

# IRRIGATION FOR RICE GROWING

## LOUISIANA, TEXAS, AND ARKANSAS

### FARMS AND ACREAGE IRRIGATED, IRRIGATION WORKS, COST OF CONSTRUCTION, AND YIELD AND VALUE OF RICE GROWN UNDER IRRIGATION

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#### INTRODUCTION.

This bulletin presents the larger part of the statistics of irrigation for rice growing in Louisiana, Texas, and Arkansas obtained in connection with the Thirteenth Census. These data, with additional information, will be embodied in a special report of the Census of Irrigation and in the final reports of the Thirteenth Census. The statistics of the number of farms reporting irrigation for rice growing, acreage irrigated for that purpose, and irrigated crops are for the calendar year 1909; those of irrigation works, cost of enterprises, acreage enterprises were capable of irrigating in 1910, and acreage included in projects are of the date July 1, 1910.

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

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

The information called for by this law which could be supplied by farm operators was obtained on supplemental schedules by the regular census enumerators as a part of the agricultural census. The remaining data, which were supplied by the owners or officials of irrigation enterprises, were obtained on special schedules by special agents. The data relating to number of farms irrigated and irrigated crops are taken from the supplemental schedules, while all data relating to acreage irrigated and to irrigation works and their construction are taken from the special schedules. The canvass by special agents was confined to Louisiana, Texas, and Arkansas. The data relating to rice production in other states, given in the first table in this bulletin, are taken from the farm schedules.

The results are presented in detail at the end of this bulletin and summarized in text tables.

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

**Number of farms reporting irrigation.**—The number of farms reporting irrigation for rice growing is obtained from the supplemental schedules filled out by the regular enumerators. This number is believed to be somewhat less than the number of farms actually irrigated for rice growing in the year preceding the census, owing to the fact that rice is grown on the same land only a few years in succession, when the land becomes foul and is not cropped for a few years. In this way it happens that on many of the farms on which rice is grown one year there are no farmers the succeeding year. It is probable that a considerable number of farms on which rice was grown in 1909 were unoccupied in 1910, and consequently not reported by the farm enumerators.

**Acreage irrigated.**—The acreage irrigated for rice growing is taken from special schedules filled out by agents from information secured from owners or officials of irrigation enterprises. The acreage thus obtained is considerably larger than the acreage of irrigated rice reported on the supplemental schedules filled out by the farm enumerators. The difference is due principally to the temporarily unoccupied farms on which land that had been irrigated in 1909 was not cropped in 1910, and the fact that the special schedules report all acreage watered, while the supplemental schedules give only the acreage harvested. A considerable acreage planted in rice in 1909 was not harvested, owing to poor stand, shortage of water, and damage by storms. Much of this was reported as watered, but obviously would not appear in the returns of acreage harvested.

**Control of irrigation works and contracts for supplying water.**—The sale of water rights, common in the arid region, is practically unknown in the rice districts. The larger enterprises supplying water for rice production are strictly commercial concerns in which the rice growers have no ownership, while most of the smaller enterprises are controlled by individual farmers.

In the cases where water is furnished by commercial enterprises, annual or limited term contracts are used, which are grouped in the four classes named below. The acreage irrigated in 1909, as well as the acreage enterprises were capable of irrigating in 1910 and that included in projects, has been classified according to the control of the works and the kind of contract used. In instances where an enterprise uses more than one form of contract, the acreages have been assigned to the class of contract under which the largest part appears to have been irrigated. The classes of contracts used are as follows:

*Share crop rental for water*, under which the canal owners receive a share of crops grown, usually one-fifth.

*Fixed crop rental for water*, under which the canal owners receive a fixed quantity of rough rice, usually 2 bags per acre irrigated.

*Cash rental for water*, under which the canal owners receive a fixed amount of cash, ranging from \$6 to \$9 per acre per year.

*Share crop rental for land, seed, and water*, under which the canal owners receive a share of the crop, usually one-half, and supply land, seed, and water.

## IRRIGATION FOR RICE GROWING.

**Sources of water supply.**—Most of the terms used in the classification of the irrigated acreage according to sources of water supply, do not require explanation. The land supplied by siphons, and by pumping and siphons, lies along the Mississippi River, and at some stages of the stream is below the level of the water in the river. Siphons are placed over the levees, and water for the irrigation of rice is drawn through these. When the water in the river is too low to flow through the siphons, small reservoirs are built far enough up on the river side of the levees to make it possible for the water to be siphoned to the rice fields. Water is pumped into these reservoirs, and from them drawn through the siphons. The only reservoirs used for rice irrigation, and classified as independent

sources of supply, are those that catch drainage water from higher lands and distribute it to lower lands.

**Acre-foot.**—The "acre-foot," used to express the capacity of reservoirs, is the volume of water required to cover 1 acre to a depth of 1 foot, or 43,560 cubic feet.

**Cost.**—The cost of irrigation enterprises is that reported by the owners. As most of the works have been installed within the last few years, and the principal part of the equipment consists of pumping machinery which has been purchased, it is probable that the cost given is approximately accurate. The cost reported for the census of 1910 is that up to July 1, 1910, and the average cost per acre is based on the acreage enterprises were capable of irrigating in 1910.

## ACREAGE AND PRODUCTION OF RICE IN THE UNITED STATES.

As stated previously, the only rice growing states covered by the special census of irrigation were Louisiana, Texas, and Arkansas. Rice production is reported on the farm schedules from seven other states, but these schedules do not indicate what acreage was irrigated. The acreage, production, and value of rough rice in 1909 and 1899, as shown on the farm schedules, are given by states in the following table. It will be noted that, except in the states where the special canvass was

made, there was a very marked decline in rice growing, although the extension in these states was much more than sufficient to offset the decline in the other states. It will be noted, also, that the acreage of rice reported for the three states included in the special inquiry is 95.5 per cent of the total acreage of rice in the United States, and that the production of rice in these three states is 96.7 per cent of the total for the United States.

DIVISION OR STATE.	ROUGH RICE.											
	Acreage harvested.				Yield (bushels).				Value.			
	1909	1899	Increase. <sup>1</sup>		1909	1899	Increase. <sup>1</sup>		1909	1899	Increase. <sup>1</sup>	
			Amount.	Per cent.			Amount.	Per cent.			Amount.	Per cent.
United States.....	2 610,175	342,214	267,961	78.3	2 21,838,580	9,002,886	12,835,694	142.6	2 \$16,019,607	\$6,329,562	\$9,690,045	153.1
<b>GEOGRAPHIC DIVISIONS:</b>												
South Atlantic.....	27,080	127,360	-100,280	-78.7	713,966	2,470,725	-1,756,759	-71.1	691,372	2,000,996	-1,309,624	-65.5
East South Central.....	560	4,424	-3,864	-87.3	10,006	59,934	-49,928	-83.3	10,547	59,455	-48,908	-82.3
West South Central.....	582,523	210,421	372,102	176.8	21,114,548	6,472,227	14,642,321	226.2	15,317,048	4,269,111	11,048,537	258.8
<b>SOUTH ATLANTIC:</b>												
Virginia.....		25	-25			157	-157			94	-94	
North Carolina.....	521	22,279	-21,758	-97.7	11,357	283,906	-272,549	-96.0	10,269	208,475	-198,206	-95.1
South Carolina.....	19,491	77,657	-58,166	-74.9	541,570	1,703,602	-1,162,032	-68.2	520,000	1,306,528	-846,528	-61.9
Georgia.....	6,445	21,998	-15,553	-70.7	148,098	401,963	-253,265	-63.0	145,813	338,567	-192,754	-56.9
Florida.....	623	5,410	-4,787	-88.5	12,341	81,097	-68,756	-84.8	15,290	87,332	-72,042	-82.5
<b>EAST SOUTH CENTRAL:</b>												
Alabama.....	279	2,329	-2,050	-88.0	5,170	33,343	-28,173	-84.5	5,179	30,891	-25,712	-83.2
Mississippi.....	281	2,095	-1,814	-86.6	4,836	26,591	-21,755	-81.8	5,368	28,564	-23,196	-81.2
<b>WEST SOUTH CENTRAL:</b>												
Arkansas.....	27,419	25	27,394	( <sup>3</sup> )	1,282,530	310	1,282,520	413,709.7	1,158,103	235	1,157,868	492,680.9
Louisiana.....	317,518	201,685	115,833	57.4	10,839,073	6,213,397	4,625,576	74.5	8,053,222	4,044,489	4,008,733	99.1
Texas.....	237,586	8,711	228,875	2,627.4	8,991,745	258,520	8,733,225	3,378.2	6,106,323	224,387	5,881,936	2,621.4

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

<sup>2</sup> Includes 12 acres producing 60 bushels, valued at \$40, in states not shown.

