Individual and partnership	5,026	10,815,909	11,599,882	-783,974	-0.8
Cooperative	531	45,051,717	42,911,035	2,140,682	4.4
Irrigation district	15	12,057,718	16,209,026	-3,611,308	-22.2
Carey Act	1	675,000	1,205,988	-630,988	-62.3
Commercial	28	5,624,989	5,711,887	-86,898	-1.5
United States Bureau of Indian Affairs	1	225,025	220,979	4,046	1.8
United States Bureau of Reclamation	2	11,551,307	10,253,281	1,298,026	12.7
State			3,904	-3,904	-100.0
City	3	408,575	117,665	380,910	323.7
Other	2	3,000		3,000	
Not reported			8,754	-8,754	-100.0

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

**STATE TABLE 13.—INVESTMENT, BY DRAINAGE BASIN: 1930 AND 1920**

DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent
	Dollars	Dollars	Dollars	
Total	87,603,240	88,302,442	-699,202	-0.8
South Platte River and tributaries	36,133,386	36,019,471	113,915	0.3
South Platte River direct	17,637,820	9,111,900	8,425,920	92.5
Boar Creek	830,800	137,240	702,560	511.9
Clear Creek	2,771,458	882,209	1,909,249	221.4
St. Vrain Creek	1,964,750	9,298,122	-7,333,372	-78.9
Big Thompson Creek	2,317,830	1,102,316	1,215,514	110.3
Big Beaver Creek	68,500	52,000	16,500	30.2
CACHE LA POUDE RIVER	9,484,322	7,907,593	1,576,729	19.9
Lone Tree Creek	44,850	2,731,100	-2,686,250	-98.4
Crow Creek	30,475	51,700	-21,225	-41.1
Other tributaries	1,073,681	4,764,691	-3,691,110	-77.5
Republican River and tributaries	45,110	89,463	-44,353	-49.0
Smoky Hill River and tributaries	250	1,200	-950	-79.2
Arkansas River and tributaries	15,756,524	19,710,289	-3,953,765	-20.1
Arkansas River direct	8,640,590	10,989,245	-2,348,655	-21.3
South Fork	81,110	69,000	12,110	17.6
Fountain River	419,889	965,287	-545,398	-66.5
St. Charles River	133,306	241,884	-108,578	-44.9
Huerfano River	1,590,384	3,204,519	-1,614,135	-60.4
Apishapa River	794,372	1,190,695	-396,323	-33.3
Purgatoire or Las Animas River	1,640,150	491,450	1,054,700	214.6
Gimarron River	9,705		9,705	
Other tributaries	2,635,018	2,558,209	-76,809	-0.9
Rio Grande and tributaries	6,778,334	4,538,300	2,240,034	49.4
Rio Grande direct	2,364,919	1,526,753	838,166	54.9
Alamosa River	801,325	556,909	244,416	43.9
La Jara River	17,825	30,275	-12,450	-41.1
Conejos River	839,676	604,739	274,937	48.7
Trinchera River	677,000	659,890	17,110	2.6
Other tributaries	2,077,689	1,199,734	877,955	73.2
San Juan River and tributaries	1,346,440	1,166,170	180,270	15.4
San Juan River direct	10,859	25,200	-14,341	-21.2
Los Pinos River	569,650	521,600	37,990	7.3
Animas River	360,177	323,638	36,539	11.3
La Plata River	120,119	94,613	25,506	27.0
Mancos River	113,365	35,477	77,878	219.5
Other tributaries	178,380	165,652	12,728	4.7
Upper Colorado River and tributaries	25,358,659	24,281,722	1,076,937	4.4
Upper Colorado River direct	5,098,045	5,023,462	-74,583	-1.5
Fraser River	12,155	55,860	-43,705	-78.2
Muddy Creek	110,650	-33,122	143,772	234.1
Blue River	115,210	116,608	-1,398	-1.2
Tagle River	322,084	109,012	213,072	195.5
Roaring Fork	559,953	407,266	152,687	37.5
Plateau Creek	315,135	341,755	-26,620	-7.8
Gunnison River and tributaries	10,538,635	10,745,767	-207,132	-1.9
Gunnison River direct	784,520	1,001,819	-217,299	-21.7
Taylor River	7,700	6,900	800	11.6
Tomichi Creek	112,335	129,243	-16,908	-12.7
North Fork	704,243	622,647	81,596	22.7
Smith Fork	484,950	396,075	88,875	22.4
Uncompahgre River	6,993,474	6,945,702	47,772	0.7
Other tributaries	1,390,913	1,643,381	-252,468	-15.4
Rio Dolores	6,482,945	4,847,569	1,635,376	33.7
Other tributaries of Upper Colorado River	1,203,847	1,701,301	-497,454	-20.2
Tributaries of Green River	1,337,707	1,372,889	-35,182	-2.6
Yampa River and tributaries	862,657	923,673	-61,016	-6.6
Yampa River direct	298,435	182,768	115,667	83.3
Little Snake River	108,877	237,254	-128,377	-54.1
Other tributaries	455,345	523,651	-68,306	-13.0
White River	460,500	447,141	13,359	8.0
Other tributaries	14,550	2,075	12,475	601.2

**STATE TABLE 13.—INVESTMENT, BY DRAINAGE BASIN: 1930 AND 1920—Continued**

DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent
	Dollars	Dollars	Dollars	
North Platte River and tributaries	714,740	835,578	-120,838	-14.5
North Platte River direct	31,550	41,200	-9,650	-23.4
Laramie River	69,650	51,800	17,850	34.4
Other tributaries	613,540	742,578	-129,038	-17.4
Independent streams	132,090	287,360	-155,270	-54.0
Saguache River	55,465	103,048	-47,583	-46.2
San Luis River	56,775	184,312	-127,537	-69.2
Other	19,850		19,850	

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

## COST OF PREPARING LAND FOR IRRIGATION

**STATE TABLE 14.—ESTIMATED COST OF PREPARING LAND, 1930**

ITEM	1930
Area reporting	2,326,239 acres
Estimated cost reported	48,379,232 dollars
Average, per acre	20.80 dollars

## DRAINAGE OF IRRIGATED LAND

**STATE TABLE 15.—AREA WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL AREA IN NEED OF DRAINAGE: 1930 AND 1920**

ITEM	1930	1920
Enterprises reporting land drained or needing drainage	301 number	420
Area <sup>1</sup> in enterprises reporting land drained or needing drainage	1,018,269 acres	1,526,311
Area for which drains have been installed	215,000 acres	113,899
Additional area needing drainage	148,063 acres	229,711
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises reporting drainage	21.2 per cent	7.5
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises	4.8 per cent	2.2
Proportion that area for which drains have been installed plus that needing drainage is of area <sup>1</sup> in all irrigation enterprises	8.0 per cent	6.4

<sup>1</sup>Irrigable area, 1930; total area, 1920.

## QUANTITY OF WATER USED

**STATE TABLE 16.—WATER USED: 1929 AND 1919**

ITEM (See definitions in Introduction)	TOTAL		MEASURED		NOT MEASURED	
	1929	1919	1929	1919	1929	1919
	Average flow of water entering canals	19,322 sec.-ft.	37,140	15,777	14,558	3,545
Area irrigated	1,771,036 acres	2,174,612	1,563,479	1,373,031	187,567	801,581
Average, per second-foot	02	59	100	94	53	35
Total quantity of water entering canals	5,303,140 ac.-ft.	13,877,292	3,786,028	4,848,103	2,077,112	9,029,189
Area irrigated	2,103,937 acres	2,446,702	1,562,291	1,752,587	541,646	694,116
Average quantity per acre	2.8 ac.-ft.	5.7	2.4	2.8	3.8	13.0
Total quantity of water delivered to irrigators	1,840,805 ac.-ft.	3,233,531	1,699,100	1,832,530	141,705	1,401,001
Area irrigated	1,001,425 acres	1,504,593	933,468	1,082,659	67,957	414,934
Average quantity per acre	1.8 ac.-ft.	2.1	1.8	1.7	2.1	3.4

IRRIGATION—COLORADO

IRRIGATION WORKS

STATE TABLE 17.—DAMS, BY MATERIAL, 1930

MATERIAL	DAMS	
	Diversion	Storage
	Number	Number
Total.....	3,672	706
Concrete or masonry.....	273	16
Timber.....	742	
Earth and rock.....		523
Other and mixed.....	1,2,506	186
Not reported.....	161	31

<sup>1</sup> Principally temporary dams, replaced annually.

STATE TABLE 18.—LENGTH OF PIPE LINES, BY MATERIAL AND SIZE, 1930

MATERIAL AND SIZE (DIAMETER)	Length	MATERIAL AND SIZE (DIAMETER)	Length
	Miles		Miles
Total.....	131.9		
Concrete:		Metal:	
1 to 12 inches.....	55.7	1 to 12 inches.....	21.0
13 to 30 inches.....	6.9	13 to 30 inches.....	10.8
More than 30 inches.....	5.4	More than 30 inches.....	4.5
Clay:		Wood:	
1 to 12 inches.....	8.9	1 to 12 inches.....	5.4
13 to 30 inches.....	1.2	13 to 30 inches.....	3.4
		More than 30 inches.....	8.7

STATE TABLE 19.—PUMPING EQUIPMENT, BY KIND OF POWER AND PUMP, 1930

ITEM	ENGINES OR MOTORS		PUMPS				
	Capacity	Proportion of total	Number	Proportion of total	Capacity	Proportion of total	Average lift
	H. p. 11,204	Per cent 100.0		Per cent 100.0	G. p. m. 437,260	Per cent 100.0	Feet 25
KIND OF POWER							
Total.....			540				
Electricity.....	4,197	37.4	221	40.9	190,082	45.5	27
Internal combustion.....	3,420	30.5	257	47.6	140,688	32.2	23
Water.....	3,248	29.0	16	3.0	83,787	19.2	24
Wind.....	14	0.1	13	2.4	1,055	0.2	17
Electricity and—							
Water.....	44	0.4	2	0.4	3,850	0.9	18
Internal combustion.....	187	1.7	18	3.3	5,608	1.3	23
Steam and water.....	30	0.3	2	0.4	550	0.1	20
Wind and internal combustion.....	64	0.6	11	2.0	2,730	0.6	31
KIND OF PUMP							
Centrifugal.....	10,270	91.7	438	81.1	392,257	89.7	23
Rotary.....	337	3.0	29	5.4	15,821	3.6	42
Turbine.....	294	2.6	20	3.7	10,050	3.7	31
Reciprocating.....	33	0.3	6	1.1	973	0.2	24
Plunger.....	30	0.3	18	3.3	1,092	0.2	37
Water wheel.....	11	0.1	6	1.1	1,987	0.5	8
Bucket.....	39	0.3	3	0.5	1,850	0.4	17
Centrifugal and—							
Reciprocating.....	60	0.5	7	1.3	2,500	0.6	35
Rotary.....	4	( <sup>1</sup> )	2	0.4	600	0.1	8
Plunger.....	29	0.3	5	0.9	370	0.1	14
Water wheel.....	30	0.3	2	0.4	550	0.1	20
Bucket.....	16	0.1	2	0.4	1,200	0.3	26
Not reported.....	42	0.4	2	0.4	2,000	0.5	32

<sup>1</sup> Less than one-tenth of 1 per cent.

STATE TABLE 20.—IRRIGATION WORKS, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS		Pipe lines, length Miles	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Diversion	Storage	Capacity	Length	Lateral canals, length Miles	Number	Capacity		Number	Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps	
	Number	Number	Sec.-ft.	Miles	Miles	765	Acre-feet		621	G. p. m.	654	G. p. m.	516	H. p.	540	G. p. m.
Total.....	3,672	706	123,652	15,355	6,026	765	1,924,982	131.9	621	39,644	654	237,903	516	11,204	540	437,260
Before 1860.....	28	1	1,108	115	25	1	232	0.5			2	500	3	40	3	3,800
1860-1869.....	301	25	24,059	1,605	1,034	43	155,745	4.4			12	4,819	7	205	8	20,969
1870-1879.....	714	57	13,692	2,250	575	70	129,482	6.0			2	720	3	40	3	3,420
1880-1889.....	987	151	32,268	4,503	2,388	153	565,478	5.2	342	16,260	1	50	7	114	7	5,420
1890-1899.....	405	108	8,534	1,866	229	113	261,136	7.0	73	6,399	2	900	10	121	10	6,017
1900-1904.....	330	100	13,169	1,665	270	117	276,306	16.7	83	7,073	2	1,350	10	139	10	8,170
1905-1909.....	221	94	22,733	1,531	1,185	104	302,249	73.2	25	2,210	28	13,850	27	4,795	33	135,000
1910-1914.....	191	65	3,568	623	130	66	42,447	3.4	25	2,718	69	27,890	44	569	44	35,141
1915-1919.....	113	26	790	244	17	18	4,789	5.9	35	3,252	94	36,410	66	968	67	43,830
1920-1924.....	55	16	393	170	17	13	35,103	2.5	10	1,012	93	41,890	88	1,242	90	48,600
1925-1929.....	44	21	432	110	56	14	2,531	3.6	5	450	184	63,442	149	1,810	159	74,501
Not reported.....	283	42	2,306	663	100	43	15,506	3.5			166	46,612	102	1,160	109	52,202

STATE TABLE 21.—IRRIGATION WORKS, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS		Pipe lines, length Miles	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Diversion	Storage	Capacity	Length	Lateral canals, length Miles	Number	Capacity		Number	Capacity	Number	Capacity	Number	Engine or motor capacity	Pumps	
	Number	Number	Sec.-ft.	Miles	Miles	765	Acre-ft.		621	G. p. m.	654	G. p. m.	516	H. p.	540	G. p. m.
Total.....	3,672	706	123,652	15,355	6,026	765	1,924,982	131.9	621	39,644	654	237,903	516	11,204	540	437,260
Individual and partnership.....	3,230	379	32,976	8,806	814	377	119,076	31.4	278	22,944	638	231,884	493	6,463	511	298,101
Cooperative.....	388	282	71,033	5,160	3,103	340	1,020,702	30.5	40	900	15	5,119	18	1,501	21	61,349
Irrigation district.....	18	17	7,847	534	453	17	309,394		300	15,000						
Carey Act.....		1	200	17	15	1	35,000	0.5								
Commercial.....	26	24	6,703	410	932	27	429,557	61.6	3	800						
United States Bureau of Indian Affairs.....			50	52	55											
United States Bureau of Reclamation.....	8		4,185	203	607			7.8					2	3,125	5	75,500
City.....	2	2	608	71	17	2										
Other.....		1				1	11,250	0.1			1	900	3	115	3	2,300









## IRRIGATION—COLORADO

COUNTY TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930; AND COST OF MAINTENANCE

