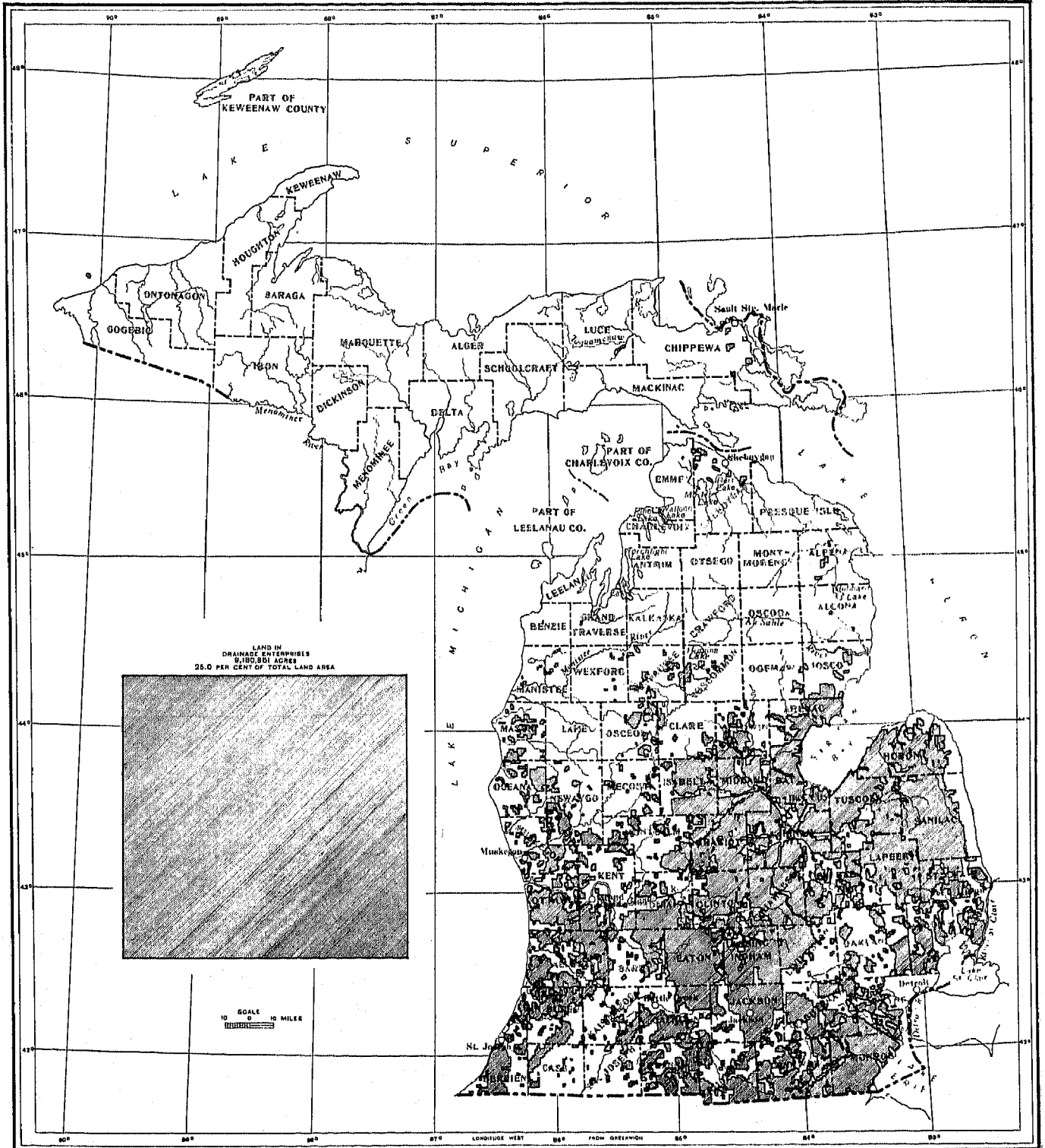


MICHIGAN

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



MICHIGAN

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—Nearly all the drainage enterprises of Michigan are located in the lower portion of the southern peninsula. There are over 9,000,000 acres in drainage enterprises, but only 12,054 acres were reported as located in the northern peninsula.

Reports were secured only for enterprises organized since January 1, 1897, the year the general drainage

law was adopted. The records for enterprises organized prior to the enactment of this law were in very unsatisfactory condition and it is most certain that the total land in organized enterprises was not diminished by the omission of projects organized prior to that year.

Approximately 83 per cent of all land in enterprises was reported as improved; 6 per cent was unfit to raise any crop for lack of drainage; and 11 per cent was idle in 1929. The reports on the condition of land prior to drainage showed that 50 per cent was then fit to raise a normal crop, 22 per cent was fit to raise a partial crop, and 28 per cent was unfit to grow any crop. The average cost of drainage was \$4.10 per acre, but this figure is doubtless low, due to the fact that work done by the landowners themselves was not estimated at the equivalent contract price.

The average precipitation for the State for 1929 was 31.2 inches, which is about two-thirds of an inch greater than normal.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief from overflow for the district as a unit. Therefore, the fact that an enterprise which has completed its works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number.....	169,372	166,447	-27,075	-13.8
Farms reporting drainage.....number.....	42,246	60,048	-24,702	-36.0
All land in farms.....acres.....	17,118,951	19,032,961	-1,914,010	-10.1
Farm land provided with drainage.....acres.....	2,156,043	3,150,632	-1,000,589	-31.7
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres.....	36,787,200	36,787,200		
Land in drainage enterprises.....acres.....	9,180,851	9,729,171	-548,320	-5.6
Improved land.....acres.....	7,663,256	7,182,352	480,904	6.7
Unimproved land:				
Woodland.....acres.....	980,846	2,195,502	-1,214,716	-55.3
Other.....acres.....	536,740	351,267	185,492	52.8
Land unfit to raise any crop for lack of drainage.....acres.....	531,454	² 1,020,207	-488,753	-47.9
Land drained, fit to raise normal crop.....acres.....	7,581,151	(3)		
Land partly drained, fit for partial crop.....acres.....	1,068,246	⁴ 692,224	376,022	54.3
Land in occupied farms.....acres.....	8,826,265	(3)		
Land in planted crops.....acres.....	6,462,930	(3)		
Land idle.....acres.....	1,041,456	(3)		
Ditches, completed.....miles.....	17,188.5	10,023.8	1,164.7	7.3
Tile drains, completed.....miles.....	3,490.2	2,178.9	1,311.3	60.6
Capital invested in enterprises.....dollars.....	37,677,084	24,683,715	12,993,369	52.6
Average, per acre.....dollars.....	4.10	2.54	1.56	61.4

¹ A minus sign (-) denotes decrease.
² "Swampy or subject to overflow."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 10,640 drainage enterprises are shown for Michigan with an average area of 1,413 acres. There are 446 such enterprises of 5,000 acres or more, 5,287 of between 500 and 5,000 acres, and 4,907 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 5,851,841 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	15,032,602	100.0	15,709,478	100.0	9,180,851
Less than 100 acres.....	38,582	0.3			24,420
100 to 199 acres.....	158,023	1.0	155,089	1.0	98,374
200 to 499 acres.....	1,076,140	7.2	907,221	6.1	710,571
500 to 999 acres.....	1,806,876	12.4	1,849,136	11.7	1,240,207
1,000 to 4,999 acres.....	5,193,743	34.6	7,002,024	50.1	3,454,032
5,000 to 9,999 acres.....	1,743,097	11.6	3,251,318	20.6	1,071,697
10,000 to 49,999 acres.....	3,281,204	21.8	1,072,885	6.8	1,772,727
50,000 to 99,999 acres.....	445,530	3.0	508,205	3.0	342,538
100,000 acres and over.....	1,229,497	8.2			457,270

¹ The sum of the areas of individual enterprises, including overlap.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects*, *county drains*, or *township drains*, according to the public officials in control.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	9,180,851	100.0	37,677,084	100.0
County drains.....	9,159,321	99.8	37,231,042	98.8
Individually owned projects.....	21,530	0.2	445,442	1.2

Type of drainage.—There were 10,575 enterprises, covering 9,068,864 acres of land, with an invested capital of \$36,888,894, which reported their works as completed; while 65 enterprises, covering 111,987 acres of land, with an invested capital of \$788,190, estimated that \$101,476 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 17,188 miles of ditches, 3,490 miles of tile drains, 35 miles of levees, and 2 pumping plants.

These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	9,180,851	100.0	37,677,084	100.0
Gravity drainage only.....	9,171,081	99.9	37,277,584	98.9
Ditches and levees.....	7,552,846	82.3	25,070,317	68.9
Tile drains.....	586,050	6.4	4,408,430	11.7
Ditches, tile drains, and levees.....	1,032,185	11.2	6,898,828	18.3
Drainage, all or part by pumping.....	9,770	0.1	399,500	1.1
All drainage by pumping.....	770	(¹)	40,500	0.2
Part gravity and part pumping.....	9,000	0.1	359,000	0.9

¹ Less than one-tenth of 1 per cent.

Pumping plants.—Only 2 pumping plants were reported in Michigan. These plants had a total engine and motor capacity of 275 horsepower and a pump capacity of 36,340 gallons per minute. The area served was 8,270 acres.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER: 1930 AND 1920

KIND OF POWER	Enterprises	Engine or motor capacity		Pump capacity	Land served
		H. p.	Per cent		
All enterprises.....	Number	H. p.	Per cent	G. p. m.	Acres
	1930..	275	100.0	36,340	8,270
	1920..	1,005	100.0	62,000	10,100
Electric.....	1	25	9.1	3,000	770
Internal combustion.....	1	250	90.9	33,340	7,500
Steam.....	3	1,005	100.0	62,000	10,100

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Engine or motor capacity	Land served
		G. p. m.	Per cent		
All enterprises, centrifugal only..	Number	G. p. m. <td>Per cent <td>H. p. <td>Acres</td> </td></td>	Per cent <td>H. p. <td>Acres</td> </td>	H. p. <td>Acres</td>	Acres
	3	36,340	100.0	275	8,270

Arrears and delinquency.—There were 149 enterprises, with approximately 4 per cent of the invested capital and covering about 7 per cent of the land in organized projects, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 10,491 enterprises were reported as not in arrears. Reports of 210 enterprises, covering 668,868 acres, show a total of 324,945 acres delinquent in drainage taxes; 10,376 enterprises, covering 8,393,430 acres, reported no delinquency; while 54 enterprises failed to report.

On account of the overlapping of enterprises, the area delinquent probably contains some land that has been reported delinquent in 2 drainage projects, but the data available do not permit of an accurate determination of the acreage that has been twice reported. From a study of the reports, it is believed that this duplication does not exceed 4,000 acres.

DRAINAGE—MICHIGAN

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	9,180,861	100.0	37,677,084	100.0	324,945
Enterprises in arrears.....	630,095	6.9	1,499,121	4.0	292,814
With some delinquent land.....	590,703	6.5	1,200,440	3.4	292,814
With no delinquent land.....	2,000	(¹)	13,960	(¹)	
With no report on delinquency.....	37,392	0.4	224,721	0.6	
Enterprises not in arrears.....	8,550,766	93.1	36,177,963	96.0	32,131
With some delinquent land.....	78,165	0.8	1,118,008	2.9	32,131
With no delinquent land.....	8,391,430	91.4	34,697,174	92.1	
With no report on delinquency.....	81,161	0.9	367,181	1.0	

¹ Less than one-tenth of 1 per cent.

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes. An enterprise, prior to drainage, may contain swamp land, improved land in farms, and land subject to overflow. The object in drainage may be to reclaim or benefit all such lands. However, the land is classified according to the principal purpose reported.

The enterprises reporting "Improvement of land already in farms" as the principal purpose of drainage doubtless contained considerable swampy and wet lands which were either unfit or partially fit for cultivation prior to drainage.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	9,180,861	100.0	37,677,084	100.0
Reclamation of swamp land not previously in farms.....	1,143,466	12.4	3,789,694	10.1
Improvement of land already in farms.....	8,011,596	87.3	33,833,349	89.8
Protection against overflow.....	26,789	0.3	54,041	0.1

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Acres	Overlapped acres	Dollars	Per cent
All enterprises.....	9,180,861	100.0	15,032,692	5,861,841	37,677,084	100.0
1897-1899.....	1,147,709	12.5	1,434,356	280,567	2,280,026	6.1
1900-1904.....	2,534,071	27.6	3,422,203	888,192	5,833,557	15.5
1905-1909.....	1,719,021	18.7	2,822,332	1,163,311	5,353,790	14.2
1910-1914.....	1,221,785	13.3	1,989,227	767,442	4,983,475	13.2
1915-1919.....	1,713,405	18.7	3,037,892	1,324,487	9,774,099	25.9
1920-1924.....	528,342	5.8	1,403,560	875,218	4,879,969	13.0
1925-1929.....	316,428	3.4	863,062	546,634	4,563,168	12.1

¹ Includes overlap.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement
	Total	Condition of land			Acres	
		Improved land	Wood-land	Other unimproved land		
All enterprises.....	9,180,861	7,663,256	83.5	980,840	536,749	60,237
1897-1899.....	1,147,709	973,458	84.8	101,162	73,189	953
1900-1904.....	2,534,071	2,146,687	84.7	253,104	134,280	15,381
1905-1909.....	1,719,021	1,438,736	83.7	170,622	100,063	3,515
1910-1914.....	1,221,785	997,731	81.7	143,046	81,008	5,130
1915-1919.....	1,713,405	1,405,537	82.0	222,768	85,100	23,253
1920-1924.....	528,342	427,051	80.9	62,220	38,471	1,755
1925-1929.....	316,428	273,450	86.4	27,934	15,038	250

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown. When the maintenance work involves the cleaning out, deepening, and widening of county drains the proceedings are similar to those for constructing a new drain and the cost is assessed against the land benefited. Many enterprises are thus reorganized for maintenance work and this accounts for much of the overlapping of enterprises in Michigan.

Systematic maintenance was reported by 5,880 enterprises, covering 4,205,622 acres of land and having an invested capital of \$19,429,852; while 4,760 enterprises, covering 4,975,229 acres of land, with an invested capital of \$18,247,232, did not have systematic maintenance.