<sup>3</sup> Per cent not calculated where base is less than 100.

## LOUISIANA.

Rice has been grown in Louisiana for more than a century. The state ranked fourth in amount produced in 1850 and 1860, third in 1870 and 1880, and first in 1890 and at the subsequent censuses. There are two well-defined rice growing districts in Louisiana, of which one is along the Mississippi River and the other in the southwestern part of the state. The latter section has by far the larger acreage in rice, containing about 82 per cent of the total acreage reported as irrigated for rice growing in the state in 1909.

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

	CENSUS OF—		INCREASE. <sup>1</sup>	
	1910	1900	Amount.	Per cent.
Number of all farms.....	2 120,546	2 115,969	4,577	3.9
Approximate land area of the state..... acres..	29,061,760	29,061,760		
Land in farms..... acres..	2 10,439,481	2 11,059,127	-619,646	-5.6
Improved land in farms..... acres..	2 5,276,016	2 4,866,532	609,484	13.1
Number of farms reporting irrigation for rice growing.....	4 2,690	5 4,531	-1,841	-40.6
Acreage irrigated for rice growing.....	4 380,200	5 201,685	178,515	88.5
Acreage enterprises were capable of irrigating.....	6 553,220	(?)		
Acreage included in projects.....	6 581,965	(?)		
Percentage irrigated for rice growing of—				
Number of all farms.....	2.2	3.9	-1.7	
Approximate land area of the state.....	1.3	0.7	0.6	
Land in farms.....	3.6	1.8	1.8	
Improved land in farms.....	7.2	4.3	2.9	
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909.....	173,020			
Excess of acreage included in projects over acreage irrigated in 1909.....	201,765			

<sup>1</sup> A minus sign (-) denotes decrease.  
<sup>2</sup> April 15.

<sup>3</sup> June 1.  
<sup>4</sup> In 1909.

<sup>5</sup> In 1899.  
<sup>6</sup> July 1.

<sup>7</sup> Not reported.

**Number of farms reporting irrigation for rice growing.**—The irrigation of rice in 1909 was reported by only 2.2 per cent of the farms of the state. The number of farms growing rice in 1899 was 3.9 per cent of all farms. There was a marked decrease in the number of farms reporting the irrigation of rice in the decade, accompanied by an increase in the acreage irrigated. This is probably due to the abandonment of irrigation on farms where only small acreages were grown, and an extension of the acreage where the crop is grown on a larger scale.

The farms reporting irrigation for rice growing in 1909 formed 31.1 per cent of the total number in Acadia Parish, 25.5 per cent in Calcasieu, and 24.1 per cent in Plaquemines. The only other parish in which the proportion was as high as 20 per cent was St. John the Baptist (20.4 per cent).

**Acreage irrigated.**—The total acreage reported as irrigated for the growing of rice in 1909 was 380,200, as against 201,685 in 1899, the increase for the decade being 178,515, or 88.5 per cent.

The percentage of the total land area of the state irrigated for rice growing increased from 0.7 in 1899 to 1.3 in 1909, while the percentage that the acreage irrigated for rice growing represented of all land in farms increased from 1.8 to 3.6, and the percentage

that it represented of all improved land in farms increased from 4.3 to 7.2.

In 1909 the parish for which the largest acreage was reported as irrigated for rice growing was Calcasieu, with 131,208 acres, while Acadia contained the next largest area, 107,466 acres. Vermilion Parish, with 52,196 acres, was the only other parish in which as many as 10,000 acres were irrigated for rice growing. In 1899 the same parishes led, but in different order, Acadia being first, with 67,955 acres; Calcasieu next, with 44,321 acres; and Vermilion third, with 24,910 acres.

**Acreage included in projects.**—The foregoing table shows that in 1910 existing enterprises were ready to supply water to 553,220 acres, or 173,020 acres more than were irrigated in 1909. The difference is almost equal to the increase from 1899 to 1909 in the acreage irrigated. The acreage included in projects exceeds the acreage irrigated in 1909 by 201,765 acres, which is considerably more than the acreage brought under irrigation in the last decade and more than one-half as much as the total acreage irrigated in 1909. This acreage represents the area which will be available for the extension of irrigation in the next few years, upon the completion of existing enterprises and without new undertakings.

Acreage irrigated, classified by control of works and kind of contract used.—The following table gives the distribution of the acreage irrigated for rice growing in 1909 according to the control of the works furnishing the water and, in the case of those supplying water under contract, according to the kind of contract used:

CONTROL OF WORKS AND KIND OF CONTRACT.	ACREAGE IRRIGATED FOR RICE GROWING IN 1909.	
	Amount.	Per cent distribution.
<b>All classes</b> .....	<b>380,200</b>	<b>100.0</b>
Works controlled by water users.....	222,049	58.4
Works supplying water under contract.....	158,151	41.6
Share crop rental for water.....	151,751	39.9
Fixed crop rental for water.....	1,600	0.4
Cash rental for water.....	2,800	0.7
Share crop rental for land, seed, and water.....	2,000	0.5

As indicated in the table, 58.4 per cent of the acreage irrigated for rice growing in 1909 was supplied with water from irrigation works controlled by the water users, the remainder being supplied under contract. Most of the latter acreage, amounting to 39.9 per cent of the total irrigated for rice growing in the state, was supplied under a share crop rental for water, while small areas were supplied under each of the other types of contract, namely, a fixed crop rental for water, a cash rental for water, and a share crop rental for land, seed, and water.

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

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED FOR RICE GROWING IN 1909.	
	Amount.	Per cent distribution.
<b>All sources</b> .....	<b>380,200</b>	<b>100.0</b>
Streams.....	257,050	67.6
By gravity.....	1,012	0.3
By pumping alone.....	211,959	55.7
By siphons alone.....	9,070	2.4
By pumping and siphons.....	35,009	9.2
Wells (by pumping).....	109,547	28.8
Reservoirs.....	7,054	1.9
Lakes.....	6,549	1.7
By gravity.....	1,347	0.4
By pumping.....	5,202	1.4

From the table it appears that 67.6 per cent of the irrigated rice land in Louisiana in 1909 was supplied from streams, and 28.8 per cent from wells, and that the greater part of the water supplied from streams, and all that supplied from wells, was pumped. Along the Mississippi River a considerable acreage, lying below the level of the water in the river, is supplied with water siphoned over the levees. At low stages of the river the water is too low to be siphoned, and it is then pumped up high enough on the river side of the levee to be siphoned over. The acreage supplied

without pumping in this section in any year depends on the stage of the river. In 1909 the pumps were used very little for this land.

#### IRRIGATION WORKS.

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

IRRIGATION WORKS.	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Independent enterprises.....number..	1,237	596	641	107.6
Ditches, total length.....miles.....	1,168	(1)		
Main ditches.....number.....	515	(1)		
Length.....miles.....	729	386	343	88.9
Lateral ditches.....number.....	180	(1)		
Length.....miles.....	439	(1)		
Reservoirs.....number.....	104	(1)		
Capacity.....acre-feet.....	19,482	(1)		
Pumped wells.....number.....	606	(1)		
Capacity.....gallons per minute.....	1,108,236	(1)		
Pumping plants.....number.....	1,007	(1)		
Engine capacity.....horsepower.....	57,426	(1)		
Pump capacity.....gallons per minute.....	5,064,173	(1)		

<sup>1</sup> Not reported.

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average acreage irrigated per enterprise in 1909 was 307.4, as against 338.4 in 1899, and the acreage irrigated per mile of main ditch was 521.5 in 1909, as against 522.5 acres in 1899.