ITEM (See definitions in Introduction)		Fremont	Garfield	Grand	Gunnison	Hinsdale	Huerfano
<b>FARMS AND FARM OPERATORS</b>							
1	All farms.....1930.....number..	1,270	1,015	229	370	44	760
2	Irrigated farms.....1930.....number..	1,015	873	208	209	34	883
3	Operated by—						
4	Owners and managers.....number..	818	620	178	204	30	322
5	Tenants.....number..	197	247	25	35	4	61
6	Irrigated farms.....1920.....number..	827	820	237	335	20	418
	Increase, <sup>1</sup> 1920-1930.....per cent..	22.7	5.3	-14.3	-10.7	17.2	-8.4
<b>FARM AREA AND TOTAL LAND AREA</b>							
7	Approximate land area.....1930.....acres..	998,480	1,988,480	1,104,240	2,034,560	621,440	900,000
8	Land in all farms.....1930.....acres..	366,717	251,791	212,341	215,849	18,142	495,851
9	Land in irrigated farms.....1930.....acres..	188,419	208,982	200,214	182,454	15,633	300,088
10	Average, per farm.....acres..	185.6	239.4	986.3	610.2	459.8	783.5
11	Operated by owners and managers.....acres..	165,842	163,305	186,311	166,875	13,453	278,430
12	Average, per farm.....acres..	202.7	280.9	1,046.7	631.3	448.4	804.7
13	Operated by tenants.....acres..	22,577	45,677	18,903	15,779	2,180	21,652
14	Average, per farm.....acres..	114.6	184.9	556.1	450.8	545.0	355.0
15	Area irrigated.....1929.....acres..	25,655	69,799	28,649	41,474	5,212	30,974
16	1919.....acres..	29,884	73,473	39,857	48,280	3,075	20,081
17	Increase, <sup>2</sup> 1919-1929.....per cent..	-14.2	-5.0	-28.1	-14.1	41.8	6.5
18	Area enterprises were capable of supplying with water.....1930.....acres..	31,957	80,472	42,343	48,080	5,084	44,129
19	1920.....acres..	35,697	93,814	43,092	52,407	3,880	32,110
20	Increase, <sup>2</sup> 1920-1930.....per cent..	-10.5	-14.2	-1.7	-8.4	54.2	37.4
21	Irrigable area in enterprises.....1930.....acres..	36,873	99,701	55,255	49,811	6,603	40,200
22	Total area in enterprises.....1920.....acres..	44,089	117,618	85,504	67,925	4,065	43,274
23	Area in enterprises available, or to be available, for settlement.....1930.....acres..	3,000	115		385		
<b>IRRIGATION WORKS</b>							
24	Enterprises.....1930.....number..	189	291	155	227	53	313
25	1920.....number..	179	323	109	382	52	267
26	Main canals.....1930.....length, miles..	204	693	410	387	61	386
27	1920.....length, miles..	229	730	542	702	104	475
28	1930.....capacity, sec.-ft..	702	1,011	1,073	1,631	385	1,218
29	1920.....capacity, sec.-ft..	901	2,563	2,037	4,296	519	1,907
30	Laterals.....1930.....length, miles..	41	133	37	22		2
31	1920.....length, miles..	101	16	21	8		140
32	Reservoirs.....1930.....number..	20	16	21	5		12
33	1920.....number..	31	26	25	8		34
34	1930.....capacity, aq.-ft..	7,260	20,572	3,641	77	120,400	1,440
35	1920.....capacity, aq.-ft..	6,972	7,594	3,137	460	43,500	12,027
36	Wells, flowing.....1930.....number..	5					
37	1920.....number..	3					
38	1930.....capacity, g. p. m..	870					
39	1920.....capacity, g. p. m..	115					
40	Wells, pumped.....1930.....number..	2					
41	1920.....number..	9					
42	1930.....capacity, g. p. m..	80					2
43	1920.....capacity, g. p. m..	287					
44	Pumping plants.....1930.....number..	5	2	1	2		70
45	1920.....number..	10	2	4	4		4
46	1930.....engine capacity, h. p..	53	42	1	62		
47	1920.....engine capacity, h. p..	309	10		112		
48	1930.....pump capacity, g. p. m..	4,380	2,000	30	4,000		11
49	1920.....pump capacity, g. p. m..	6,962	350		3,800		46
50	1930.....average lift, feet..	28	32	6	26		
51	1920.....average lift, feet..	38	29		18		52
<b>VALUES OF FARMS, 1930</b>							
52	Land and buildings, all farms.....dollars..	7,189,054	8,472,775	3,172,663	4,129,000	385,645	4,760,029
53	Land and buildings, irrigated farms.....dollars..	6,171,186	8,051,175	3,056,843	3,881,670	344,045	3,688,707
54	Operated by—						
55	Owners and managers.....dollars..	5,094,691	5,873,615	2,823,433	3,455,200	302,045	3,260,017
56	Tenants.....dollars..	1,076,495	2,177,560	233,410	426,470	42,000	322,090
57	Average, land and buildings, per farm.....dollars..	6,079.99	9,222.42	15,058.34	12,982.17	10,118.97	9,369.69
58	Average, land and buildings, per acre.....dollars..	32.75	38.53	15.27	21.27	22.01	11.96
59	Land (excluding buildings).....dollars..	4,190,710	6,269,152	2,453,043	3,108,485	272,035	3,065,172
60	Buildings (including dwellings).....dollars..	1,980,470	1,785,023	603,200	773,185	72,010	523,535
61	Implements and machinery, irrigated farms.....dollars..	377,173	560,314	177,155	278,615	30,135	231,800
62	Average, per farm.....dollars..	371.60	641.83	872.68	931.82	886.32	603.92
	per acre.....dollars..	2.00	2.68	0.88	1.53	1.93	0.77
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>							
63	Investment to Jan. 1, 1930.....dollars..	945,663	983,360	372,095	358,025	1,200,972	283,324
64	1920.....dollars..	1,761,518	1,134,502	534,913	462,748	395,752	1,061,777
65	Increase, <sup>3</sup> 1920-1930.....per cent..	-40.3	-13.3	-30.4	-22.6	220.9	-73.3
66	Average, per acre, based on area enterprises were capable of supplying with water, 1930.....dollars..	29.59	12.22	8.79	7.45	212.23	6.42
67	1920.....dollars..	49.35	12.09	12.41	8.82	102.00	33.05
68	Estimated final investment in existing enterprises, 1930.....dollars..	951,418	988,835	405,045	364,875	1,319,972	287,824
69	1920.....dollars..	1,889,558	1,170,827	547,713	472,998	395,752	1,083,232
70	Increase, <sup>3</sup> 1920-1930.....per cent..	-49.6	-15.5	-26.0	-22.9	233.5	-73.4
71	Average, per acre, based on estimated final investment and irrigable area, 1930.....dollars..	25.80	9.92	7.33	7.32	199.90	6.22
72	Average, per acre, based on estimated final investment and total area, 1920.....dollars..	42.89	9.95	6.41	6.66	67.36	25.03
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>							
73	Irrigated area for which cost was reported.....acres..	25,179	64,943	28,232	34,659	4,844	30,760
74	Average, per acre, based on area reporting.....dollars..	2.90	0.91	0.37	0.45	4.04	0.63

<sup>1</sup> Includes 2 farms reported for San Juan in 1930, to avoid disclosure of individual operations.  
<sup>2</sup> Included in "All other counties."  
<sup>3</sup> A minus sign (-) denotes decrease.



IRRIGATION—COLORADO

COUNTY TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930; AND COST OF MAINTENANCE

ITEM (See definitions in Introduction)		Montrose	Morgan	Otero	Ourray	Park	Pitkin
<b>FARMS AND FARM OPERATORS</b>							
1	All farms..... 1930..... number.....	1,318	1,569	1,298	178	394	180
2	Irrigated farms..... 1930..... number.....	1,238	845	1,120	156	125	154
3	Operated by—						
4	Owners and managers..... number.....	770	388	596	124	104	123
5	Tenants..... number.....	408	457	524	32	21	31
6	Irrigated farms..... 1920..... number.....	1,294	777	1,157	142	122	153
	Increase, 1920-1930..... per cent.....	-4.3	8.8	-3.2	9.9	2.5	0.7
<b>FARM AREA AND TOTAL LAND AREA</b>							
7	Approximate land area..... 1930..... acres.....	1,448,980	823,040	805,760	332,160	1,434,880	652,100
8	Land in all farms..... 1930..... acres.....	231,005	632,615	467,846	100,925	535,826	59,888
9	Land in irrigated farms..... 1930..... acres.....	199,966	216,334	203,359	95,820	364,004	50,292
10	Average, per farm..... acres.....	161.5	250.0	181.6	614.2	2,912.0	320.6
11	Operated by owners and managers..... acres.....	149,567	128,325	134,821	83,140	332,554	41,107
12	Average, per farm..... acres.....	194.2	350.7	226.2	670.5	3,197.6	334.2
13	Operated by tenants..... acres.....	50,409	88,009	68,538	12,080	31,450	9,185
14	Average, per farm..... acres.....	107.7	192.6	130.8	396.3	1,497.6	206.3
15	Area irrigated..... 1929..... acres.....	84,058	105,277	87,981	20,401	44,038	17,501
16	Increase, 1919-1929..... acres.....	94,757	132,231	120,198	14,016	49,793	12,994
17	Increase, 1919-1929..... per cent.....	-11.3	-20.4	-20.8	45.6	-11.6	34.7
18	Area enterprises were capable of supplying with water..... 1930..... acres.....	105,100	115,333	106,066	23,431	45,570	25,118
19	Increase, 1920-1930..... acres.....	123,805	153,796	124,879	23,092	52,029	15,172
20	Increase, 1920-1930..... per cent.....	-15.2	-25.0	-15.1	1.6	-12.4	65.6
21	Irrigable area in enterprises..... 1930..... acres.....	114,648	126,196	119,646	31,430	46,795	25,612
22	Total area in enterprises..... 1920..... acres.....	173,162	166,670	183,077	24,017	55,449	21,295
23	Area in enterprises available, or to be available, for settlement..... 1930..... acres.....	3,895		300	620		
<b>IRRIGATION WORKS</b>							
24	Enterprises..... 1930..... number.....	76	35	23	162	199	104
25	Increase, 1920-1930..... number.....	103	39	26	90	213	70
26	Main canals..... 1930..... length, miles.....	394	318	316	239	317	241
27	Increase, 1920-1930..... length, miles.....	431	308	329	213	440	191
28	1930..... capacity, sec.-ft.....	3,687	4,221	4,906	682	2,770	781
29	1920..... capacity, sec.-ft.....	2,437	3,771	5,537	642	2,705	655
30	Laterals..... 1930..... length, miles.....	447	163	162	16	24	13
31	Increase, 1920-1930..... length, miles.....	382	62	429		20	37
32	Reservoirs..... 1930..... number.....	14	4	5	2	2	2
33	Increase, 1920-1930..... number.....	14	10	10		1	3
34	1930..... capacity, ac.-ft.....	13,144	80,772	35,347	166	26,002	1,011
35	1920..... capacity, ac.-ft.....	8,335	86,680	36,659		8	19
36	Wells, flowing..... 1930..... number.....						
37	Increase, 1920-1930..... number.....						
38	1930..... capacity, g. p. m.....						
39	1920..... capacity, g. p. m.....						
40	Wells, pumped..... 1930..... number.....						
41	Increase, 1920-1930..... number.....						
42	1930..... capacity, g. p. m.....						
43	1920..... capacity, g. p. m.....						
44	Pumping plants..... 1930..... number.....	1	4	12			
45	Increase, 1920-1930..... number.....	1	4	12			
46	1930..... engine capacity, h. p.....	10	17	11			
47	1920..... engine capacity, h. p.....	41	62	188			
48	1930..... pump capacity, g. p. m.....	480	344	188			
49	1920..... pump capacity, g. p. m.....	400	4,000	9,400			
50	1930..... average lift, feet.....	80	20,585	10,438			
51	1920..... average lift, feet.....	84	30	18			
<b>VALUES OF FARMS, 1930</b>							
52	Land and buildings, all farms..... dollars.....	7,832,094	19,736,549	13,360,386	1,652,268	4,018,412	1,684,765
53	Land and buildings, irrigated farms..... dollars.....	7,512,441	14,302,368	12,125,248	1,595,310	2,838,885	1,559,915
54	Operated by—						
55	Owners and managers..... dollars.....	4,877,091	7,160,233	6,306,448	1,232,100	2,490,235	1,252,065
56	Tenants..... dollars.....	2,635,350	7,142,130	5,818,800	313,160	348,650	307,260
57	Average, land and buildings, per farm..... dollars.....	6,068.21	10,925.87	10,826.11	10,226.85	22,711.08	10,120.32
58	per acre..... dollars.....	87.67	66.11	69.62	16.65	7.80	31.02
59	Land (excluding buildings)..... dollars.....	5,537,601	11,771,663	9,655,698	1,300,410	2,231,915	1,281,665
60	Buildings (including dwellings)..... dollars.....	1,974,840	2,630,710	2,469,650	294,900	606,970	278,260
61	Implements and machinery, irrigated farms..... dollars.....	750,428	1,208,181	802,060	146,430	204,383	131,706
62	Average, per farm..... dollars.....	606.16	1,429.80	805.41	935.05	1,636.06	855.58
	per acre..... dollars.....	3.75	5.68	4.44	1.53	0.56	2.62
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>							
63	Investment to Jan. 1, 1930..... dollars.....	6,944,017	2,784,109	2,782,085	213,491	211,435	300,660
64	Increase, 1920-1930..... dollars.....	6,788,768	2,600,735	4,157,635	197,689	175,670	208,324
65	Average, per acre, based on area enterprises were capable of supplying with water, 1930..... per cent.....	2.3	7.1	-35.1	8.0	20.4	44.3
66	1920..... dollars.....	66.07	24.14	26.23	9.11	4.64	11.97
67	Estimated final investment in existing enterprises, 1930..... dollars.....	54.79	16.91	33.29	8.56	3.38	13.73
68	Increase, 1920-1930..... dollars.....	7,139,617	2,804,100	2,788,085	216,016	211,485	309,060
69	Average, per acre, based on estimated final investment and irrigable area, 1930..... per cent.....	7,286,466	2,604,785	4,438,935	197,758	176,080	214,324
70	1920..... dollars.....	-2.0	7.7	-37.2	9.2	20.1	44.2
71	Average, per acre, based on estimated final investment and total area, 1920..... dollars.....	62.27	22.22	23.30	6.87	4.52	12.07
72	Average, per acre, based on estimated final investment and total area, 1920..... dollars.....	42.08	15.63	24.25	8.23	3.18	10.06
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>							
73	Irrigated area for which cost was reported..... acres.....	83,704	105,262	87,981	20,311	42,964	17,321
74	Average, per acre, based on area reporting..... dollars.....	1.76	1.16	0.73	0.46	0.30	0.84

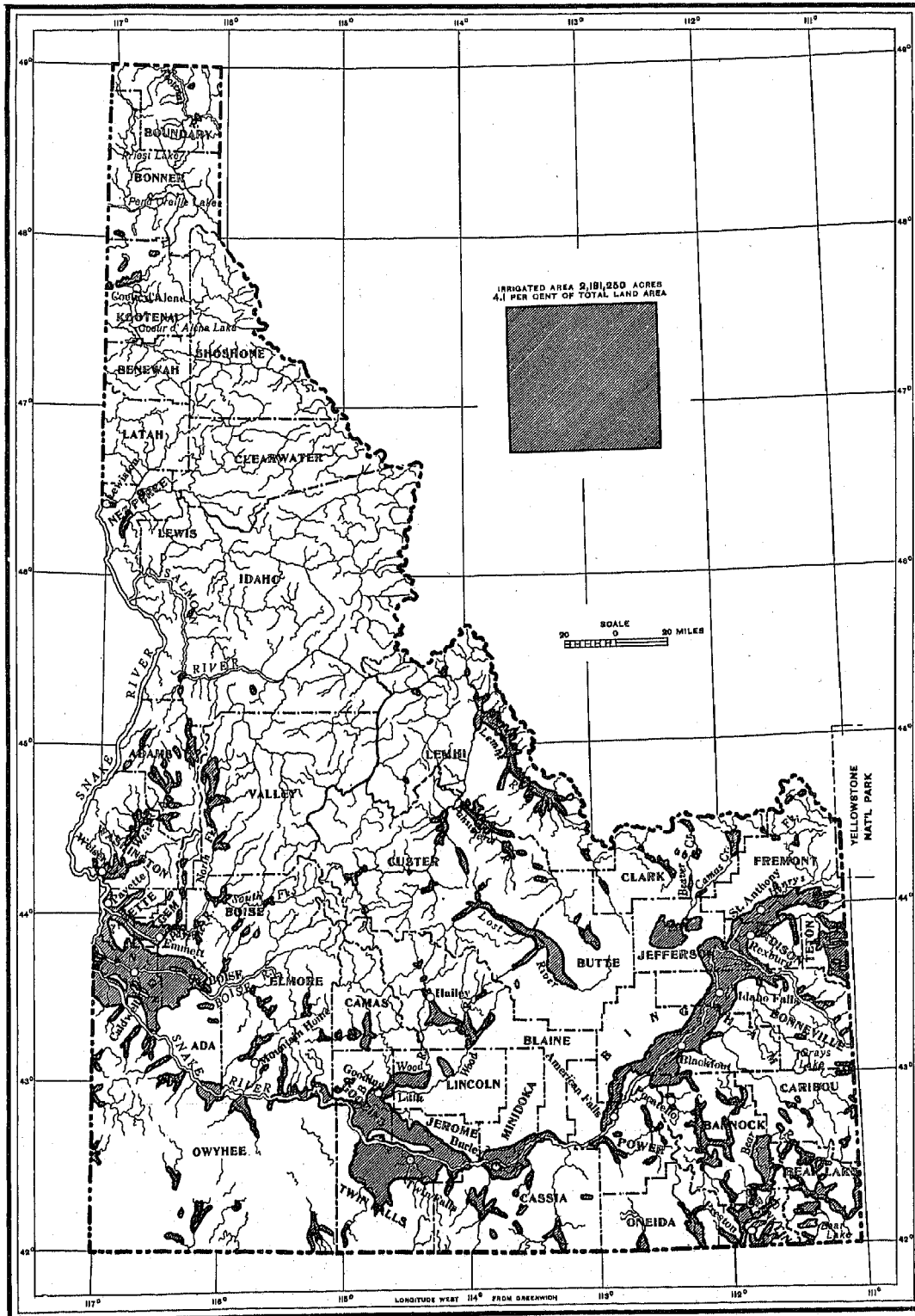
<sup>1</sup> Part of Dolores annexed in 1925.

<sup>2</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.



# IDAHO

## APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND



# IDAHO

## INTRODUCTION

Statistics are presented in the following pages on farms irrigated and area irrigated, investment and cost of maintenance and operation of irrigation enterprises, cost of preparing land for irrigation, drainage of irrigated land, quantity of water used, and distribution of irrigation works, with specialized information relating to dams, pipe lines, and pumping equipment. Data on area irrigated, investment, and irrigation works are given in detail by drainage basins. Classifications of irrigated farms by type of farm, size of farm, and value of farm products; and the acreage, yield, and value of the principal crops grown on irrigated land, for all irrigation States, are shown in Parts III and IV, pages 257 and 325, respectively, of this volume.

Statistics for area irrigated and for cost of maintenance and operation of irrigation works relate to the year 1929; all other items relate to 1930.

For purposes of comparison, statistics for the census of 1920 are shown, where available; and for the purpose of showing the historical development of irrigation certain data are presented from censuses previous to that of 1920.

Data on number, area, and value of wholly and partly irrigated farms with the tenure of the operators of these farms were collected in 1930 on the general farm schedule; in 1920 only the number of irrigated farms was obtained in this way. All other statistics, in both censuses, were collected on special schedules for irrigation enterprises.

STATE TABLE 1.—SUMMARY FOR THE STATE: 1930 AND 1920

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent
All farms.....number	41,674	42,106	-432	-1.0
All land in farms.....acres	9,346,908	8,375,873	971,035	11.6
Approximate land area of State.....acres	58,346,500	58,346,500		
Farms irrigated.....number	27,953	25,283	2,670	10.6
Area irrigated.....acres	2,181,250	2,488,806	-307,556	-12.4
Area enterprises were capable of supplying with water.....acres	2,617,021	3,092,810	-475,789	-15.4
Area in enterprises <sup>2</sup> .....acres	2,814,048	3,780,048		
Proportion irrigated:				
All farms.....per cent	67.1	60.0		
All land in farms.....per cent	23.3	29.7		
Approximate land area of State.....per cent	4.1	4.7		
Excess of area enterprises were capable of supplying with water over area irrigated.....acres	435,771	604,004	-168,233	-27.9
Excess of area in enterprises <sup>2</sup> over area irrigated.....acres	632,798	1,291,242		
Area in enterprises available, or to be available, for settlement.....acres	79,972	118,334	-38,362	-32.4
Value of irrigated farms [land, buildings (including dwellings), and implements and machinery].....dollars	316,649,034	( <sup>3</sup> )		
Investment in irrigation enterprises.....dollars	84,500,354	91,501,009	-7,000,655	-7.7
Average, per acre, based on area enterprises were capable of supplying with water.....dollars	32.29	29.59	2.70	9.1
Estimated final cost of existing enterprises.....dollars	101,350,250	97,019,717	4,330,533	4.5
Average, per acre, based on area in enterprises <sup>2</sup> .....dollars	36.02	26.07		
Average annual cost, per acre, for maintenance and operation of irrigation works.....dollars	1.44	1.17	0.27	23.1

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Irrigable area, 1930; total area, 1920.