There were 14 enterprises, with an invested capital of \$401,160 and covering 12,113 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 10,626 enterprises, with an invested capital of \$37,275,924 and covering 9,168,738 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	9,180,851		37,677,084	
By district forces.....	1,202,448	13.1	4,860,109	12.9
By contract.....	6,441,265	70.2	26,000,731	70.8
By work apportioned to landowners.....	400,378	5.3	1,846,038	4.9
Other, none, and not reported.....	1,016,760	11.4	4,310,206	11.4

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 6 per cent of the land reporting showed some cost, and 94 per cent showed no cost in 1929. The average cost for all enterprises

was 3 cents per acre, while that for enterprises drained all or part by pumping was 12 cents per acre. As previously stated, the costs here shown are abnormally low, due to the fact that much of the maintenance work was done by organizing the lands of earlier projects into new enterprises and reassessing them for the cost of the maintenance work.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
	Acres	Dollars	Dollars
All enterprises reporting.....	9,185,696	247,504	0.03
Gravity drainage only.....	9,155,926	240,304	0.03
Ditches and levees.....	7,537,001	162,408	0.02
Tile drains.....	586,050	33,059	0.06
Ditches, tile drains, and levees.....	1,032,185	49,937	0.05
Drainage, all or part by pumping.....	9,770	1,200	0.12

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Acres	Acres	Acres	
The State.....	42,246	66,048	2,160,043	3,166,632	169,372	17,118,051	9,004,033	3,234,738	30,787,200
Allegan.....	1,114	982	40,807	26,080	5,300	401,997	242,297	48,130	533,120
Arenac.....	149	195	6,575	8,225	1,202	120,071	57,087	40,531	239,300
Barry.....	550	158	17,875	4,376	2,656	207,750	150,907	39,308	355,840
Bay.....	465	1,854	21,261	92,782	2,901	219,486	137,763	36,036	283,520
Berrien.....	1,102	469	27,398	23,802	5,390	297,118	204,562	29,392	364,160
Branch.....	708	1,333	28,563	42,281	2,750	289,302	108,430	32,520	318,080
Calhoun.....	476	928	21,001	30,337	3,205	371,506	108,509	37,312	443,520
Cass.....	118	82	4,839	1,759	2,437	266,210	101,233	31,946	315,520
Cheboygan.....	12	37	545	800	1,052	115,141	41,000	47,618	404,000
Clara.....	35	187	980	5,225	893	144,042	42,646	49,751	372,480
Clinton.....	1,233	1,032	73,030	84,302	2,964	332,122	202,513	34,165	365,440
Delta.....	92	139	1,297	2,851	1,384	147,954	48,426	68,110	748,100
Eaton.....	1,750	2,021	94,796	123,106	3,385	331,200	193,760	36,745	365,440
Genesee.....	1,530	2,301	101,295	161,901	2,907	293,915	176,564	34,684	419,200
Gladwin.....	142	560	4,631	23,097	1,107	130,601	62,636	48,569	332,100
Grandtrot.....	1,978	2,813	118,437	127,510	3,315	318,521	204,838	45,831	370,560
Hillsdale.....	1,751	2,755	89,611	127,028	3,544	340,414	194,562	40,184	392,080
Huron.....	1,043	1,267	83,422	83,953	4,155	475,585	305,474	62,190	546,560
Ingham.....	1,440	2,205	79,339	98,700	2,961	304,243	174,017	32,352	365,920
Ionia.....	1,084	1,552	62,553	63,963	2,833	322,456	191,314	34,765	370,560
Iosco.....	64	170	2,284	5,890	632	95,800	31,233	38,401	364,800
Isabella.....	1,044	1,701	55,084	62,330	2,507	280,352	150,493	48,835	360,080
Jackson.....	530	1,103	19,572	31,241	2,908	362,083	191,333	38,768	452,480
Kalamazoo.....	355	543	7,415	12,991	2,731	208,690	163,052	22,101	359,680
Kent.....	922	1,424	23,040	32,156	4,422	392,001	222,500	53,972	550,400
Lake.....	35	(?)	724	(?)	651	80,217	21,823	32,530	370,560
Lapeer.....	834	1,807	36,550	86,078	3,270	354,347	190,648	44,505	426,240
Lebanon.....	2,873	4,136	188,207	240,797	4,453	440,777	272,619	44,627	475,520
Livingston.....	860	1,119	39,011	46,228	2,122	288,828	146,431	36,466	363,520
Macomb.....	968	2,510	45,523	120,068	2,951	210,015	137,002	22,662	302,080
Manistee.....	34	140	1,101	1,877	1,172	120,072	57,767	41,297	359,680
Mason.....	282	711	8,400	19,784	1,637	155,149	70,429	34,621	310,160
Macostan.....	115	267	3,330	4,823	2,003	243,075	111,453	47,177	305,440
Menominee.....	67	63	1,447	1,070	1,061	224,481	72,137	92,207	675,840
Midland.....	580	1,292	26,893	53,870	1,784	167,356	80,550	46,761	338,560
Missaukee.....	24	70	9,180	11,100	1,072	102,019	64,204	53,624	372,480
Monroe.....	2,098	3,442	113,214	201,307	3,803	288,052	192,996	27,728	366,720
Montcalm.....	469	965	15,111	27,289	3,060	372,013	203,719	57,000	463,800
Muskegon.....	204	700	9,131	39,184	1,826	137,673	66,011	34,341	322,560
Newaygo.....	303	681	12,308	25,334	2,336	202,271	114,073	70,280	544,040
Oakland.....	588	1,757	23,736	69,741	2,405	286,003	147,002	33,617	567,040
Oceana.....	125	188	7,753	5,176	2,012	201,482	106,635	33,829	347,520
Ogemaw.....	13	19	983	2,177	985	140,195	45,104	71,451	371,200
Oscoda.....	154	292	4,283	7,354	1,831	251,398	89,684	65,981	399,280
Ottawa.....	1,074	1,738	48,890	71,082	3,896	275,831	171,184	27,162	361,000
Saginaw.....	2,372	1,634	141,832	90,120	4,827	415,554	245,733	73,229	529,920
St. Clair.....	169	1,059	9,481	126,975	3,627	341,698	202,428	42,322	454,400
St. Joseph.....	93	108	5,110	4,810	2,397	283,075	174,840	22,853	321,920
Sanilac.....	874	2,148	83,597	168,750	4,599	534,070	322,824	56,079	624,040
Shiawassee.....	1,150	2,107	66,273	109,115	3,003	313,441	197,229	31,260	356,480
Tuscola.....	2,254	2,467	118,143	120,591	4,450	430,595	259,951	61,580	529,280
Van Buren.....	1,046	872	31,598	22,476	4,334	314,595	197,344	35,226	394,880
Washtenaw.....	1,408	1,210	61,730	67,819	3,259	375,090	209,967	39,922	450,560
Wayne.....	1,083	2,378	50,179	108,978	2,043	185,048	85,014	17,746	366,800
Wexford.....	14	37	561	738	1,149	127,296	53,828	32,006	369,280
All other counties.....	266	700	5,725	18,131	20,540	2,240,704	849,308	869,507	14,241,920

¹ No drainage on farms reported in Otsego County in 1930, nor in Luce County for 1920.

² Included in "All other counties."

DRAINAGE—MICHIGAN

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER

ITEM (See definitions in Introduction)		THE STATE	Allegan	Alpena	Arenac	Barry	Bay	Berrien
LAND AREA								
1	Approximate land area..... 1930..... acres.....	36,787,200	533,120	373,760	230,360	355,840	283,520	304,160
2	Land in enterprises..... 1930..... acres.....	9,180,851	278,454	5,400	132,343	154,722	214,257	151,601
3	Land unfit to raise a normal crop prior to drainage..... 1920..... acres.....	9,726,171	312,915	(1)	143,734	143,508	241,501	151,877
4	Increase, ² 1920-1930..... per cent.....	-5.6	-11.0		-7.9	7.8	-11.3	23.4
5	Area of all enterprises (overlapping areas included)..... 1930..... acres.....	15,032,002	340,280	5,400	180,001	183,777	348,985	220,003
6	Excess over land in enterprises (total areas overlapping)..... acres.....	5,851,841	67,835		50,748	20,055	134,728	74,312
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop..... 1930..... acres.....	531,454	1,143	1,080	2,011	10,678	220	8,155
8	Land unfit to raise any crop prior to drainage..... acres.....	2,558,428	98,549	2,800	38,547	32,255	10,261	33,780
9	Decrease since drainage ² per cent.....	46.8	93.8	62.2	93.2	66.9	97.0	75.9
10	Land fit to raise a normal crop..... 1930..... acres.....	7,581,151	270,511	3,980	122,080	133,470	100,649	124,350
11	Land fit to raise a normal crop prior to drainage..... acres.....	4,016,122	74,841	350	50,450	100,904	41,500	82,323
12	Increase since drainage ² per cent.....	64.2	209.5		110.3	32.3	287.1	51.1
13	Land fit to raise a partial crop..... 1930..... acres.....	1,038,246	800	400	7,052	10,508	53,388	19,180
14	Land fit to raise a partial crop prior to drainage..... acres.....	2,006,301	105,064	2,250	37,340	21,503	102,400	35,588
15	Decrease since drainage ² per cent.....	46.8	99.2	82.2	79.5	51.0	67.1	46.1
16	Improved land..... 1930..... acres.....	7,063,250	273,000	2,980	95,306	133,780	184,946	137,002
17	Increase, ² 1920-1930..... per cent.....	7,132,352	208,843	(1)	58,380	116,347	160,748	97,743
18	Unimproved land—	6.7	-8.6		63.2	16.0	15.1	40.2
19	Woodland..... 1930..... acres.....	980,846	3,270	1,680	34,266	20,192	26,977	7,201
20	Other..... 1930..... acres.....	536,749	2,184	800	2,771	750	2,334	7,488
21	Land in occupied farms..... 1930..... acres.....	8,326,205	277,773	2,980	105,472	153,520	210,467	151,016
22	Land in planted crops..... 1930..... acres.....	0,462,936	250,374	1,460	50,225	99,172	179,722	128,709
23	Woodland cleared and cultivated since drainage..... 1930..... acres.....	905,365	19,191	160	23,500	8,488	8,545	20,235
24	Land idle..... 1930..... acres.....	1,041,450	14,776	2,560	33,802	24,637	5,025	10,007
25	Land available for settlement..... 1930..... acres.....	50,237	400	1,000	10,640		126	435
DRAINAGE WORKS, 1930								
26	Ditches—							
27	Completed..... miles.....	17,188.5	489.9	8.4	268.5	148.0	484.8	268.8
28	Additional under construction..... miles.....	61.0	1.5					
29	Tile drains—							
30	Completed..... miles.....	3,400.2	16.7			50.1	0.0	120.0
31	Additional under construction..... miles.....	301.7						
32	Levees and dikes—							
33	Completed..... miles.....	34.0						
34	Pumping plants—							
35	Engine or motor capacity..... horsepower.....	275						
36	Pump capacity..... gals. per min.....	36,340						
37	Land served by pumps..... acres.....	8,270						
38	Land drained by ditches only ⁴ acres.....	7,549,946	205,082	5,400	132,343	131,076	211,547	100,328
39	Length of ditches..... miles.....	15,150.5	409.1	8.4	268.5	120.3	478.7	268.4
40	Land drained by tile only ⁴ acres.....	580,050	1,842			5,696	110	30,763
41	Length of tile..... miles.....	1,815.4	5.1			11.7	1.1	97.4
42	Land drained by ditches and tile ⁴ acres.....	1,029,685	11,530			17,350	2,000	11,600
43	Length of ditches..... miles.....	2,047.6	22.3			27.7	0.1	30.4
44	Length of tile..... miles.....	1,900.9	11.0			38.4	5.5	28.0
45	Land having ditches and levees..... acres.....	2,900						
46	Length of ditches..... miles.....	5.0						
47	Length of levees..... miles.....	1.1						
48	Land having ditches, tile drains, and levees..... acres.....	2,500						
49	Length of ditches..... miles.....	0.8						
50	Length of tile..... miles.....	5.0						
51	Length of levees..... miles.....	11.5						
52	Land drained by pumps and other drainage works ⁵ acres.....	9,770						
53	Length of ditches..... miles.....	36.0						
54	Length of tile..... miles.....	10.0						
55	Length of levees..... miles.....	22.0						
CAPITAL INVESTED AND COST PER ACRE								
56	Capital invested in enterprises to Jan. 1, 1930..... dollars.....	37,677,084	579,751	4,629	775,093	253,946	1,102,968	728,082
57	1920..... dollars.....	24,683,715	414,461	(1)	473,012	197,771	500,910	315,540
58	Increase, ² 1920-1930..... per cent.....	52.6	39.9		64.0	28.4	120.2	131.0
59	Estimated cost of enterprises when completed..... 1930..... dollars.....	37,778,560	580,182	4,629	775,693	253,946	1,102,968	728,982
60	1920..... dollars.....	25,048,980	416,127	(1)	475,212	198,350	500,910	315,540
61	Average, per acre when completed..... 1930..... dollars.....	4.11	2.68	0.85	5.86	1.64	5.15	4.81
62	1920..... dollars.....	2.57	1.33	(1)	3.31	1.38	2.07	2.57
63	Invested in and required for completion of—							
64	Enterprises having ditches only..... 1930..... dollars.....	20,044,485	523,959	4,629	775,698	157,904	1,050,408	430,787
65	Average, per acre..... dollars.....	3.45	1.98	0.85	5.86	1.20	4.99	4.02
66	Enterprises having tile drains only..... 1930..... dollars.....	4,408,539	7,500			19,382	1,400	189,025
67	Average, per acre..... dollars.....	7.52	4.07			3.40	13.27	6.14
68	Enterprises having ditches and tile drains..... 1930..... dollars.....	6,891,736	48,723			76,660	45,100	100,170
69	Average, per acre..... dollars.....	6.69	4.23			4.42	17.85	8.64
70	Enterprises having ditches and levees..... 1930..... dollars.....	10,465						
71	Average, per acre..... dollars.....	3.61						
72	Enterprises having ditches, tile drains, and levees..... 1930..... dollars.....	23,785						
73	Average, per acre..... dollars.....	9.51						
74	Enterprises having pumps and other drainage works..... 1930..... dollars.....	399,500						
75	Average, per acre..... dollars.....	40.89						

¹ Included in "Other counties."

² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000 or when less than one-tenth of 1 per cent.

³ Office estimate; the reported figures exceeded the improved acreage in all farms in the county as determined by the census of agriculture.

⁴ When works under construction have been completed.

⁵ Area of enterprises having some land served by pumps.