#### COST.

The following table shows the cost, not including operation and maintenance, up to July 1, 1910, of irrigation enterprises connected with rice growing, with the average cost per acre, based on the acreage the enterprises were capable of irrigating in 1910; and it shows also the estimated final cost of enterprises, including those completed and those under construction, with the average cost per acre, based on the acreage included in projects. Data relating to the cost of systems operated in 1899 are included for comparison.

	CENSUS OF—	
	1910	1900
Cost of irrigation enterprises.....	<sup>1</sup> \$6,859,166	<sup>2</sup> \$2,520,319
Average per acre.....	\$12.40	\$12.54
Estimated final cost of existing enterprises.....	6,914,166	(5)
Average per acre included in projects.....	11.88	(5)

<sup>1</sup> Reported July 1.

<sup>2</sup> Cost of systems operated in 1899.

<sup>3</sup> Based on acreage enterprises were capable of irrigating in 1910.

<sup>4</sup> Based on acreage irrigated in 1899.

<sup>5</sup> Not reported.

The cost of irrigation systems shows an increase of 171.2 per cent, but the average cost per acre as given for the census of 1910 is approximately the same as that for the census of 1900. These two averages, however, were not computed in the same way. The

per acre shown for 1910 is based on the enterprises were capable of irrigating in that year. The corresponding acreage for 1900 was 1,000,000 acres, the figure for average cost at the earlier date calculated on the basis of the acreage entered in 1899. If computed on the basis of the acreage entered in 1909, the average cost per acre for 1910 would be \$18.04, which represents an increase of \$5.50, or 43.9 per cent, over the average cost in the same way for the census of 1900. The average cost based on the estimated final cost of enterprises entered in 1910 and the acreage included in the census is \$11.88, only slightly less than the average cost computed on the basis of the acreage entered in 1899. Enterprises capable of irrigating in 1910—about 63,503, the average cost per acre is lowest in the river districts, where a large part of the water is obtained from the Mississippi River by siphons, and in the prairie districts, where practically all the water is pumped. The lowest average cost per acre was reported for enterprises were capable of irrigating in 1910—\$11.88, only slightly less than the average cost computed on the basis of the acreage entered in 1899. The lowest average cost per acre was reported for West Baton Rouge Parish. The

highest average cost per acre—\$15.27—was reported for Lafayette Parish. In Calcasieu Parish the average was nearly as high, \$15.14, and in Vermilion and Acadia Parishes it was, respectively, \$13.47 and \$12.50.

**IRRIGATED CROP.**

As previously stated, the data on the supplemental schedules, which afford the only returns available as to irrigated crops, are not complete. The average yield of irrigated rice in Louisiana for the acreage for which yields were reported was 34.6 bushels per acre, and the average value was \$25.70 per acre. About 82 per cent of the total irrigated acreage in 1909 was in the prairie districts, where the average yield of rough rice reported was 32.4 bushels per acre and the average value \$22.88 per acre. In the river districts the average yield per acre was 44.8 bushels and the average value per acre \$38.20.

**PARISH TABLE.**

The data summarized above, except those relating to the crop, are given in detail, by parishes, at the end of this bulletin.

**TEXAS.**

The growing district of Texas extends along the coast from the Sabine River on the east to the Rio Grande on the west, and into the interior of the State ranging from 40 to 100 miles. The average yield of rice on a large scale in this territory was reported in 1900, only 8,700 acres of irrigated rice were reported for the state for 1899. Conditions in the river districts are substantially the same as in the river districts in Louisiana, except that the water is more recent and the newer lands are more recent. As in southwest Louisiana, most

of the water is pumped from streams to the flat prairie lands adjoining

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

	CENSUS OF—		INCREASE. <sup>1</sup>	
	1910	1900	Amount.	Per cent.
Number of all farms.....	<sup>1</sup> 417,770	<sup>2</sup> 352,190	65,580	18.6
Approximate land area of the state.....acres.	167,934,720	167,934,720		
Land in farms.....acres.	<sup>3</sup> 112,435,067	<sup>3</sup> 125,807,017	-13,371,950	-10.6
Improved land in farms.....acres.	<sup>4</sup> 27,360,666	<sup>4</sup> 19,576,076	7,784,590	39.8
Number of farms reporting irrigation for rice growing.....	<sup>5</sup> 1,088	<sup>5</sup> 73	1,015	1,380.4
Acreage irrigated for rice growing.....	<sup>6</sup> 286,847	<sup>6</sup> 8,700	278,147	3,107.1
Acreage enterprises were capable of irrigating.....	<sup>7</sup> 350,350	(?)		
Acreage included in projects.....	<sup>8</sup> 409,474	(?)		
Percentage irrigated for rice growing of—				
Number of all farms.....	0.3	(?)		
Approximate land area of the state.....	0.2	(?)		
Land in farms.....	0.3	(?)		
Improved land in farms.....	1.0	(?)		
Percentage of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909.....	63,503			
Percentage of acreage included in projects over acreage irrigated in 1909.....	212,627			

<sup>1</sup> A minus sign (—) denotes decrease.  
<sup>2</sup> April 15.

<sup>3</sup> June 1.  
<sup>4</sup> In 1909.

<sup>5</sup> In 1899.  
<sup>6</sup> July 1.

<sup>7</sup> Not reported.  
<sup>8</sup> Less than one-tenth of 1 per cent.

farms reporting irrigation for rice growing in 1909 was reported 1.0 per cent of the farms of the state. The

number of farms reporting such irrigation in 1899 was 73, or less than one-tenth of 1 per cent of the total number of farms in the state.

The only county in which as many as one-fourth of the farms reported irrigation for rice growing in 1909 was Jefferson, where the percentage was 27.3. The proportions in Matagorda, Orange, and Chambers Counties are 19, 18.3, and 16.7 per cent, respectively. Wharton County, in which 10.6 per cent of all farms reported irrigation for rice growing in 1909, was the only county, other than those named, in which the proportion was as high as 10 per cent.

**Acreage irrigated.**—The total acreage reported as irrigated for rice growing in 1909 was 286,847, as against 8,700 in 1899, almost the entire development of the rice growing industry in Texas having taken place since the census of 1900.

The percentage of the total land area of the state in irrigated rice in 1909 was 0.2, and the percentage that this irrigated acreage represented of all land in farms was 0.3, while the percentage which it represented of all improved land in farms in the state was 1.

Jefferson County had the largest area in irrigated rice in both 1899 and 1909, the acreage being 5,859 and 75,983 at the respective censuses. In 1899 Orange County contained nearly all of the remaining acreage, but in 1909 six counties exceeded Orange in this respect.

Two counties besides Jefferson had more than 50,000 acres each in irrigated rice—Matagorda, with 60,834, and Wharton, with 53,930; two others, Chambers and Harris, more than 25,000 acres each (27,375 and 25,795, respectively); and the remaining county, Jackson, 11,167 acres. With the exception of Orange County, with 10,515 acres, no county other than those named in the preceding section contained as many as 10,000 acres in irrigated rice.

**Acreage included in projects.**—The foregoing table shows that in 1910 existing enterprises were ready to supply water to 350,350 acres, or 63,503 acres more than were irrigated in 1909. The total acreage included in projects exceeds the acreage irrigated in 1909 by 212,627 acres, which is equal to more than three-fourths of the increase in acreage irrigated for rice growing in the last decade and nearly three-fourths of the total area irrigated for that purpose in 1909. This acreage represents the area which will be available for the extension of rice irrigation within the next few years, upon the complete utilization of existing enterprises and without new undertakings.

**Acreage irrigated, classified by control of works and kind of contract used.**—The next table gives the distribution of the acreage irrigated for rice growing in 1909, according to control of the works furnishing the water and the character of the contract for supplying water.