<sup>3</sup> Figures not available.

STATE TABLE 2.—FARMS AND SPECIFIED FARM VALUES, BY TENURE OF FARM OPERATOR, 1930

ITEM (See definitions in Introduction)	FARMS		SPECIFIED FARM VALUES					
	Number	Area	Land and buildings		Land alone		Implements and machinery	
			Total	Per acre	Total	Per acre	Total	Per acre
All farms.....	41,674	9,346,908	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Owners and managers.....	31,115	7,488,204	417,249,572	44.64	340,255,677	36.40	39,748,803	4.25
Tenants.....	10,559	1,858,644	310,135,451	41.42			30,774,866	4.11
Irrigated farms.....	27,953	4,851,440	107,114,121	57.63			8,973,947	4.83
Owners and managers.....	20,488	3,955,944	289,343,666	59.64	233,067,280	48.04	27,305,368	5.68
Tenants.....	7,467	895,496	214,018,772	54.10	169,116,241	42.75	21,084,021	5.33
Wholly irrigated farms.....	24,631	3,298,648	75,324,894	84.12	63,951,039	71.41	6,221,347	6.95
Owners and managers.....	17,587	2,549,250	248,439,552	75.32	199,425,563	60.46	23,197,936	7.03
Tenants.....	7,044	749,398	177,444,048	69.61	139,169,009	54.59	17,878,153	6.82
Partly irrigated farms.....	3,322	1,552,792	70,995,509	94.74	60,256,554	80.41	5,819,833	7.77
Owners and managers.....	2,899	1,406,694	40,904,114	26.34	33,641,717	21.67	4,107,332	2.65
Tenants.....	423	146,098	36,574,729	26.00	29,947,232	21.29	3,705,898	2.63
Farms not irrigated.....	13,721	4,495,468	4,320,385	29.63	3,694,455	25.29	401,514	2.76
			127,905,906	28.45	107,188,397	23.84	12,448,435	2.77







STATE TABLE 13.—INVESTMENT, BY DRAINAGE BASIN: 1930 AND 1920—Continued

DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent
Tributaries of Columbia River— Continued.				
Snake River and tributaries—	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	
Salmon Falls River.....	2,517,560	4,152,745	-1,635,185	-30.4
Little Wood River.....	688,360	1,016,699	-328,339	-32.5
Big Wood River.....	9,817,833	5,395,133	4,422,700	82.0
Bruneau River.....	522,454	532,745	-10,291	-1.9
Owyhee River.....	98,652	64,467	34,185	58.0
Boise River.....	16,135,214	16,013,734	121,480	0.8
Payette River.....	4,695,747	2,915,780	1,779,967	61.0
Weiser River.....	1,122,601	2,018,450	-895,769	-44.4
Salmon River.....	875,750	1,175,362	-299,612	-25.5
Clearwater River.....	431,300	208,755	222,545	44.4
Other tributaries.....	1,189,900	3,848,907	-2,669,007	-69.1
Other tributaries of Columbia River.....	870,153	603,854	272,299	45.1
Independent streams.....	2,575,068	3,828,606	-1,253,538	-32.7
Camas Creek.....	540,925	578,627	-37,702	-5.5
Beaver Creek.....	8,500	7,259	1,241	17.1
Medicine Lodge Creek.....	7,535	31,090	-24,155	-70.2
Little Lost River.....	16,000	474,465	-457,865	-98.5
Big Lost River.....	1,833,725	2,709,698	-875,973	-32.3
Other.....	161,783	26,867	134,916	502.2

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Included in "Other tributaries of Snake River."  
<sup>3</sup> Includes Goose Creek.

**COST OF PREPARING LAND FOR IRRIGATION**

The costs shown in State Table 14 represent estimates of expenditures already made on the areas reporting, and include clearing and grading land, and building farm laterals and farm irrigation structures.

STATE TABLE 14.—ESTIMATED COST OF PREPARING LAND, 1930

ITEM	1930
Area reporting.....acres.....	2,111,819
Estimated cost reported.....dollars.....	49,892,880
Average, per acre.....dollars.....	23.62

**DRAINAGE OF IRRIGATED LAND**

STATE TABLE 15.—AREA WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL AREA IN NEED OF DRAINAGE: 1930 AND 1920

ITEM	1930	1920
Enterprises reporting land drained or needing drainage.....number.....	171	206
Area <sup>1</sup> in enterprises reporting land drained or needing drainage.....acres.....	920,314	734,405
Area for which drains have been installed.....acres.....	202,575	81,187
Additional area needing drainage.....acres.....	48,995	94,934
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises reporting drainage.....per cent.....	22.0	11.1
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises.....per cent.....	7.2	2.1
Proportion that area for which drains have been installed plus that needing drainage is of area <sup>1</sup> in all irrigation enterprises.....per cent.....	8.9	4.7

<sup>1</sup> Irrigable area, 1930; total area, 1920.

The areas in State Table 15 relate only to lands within the boundaries of irrigation enterprises. "Additional area needing drainage" includes lands producing partial crops as well as those wholly unproductive.

**QUANTITY OF WATER USED**

The quantity of water used was reported on only part of the irrigation schedules, and all areas reporting "quantity of water entering canals" did not also report "quantity delivered to irrigators." In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in State Table 16.

Some irrigation enterprises carry water to individual farms, but others only to laterals which serve several farms. The "total quantity of water delivered to irrigators," shown in State Table 16, is the quantity reported in answer to a question preceded by the inquiry: "Average head of water delivered per individual irrigator."

STATE TABLE 16.—WATER USED: 1929 AND 1919

ITEM (See definitions in Introduction)	TOTAL		MEASURED		NOT MEASURED	
	1929	1919	1929	1919	1929	1919
Average flow of water entering canals.....sec.-ft.....	31,619	43,481	28,422	35,669	3,197	7,812
Area irrigated.....acres.....	1,547,500	1,750,265	1,382,100	1,472,680	165,400	277,679
Average, per second-foot.....acres.....	49	40	49	41	52	36
Total quantity of water entering canals.....ac.-ft.....	9,389,010	11,142,792	6,084,009	9,571,753	2,705,001	1,571,039
Area irrigated.....acres.....	1,584,254	1,724,581	1,207,868	1,465,482	376,386	259,099
Average quantity per acre.....ac.-ft.....	5.9	6.5	5.5	6.5	7.2	6.1
Total quantity of water delivered to irrigators.....ac.-ft.....	4,585,715	2,269,233	4,181,543	2,045,769	404,172	223,464
Area irrigated.....acres.....	1,106,507	936,689	1,028,892	841,667	82,615	95,022
Average quantity per acre.....ac.-ft.....	4.1	2.4	4.1	2.4	4.0	2.4

**IRRIGATION WORKS**

STATE TABLE 17.—DAMS, BY MATERIAL, 1930

MATERIAL	DAMS	
	Diversion	Storage
Total.....	Number 2,305	Number 162
Concrete or masonry.....	205	22
Timber.....	227	80
Earth and rock.....	1,836	47
Other and mixed.....	37	8
Not reported.....		

<sup>1</sup> Principally temporary dams, replaced annually.













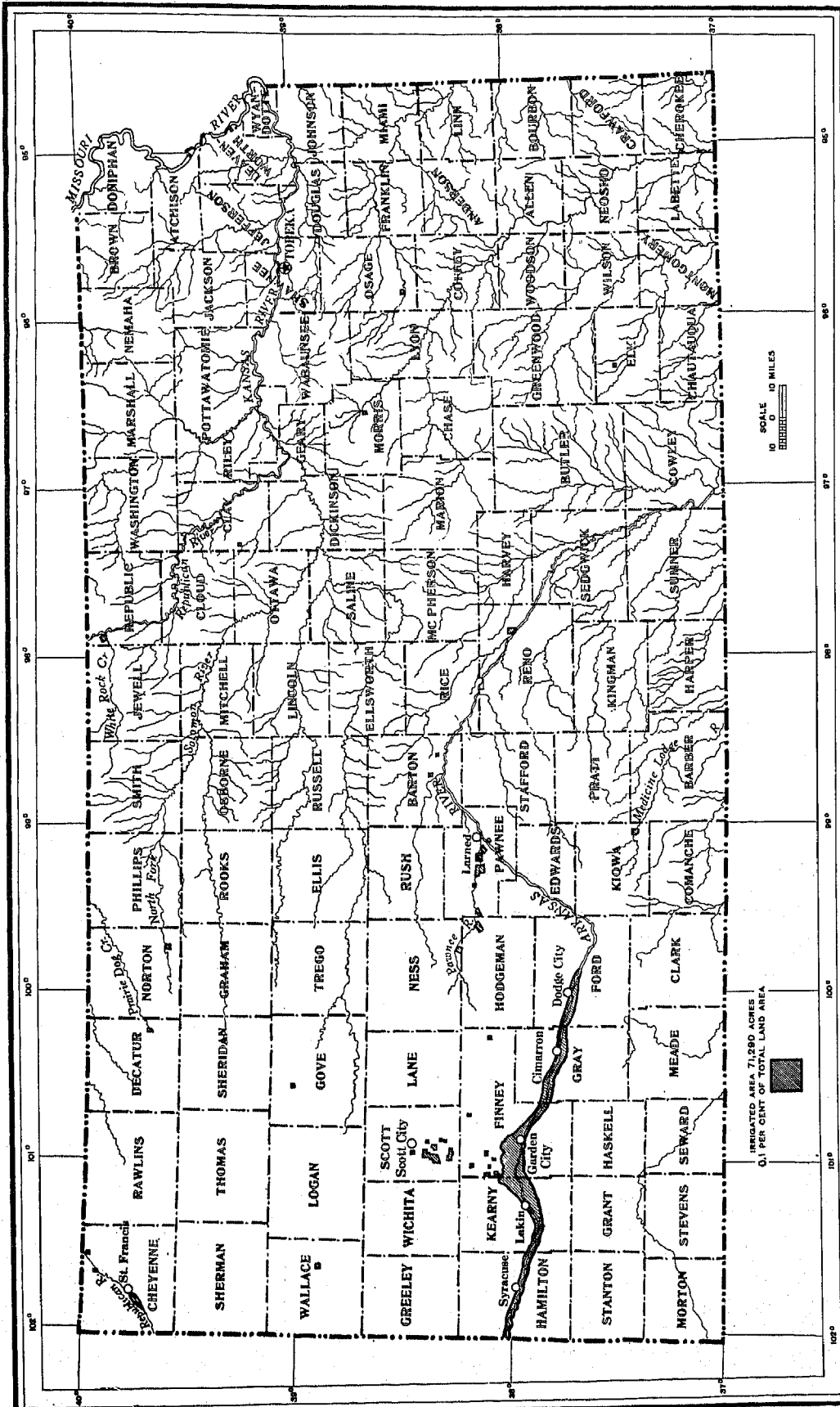
IRRIGATION—IDAHO

1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, AND OPERATION, 1929—Continued

Table with 14 columns (Lemhi, Lincoln, Madison, Minidoka, Nez Perce, Oneida, Owyhee, Payette, Power, Teton, Twin Falls, Valley, Washington, All other counties) and multiple rows of data representing agricultural statistics.

# KANSAS

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND



# KANSAS

## INTRODUCTION

Statistics are presented in the following pages on farms irrigated and area irrigated, investment and cost of maintenance and operation of irrigation enterprises, cost of preparing land for irrigation, drainage of irrigated land, quantity of water used, and distribution of irrigation works, with specialized information relating to dams, pipe lines, and pumping equipment. Data on area irrigated, investment, and irrigation works are given in detail by drainage basins. Classifications of irrigated farms by type of farm, size of farm, and value of farm products; and the acreage, yield, and value of the principal crops grown on irrigated land, for all irrigation States, are shown in Parts III and IV, pages 257 and 325, respectively, of this volume.

Statistics for area irrigated and for cost of maintenance and operation of irrigation works relate to the year 1929; all other items relate to 1930.

For purposes of comparison, statistics for the census of 1920 are shown, where available; and for the purpose of showing the historical development of irrigation certain data are presented from censuses previous to that of 1920.

Data on number, area, and value of wholly and partly irrigated farms with the tenure of the operators of these farms were collected in 1930 on the general farm schedule; in 1920 only the number of irrigated farms was obtained in this way. All other statistics, in both censuses, were collected on special schedules for irrigation enterprises.

STATE TABLE 1.—SUMMARY FOR THE STATE: 1930 AND 1920

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent
All farms.....number.....	166,042	165,280	766	0.5
All land in farms.....acres.....	46,975,647	45,426,179	1,550,468	3.4
Approximate land area of State.....acres.....	52,335,300	52,335,360		
Farms irrigated.....number.....	683	504	179	35.5
Area irrigated.....acres.....	71,290	47,312	23,978	50.7
Area enterprises were capable of supplying with water.....acres.....	83,583	67,853	15,730	23.2
Area in enterprises <sup>2</sup> .....acres.....	95,719	102,562		
Proportion irrigated:				
All farms.....per cent.....	0.4	0.3		
All land in farms.....per cent.....	0.2	0.1		
Approximate land area of State.....per cent.....	0.1	0.1		
Excess of area enterprises were capable of supplying with water over area irrigated.....acres.....	12,293	20,541	-8,248	-40.2
Excess of area in enterprises <sup>2</sup> over area irrigated.....acres.....	24,429	55,250		
Value of irrigated farms [land, buildings (including dwellings), and implements and machinery].dollars.....	13,065,069	( <sup>3</sup> )		
Investment in irrigation enterprises.....dollars.....	1,685,652	2,067,381	-381,729	-18.5
Average, per acre, based on area enterprises were capable of supplying with water.....dollars.....	20.17	30.47	-10.30	-33.8
Estimated final cost of existing enterprises.....dollars.....	1,723,872	2,195,981	-472,109	-21.5
Average, per acre, based on area in enterprises <sup>2</sup> .....dollars.....	18.01	21.41		
Average annual cost, per acre, for maintenance and operation of irrigation works.....dollars.....	1.53	3.29	-1.76	-53.5

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Irrigable area, 1930; total area, 1920.

<sup>3</sup> Figures not available.

STATE TABLE 2.—FARMS AND SPECIFIED FARM VALUES, BY TENURE OF FARM OPERATOR, 1930

ITEM (See definitions in Introduction)	FARMS		SPECIFIED FARM VALUES					
	Number	Area	Land and buildings		Land alone		Implements and machinery	
			Total	Per acre	Total	Per acre	Total	Per acre
All farms.....	166,042	46,975,647	2,281,101,631	48.56	1,894,451,780	40.33	167,785,230	3.57
Owners and managers.....	95,718	23,678,044	1,384,949,646	48.29			103,338,564	3.60
Tenants.....	70,328	18,297,603	896,151,985	48.93			64,446,666	3.52
Irrigated farms.....	683	311,174	12,294,425	39.51	10,108,835	32.49	800,644	2.57
Owners and managers.....	391	216,361	8,085,175	37.54	6,503,480	30.20	506,179	2.35
Tenants.....	292	96,823	4,209,250	43.93	3,605,375	37.62	294,465	3.07
Wholly irrigated farms.....	258	49,482	3,389,290	68.50	2,668,215	53.92	188,673	3.81
Owners and managers.....	162	33,966	2,326,275	68.49	1,797,500	52.92	119,502	3.52
Tenants.....	96	15,516	1,063,015	68.51	870,715	56.12	69,170	4.40
Partly irrigated farms.....	425	261,692	8,905,135	34.08	7,440,620	28.43	611,972	2.34
Owners and managers.....	229	181,385	5,758,900	31.75	4,705,960	25.94	380,677	2.13
Tenants.....	196	80,307	3,146,235	39.18	2,734,660	34.05	225,295	2.81
Farms not irrigated.....	165,359	46,664,473	2,268,807,206	48.62	1,884,342,955	40.38	166,984,586	3.58

FARMS AND AREA IRRIGATED

STATE TABLE 3.—FARMS AND AREA IRRIGATED: 1890 TO 1930

CENSUS YEAR	FARMS IRRIGATED			AREA IRRIGATED			
	Number	Increase <sup>1</sup>	Proportion of all farms	Area	Increase	Proportion of total land area of State	Proportion of land in all farms
1890	683	35.5	0.4	71,290	50.7	0.1	0.2
1920	504	-49.9	0.3	47,312	26.2	0.1	0.1
1910	1,006	8.3	0.6	37,479	58.7	0.1	0.1
1900	929	79.0	0.5	23,620	13.5	(?)	0.1
1890	519	(?)	(?)	20,818	(?)	(?)	0.1

<sup>1</sup> A minus sign (-) denotes decrease. <sup>2</sup> Less than one-tenth of 1 per cent.