DRAINAGE—MICHIGAN

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE,

ITEM (See definitions in Introduction)		Ionia	Iosco	Isabella	Jackson	Kalamazoo	Kent	Lapeer
LAND AREA								
1	Approximate land area..... 1930..... acres..	370,500	364,800	306,080	452,480	350,680	550,400	426,240
2	Land in enterprises..... 1930..... acres..	155,890	39,988	247,472	290,909	65,147	151,775	303,028
3	..... 1920..... acres..	286,153	31,074	307,024	76,130	79,511	145,370	238,235
4	Increase, ¹ 1920-1930..... per cent..	-45.5	25.1	-19.4	282.1	-18.1	4.4	27.2
5	Area of all enterprises (overlapping areas included)..... 1930..... acres..	321,024	40,028	420,042	302,041	69,400	210,310	460,304
6	Excess over land in enterprises (total areas overlapping)..... acres..	166,034	6,040	178,570	102,032	4,262	58,644	157,276
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop..... 1930..... acres..	8,068	811	1,015	11,814	6,812	2,290	55,573
8	Land unfit to raise any crop prior to drainage..... acres..	19,131	16,010	16,565	110,493	38,716	18,835	132,481
9	Decrease since drainage..... per cent..	53.0	94.9	93.9	89.3	82.4	87.8	58.1
10	Land fit to raise a normal crop..... 1930..... acres..	133,347	30,783	220,581	231,870	40,034	142,140	200,054
11	Land fit to raise a normal crop prior to drainage..... acres..	97,522	14,300	128,447	141,652	14,455	118,315	115,431
12	Increase since drainage..... per cent..	30.7	155.6	71.7	63.7	230.2	25.4	73.8
13	Land fit to raise a partial crop..... 1930..... acres..	13,545	2,304	25,876	47,216	9,301	7,345	46,801
14	Land fit to raise a partial crop prior to drainage..... acres..	30,237	9,588	102,466	38,764	11,976	10,625	55,116
15	Decrease since drainage ¹ per cent..	65.5	75.0	74.7	-21.8	22.3	62.6	15.1
16	Improved land..... 1930..... acres..	136,744	28,792	220,437	231,035	55,320	130,575	211,575
17	..... 1920..... acres..	228,748	14,348	201,061	61,747	61,329	143,084	168,308
18	Increase, ¹ 1920-1930..... per cent..	-40.2	100.7	0.6	275.6	-9.8	-8.7	25.7
Unimproved land—								
19	Woodland..... 1930..... acres..	11,002	10,390	27,035	45,690	4,820	18,045	61,905
20	Other..... 1930..... acres..	7,544	806	18,280	13,284	4,998	2,255	29,548
21	Land in occupied farms..... 1930..... acres..	155,800	31,090	247,302	290,909	65,147	151,510	236,010
22	Land in planted crops..... 1930..... acres..	132,954	19,094	204,243	219,334	51,970	108,738	147,295
23	Woodland cleared and cultivated since drainage..... 1930..... acres..	2,156	7,187	200	12,195	5,680	9,145	112,965
24	Land idle..... 1930..... acres..	101	9,996	15	34,042	6,848	4,185	67,301
25	Land available for settlement..... 1930..... acres..							
DRAINAGE WORKS, 1930								
Ditches—								
26	Completed..... miles..	273.0	49.0	476.8	148.9	160.1	235.8	485.5
27	Additional under construction..... miles..			1.5				
Tile drains—								
28	Completed..... miles..	127.5		364.0	24.5	3.9	12.9	6.8
29	Additional under construction..... miles..							
Levees and dikes—								
30	Completed..... miles..							
Pumping plants—								
31	Engine or motor capacity..... horsepower..							
32	Pump capacity..... gals. per min..							
33	Land served by pumps..... acres..							
34	Land drained by ditches only ² acres..	94,252	39,988	112,347	273,724	61,912	134,440	300,753
35	Length of ditches..... miles..	169.4	49.9	323.4	135.8	148.1	201.2	470.9
36	Land drained by tile only ² acres..	19,038		61,825	8,485		2,045	
37	Length of tile..... miles..	50.9		203.7	16.8		4.1	
38	Land drained by ditches and tile ² acres..	42,600		73,300	8,700	3,235	15,200	2,275
39	Length of ditches..... miles..	103.6		154.9	13.1	12.0	34.6	14.6
40	Length of tile..... miles..	76.6		160.3	7.7	3.9	8.8	6.8
41	Land having ditches and levees..... acres..							
42	Length of ditches..... miles..							
43	Length of levees..... miles..							
44	Land having ditches, tile drains, and levees..... acres..							
45	Length of ditches..... miles..							
46	Length of tile..... miles..							
47	Length of levees..... miles..							
48	Land drained by pumps and other drainage works ⁴ acres..							
49	Length of ditches..... miles..							
50	Length of tile..... miles..							
51	Length of levees..... miles..							
CAPITAL INVESTED AND COST PER ACRE								
52	Capital invested in enterprises to Jan. 1, 1930..... dollars..	551,063	125,450	1,236,045	760,650	205,045	450,392	681,201
53	..... 1920..... dollars..	539,859	65,428	785,043	115,338	107,351	241,543	506,317
54	Increase, ¹ 1920-1930..... per cent..	2.1	91.7	57.4	559.5	22.5	80.2	20.3
55	Estimated cost of enterprises when completed..... 1930..... dollars..	551,063	125,450	1,236,280	760,650	205,045	450,392	681,201
56	..... 1920..... dollars..	539,859	65,428	785,043	115,338	178,008	271,543	573,742
57	Average, per acre when completed..... 1930..... dollars..	3.63	3.14	5.00	2.01	3.15	3.08	2.25
58	..... 1920..... dollars..	1.89	2.05	2.56	1.51	2.24	1.87	2.41
Invested in and required for completion of—								
59	Enterprises having ditches only..... 1930..... dollars..	202,166	125,450	378,925	706,326	174,555	342,371	603,635
60	Average, per acre..... dollars..	2.14	3.14	3.37	2.58	2.82	2.55	2.21
61	Enterprises having tile drains only..... 1930..... dollars..	96,621		343,160	26,244		20,095	
62	Average, per acre..... dollars..	5.08		5.55	3.09		6.83	
63	Enterprises having ditches and tile drains..... 1930..... dollars..	252,276		516,195	28,080	30,490	96,026	17,566
64	Average, per acre..... dollars..	5.02		7.04	3.23	0.43	6.34	7.72
65	Enterprises having ditches and levees..... 1930..... dollars..							
66	Average, per acre..... dollars..							
67	Enterprises having ditches, tile drains, and levees..... 1930..... dollars..							
68	Average, per acre..... dollars..							
69	Enterprises having pumps and other drainage works..... 1930..... dollars..							
70	Average, per acre..... dollars..							

¹ A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.² Office estimate; the reported figures exceeded the improved acreage in all farms in the county as determined by the census of agriculture.³ When works under construction have been completed.⁴ Area of enterprises having some land served by pumps.

DRAINAGE—MICHIGAN

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Ottawa	Roscom- mon	Saginaw	St. Clair	St. Joseph	Sanilac	Shlawas- see
LAND AREA								
1	Approximate land area..... 1930..... acres..	361,000	344,320	520,920	454,400	321,920	624,040	356,480
2	Land in enterprises..... 1930..... acres..	183,945	14,340	367,850	250,288	36,000	386,701	280,982
3	..... 1920..... acres..	252,928	8,300	444,570	104,826	31,151	540,607	281,100
4	Increase, ¹ 1920-1930..... per cent..	-27.3	71.5	-19.5	28.5	15.0	-28.5	-0.1
5	Area of all enterprises (overlapping areas included)..... 1930..... acres..	201,967	14,340	796,977	327,241	36,854	1,271,300	482,519
6	Excess over land in enterprises (total areas overlapping)..... acres..	13,022		439,127	76,953	854	884,599	201,537
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop..... 1930..... acres..	285	1,733	1,500	3,809	4,333	23,480	8,493
8	Land unfit to raise any crop prior to drainage..... acres..	80,897	7,703	142,620	74,149	22,795	140,108	18,043
9	Decrease since drainage..... per cent..	99.7	77.7	98.9	94.7	81.0	83.9	84.4
10	Land fit to raise a normal crop..... 1930..... acres..	182,885	11,064	347,910	238,086	27,450	813,086	258,213
11	Land fit to raise a normal crop prior to drainage..... acres..	68,591	3,908	190,302	126,326	2,817	101,266	234,171
12	Increase since drainage..... per cent..	100.0	170.7	82.8	90.5	874.4	94.7	10.3
13	Land fit to raise a partial crop..... 1930..... acres..	775	1,543	8,440	7,703	4,217	40,235	14,276
14	Land fit to raise a partial crop prior to drainage..... acres..	28,457	2,574	24,928	50,813	10,388	79,337	23,168
15	Decrease since drainage..... per cent..	97.3	40.1	60.1	84.8	69.4	37.9	40.3
16	Improved land..... 1930..... acres..	175,281	8,107	335,150	220,493	23,346	336,763	241,077
17	..... 1920..... acres..	216,450	820	300,819	142,705	21,426	436,414	109,941
18	Increase, ¹ 1920-1930..... per cent..	-18.0	888.7	11.4	54.6	0.0	-22.8	20.0
19	Unimproved land—							
20	Woodland..... 1930..... acres..	8,654	4,498	10,008	25,007	6,142	32,087	15,825
20	Other..... 1930..... acres..	10	1,735	12,602	4,608	6,512	17,851	24,080
21	Land in occupied farms..... 1930..... acres..	183,845	8,672	355,850	249,644	35,867	380,744	280,032
22	Land in planted crops..... 1930..... acres..	160,401	5,430	323,280	190,013	20,140	274,094	220,395
23	Woodland cleared and cultivated since drainage..... 1930..... acres..	31,089	2,380	12,061	61,480	5,805	54,861	180
24	Land idle..... 1930..... acres..	805	6,780	19,443	22,370	13,735	49,107	8,024
25	Land available for settlement..... 1930..... acres..		2,120	2,000		110		
DRAINAGE WORKS, 1930								
26	Ditches—							
27	Completed..... miles..	380.4	17.7	900.1	535.7	112.1	1,107.0	559.0
27	Additional under construction..... miles..			57.7		0.3		
28	Tile drains—							
28	Completed..... miles..	2.2		42.6	2.1	3.8	1.3	101.1
29	Additional under construction..... miles..			1.4		0.3		300.0
30	Levees and dikes—							
30	Completed..... miles..			22.0				
31	Pumping plants—							
31	Engine or motor capacity..... horsepower..			259				
32	Pump capacity..... gals. per min..			33,340				
33	Land served by pumps..... acres..			7,500				
34	Land drained by ditches only ² acres..	181,615	14,340	335,504	249,480	30,442	384,701	237,414
35	Length of ditches..... miles..	374.9	17.7	973.9	535.4	92.3	1,102.1	477.1
36	Land drained by tile only ³ acres..	40		8,842	734	138	137	15,868
37	Length of tile..... miles..	1.1		31.1	2.0	0.7	0.5	46.0
38	Land drained by ditches and tile ³ acres..	2,200		4,504	68	5,420	1,893	27,700
39	Length of ditches..... miles..	11.5		16.0	0.3	20.1	4.9	82.5
40	Length of tile..... miles..	1.1		7.9	0.1	3.4	0.8	364.2
41	Land having ditches and levees..... acres..							
42	Length of ditches..... miles..							
43	Length of levees..... miles..							
44	Land having ditches, tile drains, and levees..... acres..							
45	Length of ditches..... miles..							
46	Length of tile..... miles..							
47	Length of levees..... miles..							
48	Land drained by pumps and other drainage works ⁴ acres..			9,000				
49	Length of ditches..... miles..			33.0				
50	Length of tile..... miles..			5.0				
51	Length of levees..... miles..			22.0				
CAPITAL INVESTED AND COST PER ACRE								
52	Capital invested in enterprises to Jan. 1, 1930..... dollars..	432,100	14,655	2,749,200	820,110	220,025	2,024,010	1,330,000
53	..... 1920..... dollars..	285,606	11,425	1,626,615	395,198	140,348	1,372,061	917,107
54	Increase, 1920-1930..... per cent..	51.3	28.3	70.7	109.8	53.3	47.5	46.0
55	Estimated cost of enterprises when completed..... 1930..... dollars..	432,100	14,655	2,778,754	820,110	220,325	2,024,019	1,351,862
56	..... 1920..... dollars..	285,763	14,025	1,547,036	408,033	149,343	1,374,041	917,107
57	Average, per acre when completed..... 1930..... dollars..	2.35	1.02	7.77	3.31	6.37	5.24	4.81
58	..... 1920..... dollars..	1.13	1.79	3.48	2.00	4.70	2.54	3.26
59	Invested in and required for completion of—							
60	Enterprises having ditches only..... 1930..... dollars..	416,439	14,655	2,205,213	810,859	174,801	2,013,659	878,746
61	Average, per acre..... dollars..	2.20	1.02	6.57	3.25	5.74	5.23	3.70
62	Enterprises having tile drains only..... 1930..... dollars..	1,620		92,345	14,500	360	1,500	142,731
63	Average, per acre..... dollars..	40.50		10.44	19.75	2.54	18.25	8.90
64	Enterprises having ditches and tile drains..... 1930..... dollars..	14,041		131,193	3,721	54,174	8,760	330,885
65	Average, per acre..... dollars..	6.13		29.13	54.72	10.00	4.86	11.03
66	Enterprises having ditches and levees..... 1930..... dollars..							
67	Average, per acre..... dollars..							
68	Enterprises having ditches, tile drains, and levees..... 1930..... dollars..							
69	Average, per acre..... dollars..							
70	Enterprises having pumps and other drainage works..... 1930..... dollars..			350,000				
	Average, per acre..... dollars..			38.89				

¹ A minus sign (-) denotes decrease.

² Office estimate; the reported figures exceeded the improved acreage in all farms in the county as determined by the census of agriculture.

³ When works under construction have been completed.

⁴ Area of enterprises having some land served by pumps.