The table shows that 31 per cent of the acreage irrigated for rice growing in 1909 was supplied with water by irrigation works belonging to the farmers and that the remainder of the acreage was supplied under contracts. Of the latter acreage by far the

greater part, amounting to about 50 per cent of the entire acreage irrigated for rice growing, was supplied for fixed rentals, about half (26.7 per cent of the total) receiving water on a cash basis and about half (23.8 per cent of the total) on the basis of the payment of a fixed quantity of the crop. Cash rentals range from \$6 to \$9 per acre per year, while fixed crop rentals are usually about 2 sacks or 8 bushels of rough rice per acre. About 19 per cent of the acreage irrigated for rice growing was supplied on a share crop basis, 9.5 per cent under contracts providing for a share crop rental for water alone (usually one-fifth of the crop) and 9 per cent on the basis of a share crop rental for land, seed, and water (usually one-half of the crop). There is a general effort on the part of canal owners to put on a cash rental basis the entire acreage served by them, and it is probable that this system will become more common.

CONTROL OF WORKS AND KIND OF CONTRACT.	ACREAGE IRRIGATED FOR RICE GROWING IN 1909.	
	Amount.	Per cent distribution.
<b>All classes.....</b>	<b>286,847</b>	<b>100.0</b>
Works controlled by water users.....	88,825	31.0
Works supplying water under contract.....	198,022	69.0
Share crop rental for water.....	27,154	9.5
Fixed crop rental for water.....	68,362	23.8
Cash rental for water.....	78,706	26.7
Share crop rental for land, seed, and water.....	25,800	9.0

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

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED FOR RICE GROWING IN 1909.	
	Amount.	Per cent distribution.
<b>All sources.....</b>	<b>286,847</b>	<b>100.0</b>
Streams (by pumping).....	238,382	83.1
Wells.....	47,920	16.7
Flowing.....	20	( <sup>1</sup> )
By pumping.....	47,900	16.7
Reservoirs.....	545	0.2

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

The table shows that practically all of the water used for the irrigation of rice in Texas is pumped, and that the greater part of it is pumped from streams, 83.1 per cent of the total acreage irrigated for rice growing in 1909 being supplied with water from streams, and 16.7 per cent from wells. Small areas received water from reservoirs and flowing wells.

#### IRRIGATION WORKS.

The next table summarizes the data collected in 1910 relating to works for supplying water for the irrigation of rice. Since no separate figures are available

from the Twelfth Census, there is no opportunity for comparisons between the two censuses.

Independent enterprises.....	number..	611
Ditches, total length.....	miles..	1,040
Main ditches.....	number..	225
Length.....	miles..	538
Lateral ditches.....	number..	216
Length.....	miles..	502
Reservoirs.....	number..	21
Capacity.....	acre-feet..	2,310
Flowing wells.....	number..	1
Capacity.....	gallons per minute..	80
Pumped wells.....	number..	500
Capacity.....	gallons per minute..	445,495
Pumping plants.....	number..	575
Engine capacity.....	horsepower..	48,179
Pump capacity.....	gallons per minute..	3,907,380

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average acreage irrigated per enterprise in 1909 was 469.5, and the acreage irrigated per mile of main ditch was 533.2.

**COST.**

The following statement presents statistics in regard to the cost of construction of irrigation enterprises conducted in connection with rice growing similar to those given for Louisiana in an earlier table. Separate figures as to the cost of enterprises operated for the irrigation of rice in 1899 are not available, but this cost has been estimated at \$322,000.

Cost of enterprises up to July 1, 1910.....	\$6,140,639
Average cost per acre enterprises were capable of irrigating in 1910.....	17.53
Estimated final cost of existing enterprises.....	6,140,639
Average per acre included in projects.....	12.29

**ARKANSAS.**

Rice has been grown in Arkansas on a commercial scale for a few years only, the production in 1900 being insignificant. The crop is raised on the level prairie lands in the east central part of the state, between the Arkansas and Mississippi Rivers. Practically the entire water supply is obtained from wells by pumping.

The following statement shows for the state as a whole the number of farms reporting irrigation for rice growing in 1909, and the acreage irrigated in comparison with the total number of farms, the total land area, the total land in farms, and the total acreage of improved land in farms in 1910, together with the areas not yet irrigated for which water has been or is being made available. No irrigated rice was reported in Arkansas at the census of 1900.

Number of all farms.....	1 214,678
Approximate land area of the state.....	acres.. 33,616,000
Land in farms.....	acres.. 1 17,416,075
Improved land in farms.....	acres.. 1 8,076,254
Number of farms reporting irrigation for rice growing in 1909.....	232
Acreage irrigated for rice growing in 1909.....	27,753
Acreage enterprises were capable of irrigating in 1910.....	2 47,136
Acreage included in projects.....	2 52,853
Percentage irrigated for rice growing of—	
Number of all farms.....	0.1
Approximate land area of the state.....	0.1
Land in farms.....	0.2
Improved land in farms.....	0.3
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909.....	19,383
Excess of acreage included in projects over acreage irrigated in 1909.....	25,130

<sup>1</sup> April 15, 1910.

<sup>2</sup> July 1, 1910.

As the rice growing industry in Texas has developed almost entirely since 1900, comparisons would be of little value if figures were available. The average cost per acre in Texas is considerably higher than that in Louisiana, reported on a preceding page.

The lowest average cost per acre, \$13.03, is shown for Jefferson County, while the highest, \$43.01, was reported for Fort Bend County.

**IRRIGATED CROP.**

As previously stated, the data available as to irrigated crops are not complete. For irrigated rice the average yield reported was 38.7 bushels per acre, and the average value \$28.54 per acre. The average yield and average value in Texas are higher than those in Louisiana, considered as a whole, but not so high as those in the river districts of Louisiana. The cost of water is also higher in Texas than in Louisiana.

**COUNTY TABLE.**

The data summarized in this section, except those relating to the crop, are shown in detail, by counties, at the end of this bulletin.

*Land in farms in specified counties.*—In accordance with the instructions to enumerators to assign all of the acreage of a farm to the county in which the residence of the operator is located, large acreages in adjoining counties have been tabulated as in Jackson County.

**Number of farms reporting irrigation for rice growing.**—Irrigation for rice growing in 1909 was reported by only 232 farms in the state, of which 102 were in Arkansas County, forming 4.6 per cent of the total number in that county. In the other counties from which rice irrigation was reported, the proportion of irrigated rice farms among the total number was less than 2 per cent.

**Acreage irrigated.**—The total acreage reported as irrigated for rice growing in 1909 was 27,753, of which nearly one-half was in Arkansas County, about one-fourth in Lonoke County, and about one-eighth in Prairie County. Most of the remaining acreage irrigated for rice was in St. Francis, Poinsett, and Woodruff Counties.

**Acreage included in projects.**—The foregoing table shows that in 1910 existing enterprises were ready to supply water to 47,136 acres, or 19,383 acres more than were irrigated in 1909. The difference is equal to 69.8 per cent of the entire acreage irrigated in 1909. The acreage included in projects is somewhat less than twice as great as the acreage irrigated in 1909, the excess being 25,130 acres. This latter acreage represents the area which will be available for the extension of irrigation in the next few years upon the completion of existing enterprises and without new undertakings.

## IRRIGATION FOR RICE GROWING.

**Acreage irrigated, classified by control of works and kind of contract used.**—The rice growers of Arkansas almost universally provide their own water supply, only one enterprise furnishing water under contract in 1909. This company supplied water to about 5 per cent of the total irrigated acreage, using two forms of contracts, of which one provided for share crop rental of one-fourth of the crop and the other for a cash rental of \$10 per acre per year.

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

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED FOR RICE GROWING IN 1909.	
	Amount.	Per cent distribution.
All sources.....	27,753	100.0
Wells (by pumping).....	24,308	87.9
Streams.....	3,085	11.1
By gravity.....	2,542	9.2
By pumping.....	543	2.0
Lakes (by pumping).....	270	1.0

The table shows that 87.9 per cent of the acreage irrigated for rice growing in 1909 was supplied with water from pumped wells, 11.1 per cent from streams, and 1 per cent from lakes. The water used for irrigating about 91 per cent of the total acreage was pumped, while the remainder of the acreage, 9.2 per cent of the total, received water by gravity flow.