STATE TABLE 4.—AREA, BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION

DATE OF BEGINNING (See definitions in Introduction)	Enterprises, 1930	AREA IRRIGATED IN 1929		Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
		Area	Proportion of irrigable area in enterprises		
Total	Number 300	Acres 71,290	Per cent 74.5	Acres 83,583	Acres 95,719
1870-1879	1	500	100.0	500	500
1880-1889	5	49,371	80.3	63,491	61,100
1890-1899	6	1,981	41.9	2,173	4,726
1900-1904	5	2,205	100.0	2,205	2,205
1905-1909	7	421	33.2	1,245	1,268
1910-1914	27	3,798	82.1	5,562	6,112
1915-1919	33	2,372	54.8	4,291	4,326
1920-1924	27	2,740	77.0	3,443	3,566
1925-1929	67	1,598	44.9	2,316	3,588
Not reported	122	6,304	75.3	7,857	8,368

STATE TABLE 5.—AREA, BY SOURCE OF WATER SUPPLY: 1929 AND 1919

SOURCE OF SUPPLY	AREA IRRIGATED				Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1929	1919	Increase <sup>1</sup>			
Total	Acres 71,290	Acres 47,312	Acres 23,978	Per cent 50.7	Acres 83,583	Acres 95,719
Streams, gravity	53,196	30,807	22,389	72.7	57,491	67,050
Streams, pumped	3,216	730	2,480	340.5	4,010	4,777
Streams, gravity and pumped		600	-600	-100.0		
Wells, pumped	11,048	13,235	-1,587	-12.0	18,069	18,852
Wells, flowing	3		3		3	5
Wells, pumped and flowing		50	-50	-100.0		
Springs	155		155		168	171
Stored storm water <sup>2</sup>	225		225		600	600
City water	31		31		31	31
Streams, gravity and wells, pumped	405	1,540	-1,135	-73.7	800	800
Other mixed	63	350	-297	-84.8	53	105
Not reported	2,358		2,358		2,358	2,728
Supplemental from pumped wells <sup>3</sup>	1,050				1,162	1,222

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> In reservoirs filled from channels which carry water only during storms and are not classed as streams.  
<sup>3</sup> Not considered in totals because included in enterprises reporting other sources of supply listed above.

AREA, BY CHARACTER OF ENTERPRISE

No irrigation district, Carey Act, United States Bureau of Indian Affairs, or United States Bureau of Reclamation enterprises were reported in 1930 or 1920.

STATE TABLE 6.—AREA, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

[For number of enterprises by classes, see State Table 12]

ITEM AND CHARACTER (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920	Area	Per cent
<b>AREA IRRIGATED</b>				
Total	Acres 71,290	Acres 47,312	Acres 23,978	50.7
Individual and partnership	16,689	14,546	2,143	14.7
Cooperative	37,871	32,516	5,355	16.5
Commercial	16,000	150	15,850	330.0
State	730	100	630	83.0
<b>AREA ENTERPRISES WERE CAPABLE OF SUPPLYING WITH WATER</b>				
Total	83,583	67,853	15,730	23.2
Individual and partnership	23,812	26,614	-2,802	-10.5
Cooperative	41,991	40,719	1,272	3.1
Commercial	17,000	320	16,680	380.0
State	780	200	580	290.0
<b>AREA IN ENTERPRISES<sup>2</sup></b>				
Total	95,719	102,562		
Individual and partnership	26,830	36,643		
Cooperative	50,600	65,309		
Commercial	17,000	320		
State	1,289	200		

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Irrigable area, 1930; total area, 1920.

AREA, BY CHARACTER OF WATER RIGHTS

STATE TABLE 7.—AREA IRRIGATED, BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1929 AND 1919

WATER RIGHTS (See definitions in Introduction)	1929		1919	
	Area	Proportion of total	Area	Proportion of total
Total	Acres 71,290	Per cent 100.0	Acres 47,312	Per cent 100.0
Appropriation and use	11,113	15.6	26,435	55.9
Notice filed and posted	29,427	41.3	4,218	8.9
Adjudicated by court	12,000	17.7	468	0.9
Riparian	40	0.1	30	0.1
Underground	11,044	16.3	13,480	28.5
Other and mixed			938	2.0
Not reported	6,400	9.0	1,763	3.7

AREA, BY DRAINAGE BASIN

STATE TABLE 8.—AREA, BY DRAINAGE BASIN: 1929 AND 1919

DRAINAGE BASIN (See definitions in Introduction)	AREA IRRIGATED			Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1929	1919	Increase <sup>1</sup>		
Total	Acres 71,290	Acres 47,312	Per cent 50.7	Acres 83,583	Acres 95,719
Tributaries of Missouri River	1,411	773	82.5	2,406	4,368
Tributaries of Kansas River	1,394	773	80.3	2,376	4,325
Republican River	489	510	-4.1	1,080	2,776
Smoky Hill River	111	248	-55.2	296	361
Other tributaries	794	15		1,000	1,188
Other tributaries	17			30	33
Arkansas River and tributaries	69,879	46,539	50.2	81,177	91,361
Arkansas River direct	52,938	30,130	75.9	57,109	65,751
Cimarron River	1,098			1,115	1,115
Other tributaries	15,793	16,409	-3.8	22,953	24,495

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

INVESTMENT, AND COST OF MAINTENANCE AND OPERATION OF IRRIGATION ENTERPRISES

STATE TABLE 9.—INVESTMENT IN ENTERPRISES: 1890 TO 1930

CENSUS YEAR	INVESTMENT		AVERAGE, PER ACRE <sup>1</sup>	
	Amount	Increase <sup>2</sup>	Amount	Increase <sup>3</sup>
1930	Dollars 1,685,652	Per cent -18.5	Dollars 20.17	Per cent -33.8
1920	2,067,381	51.4	30.47	212.5
1910	1,365,563	167.8	9.75	-56.5
1900	529,755	525.2	22.43	451.1
1890	84,729		4.07	

<sup>1</sup> Based on area enterprises were capable of supplying with water.  
<sup>2</sup> A minus sign (-) denotes decrease.

STATE TABLE 10.—INVESTMENT, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	INVESTMENT		
	Amount	Proportion of total	Average, per acre <sup>1</sup>
	Dollars	Per cent	Dollars
Total.....	1,685,652	100.0	20.17
1870-1879.....	50,000	3.0	100.00
1880-1889.....	725,001	43.0	13.55
1890-1899.....	16,680	1.0	7.63
1900-1904.....	16,885	1.0	7.66
1905-1909.....	34,000	2.0	27.31
1910-1914.....	192,900	11.4	34.68
1915-1919.....	117,888	7.0	27.36
1920-1924.....	117,723	7.0	34.19
1925-1929.....	102,136	6.0	36.27
Not reported.....	313,089	18.6	39.84

<sup>1</sup> Based on area enterprises were capable of supplying with water in 1930.

STATE TABLE 11.—INVESTMENT, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929; BY SOURCE OF WATER SUPPLY  
(When water is pumped, cost of maintenance and operation includes cost of fuel and attendance)

SOURCE OF SUPPLY	INVESTMENT, 1930			MAINTENANCE AND OPERATION, 1929	
	Amount	Proportion of total	Average, per acre	Irrigated area reporting	Average, per acre <sup>1</sup>
	Dollars	Per cent	Dollars	Acres	Dollars
Total.....	1,685,652	100.0	20.17	64,983	1.52
Streams, gravity.....	746,401	44.2	12.98	50,805	0.84
Streams, pumped.....	176,378	10.5	43.98	2,613	3.43
Wells, pumped.....	604,328	35.8	33.44	10,954	3.69
Wells, flowing.....	800	( <sup>2</sup> )	266.07	3	16.07
Springs.....	5,100	0.3	30.36	150	1.33
Stored storm water.....	20,000	1.2	33.33		
City water.....	3,675	0.2	118.55		
Streams, gravity and wells, pumped.....	30,010	1.8	37.51	405	10.12
Other mixed.....	1,400	0.1	26.42	58	4.72
Not reported.....	54,450	3.2	23.09		
Supplemental from pumped wells.....	43,110	2.5	37.10	1,050	2.40

<sup>1</sup> Based on area irrigated in 1929 reporting cost.

<sup>2</sup> Less than one-tenth of 1 per cent.

<sup>3</sup> Not considered in total because included in enterprises reporting other sources of supply listed above.

STATE TABLE 12.—INVESTMENT, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

CHARACTER OF ENTERPRISE (See definitions in Introduction)	Enter-prises, 1930	INVESTMENT		INCREASE <sup>1</sup>	
		1930	1920	Amount	Per cent
		Dollars	Dollars	Dollars	
Total.....	300	1,685,652	2,067,381	-381,729	-18.5
Individual and partnership.....	289	875,961	775,098	100,863	13.0
Cooperative.....	6	242,001	1,289,737	-1,047,736	-81.2
Commercial.....	2	520,000	1,549	518,481	
State.....	3	47,700	1,000	46,700	

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

STATE TABLE 13.—INVESTMENT, BY DRAINAGE BASIN: 1930 AND 1920

DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent
	Dollars	Dollars	Dollars	
Total.....	1,685,652	2,067,381	-381,729	-18.5
Tributaries of Missouri River.....	72,578	50,311	22,267	44.2
Tributaries of Kansas River.....	72,178	50,311	21,867	43.4
Republican River.....	23,655	15,816	7,839	49.6
Smoky Hill River.....	12,210	33,753	-21,543	-63.3
Other tributaries.....	35,308	742	35,556	
Other tributaries.....	400		400	
Arkansas River and tributaries.....	1,613,079	2,017,070	-403,991	-20.0
Arkansas River direct.....	748,801	1,153,205	-404,404	-35.1
Cimarron River.....	29,250	15,000	14,250	95.0
Other tributaries.....	855,028	848,865	-13,837	-1.6

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

COST OF PREPARING LAND FOR IRRIGATION

The costs shown in State Table 14 include clearing and grading land, and building farm laterals and farm irrigation structures.

STATE TABLE 14.—ESTIMATED COST OF PREPARING LAND, 1930

ITEM	1930
Area reporting.....	60,041 acres
Estimated cost reported.....	687,980 dollars
Average, per acre.....	10.96 dollars

DRAINAGE OF IRRIGATED LAND

The areas in State Table 15 relate only to lands within the boundaries of irrigation enterprises. "Additional area needing drainage" represents all lands so reported by the owners of the enterprises and includes lands producing partial crops as well as those wholly unproductive.

STATE TABLE 15.—AREA WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL AREA IN NEED OF DRAINAGE: 1930 AND 1920

ITEM	1930	1920
Enterprises reporting land drained or needing drainage.....	11 number	5
Area <sup>1</sup> in enterprises reporting land drained or needing drainage.....	651 acres	3,610
Area for which drains have been installed.....	336 acres	250
Additional area needing drainage.....	167 acres	1,320
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises reporting drainage.....	51.6 per cent	6.9
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises.....	0.4 per cent	0.2
Proportion that area for which drains have been installed plus that needing drainage is of area <sup>1</sup> in all irrigation enterprises.....	0.5 per cent	1.5

<sup>1</sup> Irrigable area, 1930; total area, 1920.

IRRIGATION WORKS

STATE TABLE 16.—DAMS, BY MATERIAL, 1930

MATERIAL	DAMS	
	Diversion	Storage
	Number	Number
Total.....	27	7
Concrete or masonry.....	14	2
Timber.....	3	
Earth and rock.....		3
Other and mixed.....	9	1
Not reported.....	1	1

<sup>1</sup> Principally temporary dams, replaced annually.

STATE TABLE 17.—PUMPING EQUIPMENT, BY KIND OF POWER AND PUMP, 1930

ITEM	ENGINES OR MOTORS		PUMPS				
	Capacity	Proportion of total	Number	Proportion of total	Capacity	Proportion of total	Average lift
	H. p.	Per cent		Per cent	G. p. m.	Per cent	Feet
Total.....	6,221	100.0	312	100.0	393,520	100.0	26
Electricity.....	3,372	54.2	173	55.4	261,539	66.5	23
Internal combustion.....	2,436	39.2	122	39.1	124,760	31.7	27
Wind.....	10	0.2	3	1.0	85	( <sup>2</sup> )	88
Water.....	11	0.2	2	0.6	26	( <sup>2</sup> )	100
Internal combustion and—							
Electricity.....	368	5.9	8	2.6	6,851	1.7	41
Wind.....	22	0.3	3	1.0	155	( <sup>2</sup> )	73
Not reported.....	2	( <sup>2</sup> )	1	0.3	110	( <sup>2</sup> )	( <sup>2</sup> )
	KIND OF PUMP						
Centrifugal.....	5,422	87.2	273	87.5	363,415	92.3	23
Rotary.....	641	10.3	19	6.1	24,130	6.1	42
Turbine.....	51	0.8	2	0.6	804	0.2	96
Reciprocating.....	2	( <sup>2</sup> )	1	0.3	3,600	0.9	10
Plunger.....	43	0.7	8	2.6	880	( <sup>2</sup> )	57
Water wheel.....	11	0.2	2	0.6	26	( <sup>2</sup> )	100
Centrifugal and—							
Rotary.....	28	0.4	3	1.0	101	( <sup>2</sup> )	12
Reciprocating.....	28	0.4	4	1.3	1,170	0.3	28

<sup>1</sup> Less than one-tenth of 1 per cent.

<sup>2</sup> Not reported.

# IRRIGATION—KANSAS

STATE TABLE 18.—IRRIGATION WORKS, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS			FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Diver- sion	Stor- age	Capac- ity	Length	Lateral canals, length	Num- ber	Capac- ity	Pipe lines, <sup>1</sup> length	Num- ber	Capac- ity	Num- ber	Capac- ity	Num- ber	Engine or motor capac- ity	Pumps	
															Num- ber	Capac- ity
<b>Total</b> .....	27	7	2,079	196	89	19	66,293	16.1	1	G. p. m. 75	772	G. p. m. 323,500	281	H. p. 6,221	312	G. p. m. 368,526
1870-1879.....	2	---	14	8	12	---	---	---	---	---	---	---	2	57	2	4,000
1880-1889.....	4	---	1,840	110	57	1	30,000	---	---	---	---	---	1	11	2	26
1890-1899.....	2	1	66	18	1	1	40	0.1	---	---	---	---	5	55	5	4,350
1900-1904.....	1	1	25	9	2	1	1	---	---	---	6	3,350	7	181	7	13,550
1905-1909.....	7	2	49	28	14	4	1,042	2.5	---	---	34	13,560	37	1,037	37	60,875
1910-1914.....	3	1	27	6	3	1	200	1.7	---	---	66	37,920	40	1,115	48	60,825
1915-1919.....	3	2	32	9	---	5	35,003	5.3	---	---	125	45,950	32	668	33	34,336
1920-1924.....	5	---	23	0	---	6	7	3.3	---	---	89	28,686	72	1,208	90	78,964
1925-1929.....	---	---	3	2	---	---	---	0.2	1	75	127	51,139	85	1,891	87	146,010
Not reported.....	---	---	---	---	---	---	---	---	---	---	325	142,905	---	---	---	---

<sup>1</sup> Material and size (diameter): Metal, 1 to 12 inches.

STATE TABLE 19.—IRRIGATION WORKS, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS			FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Diver- sion	Stor- age	Capac- ity	Length	Lateral canals, length	Num- ber	Capac- ity	Pipe lines, <sup>1</sup> length	Num- ber	Capac- ity	Num- ber	Capac- ity	Num- ber	Engine or motor capac- ity	Pumps	
															Num- ber	Capac- ity
<b>Total</b> .....	27	7	2,079	196	89	19	66,293	16.1	1	G. p. m. 75	772	G. p. m. 323,500	281	H. p. 6,221	312	G. p. m. 368,526
Individual and partnership.....	21	7	186	65	30	17	36,292	16.1	1	75	700	312,350	278	5,730	304	377,876
Cooperative.....	4	---	1,085	87	49	---	---	---	---	---	---	---	---	---	---	---
Commercial.....	1	---	800	40	10	1	30,000	---	---	---	5	6,750	5	345	5	6,750
State.....	1	---	8	4	---	1	1	---	---	---	7	4,400	8	146	8	8,900

<sup>1</sup> Material and size (diameter): Metal, 1 to 12 inches.

STATE TABLE 20.—IRRIGATION WORKS, BY DRAINAGE BASIN, 1930

DRAINAGE BASIN (See definitions in Introduction)	DAMS		MAIN CANALS			RESERVOIRS			FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS				
	Di- ver- sion	Stor- age	Capac- ity	Length	Lateral canals, length	Num- ber	Capac- ity	Pipe lines, <sup>1</sup> length	Num- ber	Capac- ity	Num- ber	Capacity	Num- ber	Engine or motor capac- ity	Pumps		Aver- age lift
															Num- ber	Capacity	
<b>Total</b> .....	27	7	2,079	196	89	19	66,293	16.1	1	G. p. m. 75	772	G. p. m. 323,500	281	H. p. 6,221	312	G. p. m. 368,526	Feet 26
Tributaries of Missouri River.....	3	---	56	14	---	2	1	3.2	---	---	36	8,385	35	568	38	24,401	36
Tributaries of Kansas River.....	3	---	56	14	---	2	1	3.1	---	---	36	8,385	35	568	38	24,491	36
Republican River.....	1	---	88	9	---	---	---	---	---	---	8	2,550	7	102	7	5,820	27
Smoky Hill River.....	1	---	8	2	---	---	---	0.3	---	---	18	2,800	3	110	3	6,200	20
Other tributaries.....	1	---	10	3	---	2	1	2.8	---	---	10	3,035	25	358	28	12,471	41
Other tributaries.....	---	---	---	---	---	---	---	0.1	---	---	---	---	---	---	---	---	---
Arkansas River and tributaries.....	24	7	2,023	182	89	17	66,292	12.0	1	75	736	315,115	246	5,653	274	369,035	25
Arkansas River direct.....	5	---	1,885	127	59	1	30,000	---	---	---	3	1,230	4	31	4	2,580	20
Cimarron River.....	---	---	---	---	---	---	---	---	---	---	1	800	1	15	1	800	80
Other tributaries.....	19	7	138	55	30	16	36,292	12.9	1	75	732	313,085	241	5,607	269	365,655	24

<sup>1</sup> Material and size (diameter): Metal, 1 to 12 inches.



# LOUISIANA

## APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND





# LOUISIANA

## INTRODUCTION

Statistics are presented in the following pages on farms irrigated and area irrigated, investment and cost of maintenance and operation of irrigation enterprises, cost of preparing land for irrigation, drainage of irrigated land, quantity of water used, and distribution of irrigation works, including pumping equipment. Data on area irrigated, investment, and irrigation works are given in detail by drainage basins. Classifications of irrigated farms by type of farm, size of farm, and value of farm products; and the acreage, yield, and value of the principal crops grown on irrigated land, for all irrigation States, are shown in Parts III and IV, pages 257 and 325, respectively, of this volume.