DRAINAGE—MICHIGAN

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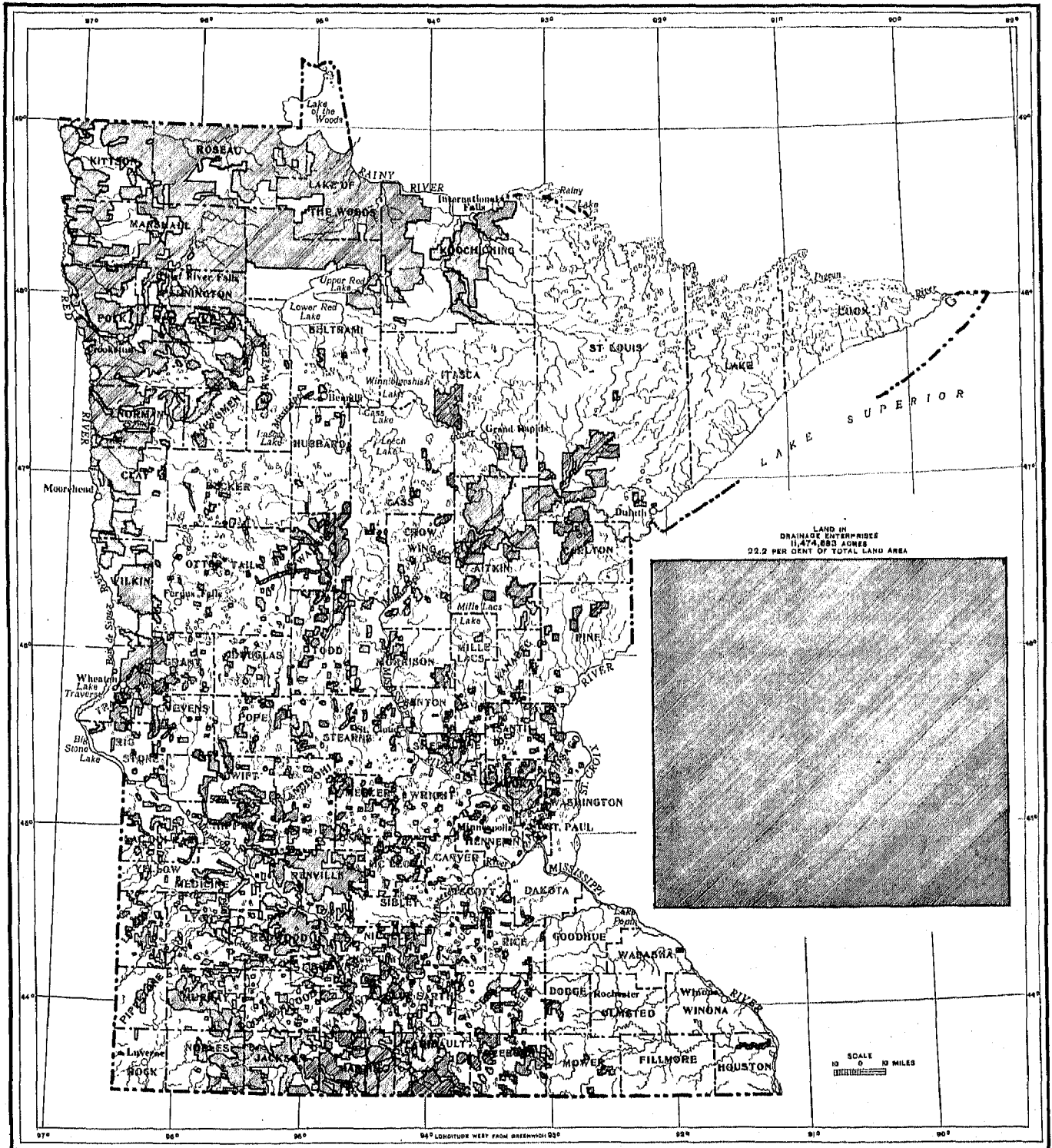
COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Tuscola	Van Buren	Washtenaw	Wayne	Wexford	Other counties ¹
LAND AREA							
1	Approximate land area.....1930.....acres.....	520,280	394,880	450,500	306,800	309,280	1,924,480
2	Land in enterprises.....1930.....acres.....	365,680	182,050	257,903	127,382	3,840	5,045
3	.....1920.....acres.....	487,423	173,508	191,598	269,007	10,254	10,907
4	Increase, ² 1920-1930.....per cent.....	-25.0	5.3	34.0	-50.9	-62.0	-54.0
5	Area of all enterprises (overlapping areas included).....1930.....acres.....	619,709	346,204	359,870	162,977	4,040	5,045
	Excess over land in enterprises (total areas overlapping).....acres.....	554,210	163,543	101,907	35,595	200	
CONDITION AND USE OF LAND							
7	Land unfit to raise any crop.....1930.....acres.....	60,022	12,070	20,541	12,802	13	369
8	Land unfit to raise any crop prior to drainage.....acres.....	173,758	57,706	48,990	26,005	20	2,165
9	Decrease since drainage.....per cent.....	59.8	70.1	58.1	52.1	35.0	83.0
10	Land fit to raise a normal crop.....1930.....acres.....	247,410	114,774	225,500	100,554	3,820	4,301
11	Land fit to raise a normal crop prior to drainage.....acres.....	130,266	70,004	182,834	86,070	3	648
12	Increase since drainage ².....per cent.....	89.0	49.2	23.4	16.8		503.7
13	Land fit to raise a partial crop.....1930.....acres.....	48,248	55,812	11,772	14,520	7	375
14	Land fit to raise a partial crop prior to drainage.....acres.....	61,505	48,046	20,070	15,647	3,817	2,232
15	Decrease since drainage ².....per cent.....	21.0	+16.2	54.9	7.2	90.8	83.2
16	Improved land.....1930.....acres.....	253,197	138,686	222,796	100,220	3,813	3,711
17	.....1920.....acres.....	331,024	137,308	164,201	102,850	7,787	7,231
18	Increase, ² 1920-1930.....per cent.....	-23.7	1.0	35.6	-38.5	-51.0	-48.7
19	Unimproved land—						
20	Woodland.....1930.....acres.....	63,896	41,322	10,207	17,235	15	604
	Other.....1930.....acres.....	48,406	2,648	15,900	9,921	12	640
21	Land in occupied farms.....1930.....acres.....	297,796	170,793	256,784	127,352	3,840	5,045
22	Land in planted crops.....1930.....acres.....	205,822	91,928	210,783	90,227	3,471	3,661
23	Woodland cleared and cultivated since drainage.....1930.....acres.....	30,480	13,280	6,938	15	15	1,423
24	Land idle.....1930.....acres.....	62,971	44,353	13,700	14,774	100	604
25	Land available for settlement.....1930.....acres.....	1,500	110	53			
DRAINAGE WORKS, 1930							
26	Ditches—						
27	Completed.....miles.....	901.3	307.6	200.0	406.0	12.0	17.3
	Additional under construction.....miles.....						
28	Tile drains—						
29	Completed.....miles.....	1.7	24.9	76.3	10.8		
	Additional under construction.....miles.....						
30	Levees and dikes—						
	Completed.....miles.....						
31	Pumping plants—						
32	Engine or motor capacity.....horsepower.....						
33	Pump capacity.....gals. per min.....						
	Land served by pumps.....acres.....						
34	Land drained by ditches only ³.....acres.....	303,047	161,631	208,144	123,405	3,840	5,045
35	Length of ditches.....miles.....	890.8	281.6	261.0	401.0	12.6	17.3
36	Land drained by tile only ³.....acres.....		1,925	12,959	3,197		
37	Length of tile.....miles.....		2.3	43.7	10.1		
38	Land drained by ditches and tile ³.....acres.....	1,042	19,100	36,800	780		
39	Length of ditches.....miles.....	1.5	20.0	38.0	4.4		
40	Length of tile.....miles.....	1.7	22.0	32.0	0.7		
41	Land having ditches and levees.....acres.....						
42	Length of ditches.....miles.....						
43	Length of levees.....miles.....						
44	Land having ditches, tile drains, and levees.....acres.....						
45	Length of ditches.....miles.....						
46	Length of tile.....miles.....						
47	Length of levees.....miles.....						
48	Land drained by pumps and other drainage works.....acres.....						
49	Length of ditches.....miles.....						
50	Length of tile.....miles.....						
51	Length of levees.....miles.....						
CAPITAL INVESTED AND COST PER ACRE							
52	Capital invested in enterprises to Jan. 1, 1930.....dollars.....	1,850,742	642,451	1,045,240	537,798	12,502	37,607
53	.....1920.....dollars.....	1,301,398	380,957	883,280	408,140	18,295	45,950
54	Increase, ² 1920-1930.....per cent.....	42.7	68.6	172.7	31.8	-31.7	-18.2
55	Estimated cost of enterprises when completed.....1930.....dollars.....	1,006,742	642,451	1,045,240	537,798	12,502	37,607
56	.....1920.....dollars.....	1,428,963	380,957	394,602	411,151	18,295	45,950
57	Average, per acre when completed.....1930.....dollars.....	6.22	3.52	4.05	4.22	3.20	7.45
58	.....1920.....dollars.....	2.93	2.20	2.06	1.68	1.78	4.10
59	Invested in and required for completion of—						
60	Enterprises having ditches only.....1930.....dollars.....	1,000,936	542,894	384,513	378,788	12,502	37,607
	Average, per acre.....dollars.....	5.22	3.36	1.85	3.05	3.20	7.45
61	Enterprises having tile drains only.....1930.....dollars.....	4,130	100,234	140,392	140,392		
	Average, per acre.....dollars.....	2.15	8.43	45.70	45.70		
62	Enterprises having ditches and tile drains.....1930.....dollars.....	5,806	95,427	551,502	14,588		
	Average, per acre.....dollars.....	3.54	5.00	14.90	18.70		
63	Enterprises having ditches and levees.....1930.....dollars.....						
	Average, per acre.....dollars.....						
64	Enterprises having ditches, tile drains, and levees.....1930.....dollars.....						
	Average, per acre.....dollars.....						
65	Enterprises having pumps and other drainage works.....1930.....dollars.....						
	Average, per acre.....dollars.....						

¹ Includes Alcona, Benzie, Charlevoix, Luce, and Presque Isle Counties in 1930; and Alcona, Alpena, Benzie, Charlevoix, Emmet, Grand Traverse, Luce, and Presque Isle Counties for 1920.
² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.
³ When works under construction have been completed.

MINNESOTA

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



MINNESOTA

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

Summary and condition of land in enterprises.—Approximately 58 per cent of the land in drainage enterprises in Minnesota drains into the Red River or the Lake of the Woods, and thence into Lake Winnipeg and Hudson Bay. These enterprises cover the large flat areas in the Red River Valley and in the northern portion of the State. Four counties—Roseau, Lake of the Woods, Koochiching, and Beltrami—contain two-thirds of all the land in enterprises in Minnesota which was reported as unfit to raise any crop for lack of drainage. The investment in some enterprises in these counties evidently was not sufficient to provide adequate drainage for much of the lands.

Of the remaining 42 per cent of all land in enterprises, all but a very small portion tributary to Lake Superior lies in the basin of the Mississippi River. The enterprises of this remaining portion are much smaller and more scattered than those of the northwestern section of the State.

Approximately 700,000 acres, or about 6 per cent, of all land in enterprises, was reported as "high" or "ridge land," indirectly benefited, but was not assessed because natural drainage was sufficient. These lands are liable as security for the bonds or other obligations of the enterprise and contribute their proportion of the assessments for maintenance. Nearly all of this

"high land" is located in the basin of the Minnesota River in the southwestern part of the State and particularly in Murray, Redwood, and Martin Counties.

In Hennepin County approximately 6,000 acres were reported as not assessed on account of being "accretions" from shallow lakes drained by the abutting property owners. Meandered lakes belong to the State, but when these lakes become so shallow and swampy that they are no longer considered valuable for public purposes they may be drained by the abutting owners. The costs are assessed to the riparian lands in proportion to the "accretions" added to each tract. After drainage the owners of the riparian property may secure title to these reclaimed State lands.

Approximately 64 per cent of all land in enterprises was reported as improved; 18 per cent was unfit to raise any crop for lack of drainage; and 33 per cent was idle in 1929. The average cost of drainage was \$5.59 per acre.

The total precipitation for 1929 varied from 10.6 to 33 inches and averaged 20.6 inches, or 4.2 inches below normal. The precipitation for May, June, July, and August was below normal.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number.....	185,255	178,478	6,777	3.8
Farms reporting drainage.....number.....	35,383	53,011	-17,628	-33.3
All land in farms.....acres.....	30,913,367	30,221,758	691,609	2.3
Farm land provided with drainage.....acres.....	2,495,059	2,993,034	-497,975	-16.6
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres.....	51,740,120	51,740,120		
Land in drainage enterprises.....acres.....	11,474,683	9,232,709	2,241,974	24.3
Improved land.....acres.....	7,306,575	3,818,490	3,488,085	98.7
Unimproved land:				
Woodland.....acres.....	2,046,799	1,370,023	676,776	49.4
Other.....acres.....	2,031,309	4,044,196	-2,012,887	-49.8
Land unfit to raise any crop for lack of drainage.....acres.....	2,037,481	² 1,193,136	844,345	70.8
Land drained, fit to raise normal crop.....acres.....	7,322,252	(3)		
Land partly drained, fit for partial crop.....acres.....	2,114,950	471,094	1,643,856	348.9
Land in occupied farms.....acres.....	8,782,323	(3)		
Land in planted crops.....acres.....	5,916,067	(3)		
Land idle.....acres.....	3,747,812	(3)		
Ditches, completed.....miles.....	14,477.6	14,657.0	-179.4	-1.2
Tile drains, completed.....miles.....	9,451.3	5,924.6	3,526.7	59.5
Capital invested in enterprises.....dollars.....	64,139,641	42,017,447	22,122,194	82.7
Average, per acre.....dollars.....	5.59	4.55	1.04	22.9

¹ A minus sign (-) denotes decrease.
² "Swampy or subject to overflow."

(3) Not called for on schedule.
 (4) "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 2,885 drainage enterprises are shown for Minnesota with an average area of 5,089 acres. There are 677 such enterprises of 5,000 acres or more, 1,722 of between 500 and 5,000 acres, and 486 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 3,206,822 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	14,081,506	100.0	9,074,662	100.0	11,474,683
Less than 100 acres.....	3,423	(2)	36,177	0.4	3,374
100 to 199 acres.....	14,236	0.1	101,761	1.0	14,043
200 to 499 acres.....	116,324	0.8	307,812	3.1	112,053
500 to 999 acres.....	356,306	2.4	1,385,737	13.9	343,443
1,000 to 4,999 acres.....	2,828,230	10.3	1,260,804	12.5	2,537,502
5,000 to 9,999 acres.....	2,388,231	10.3	4,630,974	46.4	1,760,800
10,000 to 49,999 acres.....	5,908,444	40.7	944,845	0.5	4,470,501
50,000 to 99,999 acres.....	1,838,978	12.5	1,220,502	12.3	1,275,578
100,000 acres and over.....	1,167,243	7.9			947,699

¹ The sum of the areas of individual enterprises, including overlap.
² Less than one-tenth of 1 per cent.

Character of enterprise.—Organized enterprises having executives exclusively their own, according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects*, *county drains*, or *township drains*, according to the public officials in control.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	11,474,683	100.0	64,139,041	100.0
Drainage districts.....	14,000	0.1	125,296	0.2
County drains.....	10,849,450	94.6	62,060,365	97.7
Township drains.....	3,290	(1)	4,000	(1)
State projects.....	600,173	5.3	1,339,180	2.1
Individually owned projects.....	1,800	(1)	4,800	(1)

¹ Less than one-tenth of 1 per cent.

Type of drainage.—There were 2,884 enterprises, covering 11,466,921 acres of land and with an invested capital of \$64,044,346, which reported their works as completed; while 1 enterprise, covering 7,762 acres of land and with an invested capital of \$95,295, estimated that \$10,000 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 14,478 miles of ditches, 9,451 miles of tile drains, and 150 miles of levees. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. There were 2 pumping plants reported.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	11,474,683	100.0	64,139,041	100.0
Gravity drainage only.....	11,472,587	99.9	64,018,716	99.8
Ditches and levees.....	9,163,707	79.8	28,694,853	44.7
Tile drains.....	734,022	6.4	9,302,231	14.6
Ditches, tile drains, and levees.....	1,574,858	13.7	26,901,632	40.5
Drainage, part gravity and part by pumping.....	2,096	(1)	120,925	0.2

¹ Less than one-tenth of 1 per cent.

Pumping plants.—Only 2 pumping plants were reported in Minnesota. The total horsepower of these plants was 75; the total capacity of the 5 centrifugal pumps was 12,700 gallons per minute; and the area served was 815 acres.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER, 1930

KIND OF POWER	Enterprises	Motor capacity		Pump capacity	Land served
		H. p.	Per cent		
All enterprises, ¹ electric only.....	2	75	100.0	12,700	815

¹ No pumping plants reported in 1920.

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Motor capacity	Land served
		G. p. m.	Per cent		
All enterprises, centrifugal only....	5	12,700	100.0	75	815

Arrears and delinquency.—There were 87 enterprises, with approximately 9 per cent of the invested capital and covering about 16 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 2,798 enterprises reported no arrearage. Reports of 429 enterprises, covering 4,781,701 acres, show a total of 2,780,336 acres delinquent in drainage taxes; 2,360 enterprises, covering 5,854,212 acres, reported no delinquency; while 96 enterprises failed to report.

On account of the overlapping of enterprises, the area delinquent contains some land that has been reported delinquent in 2 drainage projects, but the data available do not permit of an accurate determination of the acreage that has been twice reported. From a study of the reports, it is believed that this duplication would total from 2 to 4 per cent of the area shown delinquent.

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	11,474,683	100.0	64,139,641	100.0	2,780,336
Enterprises in arrears.....	1,857,637	10.2	5,494,118	8.6	1,449,864
With some delinquent land.....	1,822,527	15.9	5,258,624	8.2	1,440,864
With no delinquent land.....	9,823	0.1	39,389	0.1	-----
With no report on delinquency.....	25,287	0.2	196,105	0.3	-----
Enterprises not in arrears.....	9,617,046	83.8	58,645,523	91.4	1,330,472
With some delinquent land.....	2,959,174	25.8	17,286,842	25.9	1,330,472
With no delinquent land.....	5,844,389	50.9	39,184,039	61.1	-----
With no report on delinquency.....	813,483	7.1	2,174,642	3.4	-----

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes. An enterprise, prior to drainage, may contain swamp land, improved land in farms, and land subject to overflow. The object in drainage may be to reclaim or benefit all such lands. However, the land is classified according to the principal purpose reported.