## IRRIGATION WORKS.

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

Independent enterprises.....	number..	310
Main ditches.....	number..	217
Length.....	miles..	131
Reservoirs.....	number..	19
Capacity.....	acre-feet..	3
Pumped wells.....	number..	307
Capacity.....	gallons per minute..	268,829
Pumping plants.....	number..	315
Engine capacity.....	horsepower..	12,440
Pump capacity.....	gallons per minute..	436,402

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average acreage irrigated per enterprise in 1909 was 89.5, and the acreage irrigated per mile of main ditch was 211.9. No flowing wells were reported, the greater part of the water used for irrigation in 1909 coming from pumped wells, of which there were 307. The acreage irrigated per well was 79.5.

## COST.

The following statement presents statistics in regard to the cost of construction of irrigation enterprises conducted in connection with rice growing similar to those given for other states in earlier tables:

Cost of irrigation enterprises up to July 1, 1910.....	\$537,834
Average cost per acre enterprises were capable of irrigating in 1910....	12.47
Estimated final cost of existing enterprises.....	612,834
Average per acre included in projects.....	11.59

The table shows that in Arkansas the average cost per acre of irrigation enterprises, based on the acreage enterprises were capable of irrigating in 1910, is about the same as in Louisiana, and that the estimated final cost per acre included in projects does not differ greatly from that in Louisiana or that in Texas.

The average cost per acre enterprises were capable of irrigating in 1910 varies widely in the different counties. The lowest average cost—\$4.46—is shown for Arkansas County, which contains nearly one-half of the irrigated acreage. The highest average cost—\$21.29—is shown for Prairie County, in which about one-eighth of the irrigated acreage is situated. In all of the counties except Arkansas the average cost is above the average for the state.

## IRRIGATED CROP.

As previously stated, the data available as to irrigated crops are not complete. The average yield of irrigated rice reported was 45.9 bushels per acre, and the average value \$41.56 per acre.

## COUNTY TABLE.

The data summarized in this section, except those relating to the crop, are shown in detail, by counties, at the end of this bulletin.

LOUISIANA—RICE—ACREAGE IRRIGATED AND EXTENT AND COST OF IRRIGATION ENTERPRISES, BY PARISHES: 1909 AND 1910.

[Comparative data for 1899 in italics. Several parishes shown separately for 1909 and 1910 are included under "all other parishes" in 1899.]

	THE STATE.	Acadia.	Ascension.	Avoyelles	Calcasieu.	Cameron.	Concordia.
1	Number of all farms in 1910.....	120,646	3,222	1,170	4,604	3,199	1,358
2	Number of farms reporting irrigation for rice growing in 1909.....	2,690	1,002	16	4	815	5
3	Per cent of all farms.....	2.2	31.1	1.4	0.1	25.5	0.4
4	Number of farms reporting irrigation for rice growing in 1899 <sup>1</sup> .....	4,831					
5	Per cent of increase, 1899-1909.....	40.6					
<b>LAND AND FARM AREA</b>							
6	Approximate land area..... acres.....	29,061,760	414,080	186,240	542,080	2,336,000	960,640
7	Land in farms..... acres.....	10,439,881	273,932	104,253	207,983	490,694	105,625
8	Improved land in farms..... acres.....	5,276,016	240,563	57,119	126,440	274,280	27,900
9	Acres irrigated for rice growing in 1909..... acres.....	390,200	107,468	4,233	2,685	131,208	7,226
10	Per cent of total land area.....	1.3	26.0	2.3	0.5	5.6	0.8
11	Per cent of land in farms.....	3.6	30.2	4.1	1.3	20.7	1.6
12	Per cent of improved land in farms.....	7.2	44.7	7.4	2.1	47.8	4.0
13	Acres irrigated for rice growing in 1899.....	207,655	67,655	856	58	44,381	9,549
14	Per cent of increase, 1899-1909.....	88.5	68.1	395.1	( <sup>3</sup> )	196.0	24.3
15	Acres enterprises were capable of irrigating in 1910.....	563,220	167,869	4,233	3,765	191,752	11,180
16	Acres included in projects.....	581,965	171,917	4,233	3,765	208,404	12,280
<b>ACREAGE IRRIGATED AND INCLUDED IN PROJECTS</b>							
CLASSIFIED BY CONTROL OF WORKS AND KIND OF CONTRACT USED.							
<b>Works controlled by water users:</b>							
17	Irrigated in 1909.....	222,049	52,334	4,233	2,685	69,365	2,730
18	Enterprises were capable of irrigating in 1910.....	267,620	64,209	4,233	3,705	80,752	3,180
19	Included in projects.....	283,965	66,917	4,233	3,705	86,404	4,230
<b>Works supplying water under contract:</b>							
<b>Share crop rental for water—</b>							
20	Irrigated in 1909.....	151,751	55,132			57,443	2,446
21	Enterprises were capable of irrigating in 1910.....	276,800	103,600			106,200	4,000
22	Included in projects.....	285,000	106,000			113,000	4,000
<b>Fixed crop rental for water—</b>							
23	Irrigated in 1909.....	1,600				1,600	
24	Enterprises were capable of irrigating in 1910.....	2,000				2,000	
25	Included in projects.....	2,000				2,000	
<b>Cash rental for water—</b>							
26	Irrigated in 1909.....	2,800				2,800	
27	Enterprises were capable of irrigating in 1910.....	2,800				2,800	
28	Included in projects.....	7,000				7,000	
<b>Share crop rental for land, seed, and water—</b>							
29	Irrigated in 1909.....	2,000					2,000
30	Enterprises were capable of irrigating in 1910.....	4,000					4,000
31	Included in projects.....	4,000					4,000
<b>ACREAGE IRRIGATED</b>							
CLASSIFIED BY SOURCE OF WATER SUPPLY.							
32	Supplied from streams.....	257,050	67,022	4,233	2,620	75,776	7,220
33	By gravity.....	1,012				100	
34	By pumping alone.....	211,958	67,022		1,350	75,676	7,220
35	By siphons alone.....	9,070		223			
36	By pumping and siphons.....	35,009		4,010	1,270		2,600
37	Supplied from lakes.....	6,549	252				
38	By gravity.....	1,347					
39	By pumping.....	5,202	252			55,134	
40	Supplied from wells.....	109,547	38,261				
41	Flowing.....	109,547	38,261			55,134	
42	By pumping.....	7,054	1,931		65	298	
43	Supplied from reservoirs.....						
<b>IRRIGATION ENTERPRISES</b>							
44	Independent enterprises..... number.....	1,237	273	7	5	358	8
45	Number in 1899.....	699	83			55	8
46	Per cent of increase, 1899-1910.....	107.0	871.4			550.9	
47	Main ditches..... number.....	615	110	4	2	101	4
48	Number in 1899 <sup>4</sup> .....						
49	Per cent of increase, 1899-1910.....						
50	Length..... miles.....	729	220	3	1	243	14
51	Length in 1899..... miles.....	359	152			150	30
52	Per cent of increase, 1899-1910.....	88.9	66.7			52.8	63.3
53	Laterals..... number.....	180	82			81	3
54	Length..... miles.....	439	187			194	4
55	Reservoirs..... number.....	104		1	1	9	1
56	Capacity..... acre-feet.....	10,482		2	92	4,571	1,800
57	Flowing wells..... number.....						
58	Capacity..... gallons per minute.....	606	180			323	6
59	Pumped wells..... number.....	1,108,236	313,727			585,470	12,000
60	Capacity..... gallons per minute.....	1,007	283	7	4	362	8
61	Pumping plants..... number.....	57,426	16,907	473	281	22,014	643
62	Engine capacity..... horsepower.....	5,064,173	1,465,612	31,213	25,616	2,040,052	144,190
63	Pump capacity..... gallons per minute.....						70,900
<b>COST</b>							
64	Cost of enterprises up to July 1, 1910..... dollars.....	6,859,166	2,098,121	21,025	13,050	2,904,063	129,320
65	Cost in 1899..... dollars.....	2,629,519	1,077,425			862,820	164,300
66	Per cent of increase, 1899-1910.....	171.2	94.7			236.6	116.2
67	Average cost per acre enterprises were capable of irrigating in 1910..... dollars.....	12.40	12.50	4.97	3.47	15.14	11.57
68	Average cost per acre irrigated in 1899..... dollars.....	12.54	15.85			19.47	16.18
69	Estimated final cost of existing enterprises..... dollars.....	6,014,166	2,098,121	21,025	13,050	2,959,093	129,320
70	Average per acre included in projects..... dollars.....	11.88	12.20	4.97	3.47	14.20	10.53

<sup>1</sup> Figures for parishes not available.