Statistics for area irrigated and for cost of maintenance and operation of irrigation works relate to the year 1929; all other items relate to 1930.

Statistics for the census of 1930 are not strictly comparable with those of preceding censuses, which represented rice irrigation only, but statistics for the census of 1920 are shown throughout the tables because rice continues to be the only irrigated crop, except in a few localities, notably the strawberry-growing sections of Tangipahoa Parish; and certain data are presented also from censuses previous to that of 1920, in order to show the historical development of irrigation.

Data on number, area, and value of irrigated farms with the tenure of the operators of these farms, were collected in 1930 on the general farm schedule; in 1920 only the number of irrigated farms was obtained in this way. All other statistics, in both censuses, were collected on special schedules for irrigation enterprises.

STATE TABLE 1.—SUMMARY FOR THE STATE: 1930 AND 1920

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920 <sup>2</sup>	Amount	Per cent
All farms..... number.....	161,445	135,463	25,982	19.2
All land in farms..... acres.....	9,355,437	10,019,822	-664,385	-6.6
Approximate land area of State..... acres.....	20,061,700	20,061,700		
Farms irrigated..... number.....	5,588	6,471	-883	-13.6
Area irrigated..... acres.....	450,901	454,882	-3,981	-0.9
Area enterprises were capable of supplying with water..... acres.....	795,165	728,742	66,423	9.1
Area in enterprises <sup>3</sup> ..... acres.....	850,401	851,211		
Proportion irrigated:				
All farms..... per cent.....	3.5	4.8		
All land in farms..... per cent.....	4.8	4.5		
Approximate land area of State..... per cent.....	1.6	1.6		
Excess of area enterprises were capable of supplying with water over area irrigated..... acres.....	344,264	273,860	70,404	25.7
Excess of area in enterprises <sup>3</sup> over area irrigated..... acres.....	399,500	396,329		
Area in enterprises available, or to be available, for settlement..... acres.....	15,440		15,440	
Value of irrigated farms [land, buildings (including dwellings), and implements and machinery]. dollars.....	50,676,224	( <sup>4</sup> )		
Investment in irrigation enterprises..... dollars.....	15,744,743	14,063,181	1,681,562	12.0
Average, per acre, based on area enterprises were capable of supplying with water..... dollars.....	19.80	19.30	0.50	2.6
Estimated fiscal cost of existing enterprises..... dollars.....	15,771,003	14,264,178	1,506,825	10.0
Average, per acre, based on area in enterprises <sup>3</sup> ..... dollars.....	18.55	16.70		
Average annual cost, per acre, for maintenance and operation of irrigation works..... dollars.....	4.09	7.01	-2.92	-41.0

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Rice irrigation only. See text in "Introduction."

<sup>3</sup> Irrigable area, 1930; total area, 1920.  
<sup>4</sup> Figures not available.

STATE TABLE 2.—FARMS AND SPECIFIED FARM VALUES, BY TENURE OF FARM OPERATOR, 1930

ITEM (See definitions in Introduction)	FARMS		SPECIFIED FARM VALUES					
	Number	Area Acres	Land and buildings		Land alone		Implements and machinery	
			Total Dollars	Per acre Dollars	Total Dollars	Per acre Dollars	Total Dollars	Per acre Dollars
All farms.....	161,445	9,355,437	418,191,773	44.70	313,558,140	33.52	28,173,047	3.01
Owners and managers.....	53,894	5,637,019	222,866,307	41.22			18,270,733	3.24
Tenants.....	107,551	3,718,418	195,325,466	49.97			9,893,314	2.66
Irrigated farms.....	5,588	892,604	45,406,283	50.97	37,407,395	41.98	5,170,941	5.80
Owners and managers.....	3,049	552,863	20,532,808	53.42	23,746,704	42.90	3,458,820	6.26
Tenants.....	2,539	339,741	15,963,385	46.99	13,717,631	40.38	1,721,115	5.06
Wholly irrigated farms.....	2,012	358,933	18,416,048	51.81	15,533,258	43.28	2,230,327	6.21
Owners and managers.....	919	183,368	10,068,138	55.07	8,215,788	44.80	1,200,150	6.87
Tenants.....	1,093	175,565	8,317,860	47.38	7,317,470	41.08	970,168	5.52
Partly irrigated farms.....	3,576	533,671	27,080,235	50.74	21,934,187	41.10	2,940,614	5.53
Owners and managers.....	2,130	369,495	19,434,710	52.60	15,533,976	42.04	2,198,667	5.95
Tenants.....	1,446	164,176	7,645,525	46.67	6,400,161	38.98	750,047	4.57
Farms not irrigated.....	155,857	8,462,833	372,605,490	44.04	276,090,761	32.62	22,993,706	2.72

FARMS AND AREA IRRIGATED

In State Table 3 and in other tables "Number of farms irrigated" is equivalent to "Number of irrigators" used in census reports previous to 1910.

STATE TABLE 3.—FARMS AND AREA IRRIGATED: 1890 TO 1930

CENSUS YEAR	FARMS IRRIGATED			AREA IRRIGATED			
	Number	In-crease <sup>1</sup>	Pro-portion of all farms	Area	In-crease <sup>1</sup>	Pro-portion of total land area of State	Pro-portion of land in all farms
1890	5,588	-13.6	3.5	450,901	-0.9	1.6	4.8
1920	6,471	140.6	4.8	454,882	19.6	1.6	4.5
1910	2,690	-40.6	2.2	380,200	88.5	1.3	3.6
1900	4,531		3.9	201,085	139.0	0.7	1.8
1890	( <sup>2</sup> )			84,377		0.3	0.9

<sup>1</sup> A minus sign (-) denotes decrease.  
<sup>2</sup> Rice irrigation only. See text in "Introduction."  
<sup>3</sup> Not reported.

STATE TABLE 4.—AREA, BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION

DATE OF BEGINNING (See definitions in Introduction)	Enter-prises, 1930	AREA IRRIGATED IN 1929			Area enter-prises were capable of supplying with water, 1930	Irriga-ble area in enter-prises, 1930
		Area	Pro-portion of irriga-ble area in enter-prises	Per cent		
Total	Number 2,352	Acres 450,901	Per cent 63.0	Acres 795,165	Acres 850,401	
1890-1899	3	6,110	90.5	6,140	6,140	
1890-1899	21	97,052	43.0	222,020	222,720	
1900-1904	63	68,417	43.0	144,870	155,867	
1905-1909	68	25,731	56.8	43,909	45,282	
1910-1914	216	36,509	63.5	61,088	67,454	
1915-1919	475	93,054	61.5	142,194	152,183	
1920-1924	417	34,737	62.0	50,642	55,204	
1925-1929	769	45,670	53.7	67,350	80,516	
Not reported	320	43,021	67.4	67,252	74,975	

STATE TABLE 5.—AREA, BY SOURCE OF WATER SUPPLY: 1929 AND 1919

SOURCE OF SUPPLY	AREA IRRIGATED				Area enter-prises were capable of supplying with water, 1930	Irriga-ble area in enter-prises, 1930
	1929	1919 <sup>1</sup>	Increase <sup>2</sup>			
			Area	Per cent		
Total	Acres 450,901	Acres 454,882	Acres -3,981	-0.9	Acres 795,165	Acres 850,401
Streams, gravity	1,611	10,226	-8,615	-84.2	2,217	3,350
Streams, pumped	257,390	248,300	9,084	3.7	518,225	543,322
Streams, gravity and pumped		12,620	-12,620	-100.0		
Wells, pumped	172,695	154,304	18,391	11.9	240,095	266,291
Wells, flowing	2,896	196	2,700		3,495	3,806
Wells, pumped and flowing	196	1,075	-879	-81.8	220	2,280
Lakes, pumped	1,459	6,090	-5,507	-79.1	1,850	1,850
Lakes, gravity	516	3,225	-2,710	-84.0	660	960
Stored storm water <sup>3</sup>	2,271	84	2,187		2,917	3,000
Streams, gravity and wells, pumped		10,045	-10,045	-100.0		
Other mixed	11,695	7,835	3,860	49.3	25,094	27,354
Not reported	173	173			173	173
Supplemental <sup>4</sup> from—						
Pumped streams	60				1,000	1,000
Pumped wells	200				650	650

<sup>1</sup> Rice irrigation only. See text in "Introduction."  
<sup>2</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>3</sup> In reservoirs filled from channels which carry water only during storms and are not classed as streams.  
<sup>4</sup> Not considered in totals because included in enterprises reporting other sources of supply listed above.

AREA, BY CHARACTER OF ENTERPRISE

Neither the Federal Carey Act nor the Reclamation Act applies to Louisiana, and the State has no laws relating to organizations supplying water for irrigation.

Areas classified as "Commercial" in State Table 6 are principally owned by corporations which also own the irrigation systems. Land and water are supplied to tenants for a share of the rice crop.

STATE TABLE 6.—AREA, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

[For number of enterprises by classes, see State Table 11]

ITEM AND CHARACTER (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920 <sup>2</sup>	Area	Per cent
	Acres	Acres	Acres	
AREA IRRIGATED				
Total	450,901	454,882	-3,981	-0.9
Individual and partnership	226,250	259,673	-33,414	-12.9
Cooperative		10,635	-10,635	-100.0
Commercial	224,025	184,574	40,051	21.7
State	17		17	
AREA ENTERPRISES WERE CAPABLE OF SUPPLYING WITH WATER				
Total	795,165	728,742	66,423	9.1
Individual and partnership	334,045	375,917	-41,872	-11.1
Cooperative		20,325	-20,325	-100.0
Commercial	461,060	332,500	128,560	38.7
State	60		60	
AREA IN ENTERPRISES <sup>3</sup>				
Total	850,401	851,211		
Individual and partnership	374,300	468,120		
Cooperative		20,685		
Commercial	476,035	362,400		
State	60			

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Rice irrigation only. See text in "Introduction."  
<sup>3</sup> Irrigable area, 1930; total area, 1920.

AREA, BY DRAINAGE BASIN

STATE TABLE 7.—AREA, BY DRAINAGE BASIN: 1929 AND 1919

DRAINAGE BASIN (See definitions in Introduction)	AREA IRRIGATED			Area enter-prises were capable of supplying with water, 1930	Irriga-ble area in enter-prises, 1930
	1929	1919 <sup>1</sup>	In-crease <sup>2</sup>		
	Acres	Acres	Per cent		
Total	450,901	454,882	-0.9	795,165	850,401
Mississippi River and tributaries	10,463	20,269	-48.4	13,210	18,970
Mississippi River direct	8,972	17,416	-48.5	11,668	17,342
Tributaries	1,491	2,853	-47.7	1,548	1,628
Gulf streams, other than Mississippi River	440,438	434,613	1.3	781,949	831,431
Sabine River and tributaries	18,335	13,035	40.7	23,606	23,806
Calcasieu Lake, River, and tributaries	62,866	54,318	15.7	101,920	113,850
Mormontau River and tributaries	256,599	268,240	-4.6	378,863	407,376
Vermilion River and tributaries	82,785	74,034	11.8	249,618	256,078
Achafalaya River and tributaries	13,360	23,342	-42.8	19,467	20,512
Tangipahoa River and tributaries	1,526			1,737	1,811
Natalbany River and tributaries	3,648			4,903	6,053
Other Gulf streams	1,419	1,044	35.9	1,845	1,950

<sup>1</sup> Rice irrigation only. See text in "Introduction."  
<sup>2</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.

**INVESTMENT, AND COST OF MAINTENANCE AND OPERATION OF IRRIGATION ENTERPRISES**

STATE TABLE 8.—INVESTMENT IN ENTERPRISES: 1900 TO 1930

CENSUS YEAR	INVESTMENT		AVERAGE, PER ACRE <sup>1</sup>	
	Amount	Increase	Amount	Increase <sup>2</sup>
	Dollars	Per cent	Dollars	Per cent
1930.....	15,744,743	12.0	19.80	2.6
1920 <sup>3</sup> .....	14,063,181	105.0	19.30	53.6
1910 <sup>3</sup> .....	6,859,166	171.2	12.40	-1.1
1900 <sup>3</sup> .....	2,529,319		12.54	

<sup>1</sup> Based on area enterprises were capable of supplying with water.  
<sup>2</sup> A minus sign (-) denotes decrease.  
<sup>3</sup> Rice irrigation only. See text in "Introduction."

STATE TABLE 9.—INVESTMENT, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	INVESTMENT		
	Amount	Proportion of total	Average, per acre <sup>1</sup>
	Dollars	Per cent	Dollars
Total.....	15,744,743	100.0	19.80
1880-1889.....	21,400	0.1	3.48
1890-1899.....	2,785,805	17.7	12.55
1900-1904.....	2,500,743	15.9	17.30
1905-1909.....	725,085	4.6	10.51
1910-1914.....	1,249,315	7.9	24.45
1915-1919.....	3,443,803	21.9	24.22
1920-1924.....	3,225,269	20.5	63.60
1925-1929.....	984,265	6.3	14.61
Not reported.....	809,058	5.1	12.03

<sup>1</sup> Based on area enterprises were capable of supplying with water in 1930.

STATE TABLE 10.—INVESTMENT, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929; BY SOURCE OF WATER SUPPLY

(When water is pumped, cost of maintenance and operation includes cost of fuel and attendance)

SOURCE OF SUPPLY	INVESTMENT, 1930			MAINTENANCE AND OPERATION, 1929	
	Amount	Proportion of total	Average, per acre	Irrigated area reporting	Average, per acre <sup>1</sup>
	Dollars	Per cent	Dollars	Acres	Dollars
Total.....	15,744,743	100.0	19.80	431,337	4.09
Streams, gravity.....	17,288	0.1	7.80	1,590	2.42
Streams, pumped.....	8,831,806	56.1	17.04	248,802	3.66
Wells, pumped.....	6,013,183	38.2	25.05	163,313	4.45
Wells, flowing.....	249,656	1.6	71.43	1,559	2.71
Wells, pumped and flowing.....	17,826	0.1	78.75	173	3.90
Lakes, pumped.....	46,750	0.3	25.15	1,432	2.97
Lakes, gravity.....	2,225	(?)	2.32	515	0.59
Stored storm water.....	17,779	0.1	6.79	2,252	0.80
Other mixed.....	533,225	3.4	21.25	11,695	9.55
Not reported.....	2,705	(?)	15.64		
Supplemental from—					
Pumped streams.....	10,000	0.1	10.00		
Pumped wells.....	2,800	(?)	4.31	200	3.50

<sup>1</sup> Based on area irrigated in 1929 reporting cost.  
<sup>2</sup> Less than one-tenth of 1 per cent.  
<sup>3</sup> Not considered in total because included in enterprises reporting other sources of supply listed above.

STATE TABLE 11.—INVESTMENT, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

CHARACTER OF ENTERPRISE (See definitions in Introduction)	Enterprises, 1930	INVESTMENT		INCREASE <sup>1</sup>	
		1930	1920 <sup>2</sup>	Amount	Per cent
		Number	Dollars	Dollars	Dollars
Total.....	2,352	15,744,743	14,063,181	1,681,562	12.0
Individual and partnership.....	2,266	6,984,092	7,043,252	-59,160	-12.1
Cooperative.....			161,658	-161,658	-100.0
Commercial.....	85	8,757,151	5,958,271	2,798,880	47.0
State.....	1	3,500		3,500	

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Rice irrigation only. See text in "Introduction."

STATE TABLE 12.—INVESTMENT, BY DRAINAGE BASIN: 1930 AND 1920

DRAINAGE BASIN (See definitions in Introduction)	INVESTMENT		INCREASE <sup>1</sup>	
	1930	1920 <sup>2</sup>	Amount	Per cent
	Dollars	Dollars	Dollars	
Total.....	15,744,743	14,063,181	1,681,562	12.0
Mississippi River and tributaries.....	302,098	331,071	-28,973	-8.8
Mississippi River direct.....	284,998	302,385	-17,387	-5.7
Tributaries.....	17,100	28,686	-11,586	-40.4
Gulf streams, other than Mississippi River.....	15,442,645	13,732,110	1,710,535	12.5
Sabine River and tributaries.....	587,078	328,000	259,078	79.2
Calcasieu Lake, River, and tributaries.....	3,901,748	1,816,380	2,085,368	114.8
Mermentau River and tributaries.....	7,564,600	7,713,797	-149,197	-1.9
Vernilion River and tributaries.....	2,680,508	3,355,327	-674,819	-20.1
Atchafalaya River and tributaries.....	304,183	407,956	-103,773	-25.4
Tangipahoa River and tributaries.....	97,077		97,077	
Natalbany River and tributaries.....	287,221		287,221	
Other Gulf streams.....	19,565	110,650	-91,085	-82.3

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Rice irrigation only. See text in "Introduction."

**COST OF PREPARING LAND FOR IRRIGATION**

The costs shown in State Table 13 represent estimates of expenditures already made on areas reporting, and include clearing and grading land, and building farm laterals and farm irrigation structures.

STATE TABLE 13.—ESTIMATED COST OF PREPARING LAND, 1930

ITEM	1930
Area reporting.....acres.....	482,620
Estimated cost reported.....dollars.....	2,732,098
Average, per acre.....dollars.....	5.66

**DRAINAGE OF IRRIGATED LAND**

The areas in State Table 14 relate only to lands within the boundaries of irrigation enterprises. "Additional area needing drainage" represents all lands so reported by the owners of the enterprises and includes

lands producing partial crops as well as those wholly unproductive.

STATE TABLE 14.—AREA WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL AREA IN NEED OF DRAINAGE: 1930 AND 1920

ITEM	1930	1920
Enterprises reporting land drained or needing drainage.....number.....	577	406
Area <sup>1</sup> in enterprises reporting land drained or needing drainage.....acres.....	226,510	283,476
Area for which drains have been installed.....acres.....	169,577	167,138
Additional area needing drainage.....acres.....	18,832	21,202
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises reporting drainage.....per cent.....	74.0	59.0
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises.....per cent.....	10.9	10.6
Proportion that area for which drains have been installed plus that needing drainage is of area <sup>1</sup> in all irrigation enterprises.....per cent.....	22.2	22.1

<sup>1</sup> Irrigable area, 1930; total area, 1920.