Most of the land in enterprises reporting the purpose of drainage as the reclamation of swamp land is located in the extreme northern portion of the State.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	11,474,683	100.0	64,139,641	100.0
Reclamation of swamp land not previously in farms.....	4,891,673	42.6	18,045,070	29.1
Improvement of land already in farms.....	6,207,228	54.1	44,103,629	68.8
Protection against overflow.....	375,882	3.3	1,390,933	2.1

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Acres	Overlapped acres	Dollars	Per cent
All enterprises.....	11,474,683	100.0	14,681,605	3,206,822	64,139,641	100.0
1880-1889.....	38,690	0.3	38,690	-----	32,425	(?)
1890-1899.....	468,662	4.1	484,519	15,857	386,052	0.6
1900-1904.....	823,483	7.2	1,016,823	193,340	1,470,836	2.3
1905-1909.....	2,420,005	21.1	2,767,463	347,458	6,501,049	10.1
1910-1914.....	3,624,266	31.6	4,210,372	586,106	12,989,989	20.3
1915-1919.....	3,290,051	28.7	4,493,214	1,203,163	27,044,315	42.2
1920-1924.....	721,220	6.3	1,461,180	739,910	14,678,162	22.9
1925-1929.....	88,297	0.7	200,285	111,088	1,036,813	1.6

¹ Includes overlap.

² Less than one-tenth of 1 per cent.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES				
	Total	Condition of land			Land available for settlement
		Improved land	Wood-land	Other unimproved land	
All enterprises.....	11,474,683	7,396,575	2,040,769	2,031,309	1,340,207
1880-1889.....	38,690	34,807	2,278	1,554	-----
1890-1899.....	468,662	438,161	9,622	20,379	3,000
1900-1904.....	823,483	649,140	82,222	112,121	31,404
1905-1909.....	2,420,005	1,830,747	288,858	291,400	244,047
1910-1914.....	3,624,266	1,706,633	950,054	967,579	614,959
1915-1919.....	3,290,051	2,070,430	671,802	547,759	387,259
1920-1924.....	721,220	587,940	54,808	78,382	59,938
1925-1929.....	88,297	60,657	7,005	11,635	4,066

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 1,009 enterprises, covering 2,559,768 acres of land and having an invested capital of \$31,050,222; while 1,876 enterprises, with an invested capital of \$33,089,419 and covering 8,914,915 acres of land, did not have systematic maintenance.

There were 51 enterprises, with an invested capital of \$1,244,573 and covering 296,860 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 2,834 enterprises, with an invested capital of \$62,895,068 and covering 11,177,823 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	11,474,683	100.0	64,139,641	100.0
By district forces.....	1,986,220	17.3	24,005,937	37.0
By contract.....	3,462,007	30.2	12,130,631	18.0
By work apportioned to landowners.....	1,641,153	14.3	6,634,655	10.3
Other, none, and not reported.....	4,386,298	38.2	21,270,188	33.2

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 16 per cent of the land reporting showed some cost, and 84 per cent showed no cost in 1929. The average cost for all enterprises was 2 cents per acre, while that for enterprises drained all or part by pumping was \$1.95 per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
All enterprises reporting.....	11,447,197	\$207,948	\$0.02
Gravity drainage only.....	11,445,101	208,870	0.02
Ditches and levees.....	9,143,917	24,172	(1)
Tile drains.....	784,022	28,868	0.04
Ditches, tile drains, and levees.....	1,567,162	151,330	0.10
Drainage, part gravity and part pumping.....	2,096	4,078	1.95

¹ Less than 1 cent.

DRAINAGE—MINNESOTA

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER

ITEM (See definitions in Introduction)		THE STATE	Aitkin	Anoka	Becker	Beltrami ¹	Benton	Big Stone
LAND AREA								
1	Approximate land area.....1930.....acres..	51,749,120	1,171,200	293,760	863,860	1,584,640	259,200	314,240
2	Land in enterprises.....1930.....acres..	11,474,683	435,231	123,483	18,901	645,416	8,471	31,999
3	.....1920.....acres..	9,232,709	419,680	88,801	17,235	1,211,754	7,979	10,111
4	Increase, ² 1920-1930.....per cent..	24.3	3.7	79.2	9.7	-46.7	6.2	216.5
5	Area of all enterprises (overlapping areas included).....1930.....acres..	14,681,505	544,251	137,233	18,901	832,409	8,471	34,479
6	Excess over land in enterprises (total areas overlapping).....acres..	3,206,822	109,020	13,750		186,993		2,480
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop.....1930.....acres..	2,037,481	137,547	12,340	1,065	385,470	125	2,107
8	Land unfit to raise any crop prior to drainage.....acres..	5,950,274	412,186	63,676	9,225	645,406	1,003	15,884
9	Decrease since drainage.....per cent..	65.8	66.6	80.6	78.7	40.3	87.5	80.1
10	Land fit to raise a normal crop.....1930.....acres..	7,322,252	61,444	90,078	12,061	146,465	8,240	26,290
11	Land fit to raise a normal crop prior to drainage.....acres..	3,398,725	3,567	40,542	1,905	7,771	4,855	11,046
12	Increase since drainage ².....per cent..	115.4		137.0	533.1		69.8	120.1
13	Land fit to raise a partial crop.....1930.....acres..	2,114,060	230,240	15,065	4,875	113,481	100	3,512
14	Land fit to raise a partial crop prior to drainage.....acres..	2,125,684	19,479	19,265	7,771	10	2,613	4,219
15	Decrease since drainage ².....per cent..	0.5		21.8	37.3		96.2	10.8
16	Improved land.....1930.....acres..	7,396,575	54,459	91,104	13,805	150,447	8,130	27,055
17	.....1920.....acres..	3,818,490	36,058	26,459	8,412	37,004	4,310	5,918
18	Increase, ² 1920-1930.....per cent..	93.7	51.0	244.3	64.1	300.1	88.6	357.2
19	Unimproved land—							
20	Woodland.....1930.....acres..	2,040,709	290,254	14,947	2,205	404,959	205	306
20	Other.....1930.....acres..	2,031,309	81,518	17,432	2,891	10	70	4,038
21	Land in occupied farms.....1930.....acres..	8,782,323	52,085	123,457	15,907	146,107	8,471	31,009
22	Land in planted crops.....1930.....acres..	5,910,067	21,729	70,588	9,677	107,750	7,094	25,553
23	Woodland cleared and cultivated since drainage.....1930.....acres..	952,428	13,702	4,910	1,850	148,395	130	
24	Land idle.....1930.....acres..	3,747,812	356,701	44,570	4,909	398,329	341	4,119
25	Land available for settlement.....1930.....acres..	1,346,207	249,020		1,600	147,000		
DRAINAGE WORKS, 1930								
26	Ditches—							
26	Completed.....miles..	14,477.6	427.9	288.4	78.9	800.2	57.1	42.1
27	Tile drains—							
27	Completed.....miles..	9,451.3		10.9				42.5
28	Additional under construction.....miles..	0.5						
29	Levees and dikes—							
29	Completed.....miles..	149.7						
30	Additional under construction.....miles..	0.5						
31	Pumping plants—							
31	Motor capacity.....horsepower..	75						
32	Pump capacity.....gals. per min..	12,700						
33	Land served by pumps.....acres..	815						
34	Land drained by ditches only.....acres..	8,953,007	435,231	115,043	18,901	645,416	8,471	20,858
35	Length of ditches.....miles..	12,509.8	427.9	268.6	78.9	800.2	57.1	34.7
36	Land drained by tile only.....acres..	734,022		1,040				4,041
37	Length of tile.....miles..	3,320.1		2.0				20.3
38	Land drained by ditches and tile.....acres..	1,560,449		6,800				7,100
39	Length of ditches.....miles..	1,776.3		19.8				7.4
40	Length of tile.....miles..	6,047.7		8.9				10.2
41	Land having ditches and levees.....acres..	210,700						
42	Length of ditches.....miles..	100.6						
43	Length of levees.....miles..	149.5						
44	Land having ditches, tile drains, and levees ⁴.....acres..	8,409						
45	Length of ditches.....miles..	0.9						
46	Length of tile.....miles..	61.0						
47	Length of levees.....miles..	0.7						
48	Land drained by pumps and other drainage works ⁵.....acres..	2,096						
49	Length of tile.....miles..	23.0						
50	Land protected by levees of an outside agency.....acres..	47,926	47,498					
CAPITAL INVESTED AND COST PER ACRE								
51	Capital invested in enterprises to Jan. 1, 1930.....dollars..	64,139,641	1,223,274	320,398	209,099	1,806,123	66,507	210,688
52	.....1920.....dollars..	42,017,447	966,046	315,585	162,025	2,904,371	63,127	204,470
53	Increase, ² 1920-1930.....per cent..	52.7	26.6	1.5	29.4	-36.7	5.4	3.0
54	Estimated cost of enterprises when completed.....1930.....dollars..	64,149,641	1,223,274	320,398	209,099	1,806,123	66,507	210,688
55	.....1920.....dollars..	44,183,838	966,046	315,585	162,025	3,106,371	64,753	204,470
56	Average, per acre when completed.....1930.....dollars..	5.59	2.81	2.59	11.09	2.94	7.85	6.58
57	.....1920.....dollars..	4.79	2.30	4.58	9.40	2.56	8.12	20.22
58	Invested in and required for completion of—							
58	Enterprises having ditches only.....1930.....dollars..	28,143,814	1,223,274	260,135	209,600	1,806,123	66,507	96,645
59	Average, per acre.....dollars..	3.14	2.81	2.25	11.09	2.94	7.85	4.63
60	Enterprises having tile drains only.....1930.....dollars..	9,302,231		8,830				43,743
61	Average, per acre.....dollars..	12.75		8.50				10.82
62	Enterprises having ditches and tile drains.....1930.....dollars..	25,837,737		51,427				70,300
63	Average, per acre.....dollars..	16.49		7.56				9.00
64	Enterprises having ditches and levees.....1930.....dollars..	551,030						
65	Average, per acre.....dollars..	2.62						
66	Enterprises having ditches, tile drains, and levees.....1930.....dollars..	133,895						
67	Average, per acre.....dollars..	15.92						
68	Enterprises having pumps and other drainage works.....1930.....dollars..	120,925						
69	Average, per acre.....dollars..	57.69						

¹ Part taken to form Lake of the Woods in 1922.

² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000 or when less than one-tenth of 1 per cent.

³ Office estimate; the reported figures exceeded the improved acreage in all farms in the county as determined by the census of agriculture.

⁴ When works under construction have been completed.

⁵ Area of enterprises having some land served by pumps.

DRAINAGE—MINNESOTA

ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

Blue Earth	Brown	Carlton	Carver	Cass	Chippewa	Chisago	Clay	Clearwater	Cottonwood	Crow Wing	Dodge	Douglas	Faribault	Freeborn	Grant	
487,080	391,080	554,880	240,640	1,346,560	378,240	273,280	667,520	652,160	409,600	678,480	281,600	414,720	400,160	470,400	353,920	1
70,318 54,548 45.4	91,203 27,538 231.2	78,282 42,500 84.2	6,285 6,282	81,530 71,871 13.4	66,749 50,782 31.4	45,168 17,368 160.1	309,390 370,076 -18.0	78,720	45,554 33,524 35.9	41,615 24,402 70.5	14,421 13,002 3.7	24,605 30,677 -19.8	252,519 118,085 112.8	123,815 19,084 548.8	62,415 60,366 3.4	2
81,568 2,190	91,203	78,282	6,285	81,530	67,829 1,080	45,168	617,933 308,537	81,920 3,200	40,504 1,040	41,615	14,421	24,605	264,890 12,371	127,507 3,692	67,363 4,078	5 6
75,683 100.0	33,570 100.0	51,400 60,000 12.9	105 1,845 80.4	13,154 46,430 71.7	1,428 7,672 81.4	5,801 19,945 70.0	2,100 18,559 88.7	5,300 19,420 72.7	420 13,080 90.7	3,550 18,700 81.0	600 1,410 57.4	520 18,980 97.3	875 24,174 90.4	12,080 60,455 80.0	400 28,111 98.6	7 8 9
70,318 1,808	91,203 57,933 58.2	26,882 19,282 30.4	5,535 3,085 70.4	24,162 9,943 143.0	54,842 29,291 87.2	30,921 14,505 113.2	304,351 200,837 4.0	56,000 40,800 30.5	42,727 39,074 42.1	29,644 11,907 147.7	13,501 12,811 5.4	22,179 95	261,244 208,790 20.3	111,517 63,300 70.0	60,726 26,441 129.7	10 11 12
1,787 100.0			555 1,355 59.0	44,214 25,148 +75.8	10,479 29,786 04.8	8,443 10,718 21.2	2,945	16,520 18,560 10.7	2,398 2,400 0.1	8,421 10,948 23.1	320 200 -60.0	1,906 5,530 95.6	400 19,555 98.0	218	1,289 7,893 83.6	13 14 15
70,318 49,638 59.8	91,065 15,310 494.8	12,438 6,320 90.6	5,258 3,140 67.6	18,068 14,137 32.1	66,719 30,329 69.6	31,768 8,782 261.7	305,901 248,830 22.9	36,400	44,825 26,121 71.0	17,374 12,551 38.4	13,941 7,028 98.4	21,754 16,752 20.9	252,219 101,504 148.5	123,815 11,403 985.8	61,932 60,305 2.6	16 17 18
	138	32,000 33,844	133 894	46,129 15,733	30	8,540 4,800	3,405	10,300 32,020	720	20,424 3,817	480	1,350 1,501	300		100 383	19 20
70,318 73,352	91,203 56,273	17,409 9,400	6,285 5,258	81,530 17,441	66,749 54,175	45,168 23,935	309,390 257,447	63,440 32,040	45,554 39,791	26,050 15,500	14,101 11,179	24,605 21,455	252,519 229,280	123,815 103,740	62,415 60,595	21 22
		6,800 54,400	332 147	28,660 40,233	6,744	4,401 16,380	600	8,300 33,300	1,007	6,350 16,121	320	1,375 302	320 40	660	1,117	23 24
		9,000						14,400		11,769						25
79.2	123.5	103.0	47.5	157.9	201.0	84.0	225.1	72.7	23.7	98.2	34.2	130.6	186.9	145.5	70.0	26
278.4	246.0		2.0		165.2				414.5		10.0	24.8	710.5	101.5	33.8	27 28
																29 30
																31 32 33
11,826 56.1 39,582 197.9	37,449 106.2 35,050 194.5	78,282 103.0	4,695 30.3	81,530 157.9	24,794 110.0 0,705 84.2	45,168 84.0	309,390 225.1	78,720 72.7	2,048 0.5 18,126 180.4	41,615 98.2	1,310 2.2	20,216 117.8 814 8.6	15,180 51.7 67,230 233.5	30,071 73.5 2,594 7.8	50,775 60.5 4,700 21.3	34 35 36 37
27,910 23.1 80.5	18,695 17.3 51.5		1,600 11.2 2.0		32,250 85.0 81.0				25,380 17.2 225.1		13,111 32.0 10.0	3,575 12.8 10.2	170,100 135.2 480.0	81,200 72.0 180.3	6,880 3.5 12.5	38 39 40
																41 42 43
																44 45 46 47
																48 49
														1,010 3.4		50
1,576,553 953,798 65.3	900,609 660,195 00.8	401,280 135,012 197.2	122,055 117,579 3.8	300,238 208,600 11.7	956,748 1,036,955 -7.7	143,408 94,992 51.0	1,055,379 712,787 48.1	150,571	1,304,740 844,801 54.4	93,113 93,973 -0.9	84,220 55,900 50.5	354,103 107,536 79.3	2,580,791 2,101,016 17.8	1,733,104 205,283 553.3	383,152 584,823 -84.5	51 52 53
1,576,553 964,858 10.88 17.69	900,609 992,574 9.87 25.15	401,280 135,012 5.13 3.18	122,055 136,079 10.42 21.66	300,238 268,600 3.68 3.74	956,748 1,036,955 14.33 20.42	143,408 94,992 3.17 5.47	1,055,379 712,787 3.41 1.88	150,571 1.99	1,304,740 952,231 28.64 23.40	93,113 93,973 3.24 3.85	84,220 55,900 5.84 4.03	354,103 107,536 14.39 6.44	2,580,791 2,101,016 10.22 10.52	1,733,104 313,283 14.00 10.42	383,152 584,823 0.14 0.69	54 55 56 57
74,966 6.34 807,176 20.39 994,411 24.88	150,416 4.26 605,139 14.41 236,054 12.63	401,280 5.13	88,681 18.89	300,238 3.08	175,151 7.06 180,350 18.58 601,247 18.64	143,408 3.17	1,055,379 3.41	150,571 1.99	32,005 15.07 452,253 21.95 820,392 32.32	93,113 2.24	11,760 8.98	196,187 9.70 49,785 67.45 111,131 31.00	112,453 7.41 600,268 8.93 1,868,040 10.98	170,533 4.36 23,233 11.14 1,499,434 18.47	168,226 3.31 79,309 10.06 135,617 19.71	58 59 60 61 62 63 64
																65 66 67 68 69