<sup>2</sup> Decrease.

<sup>3</sup> Percentages not calculated where base is less than 100.

<sup>4</sup> Not reported.

IRRIGATION FOR RICE GROWING.

LOUISIANA—RICE—ACREAGE IRRIGATED AND EXTENT AND COST OF IRRIGATION ENTERPRISES, BY PARISHES: 1909 AND 1910—Continued.

[Comparative data for 1899 in Italics. Several parishes shown separately for 1909 and 1910 are included under "all other parishes" in 1899.]

	East Carroll.	Iberia.	Iberville.	Jefferson.	Lafayette.	Lafourche.	Plaquemines.	Pointe Coupee.
1	1,851	1,704	609	364	3,216	1,230	623	2,697
2	30	29	13	7	23	6	150	10
3	1.6	1.7	2.1	1.9	0.7	0.5	24.1	0.4
4								
5								
<b>LAND AND FARM AREA</b>								
6	268,800	376,960	373,760	272,000	178,560	634,240	643,200	368,640
7	133,188	171,061	104,728	30,702	162,329	220,688	85,380	203,591
8	74,961	121,436	64,422	14,196	141,762	86,281	30,397	115,829
9	8,320	3,865	7,922	1,542	2,212	1,104	6,375	3,205
10	3.1	1.0	2.1	0.6	1.2	0.2	1.0	0.9
11	6.0	2.3	7.6	5.0	1.4	0.5	7.5	1.6
12	11.1	3.2	12.3	10.9	1.6	1.3	21.0	2.8
13		6,178	9,113	2,445	1,494	4,668	11,566	1
14		437.4	274.9	436.9	48.1	476.3	444.8	(5)
15	10,685	4,090	7,845	1,592	2,562	1,104	10,481	3,830
16	11,985	4,090	7,845	1,592	3,402	1,129	12,516	3,830
<b>ACREAGE IRRIGATED AND INCLUDED IN PROJECTS</b>								
<b>CLASSIFIED BY CONTROL OF WORKS AND KIND OF CONTRACT USED.</b>								
<b>Works controlled by water users:</b>								
17	8,320	3,865	7,922	1,542	2,212	1,104	6,375	3,205
18	10,685	4,090	7,845	1,592	2,562	1,104	10,481	3,830
19	11,985	4,090	7,845	1,592	3,402	1,129	12,516	3,830
<b>Works supplying water under contract:</b>								
<b>Share crop rental for water—</b>								
20								
21								
22								
<b>Fixed crop rental for water—</b>								
23								
24								
25								
<b>Cash rental for water—</b>								
26								
27								
28								
<b>Share crop rental for land, seed, and water—</b>								
29								
30								
31								
<b>ACREAGE IRRIGATED</b>								
<b>CLASSIFIED BY SOURCE OF WATER SUPPLY.</b>								
32	2,050	3,865	7,922	1,542	20	1,104	6,375	3,205
33								
34	250	3,865	6,596	305	20	1,104		
35							5,684	
36	2,700		1,327	1,237			691	3,205
37	4,070							
38								
39	4,070							
40	700				2,192			
41								
42	700				2,192			
43								
<b>IRRIGATION ENTERPRISES</b>								
44	23	16	20	7	15	5	109	7
45							394	
46							472.3	
47	10	13	14	4	3	3	84	4
48								
49								
50	12	5	5	2	4	1	23	5
51								
52								
53								
54								
55	2		2					5
56	55		2					30
57								
58								
59	5				15			
60	15,000				29,074			
61	25	16	22	7	15	6	5	8
62	2,059	775	1,100	197	547	151	102	394
63	161,551	41,982	71,585	18,437	29,074	15,611	6,135	34,450
<b>COST</b>								
64	126,903	29,971	53,638	8,337	39,112	4,899	26,891	15,483
65							32,136	
66							470.8	
67								
68	11.88	7.33	6.84	5.24	15.27	4.44	2.57	4.04
69	126,903	29,971	53,638	8,337	39,112	4,899	26,891	15,483
70	10.59	7.33	6.84	5.24	11.50	4.34	2.15	4.04

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

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

<sup>3</sup> Includes a number of parishes shown separately in 1909 and 1910.

<sup>4</sup> Decrease.

LOUISIANA, TEXAS, AND ARKANSAS.

LOUISIANA—RICE—ACREAGE IRRIGATED AND EXTENT AND COST OF IRRIGATION ENTERPRISES, BY PARISHES: 1909 AND 1910—Continued.

[Comparative data for 1899 in italics. Several parishes shown separately for 1909 and 1910 are included under "all other parishes" in 1899.]

	St. Charles.	St. James.	St. John the Baptist.	St. Landry.	Tensas.	Vermilion.	West Baton Rouge.	All other parishes.
1	284	355	206	8,661	2,897	2,892	565	78,242
2	39	59	42	119	4	272	2	22
3	13.7	16.6	20.4	1.4	0.1	9.4	0.4	(1)
4								
5								
<b>LAND AND FARM AREA</b>								
6	188,800	162,560	147,840	1,052,800	404,480	776,320	136,960	18,179,840
7	46,732	80,321	45,145	467,823	182,036	258,712	57,383	6,836,869
8	21,250	48,755	29,438	327,623	93,640	177,824	39,866	3,097,588
9	4,878	8,140	6,124	9,387	3,100	52,196	1,597	4,815
10	2.6	5.0	4.1	0.9	0.8	6.7	1.2	(1)
11	10.4	10.1	13.6	2.0	1.7	20.2	2.8	0.1
12	23.0	16.7	20.8	2.9	3.3	29.4	4.0	0.2
13	3,762	5,001	3,890	3,180		24,810	356	4,425
14	30.0	62.8	57.4	14.7		109.5	349.9	
15	5,586	8,215	6,292	12,756	3,750	79,866	1,597	7,520
16	5,706	8,215	6,292	12,916	4,100	81,581	1,597	7,920
<b>ACREAGE IRRIGATED AND INCLUDED IN PROJECTS</b>								
<b>CLASSIFIED BY CONTROL OF WORKS AND KIND OF CONTRACT USED.</b>								
<b>Works controlled by water users:</b>								
17	4,878	8,140	6,124	9,387	3,100	15,466	1,597	4,815
18	5,586	8,215	6,292	12,756	3,750	16,866	1,597	7,520
19	5,706	8,215	6,292	12,916	4,100	18,581	1,597	7,920
<b>Works supplying water under contract:</b>								
<b>Share crop rental for water—</b>								
20						36,730		
21						63,000		
22						63,000		
<b>Fixed crop rental for water—</b>								
23								
24								
25								
<b>Cash rental for water—</b>								
26								
27								
28								
<b>Share crop rental for land, seed, and water—</b>								
29								
30								
31								
<b>ACREAGE IRRIGATED</b>								
<b>CLASSIFIED BY SOURCE OF WATER SUPPLY.</b>								
32	4,878	8,140	6,124	2,357	3,100	40,749	1,597	3,645
33							897	15
34				2,357	3,100	40,749		2,340
35		1,950	1,213				700	1,290
36	4,878	6,190	4,911					140
37				1,347		140		140
38				1,347		140		140
39				1,023		11,307		930
40								
41				1,023		11,307		930
42				4,660				100
43								
<b>IRRIGATION ENTERPRISES</b>								
44	25	30	24	157	6	93	5	32
45						16		95
46	19	28	21	28	3	481.3	38	16
47								
48	9	24	16	11	5	95		19
49						42		23
50						126.2		
51						14		
52						54		
53							1	1
54		4	3	69			14	160
55		3	12	12,736				
56								
57								
58								
59				10		65		3
60				17,900		130,910		4,155
61				40	8	62	2	23
62	20	28	20	40				1,130
63	714	958	742	1,003	595	5,506	125	90,130
	56,562	57,301	66,135	76,230	23,688	528,719	9,000	
<b>COST</b>								
64	23,872	40,895	37,686	73,065	17,707	1,075,561	2,700	71,367
65						241,650		101,080
66						345.3		
67	4.27	4.98	5.99	5.73	4.72	18.47	1.69	9.49
68						9.70		82.84
69	23,872	40,895	37,686	73,065	17,707	1,075,561	2,700	71,367
70	4.18	4.98	5.99	5.66	4.32	13.18	1.69	9.01

<sup>1</sup> Percentage not calculated when base is less than 100.