QUANTITY OF WATER USED

The quantity of water used was reported on only part of the irrigation schedules, and all areas reporting "quantity of water entering canals" did not also report "quantity delivered to irrigators." In order that proper values may be assigned to the figures given, those representing measurements and those for estimates are reported separately in State Table 15.

Some irrigation enterprises carry water to individual farms, but others only to laterals which serve several farms. The "total quantity of water delivered to irrigators," shown in State Table 15, is the quantity reported in answer to a question preceded by the inquiry: "Average head of water delivered per individual irrigator."

STATE TABLE 15.—WATER USED: 1929 AND 1919

ITEM (See definitions in Introduction)	TOTAL		MEAS- URED <sup>1</sup>			NOT MEASURED	
	1929	1919	1919	1929	1919		
Average flow of water entering canals.....sec.-ft.....	2,162	5,042	34	2,162	5,008		
Area irrigated.....acres.....	89,224	20,782	780	89,224	20,002		
Average, per second-foot.....acres.....	41	4	23	41	4		
Total quantity of water entering canals.....ac.-ft.....	471,354	198,942	7,022	471,354	191,920		
Area irrigated.....acres.....	166,224	65,424	780	166,224	64,044		
Average quantity per acre.....ac.-ft.....	2.8	3.0	9.0	2.8	3.0		
Total quantity of water delivered to irrigators.....ac.-ft.....	33,180	16,497		33,180	16,497		
Area irrigated.....acres.....	21,219	7,994		21,219	7,994		
Average quantity per acre.....ac.-ft.....	1.6	2.1		1.6	2.1		

<sup>1</sup> No enterprise reported the measurement of water used in 1929.

IRRIGATION WORKS

STATE TABLE 16.—DAMS, BY MATERIAL, 1930

MATERIAL	DAMS	
	Diversion	Storage
	Number	Number
	30	81
Total.....	1	1
Concrete or masonry.....	1	69
Earth and rock.....	34	10
Other and mixed.....	1	2
Not reported.....		

<sup>1</sup> Principally temporary dams, replaced annually.

STATE TABLE 17.—LENGTH OF PIPE LINES, BY MATERIAL AND SIZE, 1930

MATERIAL AND SIZE (DIAMETER)	Length
	Miles
Total.....	15.1
Metal:	
1 to 12 inches.....	10.3
13 to 30 inches.....	4.3
Wood:	
1 to 12 inches.....	0.3
13 to 30 inches.....	0.2

STATE TABLE 18.—PUMPING EQUIPMENT, BY KIND OF POWER AND PUMP, 1930

ITEM	ENGINES OR MOTORS		PUMPS				
	Capacity	Proportion of total	Number	Proportion of total	Capacity	Proportion of total	Average lift
KIND OF POWER	H. p.	Per cent		Per cent	G. p. m.	Per cent	Feet
Total.....	86,413	100.0	2,000	100.0	6,914,799	100.0	37
Electricity.....	11,827	13.7	178	8.9	693,662	11.7	45
Internal combustion.....	46,930	54.3	1,582	79.1	2,748,421	46.5	37
Steam.....	17,222	19.9	156	7.8	1,660,396	28.1	30
Electricity and—							
Internal combustion.....	2,660	3.1	33	1.7	101,560	1.7	43
Steam.....	2,180	2.5	13	0.6	199,300	3.4	44
Steam and internal combustion.....	5,105	5.9	29	1.4	488,500	8.2	28
Electricity, steam, and internal combustion.....	480	0.5	8	0.4	22,000	0.4	43
Not reported.....	10	( <sup>1</sup> )	1	0.1	1,020	( <sup>1</sup> )	8
KIND OF PUMP							
Centrifugal.....	72,862	84.3	1,441	72.1	4,090,066	84.4	43
Rotary.....	10,634	12.3	486	24.3	643,688	10.0	25
Reciprocating.....	125	0.1	13	0.6	11,320	0.2	10
Plunger.....	85	0.1	18	0.9	3,995	0.1	15
Centrifugal and—							
Rotary.....	1,963	2.3	36	1.8	171,880	2.9	25
Screw.....	700	0.8	3	0.2	90,000	1.5	24
Not reported.....	44	0.1	3	0.1	3,850	( <sup>1</sup> )	( <sup>2</sup> )

<sup>1</sup> Less than one-tenth of 1 per cent.

<sup>2</sup> Not reported.

IRRIGATION—LOUISIANA

STATE TABLE 19.—IRRIGATION WORKS, BY DATE OF BEGINNING, 1930

DATE OF BEGINNING (See definitions in Introduction)	DAMS		MAIN CANALS		Lateral canals, length	RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Di- ver- sion	Stor- age	Capac- ity	Length		Number	Capac- ity		Number	Capac- ity	Number	Capacity	Number	Engine or motor capacity	Pumps	
	Number 36	Number 81	Sec.-ft. 11,386	Miles 1,318	Miles 908	85	Ac.-ft. 13,909	Miles 15.1	807	G. p. m. 31,961	1,389	G. p. m. 1,958,811	1,790	H. p. 86,413	2,000	G. p. m. 5,914,799
1880-1889.....						1	90		5	60			1	250	2	65,000
1890-1899.....	3	3	3,240	135	329	2	415	0.1	3	125	4	11,080	23	10,325	38	1,237,050
1900-1904.....		8	2,090	196	233	4	185	0.3	20	740	24	82,560	52	8,707	05	884,086
1905-1909.....	11	7	437	80	53	6	6,304		24	980	42	97,425	57	4,323	58	350,425
1910-1914.....	3	27	1,291	236	46	25	2,022	1.1	53	2,137	134	301,235	170	10,638	175	381,040
1915-1919.....	7	14	2,396	367	103	15	1,220	2.5	127	4,701	327	779,078	393	29,139	419	1,101,982
1920-1924.....	2	6	721	124	67	11	1,993	4.9	270	10,916	153	184,708	213	7,947	248	472,185
1925-1929.....	8	14	888	133	44	18	693	4.9	250	10,675	409	178,700	595	8,942	700	521,150
Not reported.....	2	2	314	47	33	3	978	1.3	55	1,627	206	324,075	281	9,142	205	900,076

STATE TABLE 20.—IRRIGATION WORKS, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE (See definitions in Introduction)	DAMS		MAIN CANALS		Lateral canals, length	RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS			
	Di- ver- sion	Stor- age	Capac- ity	Length		Number	Capac- ity		Number	Capac- ity	Number	Capacity	Number	Engine or motor capacity	Pumps	
	Number 36	Number 81	Sec.-ft. 11,386	Miles 1,318	Miles 908	85	Ac.-ft. 13,909	Miles 15.1	807	G. p. m. 31,961	1,389	G. p. m. 1,958,811	1,790	H. p. 86,413	2,000	G. p. m. 5,914,799
Individual and partnership.....	31	79	4,001	759	146	82	12,709	15.1	807	31,001	1,325	1,797,411	1,663	59,162	1,845	3,103,440
Commercial.....	5	2	7,380	553	761	3	1,200				63	159,400	126	27,191	154	2,719,350
State.....			5	1	1						1	2,000	1	60	1	2,000

STATE TABLE 21.—IRRIGATION WORKS, BY DRAINAGE BASIN, 1930

DRAINAGE BASIN (See definitions in Introduction)	DAMS		MAIN CANALS		Lateral canals, length	RESERVOIRS		Pipe lines, length	FLOWING WELLS		PUMPED WELLS		PUMPING PLANTS				
	Di- ver- sion	Stor- age	Capac- ity	Length		Number	Capac- ity		Number	Capac- ity	Number	Capacity	Number	Engine or motor capacity	Pumps		Average lift
	Number 36	Number 81	Sec.-ft. 11,386	Miles 1,318	Miles 908	85	Ac.-ft. 13,909	Miles 15.1	807	G. p. m. 31,961	1,389	G. p. m. 1,958,811	1,790	H. p. 86,413	2,000	G. p. m. 5,914,799	
Mississippi River and tributaries.....	1	9	719	16		11	156	13.4	1	48	8	4,012	70	1,224	70	94,270	10
Mississippi River direct.....	1	6	719	16		9	104	13.2			6	1,382	64	1,038	64	82,030	15
Tributaries.....		3				2	52	0.2	1	48	2	2,650	6	186	6	11,640	28
Gulf streams, other than Mississippi River.....	35	72	10,667	1,302	908	74	13,753	1.7	806	31,913	1,381	1,954,799	1,720	85,189	1,930	5,820,529	38
Sabine River and tributaries.....		1	1,522	41	42	1	20				7	18,800	13	1,852	13	175,100	42
Calcasieu Lake, River, and tributaries.....	2	1	578	180	182	4	448				74	271,650	104	10,332	115	947,050	40
Mermentau River and tributaries.....	26	65	2,282	943	379	63	13,018	0.2			575	1,397,670	733	59,119	768	2,909,468	44
Vermilion River and tributaries.....	4		6,126	67	296						55	178,350	104	8,682	179	1,442,590	21
Atchafalaya River and tributaries.....	3	4	94	69	9	5	207	1.4			10	60,700	74	3,235	79	247,400	20
Tangipahoa River and tributaries.....		1							228	7,984	174	8,080	157	405	240	8,125	19
Natalbany River and tributaries.....						1	60		578	23,929	486	21,549	470	1,368	531	21,410	43
Other Gulf streams.....			65	2				0.1				196	5	196	5	69,300	17

# IRRIGATION—LOUISIANA

PARISH TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930 AND 1920<sup>1</sup>; AREAS IRRIGATED, 1929 AND 1919<sup>1</sup>; TENURE OF FARM OPERATORS AND VALUE OF FARMS, 1930; AND COST OF MAINTENANCE AND OPERATION, 1929

	ITEM (See definitions in Introduction)	THE STATE	Acadia	Allen	Ascension	Assump- tion
<b>FARMS AND FARM OPERATORS</b>						
1	All farms..... 1930..... number	161,445	3,828	1,068	1,335	416
2	Irrigated farms..... 1930..... number	5,583	1,210	91	14	8
3	Operated by—					
4	Owners and managers..... number	3,049	653	47	11	3
5	Tenants..... number	2,539	557	44	3	3
6	Irrigated farms..... 1920..... number	6,471	1,678	165	74	13
	Increase, <sup>2</sup> 1920-1930..... per cent.	-13.6	-27.9	-44.8	-81.1	-76.9
<b>FARM AREA AND TOTAL LAND AREA</b>						
7	Approximate land area..... 1930..... acres	20,061,700	414,080	424,320	180,240	309,760
8	Land in all farms..... 1930..... acres	9,355,437	310,702	76,740	74,222	104,615
9	Land in irrigated farms..... 1930..... acres	892,004	222,752	20,883	7,895	1,274
10	Average, per farm..... acres	159.7	184.1	229.8	608.9	424.7
11	Operated by owners and managers..... acres	552,893	151,137	11,905	6,289	1,274
12	Average, per farm..... acres	131.3	231.6	254.6	871.7	424.7
13	Operated by tenants..... acres	339,741	71,615	8,978	1,606	3
14	Average, per farm..... acres	133.8	128.6	202.7	535.3	
15	Area irrigated..... 1929..... acres	450,001	133,589	11,508	3,721	325
16	Increase, <sup>2</sup> 1919-1929..... per cent.	454,882	134,710	15,805	2,080	1,130
17	Increase, <sup>2</sup> 1919-1929..... per cent.	-0.9	-0.9	-20.8	78.9	-71.2
18	Area enterprises were capable of supplying with water..... 1930..... acres	795,105	192,701	17,187	4,230	475
19	Increase, <sup>2</sup> 1920-1930..... per cent.	728,742	186,218	29,560	2,635	1,630
20	Increase, <sup>2</sup> 1920-1930..... per cent.	0.1	3.5	-59.9	60.5	-69.0
21	Irrigable area in enterprises..... 1930..... acres	850,401	197,691	18,282	4,290	505
22	Total area in enterprises..... 1920..... acres	851,211	203,799	30,705	2,635	1,630
23	Area in enterprises available, or to be available, for settlement..... 1930..... acres	15,440	10,000			
<b>IRRIGATION WORKS</b>						
24	Enterprises..... 1930..... number	2,355	343	25	10	3
25	Increase, <sup>2</sup> 1920-1930..... per cent.	1,373	323	32	6	2
26	Main canals..... 1930..... length, miles	1,318	480	37	6	
27	Increase, <sup>2</sup> 1920-1930..... per cent.	1,584	428	36	7	1
28	Capacity, 1930..... capacity, sec.-ft.	11,380	2,930	135	72	
29	Increase, <sup>2</sup> 1920-1930..... per cent.	11,889	1,934	86	16	4
30	Laterals..... 1930..... length, miles	903	223	6		
31	Increase, <sup>2</sup> 1920-1930..... per cent.	1,659	390	41	1	
32	Reservoirs..... 1930..... number	85	6	2	3	
33	Increase, <sup>2</sup> 1920-1930..... per cent.	74	11			
34	Capacity, 1930..... capacity, ac.-ft.	13,909	881	80	9	
35	Increase, <sup>2</sup> 1920-1930..... per cent.	7,632	2,170			
36	Wells, flowing..... 1930..... number	807				
37	Increase, <sup>2</sup> 1920-1930..... per cent.	9				
38	Capacity, 1930..... capacity, g. p. m.	31,961				
39	Increase, <sup>2</sup> 1920-1930..... per cent.	6,255				
40	Wells, pumped..... 1930..... number	1,389	308	23	1	
41	Increase, <sup>2</sup> 1920-1930..... per cent.	812	230	32		
42	Capacity, 1930..... capacity, g. p. m.	1,058,811	637,055	49,500	1,000	
43	Increase, <sup>2</sup> 1920-1930..... per cent.	1,607,637	426,300	89,700		
44	Pumping plants..... 1930..... number	1,700	379	27	8	2
45	Increase, <sup>2</sup> 1920-1930..... per cent.	1,250	347	45	7	2
46	Engine capacity, 1930..... engine capacity, h. p.	86,413	31,793	1,962	300	46
47	Increase, <sup>2</sup> 1920-1930..... per cent.	85,628	27,279	5,680	375	155
48	Capacity, 1930..... pump capacity, g. p. m.	5,914,790	1,323,978	96,700	33,600	48,000
49	Increase, <sup>2</sup> 1920-1930..... per cent.	4,908,686	1,509,335	161,100	9,500	11,000
50	Average lift, 1930..... average lift, feet	37	47	49	14	16
51	Increase, <sup>2</sup> 1920-1930..... per cent.	32	37	36	15	22
<b>VALUES OF FARMS, 1930</b>						
52	Land and buildings, all farms..... dollars	418,191,773	17,428,700	2,544,421	3,515,270	4,675,318
53	Land and buildings, irrigated farms..... dollars	45,496,283	12,048,814	737,450	307,800	51,000
54	Operated by—					
55	Owners and managers..... dollars	29,532,898	8,220,429	410,950	232,800	51,000
56	Tenants..... dollars	15,963,385	3,828,385	320,500	75,000	
57	Average, land and buildings, per farm..... dollars	8,141.78	9,957.70	8,103.85	21,985.71	17,000.00
58	Average, per acre..... dollars	50.97	54.09	35.31	38.99	40.03
59	Land (excluding buildings)..... dollars	37,467,395	10,204,504	612,895	242,800	35,600
60	Buildings (including dwellings)..... dollars	8,028,888	1,844,310	124,555	65,000	15,400
61	Implements and machinery, irrigated farms..... dollars	5,179,941	1,411,558	100,677	62,134	1,100
62	Average, per farm..... dollars	929.98	1,169.58	1,108.34	4,438.14	806.67
	Average, per acre..... dollars	5.80	6.34	4.82	7.87	0.88
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>						
63	Investment to Jan. 1, 1930..... dollars	15,744,743	4,167,252	240,900	29,650	6,250
64	Increase, <sup>2</sup> 1920-1930..... dollars	14,063,181	3,732,643	300,450	44,100	12,500
65	Increase, <sup>2</sup> 1920-1930..... per cent.	12.0	11.6	-22.2	-32.8	-50.0
66	Average, per acre, based on area enterprises were capable of supplying with water, 1930..... dollars	19.80	21.62	14.02	7.01	18.16
67	Average, per acre, based on area enterprises were capable of supplying with water, 1920..... dollars	19.30	20.04	10.82	16.74	8.17
68	Estimated final investment in existing enterprises, 1930..... dollars	15,771,003	4,168,302	250,900	41,650	6,250
69	Increase, <sup>2</sup> 1920-1930..... dollars	14,264,178	3,795,613	310,950	44,100	12,500
70	Increase, <sup>2</sup> 1920-1930..... per cent.	10.8	9.3	-19.3	-5.6	-60.0
71	Average, per acre, based on estimated final investment and irrigable area, 1930..... dollars	18.55	21.08	18.72	9.76	12.38
72	Average, per acre, based on estimated final investment and total area, 1920..... dollars	16.76	18.18	10.13	16.74	8.17
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>						
73	Irrigated area for which cost was reported..... acres	431,337	131,850	10,966	2,935	320
74	Average, per acre, based on area reporting..... dollars	4.09	4.25	6.71	2.87	3.34

<sup>1</sup> Rice irrigation only reported in 1920. See text in "Introduction."

<sup>2</sup> A minus sign (-) denotes decrease.

<sup>3</sup> Includes 3 interparish projects counted in this table as 6 independent enterprises; corresponding figures for 1920 not available. For actual number of enterprises see State Tables 4 and 11.