DRAINAGE—MINNESOTA

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE

ITEM (See definitions in Introduction)		Hennepin	Houston	Hubbard	Isanti	Itasca	Jackson	Kanabec	Kandi- yohi
LAND AREA									
1	Approximate land area.....1930.....acres..	361,600	364,800	613,120	282,880	1,747,200	440,280	341,700	512,040
2	Land in enterprises.....1930.....acres..	20,614	11,046	21,956	29,127	110,000	251,866	14,717	66,608
3	.....1920.....acres..	13,375	(?)	14,302	19,168	99,527	65,147	16,539	66,279
4	Increase, 1920-1930.....per cent..	54.1		53.5	52.0	10.5	280.6	-11.0	0.5
5	Area of all enterprises (overlapping areas included).....1930.....acres..	21,096	11,046	21,956	29,127	110,000	288,429	14,717	69,240
6	Excess over land in enterprises (total areas overlapping).....acres..	482					36,563		2,632
CONDITION AND USE OF LAND									
7	Land unfit to raise any crop.....1930.....acres..	1,645	1,261	2,658	4,869	61,400	50	1,685	2,467
8	Land unfit to raise any crop prior to drainage.....acres..	10,247	3,000	17,628	10,620	107,900	35,293	5,717	36,724
9	Decrease since drainage.....per cent..	83.9	58.0	84.9	54.2	43.1	99.9	70.5	93.3
10	Land fit to raise a normal crop.....1930.....acres..	14,494	6,000	18,399	15,617	30,200	250,773	9,738	52,775
11	Land fit to raise a normal crop prior to drainage.....acres..	6,463	4,261	3,828	10,326	60	214,120	5,730	78
12	Increase since drainage 1.....per cent..	124.6	40.8	380.6	44.3		17.1	69.9	
13	Land fit to raise a partial crop.....1930.....acres..	4,475	3,785	899	8,841	18,400	1,043	3,294	11,860
14	Land fit to raise a partial crop prior to drainage.....acres..	3,914	3,785	500	7,681	2,040	2,447	3,270	20,806
15	Decrease since drainage 2.....per cent..	-14.3		-179.8	+12.5	-802.0	67.4	-0.7	61.9
16	Improved land.....1930.....acres..	17,799	3,506	16,141	16,172	11,780	251,470	9,343	65,408
17	.....1920.....acres..	8,030	(?)	3,305	9,616		66,193	8,303	60,023
18	Increase, 1920-1930.....per cent..	121.7		388.4	68.2		347.5	12.5	9.0
Unimproved land—									
19	Woodland.....1930.....acres..	474	7,540	4,512	6,717	47,820		3,032	
20	Other.....1930.....acres..	2,341		1,303	6,238	50,400	390	2,342	1,209
21	Land in occupied farms.....1930.....acres..	20,264	11,046	21,368	29,127	10,780	251,866	14,717	66,608
22	Land in planted crops.....1930.....acres..	15,381	3,500	10,708	13,293	8,082	220,798	3,462	40,105
23	Woodland cleared and cultivated since drainage.....1930.....acres..		200	2,700	5,927	9,020		1,440	
24	Land idle.....1930.....acres..	1,847		2,526	8,055	96,900	40	3,771	13,410
25	Land available for settlement.....1930.....acres..					37,820			
DRAINAGE WORKS, 1930									
26	Ditches—								
26	Completed.....miles..	67.4	20.0	39.7	153.8	104.5	71.0	80.5	395.7
27	Tile drains—								
27	Completed.....miles..	71.8			2.2		769.6	2.1	105.0
28	Additional under construction.....miles..								
Levees and dikes—									
29	Completed.....miles..								
30	Additional under construction.....miles..								
Pumping plants—									
31	Motor capacity.....horsepower..	50							
32	Pump capacity.....gals. per min..	10,000							
33	Land served by pumps.....acres..	490							
34	Land drained by ditches only.....acres..	17,202	11,046	21,956	27,851	110,000		13,817	49,061
35	Length of ditches.....miles..	63.8	20.0	39.7	146.4	104.5		76.0	321.5
36	Land drained by tile only.....acres..	646					93,133		3,097
37	Length of tile.....miles..	20.0					271.6		45.2
38	Land drained by ditches and tile.....acres..	1,680			1,276		158,733	900	13,580
39	Length of ditches.....miles..	3.6			7.4		71.9	4.5	74.2
40	Length of tile.....miles..	23.2			2.2		498.0	2.1	59.8
41	Land having ditches and levees.....acres..								
42	Length of ditches.....miles..								
43	Length of levees.....miles..								
44	Land having ditches, tile drains, and levees.....acres..								
45	Length of ditches.....miles..								
46	Length of tile.....miles..								
47	Length of levees.....miles..								
48	Land drained by pumps and other drainage works 3.....acres..	1,086							
49	Length of tile.....miles..	10.6							
50	Land protected by levees of an outside agency.....acres..								
CAPITAL INVESTED AND COST PER ACRE									
51	Capital invested in enterprises to Jan. 1, 1930.....dollars..	480,086	234,144	53,235	365,462	314,200	2,268,563	125,782	960,673
52	.....1920.....dollars..	227,277	(?)	30,837	194,885	241,490	1,555,157	105,760	632,583
53	Increase, 1920-1930.....per cent..	111.2		72.4	87.5	30.1	45.2	18.9	51.9
54	Estimated cost of enterprises when completed.....1930.....dollars..	480,086	234,144	53,235	365,462	314,200	2,268,563	125,782	960,673
55	.....1920.....dollars..	237,777	(?)	30,837	194,885	241,490	1,555,157	105,760	632,583
56	Average, per acre when completed.....1930.....dollars..	23.29	21.20	2.42	12.55	2.86	8.97	8.55	14.42
57	.....1920.....dollars..	17.78	(?)	2.16	10.17	2.43	24.94	6.39	10.38
Invested in and required for completion of—									
58	Enterprises having ditches only.....1930.....dollars..	228,311	234,144	53,235	345,647	314,200		104,325	376,099
59	Average, per acre.....dollars..	13.27	21.20	2.42	12.41	2.86		7.55	7.63
60	Enterprises having tile drains only.....1930.....dollars..	38,727					765,372		135,682
61	Average, per acre.....dollars..	69.95					8.22		44.24
62	Enterprises having ditches and tile drains.....1930.....dollars..	127,027			19,815		1,493,191	21,457	448,592
63	Average, per acre.....dollars..	75.61			15.53		9.41	23.84	33.00
64	Enterprises having ditches and levees.....1930.....dollars..								
65	Average, per acre.....dollars..								
66	Enterprises having ditches, tile drains, and levees.....1930.....dollars..								
67	Average, per acre.....dollars..								
68	Enterprises having pumps and other drainage works.....1930.....dollars..	86,021							
69	Average, per acre.....dollars..	79.21							

1 Organized from part of Beltrami in 1922.

2 Included in "Other counties."

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

4 Office estimate; the reported figures exceeded the improved acreage in all farms in the county as determined by the census of agriculture.

5 Area of enterprises having some land served by pumps.

DRAINAGE—MINNESOTA

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE,

ITEM (See definitions in Introduction)		Murray	Nicollet	Nobles	Norman	Otter Tail	Penning- ton	Pine	Pipe- stone
LAND AREA									
1	Approximate land area.....1930.....acres..	450,560	283,520	462,080	550,400	1,304,900	388,480	904,320	300,100
2	Land in enterprises.....1930.....acres..	202,020	80,065	104,098	346,080	53,157	322,483	37,428	21,801
3	.....1920.....acres..	44,984	28,066	16,734	280,024	50,555	340,024	10,237	14,834
4	Increase, ² 1920-1930.....per cent..	349.1	210.7	622.1	23.8	5.1	-7.8	130.7	47.0
5	Area of all enterprises (overlapping areas included).....1930.....acres..	220,073	80,815	104,098	531,062	54,277	552,526	37,428	21,801
6	Excess over land in enterprises (total areas overlapping).....acres..	18,063	750		184,382	1,120	230,043		
CONDITION AND USE OF LAND									
7	Land unfit to raise any crop.....1930.....acres..	7,778	3,353	5,115	38,630	5,030	13,028	6,460	
8	Land unfit to raise any crop prior to drainage.....acres..	50,462	27,367	42,010	120,915	39,849	100,135	21,825	
9	Decrease since drainage.....per cent..	84.6	87.7	87.8	68.0	87.4	87.2	70.4	
10	Land fit to raise a normal crop.....1930.....acres..	181,860	72,080	90,608	233,320	33,938	100,274	11,230	21,801
11	Land fit to raise a normal crop prior to drainage.....acres..	128,274	35,583	48,372	140,337	1,479	71,065	4,105	
12	Increase since drainage ¹.....per cent..	41.8	102.0	87.3	50.4		123.0	160.0	
13	Land fit to raise a partial crop.....1930.....acres..	12,382	13,032	8,375	74,715	14,180	148,281	10,738	
14	Land fit to raise a partial crop prior to drainage.....acres..	23,284	20,115	13,710	79,428	11,829	141,683	11,438	21,801
15	Decrease since drainage ².....per cent..	46.8	47.8	38.9	5.9	+20.0	+4.7	+72.6	100.0
16	Improved land.....1930.....acres..	166,970	80,057	92,533	245,931	36,524	172,432	6,070	21,801
17	.....1920.....acres..	35,225	16,053	12,069	160,386	25,384	180,310	8,630	14,002
18	Increase, ² 1920-1930.....per cent..	374.0	436.1	666.7	47.8	43.0	-7.5	-20.7	54.7
19	Unimproved land—								
20	Woodland.....1930.....acres..	140	1,117				57,755	21,700	
21	Other.....1930.....acres..	34,901	1,801	11,565	100,740	10,633	92,296	0,568	
22	Land in occupied farms.....1930.....acres..	201,836	88,565	100,508	344,030	40,393	222,840	37,428	21,801
23	Land in planted crops.....1930.....acres..	164,481	67,348	80,801	180,270	32,480	103,060	5,485	10,000
24	Woodland cleared and cultivated since drainage.....1930.....acres..		1,050			207	36,340	905	
25	Land idle.....1930.....acres..	11,566	247		106,367	15,786	110,550	30,148	
26	Land available for settlement.....1930.....acres..					1,122	63,010		
DRAINAGE WORKS, 1930									
26	Ditches—								
27	Completed.....miles..	77.6	108.4	50.8	270.7	253.4	283.1	50.0	13.0
28	Tile drains—								
29	Completed.....miles..	777.0	55.1	294.1		30.9			113.0
30	Additional under construction.....miles..								
31	Levees and dikes—								
32	Completed.....miles..						140.5		
33	Additional under construction.....miles..								
34	Pumping plants—								
35	Motor capacity.....horsepower..								
36	Pump capacity.....gals. per min..								
37	Land served by pumps.....acres..								
38	Land drained by ditches only.....acres..	30,066	70,321	7,640	346,680	50,635	111,783	37,428	
39	Length of ditches.....miles..	51.3	104.4	19.8	270.7	244.5	92.5	50.0	
40	Land drained by tile only.....acres..	90,404	11,249	32,577		945			
41	Length of tile.....miles..	403.6	27.0	95.7		22.3			
42	Land drained by ditches and tile.....acres..	81,550	7,495	63,881		1,677			21,801
43	Length of ditches.....miles..	26.3	4.0	37.0		8.0			13.0
44	Length of tile.....miles..	374.0	28.1	108.4					113.0
45	Land having ditches and levees.....acres..						210,700		
46	Length of ditches.....miles..						190.0		
47	Length of levees.....miles..						149.5		
48	Land having ditches, tile drains, and levees.....acres..								
49	Length of ditches.....miles..								
50	Length of tile.....miles..								
51	Land drained by pumps and other drainage works.....acres..								
52	Length of tile.....miles..								
53	Land protected by levees of an outside agency.....acres..	428							
CAPITAL INVESTED AND COST PER ACRE									
54	Capital invested in enterprises to Jan. 1, 1930.....dollars..	2,284,010	410,538	1,585,461	885,417	392,427	852,411	125,236	251,000
55	.....1920.....dollars..	1,343,220	332,762	510,331	670,666	316,154	603,019	89,274	219,175
56	Increase, ² 1920-1930.....per cent..	70.0	23.4	210.7	32.0	24.1	41.4	40.3	14.5
57	Estimated cost of enterprises when completed.....1930.....dollars..	2,284,010	410,538	1,585,461	885,417	392,427	852,411	125,236	251,000
58	.....1920.....dollars..	1,448,271	342,445	545,060	670,666	316,154	603,019	80,274	260,175
59	Average, per acre when completed.....1930.....dollars..	11.31	4.61	15.23	2.55	7.38	2.64	3.35	11.51
60	.....1920.....dollars..	32.20	11.05	32.01	2.40	6.25	1.72	5.50	18.15
61	Invested in and required for completion of—								
62	Enterprises having ditches only.....1930.....dollars..	127,127	186,661	45,000	885,417	304,962	301,372	125,236	
63	Average, per acre.....dollars..	4.23	2.65	5.89	2.55	6.02	2.70	3.35	
64	Enterprises having tile drains only.....1930.....dollars..	1,020,210	121,422	331,190		51,473			
65	Average, per acre.....dollars..	11.29	10.79	10.17		54.47			
66	Enterprises having ditches and tile drains.....1930.....dollars..	1,136,073	102,455	1,209,271		35,992			251,000
67	Average, per acre.....dollars..	13.04	13.67	18.93		22.82			11.51
68	Enterprises having ditches and levees.....1930.....dollars..						551,039		
69	Average, per acre.....dollars..						2.62		
70	Enterprises having ditches, tile drains, and levees.....1930.....dollars..								
71	Average, per acre.....dollars..								
72	Enterprises having pumps and other drainage works.....1930.....dollars..								
73	Average, per acre.....dollars..								