<sup>2</sup> Not reported.

IRRIGATION FOR RICE GROWING.

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

[Comparative data for 1899 in italics. Several counties shown for 1909 and 1910 are included under "all other counties" in 1899.]

	THE STATE.	Brazoria.	Chambers.	Colorado.	Fort Bend.	Galveston.	Harris.	
1	Number of all farms in 1910.....	417,770	1,685	593	2,283	2,541	947	2,543
2	Number of farms reporting irrigation for rice growing in 1909.....	1,088	9	99	57	21	9	90
3	Per cent of all farms.....	0.3	0.5	16.7	2.5	0.8	1.0	3.5
4	Number of farms reporting irrigation for rice growing in 1899.....	73		2	1			1
5	Per cent of increase, 1899-1909.....	( <sup>2</sup> )		( <sup>2</sup> )	( <sup>2</sup> )			( <sup>2</sup> )
<b>LAND AND FARM AREA</b>								
6	Approximate land area.....acres.....	167,934,720	857,600	395,520	622,080	506,880	252,800	1,058,560
7	Land in farms.....acres.....	112,435,067	248,512	180,593	383,919	309,654	51,116	400,649
8	Improved land in farms.....acres.....	27,360,666	71,621	53,825	167,806	140,755	18,990	148,172
9	Acres irrigated for rice growing in 1909.....acres.....	286,847	1,972	27,375	7,503	7,303	2,500	25,795
10	Per cent of total land area.....	0.2	0.2	6.9	1.2	1.4	1.0	2.4
11	Per cent of land in farms.....	0.3	0.8	15.2	2.0	2.4	4.9	6.4
12	Per cent of improved land in farms.....	1.0	2.8	50.9	4.5	5.2	13.2	17.4
13	Acres irrigated for rice growing in 1899.....	8,700		57	200			35
14	Per cent of increase, 1899-1909.....	3,197.1		( <sup>2</sup> )	3,651.5			( <sup>2</sup> )
15	Acres enterprises were capable of irrigating in 1910.....	350,350	2,700	27,950	10,435	7,875	3,195	26,760
16	Acres included in projects.....	499,474	5,150	70,450	13,501	8,890	3,985	27,980
<b>ACREAGE IRRIGATED AND INCLUDED IN PROJECTS</b>								
<b>CLASSIFIED BY CONTROL OF WORKS AND KIND OF CONTRACT USED.</b>								
<b>Works controlled by water users:</b>								
17	Irrigated in 1909.....	88,825	1,972	875	4,201	1,945	2,500	7,795
18	Enterprises were capable of irrigating in 1910.....	103,400	2,700	1,450	6,310	2,375	3,195	8,760
19	Included in projects.....	133,174	5,150	1,950	7,701	3,390	3,985	9,980
<b>Works supplying water under contract:</b>								
<b>Share crop rental for water—</b>								
20	Irrigated in 1909.....	27,154		13,000	1,802			
21	Enterprises were capable of irrigating in 1910.....	31,850		13,000	2,625			
22	Included in projects.....	77,400		50,000	4,000			
<b>Fixed crop rental for water—</b>								
23	Irrigated in 1909.....	68,362		13,500				12,000
24	Enterprises were capable of irrigating in 1910.....	79,000		13,500				12,000
25	Included in projects.....	119,500		18,500				12,000
<b>Cash rental for water—</b>								
26	Irrigated in 1909.....	76,708				5,358		6,000
27	Enterprises were capable of irrigating in 1910.....	89,900				5,500		6,000
28	Included in projects.....	102,900				5,500		6,000
<b>Share crop rental for land, seed, and water—</b>								
29	Irrigated in 1909.....	25,800			1,500			
30	Enterprises were capable of irrigating in 1910.....	41,200			1,500			
31	Included in projects.....	66,500			1,800			
<b>ACREAGE IRRIGATED</b>								
<b>CLASSIFIED BY SOURCE OF WATER SUPPLY.</b>								
32	Supplied from streams.....	238,382	1,922	27,125	3,302	6,393	2,000	21,030
33	By gravity.....							
34	By pumping alone.....	238,382	1,922	27,125	3,302	6,393	2,000	21,030
35	By siphons alone.....							
36	By pumping and siphons.....							
37	Supplied from lakes.....							
38	By gravity.....							
39	By pumping.....							
40	Supplied from wells.....	47,920	50		4,201	910	500	4,715
41	Flowing.....	20						20
42	By pumping.....	47,900	50		4,201	910	500	4,695
43	Supplied from reservoirs.....	545		250				50
<b>IRRIGATION ENTERPRISES</b>								
44	Independent enterprises.....number.....	611	8	8	46	11	6	31
45	Number in 1899 <sup>1</sup> .....							
46	Per cent of increase, 1899-1910.....							
47	Main ditches.....number.....	225	6	5	18	10	5	16
48	Number in 1899 <sup>1</sup> .....							
49	Per cent of increase, 1899-1910.....							
50	Length.....miles.....	538	7	41	22	13	8	21
51	Length in 1899 <sup>1</sup> .....miles.....							
52	Per cent of increase, 1899-1910.....							
53	Laterals.....number.....	216		28	11	3		11
54	Length.....miles.....	502		61	13	10		36
55	Reservoirs.....number.....	21	5	1	2		1	3
56	Capacity.....acre-feet.....	2,310	1,565	61	( <sup>5</sup> )		1	333
57	Flowing wells.....number.....	1						1
58	Capacity.....gallons per minute.....	80						80
59	Pumped wells.....number.....	500	3		65	10	2	36
60	Capacity.....gallons per minute.....	445,495	2,600		39,620	36,253	6,000	35,000
61	Pumping plants.....number.....	575	9	6	60	12	6	35
62	Engine capacity.....horsepower.....	48,179	530	2,931	2,629	1,237	695	3,390
63	Pump capacity.....gallons per minute.....	3,907,380	48,800	296,133	135,120	125,577	27,100	155,350
<b>COST</b>								
64	Cost of enterprises up to July 1, 1910.....dollars.....	6,140,639	59,252	593,410	178,503	338,704	72,476	848,600
65	Cost in 1899 <sup>1</sup> .....dollars.....	522,000						
66	Per cent of increase, 1899-1910.....	1,807.0						
67	Average cost per acre enterprises were capable of irrigating in 1910.....dollars.....	17.53	21.95	21.23	17.11	43.01	22.68	31.71
68	Average cost per acre irrigated in 1899 <sup>1</sup> .....dollars.....	57.01						
69	Estimated final cost of existing enterprises.....dollars.....	6,140,639	59,252	593,410	178,503	338,704	72,476	848,600
70	Average per acre included in projects.....dollars.....	12.20	11.51	8.42	13.22	38.10	18.19	30.33

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

<sup>2</sup> Percentages not calculated where base is less than 100.

<sup>5</sup> See explanation for 1910 figures at close of text.

LOUISIANA, TEXAS, AND ARKANSAS.

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

[Comparative data for 1899 in italics. Several counties shown for 1909 and 1910 are included under "all other counties" in 1899.]