IRRIGATION—LOUISIANA

PARISH TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930; AND COST OF MAINTENANCE

ITEM (See definitions in Introduction)		Avoyelles	Calcasieu	Cameron	Evangeline	Iberia
<b>FARMS AND FARM OPERATORS</b>						
1	All farms..... 1930..... number.....	5,975	1,565	814	4,610	1,297
2	Irrigated farms..... 1930..... number.....	3	266	34	205	11
Operated by—						
3	Owners and managers..... number.....		123	8	85	6
4	Tenants..... number.....	3	143	26	120	5
5	Irrigated farms..... 1920..... number.....	(?)	377	192	601	197
6	Increase, 1920-1930..... per cent.....		-29.4	-82.3	-65.9	-94.4
<b>FARM AREA AND TOTAL LAND AREA</b>						
7	Approximate land area..... 1930..... acres.....	542,080	695,040	900,640	435,840	376,000
8	Land in all farms..... 1930..... acres.....	171,967	178,573	68,037	169,231	126,306
9	Land in irrigated farms..... 1930..... acres.....	477	83,536	13,503	19,133	7,667
10	Average, per farm..... acres.....	159.0	314.2	397.1	93.8	697.0
11	Operated by owners and managers..... acres.....		41,838	8,775	11,134	5,033
12	Average, per farm..... acres.....		340.1	1,000.9	131.0	838.8
13	Operated by tenants..... acres.....	477	41,748	4,728	7,099	2,634
14	Average, per farm..... acres.....	159.0	291.9	181.8	66.7	526.8
15	Area irrigated..... 1920..... acres.....	860	63,601	3,695	13,672	2,740
16	Increase, 1910-1920..... acres.....	(?)	47,066	726	12,058	11,801
17	Increase, 1910-1920..... per cent.....		35.2	405.5	13.4	-76.8
18	Area enterprises were capable of supplying with water..... 1930..... acres.....	735	105,245	6,380	20,175	2,830
19	Increase, 1920-1930..... acres.....	(?)	121,612	4,230	17,602	11,505
20	Increase, 1920-1930..... per cent.....		-13.5	50.8	15.3	-75.4
21	Irrigable area in enterprises..... 1930..... acres.....	800	114,330	6,380	20,310	2,865
22	Total area in enterprises..... 1920..... acres.....	(?)	147,115	4,810	18,812	12,036
23	Area in enterprises available, or to be available, for settlement..... 1930..... acres.....		5,400			
<b>IRRIGATION WORKS</b>						
24	Enterprises..... 1930..... number.....	4	42	4	96	5
25	Increase, 1920-1930..... number.....	(?)	56	5	83	43
26	Main canals..... 1930..... length, miles.....	1	173	4	163	10
27	Increase, 1920-1930..... length, miles.....	(?)	160	5	35	42
28	1930..... capacity, sec.-ft.....	1	1,985	86	1,001	304
29	1920..... capacity, sec.-ft.....	(?)	1,580	8	127	381
30	Laterals..... 1930..... length, miles.....		221	6	15	5
31	Increase, 1920-1930..... length, miles.....		145	6	21	25
32	Reservoirs..... 1930..... number.....		5		34	
33	Increase, 1920-1930..... number.....	(?)	3		10	1
34	1930..... capacity, ac.-ft.....		6,448		5,006	
35	1920..... capacity, ac.-ft.....		460		255	2,041
36	Wells, flowing..... 1930..... number.....					
37	Increase, 1920-1930..... number.....	(?)	5			1
38	1930..... capacity, g. p. m.....					
39	1920..... capacity, g. p. m.....	(?)	5,800			
40	Wells, pumped..... 1930..... number.....	1	16		42	
41	Increase, 1920-1930..... number.....		28	1	26	35
42	1930..... capacity, g. p. m.....	2,500	88,450		98,650	
43	1920..... capacity, g. p. m.....		106,800	2,000	50,150	40,580
44	Pumping plants..... 1930..... number.....	4	54	3	68	6
45	Increase, 1920-1930..... number.....	(?)	57	5	57	40
46	1930..... engine capacity, h. p.....	57	7,559	150	4,235	455
47	1920..... engine capacity, h. p.....	(?)	7,947	187	2,451	1,823
48	1930..... pump capacity, g. p. m.....	3,050	916,562	39,800	136,720	28,100
49	1920..... pump capacity, g. p. m.....	(?)	745,200	98,094	71,070	90,276
50	1930..... average lift, feet.....	22	22	0	31	22
51	1920..... average lift, feet.....		21	17	34	19
<b>VALUES OF FARMS, 1930</b>						
52	Land and buildings, all farms..... dollars.....	11,255,029	7,710,790	2,076,480	8,300,723	8,603,226
53	Land and buildings, irrigated farms..... dollars.....	27,745	3,323,000	336,450	781,700	580,300
Operated by—						
54	Owners and managers..... dollars.....		1,796,970	193,900	457,260	432,900
55	Tenants..... dollars.....	27,745	1,526,030	141,550	324,440	147,400
56	Average, land and buildings, per farm..... dollars.....	9,243.33	12,492.43	9,866.18	3,813.17	52,754.55
57	per acre..... dollars.....	58.17	39.78	24.84	40.88	75.69
58	Land (excluding buildings)..... dollars.....	26,820	2,763,455	289,800	620,680	460,560
59	Buildings (including dwellings)..... dollars.....	925	564,545	65,650	161,020	119,750
60	Implements and machinery, irrigated farms..... dollars.....	3,300	424,068	38,315	144,405	72,100
61	Average, per farm..... dollars.....	1,100.00	1,507.62	1,126.91	704.85	6,564.55
62	per acre..... dollars.....	6.92	5.08	2.84	7.55	9.40
<b>INVESTMENT IN IRRIGATION ENTERPRISES</b>						
63	Investment to Jan. 1, 1930..... dollars.....	7,685	4,166,885	17,000	422,793	33,200
64	Increase, 1920-1930..... dollars.....	(?)	1,667,236	50,570	487,977	201,626
65	Average, per acre, based on area enterprises were capable of supplying with water, 1930..... per cent.....		149.9	-71.5	-13.4	-83.5
66	1920..... dollars.....	10.46	39.59	2.66	20.96	11.73
67	Estimated final investment in existing enterprises, 1930..... dollars.....		13.71	14.08	27.88	17.63
68	Increase, 1920-1930..... dollars.....	8,485	4,167,385	17,000	422,853	33,200
69	Average, per acre, based on estimated final investment and irrigable area, 1930..... per cent.....	(?)	1,069,936	59,570	521,662	201,626
70	1920..... dollars.....		149.6	-71.5	-18.9	-83.5
71	Average, per acre, based on estimated final investment and total area, 1920..... dollars.....	9.87	36.45	2.66	20.82	11.69
72	per acre..... dollars.....		11.35	13.82	27.73	16.75
<b>COST OF MAINTENANCE AND OPERATION, 1929</b>						
73	Irrigated area for which cost was reported..... acres.....	800	60,331	3,300	13,018	2,505
74	Average, per acre, based on area reporting..... dollars.....	6.28	4.49	3.76	3.49	6.03

<sup>1</sup> Rice irrigation only reported in 1920. See text in "Introduction,"

<sup>2</sup> Included in "All other parishes."

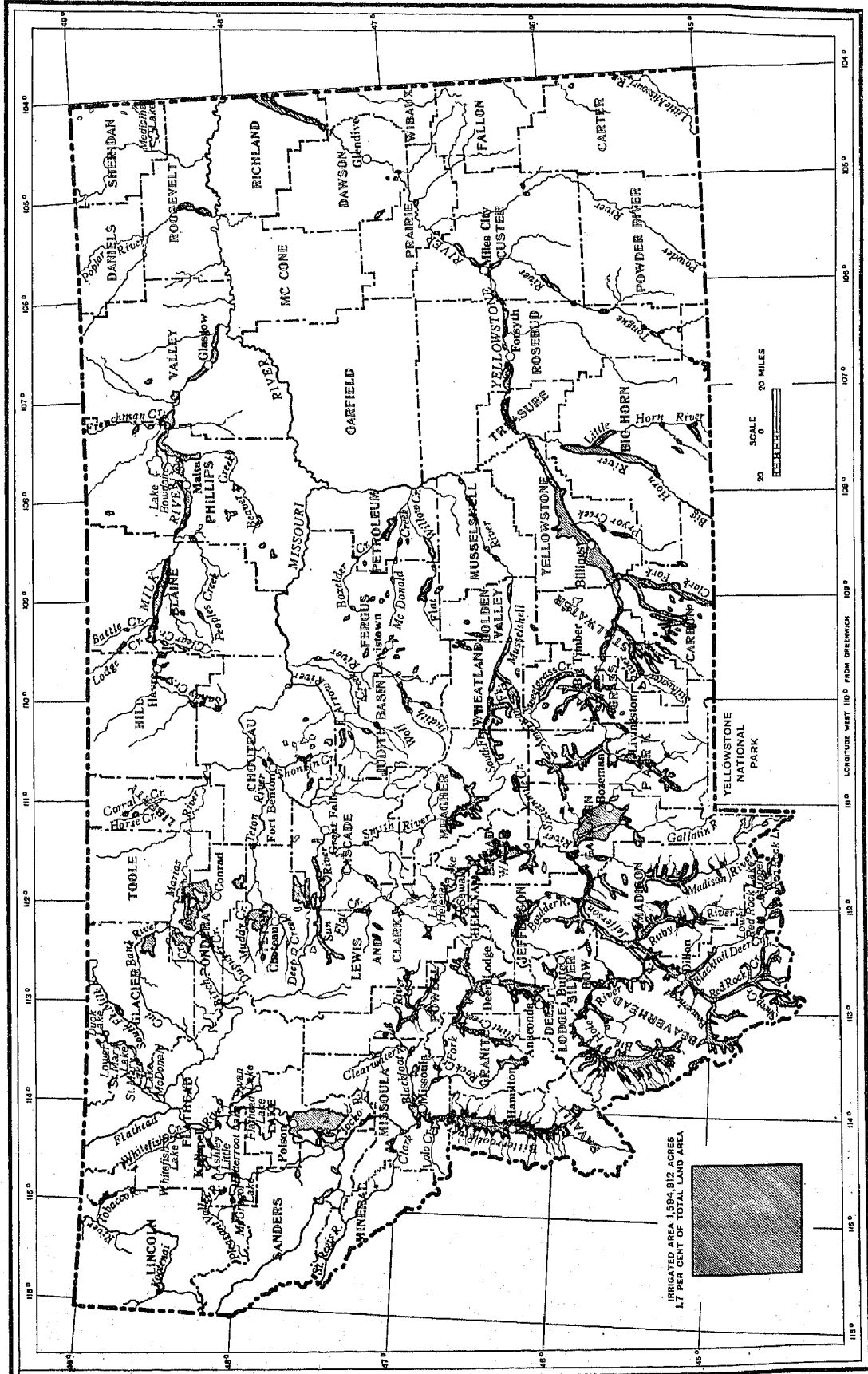
<sup>3</sup> A minus sign (-) denotes decrease.





# MONTANA

APPROXIMATE LOCATION AND EXTENT OF IRRIGATED LAND



# MONTANA

## INTRODUCTION

Statistics are presented in the following pages on farms irrigated and area irrigated, investment and cost of maintenance and operation of irrigation enterprises, cost of preparing land for irrigation, drainage of irrigated land, quantity of water used, and distribution of irrigation works, with specialized information relating to dams, pipe lines, and pumping equipment. Data on area irrigated, investment, and irrigation works are given in detail by drainage basins. Classifications of irrigated farms by type of farm, size of farm, and value of farm products; and the acreage, yield, and value of the principal crops grown on irrigated land, for all irrigation States, are shown in Parts III and IV, pages 257 and 325, respectively, of this volume.

Statistics for area irrigated and for cost of maintenance and operation of irrigation works relate to the year 1929; all other items relate to 1930.

For purposes of comparison, statistics for the census of 1920 are shown, where available; and for the purpose of showing the historical development of irrigation certain data are presented from censuses previous to that of 1920.

Data on number, area, and value of wholly and partly irrigated farms with the tenure of the operators of these farms were collected in 1930 on the general farm schedule; in 1920 only the number of irrigated farms was obtained in this way. All other statistics, in both censuses, were collected on special schedules for irrigation enterprises.

STATE TABLE 1.—SUMMARY FOR THE STATE: 1930 AND 1920

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920	Amount	Per cent
All farms.....number.....	47,495	57,677	-10,182	-17.6
All land in farms.....acres.....	44,659,152	35,070,656	9,588,496	27.3
Approximate land area of State.....acres.....	93,523,840	93,523,840		
Farms irrigated.....number.....	11,925	10,807	1,118	10.3
Area irrigated.....acres.....	1,594,912	1,681,729	-86,817	-5.2
Area enterprises were capable of supplying with water.....acres.....	2,276,000	2,753,498	-477,498	-17.3
Area in enterprises <sup>2</sup> .....acres.....	2,622,423	4,329,148		
Proportion irrigated:				
All farms.....per cent.....	25.1	18.7		
All land in farms.....per cent.....	3.6	4.8		
Approximate land area of State.....per cent.....	1.7	1.8		
Excess of area enterprises were capable of supplying with water over area irrigated.....acres.....	681,088	1,071,769	-390,681	-36.4
Excess of area in enterprises <sup>2</sup> over area irrigated.....acres.....	1,027,511	2,647,419		
Area in enterprises available, or to be available, for settlement.....acres.....	53,576	207,630	-153,954	-74.2
Value of irrigated farms [land, buildings (including dwellings), and implements and machinery].....dollars.....	205,027,415	( <sup>3</sup> )		
Investment in irrigation enterprises.....dollars.....	50,319,204	52,143,363	-1,824,159	-3.5
Average, per acre, based on area enterprises were capable of supplying with water.....dollars.....	22.11	18.94	3.17	10.7
Estimated final cost of existing enterprises.....dollars.....	58,489,575	70,079,028	-11,589,453	-16.5
Average, per acre, based on area in enterprises <sup>2</sup> .....dollars.....	22.30	16.19		
Average annual cost, per acre, for maintenance and operation of irrigation works.....dollars.....	0.87	1.26	-0.39	-31.0

<sup>1</sup> A minus sign (-) denotes decrease.

<sup>2</sup> Irrigable area, 1930; total area, 1920.

<sup>3</sup> Figures not available.

STATE TABLE 2.—FARMS AND SPECIFIED FARM VALUES, BY TENURE OF FARM OPERATOR, 1930

ITEM (See definitions in Introduction)	FARMS		SPECIFIED FARM VALUES					
	Number	Area	Land and buildings		Land alone		Implements and machinery	
			Total	Per acre	Total	Per acre	Total	Per acre
All farms.....	47,495	44,659,152	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Owners and managers.....	35,867	37,159,611	527,610,002	11.81	442,941,368	9.92	62,070,274	1.39
Tenants.....	11,628	7,499,541	421,629,148	11.35			49,837,428	1.34
Irrigated farms.....	11,925	12,032,619	105,980,854	14.13			12,232,846	1.63
Owners and managers.....	8,701	10,494,023	190,057,936	15.80	156,067,215	12.87	14,969,479	1.24
Tenants.....	3,224	1,538,596	151,420,935	14.43	123,828,070	11.80	11,750,163	1.12
Wholly irrigated farms.....	8,638	6,671,194	38,637,001	25.11	32,239,145	20.95	3,219,316	2.09
Owners and managers.....	6,263	5,752,055	122,267,543	18.33	98,228,845	14.72	9,596,784	1.44
Tenants.....	2,385	919,139	96,071,382	16.70	76,719,879	13.34	7,444,102	1.29
Partly irrigated farms.....	3,287	5,361,425	20,106,161	28.50	21,508,966	23.40	2,152,682	2.34
Owners and managers.....	2,448	4,741,988	67,790,393	12.64	57,838,370	10.79	5,372,695	1.00
Tenants.....	839	619,457	55,349,658	11.67	47,108,191	9.93	4,306,061	0.91
Farms not irrigated.....	35,570	32,626,533	12,440,840	20.08	10,730,179	17.32	1,066,634	1.72
			337,552,066	10.34	286,874,153	8.79	47,100,795	1.44

FARMS AND AREA IRRIGATED

In State Table 3 and in other tables "Number of farms irrigated" is equivalent to "Number of irrigators" used in census reports previous to 1910.

STATE TABLE 3.—FARMS AND AREA IRRIGATED: 1890 TO 1930

CENSUS YEAR	FARMS IRRIGATED			AREA IRRIGATED			
	Number	Increase	Proportion of all farms	Area	Increase <sup>1</sup>	Proportion of total land area of State	Proportion of land in all farms
		Per cent	Per cent	Acres	Per cent	Per cent	Per cent
1930.....	11,925	10.3	25.1	1,594,912	-5.2	1.7	8.6
1920.....	10,807	20.5	18.7	1,081,729	0.2	1.8	4.8
1910.....	8,970	11.5	34.2	1,079,084	76.5	1.8	12.4
1900.....	8,043	117.0	60.2	951,154	171.3	1.0	8.0
1890.....	3,706		66.1	350,582		0.4	17.8

<sup>1</sup> A minus sign (-) denotes decrease.