¹ Included in "Other counties."

² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.

³ Office estimate; the reported figures exceeded the improved acreage in all farms in the county as determined by the census of agriculture.

DRAINAGE—MINNESOTA

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Swift	Todd	Traverse	Wadena	Wasoca	Washington
LAND AREA							
1	Approximate land area.....1930.....acres	474,240	612,480	363,520	344,320	275,840	254,080
2	Land in enterprises.....1930.....acres	83,350	97,050	152,602	90,270	32,959	10,284
3	.....1920.....acres	65,840	46,785	171,595	51,937	10,076	8,804
4	Increase, ¹ 1920-1930.....per cent	26.6	107.4	-11.1	73.8	227.1	16.8
5	Area of all enterprises (overlapping areas included).....1930.....acres	84,150	103,684	177,818	90,270	33,943	10,284
6	Excess over land in enterprises (total areas overlapping).....acres	800	6,634	25,216		984	
CONDITION AND USE OF LAND							
7	Land unfit to raise any crop.....1930.....acres		14,930		8,707	4,481	1,464
8	Land unfit to raise any crop prior to drainage.....acres	23,146	54,650	120	52,474	16,077	2,107
9	Decrease since drainage.....per cent	100.0	72.7	100.0	83.4	72.1	32.4
10	Land fit to raise a normal crop.....1930.....acres	83,350	61,063	152,602	66,030	25,242	5,547
11	Land fit to raise a normal crop prior to drainage.....acres	8,700	25,115	4,376	22,090	11,051	1,075
12	Increase since drainage ¹.....per cent	858.1	143.1		198.8	128.4	231.2
13	Land fit to raise a partial crop.....1930.....acres		21,057		15,536	3,230	3,273
14	Land fit to raise a partial crop prior to drainage.....acres	48,513	17,285	143,106	15,700	5,831	6,442
15	Decrease since drainage ¹.....per cent	100.0	+21.8	100.0	1.1	44.5	49.2
16	Improved land.....1930.....acres	83,350	67,465	152,602	50,931	23,163	5,440
17	.....1920.....acres	60,429	18,394	150,906	17,109	6,007	4,557
18	Increase, ¹ 1920-1930.....per cent	36.8	266.8	-2.7	232.8	336.5	10.4
19	Unimproved land—						
20	Woodland.....1930.....acres		24,613		23,077	1,108	1,440
20	Other.....1930.....acres		4,072		10,271	6,688	3,204
21	Land in occupied farms.....1930.....acres	83,350	95,004	152,602	70,901	32,950	9,280
22	Land in planted crops.....1930.....acres	78,600	47,680	113,620	54,115	25,005	4,505
23	Woodland cleared and cultivated since drainage.....1930.....acres		21,530		4,453		904
24	Land idle.....1930.....acres	600	47,807	38,952	21,154	1,074	1,655
25	Land available for settlement.....1930.....acres		453		0,940		
DRAINAGE WORKS, 1930							
26	Ditches—						
26	Completed.....miles	224.5	356.8	100.7	225.1	67.7	27.1
27	Tile drains—						
27	Completed.....miles	367.0		1.5	0.1	23.7	14.3
28	Additional under construction.....miles						
29	Levees and dikes—						
29	Completed.....miles						
30	Additional under construction.....miles						
31	Pumping plants—						
31	Motor capacity.....horsepower						
32	Pump capacity.....gals. per min.						
33	Land served by pumps.....acres						
34	Land drained by ditches only.....acres	22,210	97,050	152,322	88,599	26,928	8,190
35	Length of ditches.....miles	69.0	356.8	100.7	218.8	55.0	25.1
36	Land drained by tile only.....acres	6,499		280		991	1,060
37	Length of tile.....miles	21.0		1.5		10.0	8.3
38	Land drained by ditches and tile.....acres	54,650			1,080	5,040	414
39	Length of ditches.....miles	155.5			0.3	12.7	2.0
40	Length of tile.....miles	346.0			0.1	13.7	6.0
41	Land having ditches and levees.....acres						
42	Length of ditches.....miles						
43	Length of levees.....miles						
44	Land having ditches, tile drains, and levees.....acres						
45	Length of ditches.....miles						
46	Length of tile.....miles						
47	Length of levees.....miles						
48	Land drained by pumps and other drainage works.....acres						
49	Length of tile.....miles						
50	Land protected by levees of an outside agency.....acres						
CAPITAL INVESTED AND COST PER ACRE							
51	Capital invested in enterprises to Jan. 1, 1930.....dollars	1,570,046	349,670	328,032	175,200	331,184	107,650
52	.....1920.....dollars	1,004,494	318,492	297,428	164,543	81,715	58,217
53	Increase, 1920-1930.....per cent	47.5	0.8	10.3	6.5	305.3	84.8
54	Estimated cost of enterprises when completed.....1930.....dollars	1,570,046	349,670	328,032	175,200	331,184	107,650
55	.....1920.....dollars	1,004,494	318,492	297,428	164,543	81,715	58,217
56	Average, per acre when completed.....1930.....dollars	18.83	3.60	2.15	1.94	10.05	10.40
57	.....1920.....dollars	16.17	6.81	1.73	3.17	8.11	6.01
58	Invested in and required for completion of—						
58	Enterprises having ditches only.....1930.....dollars	66,888	340,670	326,860	172,902	123,953	45,405
59	Average, per acre.....dollars	3.01	3.60	2.15	1.95	4.60	5.54
60	Enterprises having tile drains only.....1930.....dollars	61,887		1,172		51,048	45,427
61	Average, per acre.....dollars	9.52		4.19		51.51	27.04
62	Enterprises having ditches and tile drains.....1930.....dollars	1,441,271			2,394	156,183	10,727
63	Average, per acre.....dollars	26.37			1.43	30.90	40.40
64	Enterprises having ditches and levees.....1930.....dollars						
65	Average, per acre.....dollars						
66	Enterprises having ditches, tile drains, and levees.....1930.....dollars						
67	Average, per acre.....dollars						
68	Enterprises having pumps and other drainage works.....1930.....dollars						
69	Average, per acre.....dollars						

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

DRAINAGE—MINNESOTA

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COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Watonwan	Wilkin	Wright	Yellow Medicine	Other counties ¹
LAND AREA						
1	Approximate land area..... 1930..... acres..	277,760	470,800	442,240	470,300	1,044,480
2	Land in enterprises..... 1930..... acres..	60,452	253,295	13,017	38,962	8,191
3	..... 1920..... acres..	15,158	237,048	13,362	12,775	19,747
4	Increase, ² 1920-1930..... per cent..	298.8	6.4	-2.6	295.0	-58.5
5	Area of all enterprises (overlapping areas included)..... 1930..... acres..	60,452	355,691	13,017	38,962	8,191
6	Excess over land in enterprises (total areas overlapping)..... acres..		102,396			
CONDITION AND USE OF LAND						
7	Land unfit to raise any crop..... 1930..... acres..	1,040	7,397			200
8	Land unfit to raise any crop prior to drainage..... acres..	30,355	49,188	10,363	5,525	4,797
9	Decrease since drainage..... per cent..	99.0	85.0	100.0	100.0	95.8
10	Land fit to raise a normal crop..... 1930..... acres..	53,977	235,318	11,164	38,837	7,991
11	Land fit to raise a normal crop prior to drainage..... acres..	24,389	100,030	1,234	12,786	1,120
12	Increase since drainage..... per cent..	121.3	20.0	804.7	203.7	609.7
13	Land fit to raise a partial crop..... 1930..... acres..	5,435	10,580	1,863	125	
14	Land fit to raise a partial crop prior to drainage..... acres..	5,708	8,077	1,420	20,651	2,298
15	Decrease since drainage ² per cent..	4.8	-31.0	-30.5	99.4	100.0
16	Improved land..... 1930..... acres..	55,502	245,698	12,880	38,862	7,904
17	..... 1920..... acres..	13,900	146,620	7,756	8,405	13,124
18	Increase, ² 1920-1930..... per cent..	299.6	67.6	66.1	357.5	-39.8
Unimproved land--						
19	Woodland..... 1930..... acres..	800		106		287
20	Other..... 1930..... acres..	4,000	7,597	25	100	
21	Land in occupied farms..... 1930..... acres..	55,055	252,895	13,017	38,962	7,704
22	Land in planted crops..... 1930..... acres..	45,322	204,050	11,827	34,609	7,120
23	Woodland cleared and cultivated since drainage..... 1930..... acres..			10		
24	Land idle..... 1930..... acres..	1,663				
26	Land available for settlement..... 1930..... acres..	340				
DRAINAGE WORKS, 1930						
Ditches--						
26	Completed..... miles..	15.0	205.3	100.2	88.6	25.6
Tile drains--						
27	Completed..... miles..	373.5		34.0	285.7	8.0
28	Additional under construction..... miles..	0.5				
Levees and dikes--						
29	Completed..... miles..				0.2	
30	Additional under construction..... miles..	0.5				
Pumping plants--						
31	Motor capacity..... horsepower..					
32	Pump capacity..... gals. per min..					
33	Land served by pumps..... acres..					
34	Land drained by ditches only..... acres..	120	253,295	0,923	8,577	4,849
35	Length of ditches..... miles..	3.5	265.3	90.6	21.0	25.6
36	Land drained by tile only..... acres..	20,598		168	6,222	3,342
37	Length of tile..... miles..	206.5		1.0	84.2	8.0
38	Land drained by ditches and tile..... acres..	22,972		2,930	23,519	
39	Length of ditches..... miles..	10.7		18.6	67.5	
40	Length of tile..... miles..	118.0		83.0	190.0	
41	Land having ditches and levees..... acres..					
42	Length of ditches..... miles..					
43	Length of levees..... miles..					
44	Land having ditches, tile drains, and levees ³ acres..	7,762			647	
45	Length of ditches..... miles..	6.8			0.1	
46	Length of tile..... miles..	49.6			11.5	
47	Length of levees..... miles..	0.5			0.2	
48	Land drained by pumps and other drainage works..... acres..					
49	Length of tile..... miles..					
50	Land protected by levees of an outside agency..... acres..					
CAPITAL INVESTED AND COST PER ACRE						
51	Capital invested in enterprises to Jan. 1, 1930..... dollars..	730,270	720,039	264,347	1,740,446	147,921
52	..... 1920..... dollars..	450,516	721,576	217,807	212,850	413,079
53	Increase, ² 1920-1930..... per cent..	62.1	0.7	21.3	717.7	-64.3
54	Estimated cost of enterprises when completed..... 1930..... dollars..	740,270	720,039	264,347	1,740,446	147,921
55	..... 1920..... dollars..	450,516	741,576	217,807	227,128	403,079
56	Average, per acre when completed..... 1930..... dollars..	12.25	2.87	20.31	44.67	18.06
57	..... 1920..... dollars..	29.72	8.12	16.31	17.78	23.50
Invested in and required for completion of--						
58	Enterprises having ditches only..... 1930..... dollars..	3,400	720,039	138,087	17,615	42,921
59	Average, per acre..... dollars..	28.33	2.87	13.02	2.05	8.85
60	Enterprises having tile drains only..... 1930..... dollars..	322,895		3,655	290,981	105,000
61	Average, per acre..... dollars..	10.91		23.13	46.77	31.42
62	Enterprises having ditches and tile drains..... 1930..... dollars..	308,677		122,005	1,403,250	
63	Average, per acre..... dollars..	13.44		41.70	59.67	
64	Enterprises having ditches and levees..... 1930..... dollars..					
65	Average, per acre..... dollars..					
66	Enterprises having ditches, tile drains, and levees..... 1930..... dollars..	105,205			28,000	
67	Average, per acre..... dollars..	13.57			44.20	
68	Enterprises having pumps and other drainage works..... 1930..... dollars..					
69	Average, per acre..... dollars..					

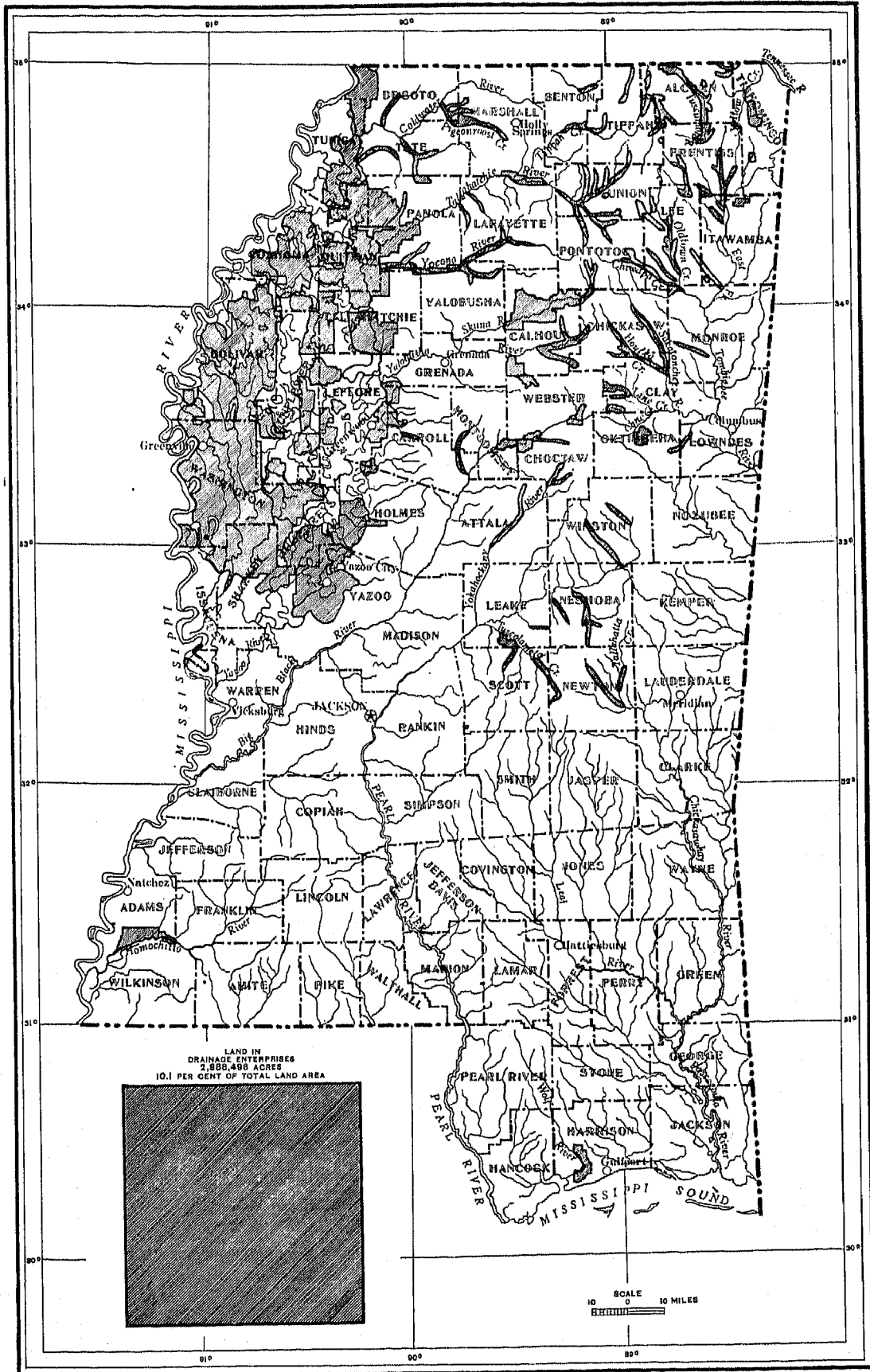
¹ Includes only Dakota, Rock, and Wabasha Counties in 1930; and Dakota, Houston, Rock, Scott, and Wabasha Counties for 1920.