	Jackson.	Jefferson.	Liberty.	Matagorda.	Orange.	Wharton.	All other counties.
1							
2	804	586	1,000	1,116	339	2,654	400,679
3	74	160	5	212	62	282	8
4	9.2	27.3	0.5	19.0	18.3	10.6	(1)
5		37	4		19		9
6		(2)	(2)		(3)		
<b>LAND AND FARM AREA</b>							
7	571,520	588,800	742,400	727,040	232,320	711,680	160,667,520
8	989,567	201,844	103,180	205,343	57,775	355,075	108,887,867
9	258,070	145,431	35,437	154,854	25,177	213,636	25,926,782
10	11,167	75,983	1,030	60,834	10,515	53,930	940
11	2.0	12.9	0.1	8.4	4.5	7.6	(1)
12	1.1	37.6	1.0	22.9	18.2	15.2	(1)
13	4.3	52.2	2.9	39.3	41.8	25.2	(1)
14		5,859	168		2,547		60
15	10,293	92,818	535.8	86,216	348.0	63,613	1,010
16	14,995	90,822	5,470	130,304	26,045	91,632	1,250
<b>ACREAGE IRRIGATED AND INCLUDED IN PROJECTS</b>							
<b>CLASSIFIED BY CONTROL OF WORKS AND KIND OF CONTRACT USED.</b>							
<b>Works controlled by water users:</b>							
17	10,117	16,953	1,030	6,916	4,015	29,506	940
18	8,593	23,018	4,870	8,266	4,515	33,038	1,010
19	13,595	29,922	5,470	8,554	7,045	35,182	1,250
<b>Works supplying water under contract:</b>							
<b>Share crop rental for water—</b>							
20	1,050			9,500		1,802	
21	1,400			12,200		2,625	
22	1,400			18,000		4,000	
<b>Fixed crop rental for water—</b>							
23		16,000			6,500	20,362	
24		20,000			8,000	25,500	
25		20,000			19,000	50,000	
<b>Cash rental for water—</b>							
26		43,030		22,318			
27		49,900		28,500			
28		49,900		41,500			
<b>Share crop rental for land, seed, and water—</b>							
29				22,100		2,200	
30				37,250		2,450	
31				62,250		2,450	
<b>ACREAGE IRRIGATED</b>							
<b>CLASSIFIED BY SOURCE OF WATER SUPPLY.</b>							
32	3,242	75,783	300	50,474	10,115	27,696	
33							
34	3,242	75,783	300	50,474	10,115	27,696	
35							
36							
37							
38							
39							
40	7,880		730	1,360	400	20,234	940
41							
42	7,880		730	1,360	400	20,234	940
43	45	200					
<b>IRRIGATION ENTERPRISES</b>							
44	78	160	7	37	11	199	9
45							
46							
47	23	22	3	29	9	78	1
48							
49							
50	21	133	4	114	23	125	1
51							
52							
53	6	29		86	21	21	
54	2	154		142	27	57	
55	4	4				1	
56	86	144				120	
57							
58							
59	75	1	5	14	2	278	9
60	90,000	11	45,500	10,858	15,000	150,000	14,653
61	84	24	7	42	11	263	10
62	3,365	9,526	1,060	8,373	1,501	12,346	595
63	119,440	1,179,010	65,100	915,600	208,700	625,797	14,633
<b>COST</b>							
64	265,525	1,210,787	71,500	1,403,239	171,684	889,174	37,785
65							
66							
67	25.80	13.03	14.68	16.28	13.72	13.98	37.41
68							
69	265,525	1,210,787	71,500	1,403,239	171,684	889,174	37,785
70	17.71	12.13	13.07	10.77	6.59	9.70	30.23

<sup>4</sup> Not reported.

<sup>5</sup> Less than 1 acre-foot.

<sup>6</sup> Estimated.

# IRRIGATION FOR RICE GROWING.

ARKANSAS—RICE—ACREAGE IRRIGATED AND EXTENT AND COST OF IRRIGATION ENTERPRISES, BY COUNTIES:  
1909 AND 1910.

		THE STATE.	Arkansas.	Lonoke.	Poinsett.	Prairie.	St. Francois.	Woodruff.	All other counties.
1	Number of all farms in 1910.....	214,678	2,194	5,104	1,535	1,904	3,807	3,229	196,905
2	Number of farms reporting irrigation for rice growing in 1909.....	232	102	58	16	35	9	5	7
3	Per cent of all farms.....	0.1	4.6	1.1	1.0	1.8	0.2	0.2	(1)
<b>LAND AND FARM AREA</b>									
4	Approximate land area..... acres..	33,616,000	640,000	508,160	481,440	432,000	401,920	369,280	30,803,200
5	Land in farms..... acres..	17,416,075	300,417	287,691	101,370	189,471	177,858	156,107	16,203,161
6	Improved land in farms..... acres..	8,076,254	173,458	181,858	51,519	108,618	113,619	101,598	7,345,284
7	Acreage irrigated for rice growing in 1909..... acres..	27,753	13,250	7,223	878	3,587	1,450	725	540
8	Per cent of total land area.....	0.2	2.1	1.4	0.2	0.8	0.4	0.2	(1)
9	Per cent of land in farms.....	0.2	4.4	2.5	1.0	1.9	0.8	0.5	(1)
10	Per cent of improved land in farms.....	0.3	7.6	4.0	1.9	3.3	1.3	0.7	(1)
11	Acreage enterprises were capable of irrigating in 1910.....	47,136	20,240	12,651	1,975	6,045	2,720	1,230	2,275
12	Acreage included in projects.....	52,833	22,485	14,335	2,920	6,253	2,865	1,340	2,685
<b>ACREAGE IRRIGATED AND INCLUDED IN PROJECTS</b>									
CLASSIFIED BY CONTROL OF WORKS AND KIND OF CONTRACT USED.									
<b>Works controlled by water users:</b>									
13	Irrigated in 1909.....	26,353	11,850	7,223	978	3,587	1,450	725	540
14	Enterprises were capable of irrigating in 1910.....	44,636	17,740	12,651	1,975	6,045	2,720	1,230	2,275
15	Included in projects.....	50,883	19,985	14,335	2,920	6,253	2,865	1,340	2,685
<b>Works supplying water under contract:</b>									
16	Irrigated in 1909.....	*1,400	1,400						
17	Enterprises were capable of irrigating in 1910.....	2,500	2,500						
18	Included in projects.....	2,500	2,500						
<b>ACREAGE IRRIGATED</b>									
CLASSIFIED BY SOURCE OF WATER SUPPLY.									
19	Supplied from streams.....	3,085	2,542	100	118	295			30
20	By gravity.....	2,542	2,542						
21	By pumping alone.....	543		100	118	295			30
22	By siphons alone.....								
23	By pumping and siphons.....								
24	Supplied from lakes.....	270		120					150
25	By gravity.....								
26	By pumping.....	270		120					150
27	Supplied from wells.....	24,398	10,708	7,003	860	3,292	1,450	725	360
28	Flowing.....								
29	By pumping.....	24,398	10,708	7,003	860	3,292	1,450	725	360
<b>IRRIGATION ENTERPRISES</b>									
30	Independent enterprises..... number..	310	127	88	23	37	14	11	10
31	Main ditches..... number..	217	170	19	4	10	5	4	5
32	Length..... miles..	131	73	13	20	6	9	3	8
33	Laterals..... number..								
34	Length..... miles..								
35	Reservoirs..... number..	19	(2) 7	8	(2) 2				2
36	Capacity..... acre-feet..	3		2					1
37	Flowing wells..... number..								
38	Capacity..... gallons per minute..								
39	Pumped wells..... number..	307	119	91	24	39	15	12	7
40	Capacity..... gallons per minute..	268,829	22,335	121,745	19,467	44,077	21,365	14,640	24,700
41	Pumping plants..... number..	315	128	90	24	38	13	12	10
42	Engine capacity..... horsepower..	12,440	5,298	3,530	561	1,504	615	342	500
43	Pump capacity..... gallons per minute..	436,402	173,305	128,685	21,160	46,977	21,365	14,040	30,270
<b>COST</b>									
44	Cost of enterprises up to July 1, 1910..... dollars..	587,834	90,219	230,714	31,600	128,682	51,552	22,715	32,352
45	Average cost per acre enterprises were capable of irrigating in 1910..... dollars..	12.47	4.46	18.24	16.00	21.29	18.95	18.47	14.22
46	Estimated final cost of existing enterprises..... dollars..	612,834	115,219	230,714	31,600	128,682	51,552	22,715	32,352
47	Average per acre included in projects..... dollars..	11.59	5.12	16.09	10.82	20.58	17.99	16.95	12.05

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

<sup>2</sup> Used both share crop and cash rental contracts.

<sup>3</sup> Less than 1 acre-foot.