STATE TABLE 4.—AREA, BY DATE OF BEGINNING OF ENTERPRISES SUPPLYING WATER FOR IRRIGATION

DATE OF BEGINNING (See definitions in Introduction)	Enterprises, 1930	AREA IRRIGATED IN 1929		Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
		Area	Proportion of irrigable area in enterprises		
	Number	Acres	Per cent	Acres	Acres
Total.....	4,461	1,594,912	60.8	2,276,000	2,622,423
Before 1860.....	4	2,955	100.0	2,955	2,955
1860-1869.....	305	109,955	78.5	135,190	140,001
1870-1879.....	330	101,020	79.7	119,245	126,715
1880-1889.....	891	384,707	73.6	485,208	522,718
1890-1899.....	833	310,065	75.3	378,018	412,604
1900-1904.....	301	125,153	55.1	157,737	227,214
1905-1909.....	275	332,025	38.9	688,219	856,146
1910-1914.....	300	54,982	57.5	88,544	95,628
1915-1919.....	187	29,800	67.5	41,885	44,127
1920-1924.....	140	13,596	59.7	18,803	22,758
1925-1929.....	145	26,609	66.1	37,643	40,254
Not reported.....	660	102,536	78.1	122,556	131,213

STATE TABLE 5.—AREA, BY SOURCE OF WATER SUPPLY: 1929 AND 1919

SOURCE OF SUPPLY	AREA IRRIGATED				Area enterprises were capable of supplying with water, 1930	Irrigable area in enterprises, 1930
	1929	1919	Increase <sup>1</sup>			
			Area	Per cent		
	Acres	Acres	Acres	Per cent	Acres	Acres
Total.....	1,594,912	1,081,729	-508,183	-31.5	2,276,000	2,622,423
Streams, gravity.....	1,392,161	1,515,212	123,051	8.8	1,075,084	2,289,432
Streams, pumped.....	38,620	15,743	-22,877	-59.2	51,094	55,355
Streams, gravity and pumped.....	56,970	19,872	-37,098	-65.1	104,449	117,276
Wells, pumped.....	243	139	-104	-42.8	289	304
Wells, flowing.....	821	212	-609	-74.2	1,173	1,200
Lakes, pumped.....	5,528	79	-5,449	-98.6	10,288	10,288
Lakes, gravity.....	4,905	10,653	5,748	117.2	13,444	13,432
Springs.....	10,947	14,945	3,998	36.5	13,042	14,180
Stored storm water.....	4,828	3,280	-1,548	-32.1	7,093	8,409
City water.....	335	15	-320	-95.5	462	527
Sewage.....	5	245	240	4800.0	5	5
Streams, gravity and wells, pumped.....	2,694	155	-2,539	-94.6	4,520	4,820
Streams, gravity and wells, flowing.....		6,068	-6,068	-100.0		
Other mixed.....	76,732	89,070	12,338	16.2	94,934	106,946
Other.....	123	41	-82	-66.7	123	123

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> In reservoirs filled from channels which carry water only during storms and are not classed as streams.

AREA, BY CHARACTER OF ENTERPRISE

The areas credited to the United States Bureau of Reclamation, in State Table 6, include not only the project units still operated by that Bureau, but also the Huntley, Alfalfa Valley, Fort Balknap, Harlem, Paradise Valley, Zurich, and Fort Shaw irrigation districts, which have assumed operation of several units formerly operated by it.

Areas classed as "Carey Act" are those of a single enterprise. Other Carey Act enterprises reported in 1920 have since then been turned over to the water users, and are included in the 1930 "Cooperative" classification.

STATE TABLE 6.—AREA, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

[For number of enterprises by classes, see State Table 13]

ITEM AND CHARACTER (See definitions in Introduction)	CENSUS OF—		INCREASE <sup>1</sup>	
	1930	1920	Area	Per cent
	Acres	Acres	Acres	
<b>AREA IRRIGATED</b>				
Total.....	1,594,912	1,081,729	-513,183	-47.3
Individual and partnership.....	885,274	976,615	91,341	10.3
Cooperative.....	418,862	393,257	-25,605	-6.1
Irrigation district.....	83,870	35,153	-48,717	-58.1
Carey Act.....	10,000	54,771	44,771	447.7
Commercial.....	22,375	34,115	11,740	52.5
United States Bureau of Indian Affairs.....	75,844	98,837	23,043	30.4
United States Bureau of Reclamation.....	98,327	88,291	-10,036	-10.2
State.....	360	20	-340	-94.4
City.....		320	320	100.0
Other.....		300	-300	-100.0
<b>AREA ENTERPRISES WERE CAPABLE OF SUPPLYING WITH WATER</b>				
Total.....	2,276,000	2,753,498	477,498	21.0
Individual and partnership.....	1,099,099	1,617,617	518,518	47.2
Cooperative.....	624,077	553,952	-70,125	-11.2
Irrigation district.....	137,458	70,050	-67,408	-49.0
Carey Act.....	17,000	83,913	66,913	393.6
Commercial.....	28,780	38,215	9,435	32.8
United States Bureau of Indian Affairs.....	230,870	215,940	-14,930	-6.5
United States Bureau of Reclamation.....	247,755	172,206	-75,549	-30.5
State.....	360	50	-310	-86.1
City.....		390	390	100.0
Other.....		565	-565	-100.0
<b>AREA IN ENTERPRISES<sup>2</sup></b>				
Total.....	2,622,423	4,320,148	1,697,725	64.7
Individual and partnership.....	1,243,248	2,372,036	1,128,788	91.6
Cooperative.....	544,738	609,310	64,572	11.9
Irrigation district.....	141,643	71,087	-70,556	-49.8
Carey Act.....	17,000	181,873	164,873	970.4
Commercial.....	29,780	39,160	9,380	31.5
United States Bureau of Indian Affairs.....	334,178	520,090	185,912	55.6
United States Bureau of Reclamation.....	311,471	430,982	119,511	38.4
State.....	360	100	-260	-72.2
City.....		530	530	100.0
Other.....		730	-730	-100.0

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Irrigable area, 1930; total area, 1920.

AREA, BY CHARACTER OF WATER RIGHTS

STATE TABLE 7.—AREA IRRIGATED, BY CHARACTER OF RIGHTS UNDER WHICH WATER IS RECEIVED: 1929 AND 1919

WATER RIGHTS (See definitions in Introduction)	1929		1919	
	Area	Proportion of total	Area	Proportion of total
	Acres	Per cent	Acres	Per cent
Total.....	1,594,912	100.0	1,081,729	100.0
Appropriation and use.....	225,901	14.2	229,887	21.3
Notice filed and posted.....	470,689	29.5	609,305	56.3
Adjudicated by court.....	805,720	50.5	791,015	73.1
Riparian.....	( <sup>1</sup> )		5,800	0.5
Underground.....	1,064	0.1	482	0.04
Other.....	8,020	0.5	8,561	0.8
Mixed.....	18,115	1.1		
Not reported.....	65,394	4.1	69,979	6.4

<sup>1</sup> Riparian rights were invalidated by court decision in 1921.  
<sup>2</sup> Less than one-tenth of 1 per cent.



STATE TABLE 13.—INVESTMENT, BY CHARACTER OF ENTERPRISE: 1930 AND 1920

CHARACTER OF ENTERPRISE (See definitions in Introduction)	Enter- prises, 1930	INVESTMENT		INCREASE <sup>1</sup>	
		1930	1920	Amount	Per cent
		Number	Dollars	Dollars	Dollars
Total.....	4,461	50,319,204	52,143,393	-1,824,189	-3.5
Individual and partnership.....	4,237	7,595,504	15,543,237	-7,947,733	-51.1
Cooperative.....	180	8,466,936	6,692,877	1,774,059	26.5
Irrigation district.....	25	5,404,781	1,708,851	3,695,930	216.3
Carey Act.....	1	300,000	4,834,407	-4,534,407	-03.8
Commercial <sup>2</sup> .....	8	632,480	676,535		
U. S. Bureau of Indian Affairs.....	5	9,580,693	8,193,390	1,386,303	17.0
U. S. Bureau of Reclamation.....	4	18,325,910	14,381,318	3,944,592	27.4
State.....	1	3,000	100	2,900	
City.....			105,538		
Other.....			7,060	-7,060	

<sup>1</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>2</sup> Data for 1930 include 1 "City" enterprise selling water to other enterprises.

COST OF PREPARING LAND FOR IRRIGATION

The costs shown in State Table 14 represent estimates of expenditures already made on the areas reporting, and include clearing and grading land, and building farm laterals and farm irrigation structures.

STATE TABLE 14.—ESTIMATED COST OF PREPARING LAND, 1930

ITEM	1930
Area reporting.....acres.....	1,636,771
Estimated cost reported.....dollars.....	16,539,617
Average, per acre.....dollars.....	10.14

DRAINAGE OF IRRIGATED LAND

The areas in State Table 15 relate only to lands within the boundaries of irrigation enterprises. "Additional area needing drainage" includes lands producing partial crops as well as those wholly unproductive.

STATE TABLE 15.—AREA WITHIN IRRIGATION ENTERPRISES FOR WHICH DRAINS HAVE BEEN INSTALLED AND ADDITIONAL AREA IN NEED OF DRAINAGE: 1930 AND 1920

ITEM	1930	1920
Enterprises reporting land drained or needing drainage.....number.....	184	276
Area <sup>1</sup> in enterprises reporting land drained or needing drainage.....acres.....	840,007	751,274
Area for which drains have been installed.....acres.....	85,139	62,872
Additional area needing drainage.....acres.....	59,995	50,901
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises reporting drainage.....per cent.....	10.1	8.4
Proportion that area for which drains have been installed is of area <sup>1</sup> in all irrigation enterprises.....per cent.....	3.2	1.5
Proportion that area for which drains have been installed plus that needing drainage is of area <sup>1</sup> in all irrigation enterprises.....per cent.....	5.5	2.6

<sup>1</sup> Irrigable area, 1930; total area, 1920.

QUANTITY OF WATER USED

The quantity of water used was reported on only part of the irrigation schedules, and all areas reporting "quantity of water entering canals" did not also report "quantity delivered to irrigators." In order that proper values may be assigned to the figures given, those representing measurements and those representing estimates are reported separately in State Table 16.

Some irrigation enterprises carry water to individual farms, but others only to laterals which serve several farms. The "total quantity of water delivered to irrigators" is the quantity reported in answer to a question preceded by the inquiry: "Average head of water delivered per individual irrigator."

STATE TABLE 16.—WATER USED: 1929 AND 1919

ITEM (See definitions in Introduction)	TOTAL		MEASURED		NOT MEASURED	
	1929	1919	1929	1919	1929	1919
Average flow of water entering canals...second-feet..	9,414	22,808	4,503	10,179	4,911	12,632
Area irrigated.....acres.....	530,550	794,702	281,709	425,618	254,880	369,144
Average, per second-foot.....acres.....	57	35	62	42	52	29
Total quantity of water entering canals.....acre-feet..	2,244,723	4,103,486	678,245	1,802,871	1,566,478	2,300,615
Area irrigated.....acres.....	516,637	745,925	212,740	424,712	303,891	321,213
Average quantity per acre.....acre-feet..	4.3	5.5	3.2	4.2	5.2	7.2
Total quantity of water delivered to irrigators.....acre-feet..	602,515	968,991	283,818	400,039	318,697	559,052
Area irrigated.....acres.....	349,323	290,884	172,770	181,430	176,553	109,454
Average quantity per acre.....acre-feet..	1.7	3.3	1.6	2.3	1.8	5.1

IRRIGATION WORKS

STATE TABLE 17.—DAMS, BY MATERIAL, 1930

MATERIAL	DAMS	
	Diversion	Storage
	Number	Number
Total.....	2,856	326
Concrete or masonry.....	188	40
Timber.....	472	
Earth and rock.....	1,990	176
Other and mixed.....	200	84
Not reported.....		24

<sup>1</sup> Principally temporary dams, replaced annually.

STATE TABLE 18.—LENGTH OF PIPE LINES, BY MATERIAL AND SIZE, 1930

MATERIAL AND SIZE (DIAMETER)	Length	MATERIAL AND SIZE (DIAMETER)	Length
	Miles		Miles
Total.....	64.0	Metal:	
		1 to 12 inches.....	19.6
Concrete:		13 to 30 inches.....	4.5
1 to 12 inches.....	0.2	More than 30 inches.....	3.5
13 to 30 inches.....	10.9	Wood:	
More than 30 inches.....	1.2	1 to 12 inches.....	4.7
Clay:		13 to 30 inches.....	3.8
1 to 12 inches.....	0.7	More than 30 inches.....	7.3
13 to 30 inches.....	8.5		

STATE TABLE 19.—PUMPING EQUIPMENT, BY KIND OF POWER AND PUMP, 1930

ITEM	ENGINES OR MOTORS		PUMPS				
	Capacity	Proportion of total	Number	Proportion of total	Capacity	Proportion of total	Average lift
KIND OF POWER	H. p.	Per cent		Per cent	G. p. m.	Per cent	Feet
Total.....	9,095	100.0	283	100.0	523,494	100.0	22
Electricity.....	5,894	64.8	88	37.7	280,347	44.0	30
Internal combustion.....	2,005	22.0	109	46.8	205,618	39.3	16
Steam.....	238	2.6	7	3.0	27,460	5.2	16
Water.....	925	10.2	17	7.3	58,087	11.1	19
Wind.....	6	0.1	5	2.1	138	( <sup>1</sup> )	30
Internal combustion and—							
Electricity.....	15	0.2	3	1.3	900	0.2	12
Wind.....	2	( <sup>1</sup> )	2	0.9	54	( <sup>1</sup> )	( <sup>1</sup> )
Water and wind.....	10	0.1	2	0.9	900	0.2	20
KIND OF PUMP							
Centrifugal.....	8,753	96.2	181	77.7	476,254	90.9	22
Rotary.....	167	1.8	18	7.7	13,731	2.6	20
Reciprocating.....	13	0.1	8	3.4	4,045	0.8	39
Plunger.....	16	0.2	10	4.3	1,564	0.3	17
Screw.....	80	0.9	1	0.4	22,500	4.3	8
Water wheel.....	36	0.4	3	3.4	2,900	0.6	11
Centrifugal and—							
Plunger.....	5	0.1	2	0.9	650	0.1	10
Reciprocating.....	15	0.2	3	1.3	900	0.2	12
Plunger and water wheel.....	10	0.1	2	0.9	900	0.2	20

<sup>1</sup> Less than one-tenth of 1 per cent.

<sup>2</sup> Not reported.

IRRIGATION—MONTANA

STATE TABLE 20.—IRRIGATION WORKS, BY DATE OF BEGINNING, 1930

Table with columns: DATE OF BEGINNING (See definitions in Introduction), DAMS (Diver-sion, Stor-age), MAIN CANALS (Capacity, Length, Lateral canals, length), RESERVOIRS (Num-ber, Capacity, Pipe lines, length), FLOWING WELLS (Num-ber, Capacity), PUMPED WELLS (Num-ber, Capacity), PUMPING PLANTS (Num-ber, Engine or motor capac-ity, Pumps (Num-ber, Capacity)). Includes rows for 'Total' and various time periods from 'Before 1880' to 'Not reported'.

STATE TABLE 21.—IRRIGATION WORKS, BY CHARACTER OF ENTERPRISE, 1930

Table with columns: CHARACTER OF ENTERPRISE (See definitions in Introduction), DAMS (Diver-sion, Stor-age), MAIN CANALS (Capacity, Length, Lateral canals, length), RESERVOIRS (Num-ber, Capacity, Pipe lines, length), FLOWING WELLS (Num-ber, Capacity), PUMPED WELLS (Num-ber, Capacity), PUMPING PLANTS (Num-ber, Engine or motor capac-ity, Pumps (Num-ber, Capacity)). Includes rows for 'Total' and categories like 'Individual and partnership', 'Cooperative', 'Irrigation district', etc.

1 Includes 1 "City" project selling water to other enterprises.

STATE TABLE 22.—IRRIGATION WORKS, BY DRAINAGE BASIN, 1930

Table with columns: DRAINAGE BASIN (See definitions in Introduction), DAMS (Diver-sion, Stor-age), MAIN CANALS (Capacity, Length, Lateral canals, length), RESERVOIRS (Num-ber, Capacity, Pipe lines, length), FLOWING WELLS (Num-ber, Capacity), PUMPED WELLS (Num-ber, Capacity), PUMPING PLANTS (Num-ber, Engine or motor capac-ity, Pumps (Num-ber, Capacity), Average lift). Includes rows for 'Total' and various basins like 'Missouri River and tributaries', 'Yellowstone River and tributaries', etc.







IRRIGATION—MONTANA

1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, AND OPERATION, 1929—Continued

Garfield	Glacier	Golden Valley <sup>a</sup>	Granite	Hill	Jefferson	Judith Basin <sup>b</sup>	Lake <sup>c</sup>	Lewis and Clark	Liberty	Lincoln	Madison	Meagher	Mineral	Missoula <sup>d</sup>
1,077	455	387	247	1,423	385	776	1,197	612	402	503	748	270	96	688
6	21	47	177	49	207	41	723	308	10	125	576	111	30	500
5	18	37	128	85	103	30	553	235	10	90	461	101	25	401
1	3	10	49	14	44	11	170	73		26	115	10	5	90
3	19		189	84	227			100		81	614	122	28	854
100.0	10.5		-0.3	44.1	-8.8			182.6		54.3	-0.2	-0.0	7.1	-41.4

<sup>a</sup> Organized from parts of Musselshell and Sweet Grass in 1920.  
<sup>b</sup> Organized from parts of Cascade and Fergus in 1920.  
<sup>c</sup> Organized from parts of Flathead and Missoula in 1923.  
<sup>d</sup> Part taken to form part of Lake in 1923.  
<sup>e</sup> A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.  
<sup>f</sup> Principally storage; reported in 1930 as utilized for power only.

IRRIGATION—MONTANA

COUNTY TABLE.—FARMS, AREA, INVESTMENT IN IRRIGATION ENTERPRISES, AND IRRIGATION WORKS, 1930; AND COST OF MAINTENANCE

Table with 10 columns: ITEM (See definitions in Introduction), Musselshell 1, Park 2, Petroleum 3, Phillips, Pondera, Powell, Prairie, Ravalli. Rows include FARM AREA AND TOTAL LAND AREA, IRRIGATION WORKS, and VALUES OF FARMS, 1930.

1 Part taken to form part of Golden Valley in 1920. 2 Part annexed to Yellowstone National Park in 1920.

3 Organized from part of Fergus in 1925. 4 Part taken to form part of Golden Valley in 1920.

IRRIGATION—MONTANA

1930 AND 1920; AREAS IRRIGATED, 1929 AND 1919; TENURE OF FARM OPERATORS AND VALUE OF FARMS, AND OPERATION, 1929—Continued

Table with 15 columns: Richland, Roosevelt, Rosebud, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Yellowstone, and All other counties. Each column contains numerical data for various years and metrics.

\* Part of Chouteau annexed in 1921.
\* Part taken to form part of Daniels in 1920.

† Part annexed to Carbon in 1925.
‡ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.