² A minus sign (-) denotes decrease. A plus sign (+) denotes increase.

³ When works under construction have been completed.

MISSISSIPPI

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



MISSISSIPPI

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—The drainage enterprises in Mississippi lie almost entirely in the northern half of the State. Those in the hill section were constructed principally to protect the bottom lands from overflow due to flood in the streams. Those in the Yazoo-Mississippi delta drain large flat areas, most of which were originally swampy and also subject to overflow from the Mississippi River until the present system of levees was constructed. Such

natural drainage as existed was afforded by crooked and sluggish streams, the banks of which were usually several feet higher than the land some distance back. With the cutting of timber these natural streams or bayous were usually obstructed with brush and logs. The general slope of this section is about a foot per mile from north to south. The soil is an alluvial formation, the greater portion of which is known as gumbo. The lower portion of this delta is subject to overflow from backwater due to high stages in the Mississippi River.

State Table 1 shows approximately 3,000,000 acres in drainage enterprises, of which about two-thirds is improved and one-third idle. The unimproved areas are principally cut-over lands from which the commercial timber has been removed. About 10 per cent of the land in enterprises was reported as unfit to raise any crop. However, much of this condition may be due to lack of farm or local ditches rather than to an inadequacy of the ditches in the enterprises.

The usual purpose of an organized enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....	number.....	272,101	40,562	14.9
Farms reporting drainage.....	number.....	34,026	-5,820	-16.7
All land in farms.....	acres.....	18,190,979	-864,784	-4.8
Farm land provided with drainage.....	acres.....	825,878	-197,027	-23.9
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....	acres.....	20,071,080		
Land in drainage enterprises.....	acres.....	1,601,444	1,387,052	86.6
Improved land.....	acres.....	941,239	1,009,117	107.2
Unimproved land:				
Woodland.....	acres.....	631,964	273,748	43.3
Other.....	acres.....	28,241	104,187	368.9
Land unfit to raise any crop for lack of drainage.....	acres.....	² 261,126	25,029	9.6
Land drained, fit to raise normal crop.....	acres.....	(3)		
Land partly drained, fit for partial crop.....	acres.....	⁴ 12,207	255,541	
Land in occupied farms.....	acres.....	(3)		
Land in planted crops.....	acres.....	(3)		
Land idle.....	acres.....	(3)		
Ditches, completed.....	miles.....	1,815.1	2,207.0	121.6
Tile drains, completed.....	miles.....	238.8	-195.3	-81.8
Capital invested in enterprises.....	dollars.....	7,076,164	16,525,279	233.5
Average, per acre.....	dollars.....	4.42	3.48	78.7

¹ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.
² "Swampy or subject to overflow."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 344 drainage enterprises are shown for Mississippi with an average area of 9,186 acres. There are 150 such enterprises of 5,000 acres or more, 171 of between 500 and 5,000 acres, and 23 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 171,448 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres
	1930		1920		
	Acres	Per cent 100.0	Acres	Per cent 100.0	
All enterprises.....	3,159,944		1,004,484		2,988,400
Less than 100 acres.....	85	(¹)			85
100 to 199 acres.....	330	(¹)			330
200 to 499 acres.....	6,984	0.2	1,894	0.1	6,984
500 to 999 acres.....	10,705	0.0	9,789	0.6	14,125
1,000 to 4,999 acres.....	347,792	11.0	201,240	12.5	320,015
5,000 to 9,999 acres.....	462,054	14.6	167,410	9.8	378,014
10,000 to 49,999 acres.....	1,558,578	49.3	664,285	41.4	1,508,697
50,000 to 99,999 acres.....	631,908	20.0	320,400	20.0	631,908
100,000 acres and over.....	131,078	4.2	240,400	15.5	131,078

¹ The sum of the areas of individual enterprises, including overlap.
² Less than one-tenth of 1 per cent.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects, county drains, or township drains*, according to the public officials in control.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	2,988,400		23,601,443	
Drainage districts.....	2,060,536	69.0	23,368,278	99.1
State projects.....	560	(¹)	2,500	(¹)
Individually owned projects.....	27,400	0.9	200,665	0.8

¹ Less than one-tenth of 1 per cent.

Type of drainage.—There were 336 enterprises, covering 2,808,241 acres of land, with an invested capital of \$22,774,948, that reported their works as completed; while 8 enterprises, covering 180,255 acres of land, with an invested capital of \$826,495, estimated that \$301,000 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 4,022 miles of ditches, 44 miles of tile drains, and 228 miles of levees. These figures do not include drains or levees, installed by individual farmers,

supplemental to the works of an enterprise, nor the works of levee districts that had not constructed ditches, tile drains, or pumping plants.

There were 3 enterprises that reported pumping plants. However, only 2 of these were used in 1929.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	2,988,400		23,601,443	
Gravity drainage only.....	2,888,179	96.6	22,625,162	95.9
Ditches and levees.....	2,880,048	96.4	22,563,562	95.6
Tile drains.....	2,400	0.1	20,000	0.1
Ditches and tile drains.....	5,131	0.1	51,600	0.2
Drainage, all or part by pumping.....	100,317	3.4	976,281	4.1
All drainage by pumping.....	4,000	0.2	72,000	0.3
Part gravity and part pumping.....	96,317	3.2	904,281	3.8

Pumping plants.—There were 3 enterprises that reported pumping plants capable of serving 8,040 acres. One of these enterprises, covering 95,757 acres, contains a pumping plant designed to serve 4,000 acres, but so far none of the land in the pumping unit has been put into cultivation. However, the pumps are occasionally started in order to keep the plant in operating condition.

Another plant, serving 40 acres, operated only 3 days in 1929. The remaining plant served 4,000 acres which is also the area of the enterprise.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER: 1930 AND 1929

KIND OF POWER	Enterprises	Engine or motor capacity		Pump capacity	Land served
		Number	H. p.			Per cent 100.0	G. p. m.	Acres
All enterprises.....	1930.. 3 1929.. 1	370	100.0	163,000	8,040
Electric.....	1930.. 1	100	27.0	22,000	4,000
Internal combustion.....	1930.. 2 1929.. 1	270	73.0	81,000	4,040
		260	100.0	78,000	14,000

¹ Incorrectly reported. Correct area is 4,000 acres.

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Engine or motor capacity	Land served
		G. p. m.	Per cent 100.0			H. p.	Acres
All enterprises.....	5	163,000		370	8,040
Centrifugal.....	4	102,000	99.0	350	8,000
Rotary.....	1	1,000	1.0	20	40

Arrears and delinquency.—There were 17 enterprises, with approximately 10 per cent of the invested capital and covering approximately 6 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while 327 enterprises reported no arrearage. There were 55 enterprises, covering 991,047 acres, which reported a total of 135,044 acres delinquent in.

drainage taxes; 280 enterprises, covering 1,856,987 acres, reported no delinquency; while 9 enterprises failed to report.

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	2,988,496	100.0	23,601,443	100.0	135,044
Enterprises in arrears.....	183,977	6.2	2,475,040	10.5	72,525
With some delinquent land.....	179,019	6.0	2,426,140	10.3	72,525
With no delinquent land.....	3,040	0.1	31,500	0.1	
With no report on delinquency.....	1,909	0.1	18,000	0.1	
Enterprises not in arrears.....	2,804,519	93.8	21,125,808	89.5	62,519
With some delinquent land.....	812,028	27.2	6,374,411	29.1	62,519
With no delinquent land.....	1,853,988	62.0	13,127,325	55.6	
With no report on delinquency.....	138,563	4.6	1,124,067	4.8	

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported. About 50 per cent of the drained land is in enterprises organized primarily to reclaim swamp land.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	2,988,496	100.0	23,601,443	100.0
Reclamation of swamp land not previously in farms.....	1,505,870	50.4	11,608,967	49.2
Improvement of land already in farms.....	1,391,771	46.6	11,183,776	47.4
Protection against overflow.....	90,855	3.0	808,700	3.4

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. State Table 9 shows that about 85 per cent of the drained land in Mississippi is in enterprises organized from 1910 to 1924, inclusive.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Acres	Overlapped acres	Dollars	Per cent
All enterprises.....	2,988,496	100.0	3,159,944	171,448	23,601,443	100.0
1900-1904.....	5,000	0.2	5,000		50,000	0.2
1905-1909.....	268,368	9.0	268,368		1,360,465	5.8
1910-1914.....	777,686	26.0	780,686	3,000	4,752,447	20.1
1915-1919.....	823,812	27.6	854,292	30,480	6,676,464	27.9
1920-1924.....	936,126	31.3	1,042,343	106,217	9,607,698	40.7
1925-1929.....	177,504	5.9	209,255	31,751	1,254,379	5.3

¹ Includes overlap.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement Acres
	Total	Condition of land			Other unimproved land Acres	
		Improved land	Wood-land	Per cent		
All enterprises.....	2,988,496	1,950,356	65.3	905,712	132,428	687,363
1900-1904.....	5,000	5,000	100.0			
1905-1909.....	268,368	232,188	86.5	33,765	2,405	23,786
1910-1914.....	777,686	587,283	75.5	169,868	20,535	158,532
1915-1919.....	823,812	441,570	53.6	329,218	53,018	251,860
1920-1924.....	936,126	574,892	61.4	317,362	43,872	220,441
1925-1929.....	177,504	109,467	61.7	55,499	12,538	20,785

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Legal provision is made for the maintenance of all organized drainage enterprises. The county supervisors are authorized to maintain the drainage works of swamp-land districts organized under chapter 17 of the Laws of 1906. The commissioners of districts established under chapter 39, Laws of 1906, may make all necessary repairs and levy additional assessments to pay for such work.

The commissioners of districts established under chapter 195, Laws of 1912, can borrow money for maintenance purposes. This money is repaid by a special levy against the district by the county supervisors, but a notice and hearing must precede this levy. The commissioners of districts established under chapter 198, Laws of 1912, can also raise money for maintenance, but the levy must not exceed 25 cents per acre in any year. The commissioners of districts established under chapter 197, Laws of 1912, may, with the approval of the county drainage commissioners, make all necessary repairs and the county supervisors shall levy taxes against the districts to pay for these repairs.

Systematic maintenance was reported by 268 enterprises, covering 2,159,161 acres of land and having an invested capital of \$16,562,992. There were 76 enterprises, with an invested capital of \$7,038,451 and covering 829,335 acres of land, that did not have systematic maintenance.

There were 22 enterprises, with an invested capital of \$4,978,420 and covering 749,864 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 322 enterprises, with an invested capital of \$18,623,023 and covering 2,238,632 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	2,988,496	100.0	23,601,443	100.0
By district forces.....	1,457,174	48.8	10,796,800	45.8
By contract.....	1,045,360	34.9	8,626,163	36.5
By work apportioned to landowners.....	240,597	8.1	2,170,045	9.2
Other, none, and not reported.....	247,359	8.2	2,009,435	8.5

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 76 per cent of the land reporting showed some cost, and 24 per cent showed no cost in 1929. The average cost for all enterprises was 10 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
		Dollars	Dollars
All enterprises reporting.....	2,837,091	274,062	0.10
Gravity drainage only.....	2,780,774	266,412	0.10
Ditches and levees.....	2,729,387	266,092	0.10
Tile drains.....	2,250	200	0.09
Ditches and tile drains.....	5,131	1,120	0.22
Drainage, all or part by pumping.....	100,317	8,250	0.08

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1920	1930	1920	1930		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Number	Acres	Acres	
The State.....	20,007	34,026	628,851	825,878	312,663	17,332,195	7,454,835	6,224,300	29,671,690
Alcorn.....	301	1,000	6,727	32,072	3,334	199,312	83,719	60,804	247,040
Attala.....	930	242	10,612	6,004	4,342	323,322	95,898	150,058	467,000
Benton.....	37	260	760	4,435	2,110	177,044	50,534	81,702	253,440
Bolivar.....	2,709	2,205	55,429	47,008	15,032	400,075	342,464	40,840	502,500
Calhoun.....	859	424	25,293	14,230	3,237	237,180	81,070	105,886	370,560
Carroll.....	112	273	3,263	13,000	4,372	282,823	96,811	75,262	309,300
Chickasaw.....	300	593	8,827	17,466	3,205	208,469	89,993	52,146	320,640
Choctaw.....	231	335	6,410	6,499	2,204	195,854	50,805	104,004	264,060
Claiborne.....	7	144	963	2,238	2,053	193,042	93,454	93,570	312,960
Clarke.....	49		1,184		2,252	191,892	59,725	84,024	432,000
Clay.....	172	254	7,328	7,345	2,920	170,170	74,080	44,730	261,120
Columbia.....	1,619	888	30,259	15,002	9,319	255,733	214,590	30,533	339,200
Copiah.....	146	101	2,230	1,930	4,908	320,945	93,100	130,022	492,160
De Soto.....	84	128	3,333	2,757	5,437	246,000	133,417	30,250	304,000
Grenada.....	4	(?)	1,140	(?)	2,301	162,711	63,140	57,159	282,880
Harrison.....	43	30	982	648	782	56,670	12,003	30,330	364,800
Hinds.....	258	555	5,020	7,709	6,909	336,652	103,234	62,088	549,120
Holmes.....	300	1,170	11,251	18,265	6,004	318,394	153,080	77,949	480,640
Humphreys.....	1,241	379	25,241	8,874	5,689	132,828	111,707	17,411	261,120
Issaquena.....	268	800	10,823	16,805	1,381	70,055	40,538	19,408	269,340
Itawamba.....	1,094	901	15,500	12,935	3,459	244,485	75,817	124,400	338,500
Kemper.....	73	(?)	948	(?)	3,002	257,709	100,854	90,071	481,280
Lafayette.....	68	36	2,583	1,377	3,515	207,275	94,031	103,120	424,000
Lauderdale.....	24	103	685	1,794	3,239	247,409	79,106	123,748	448,000
Leake.....	714	206	7,099	2,075	4,240	228,973	87,040	85,700	308,640
Lee.....	503	1,322	8,555	27,385	5,877	236,201	120,493	36,025	289,720
Leflore.....	2,889	961	60,076	24,002	9,739	281,102	221,207	30,641	306,080
Lincoln.....	20	(?)	505	(?)	3,580	283,502	80,811	123,001	309,020
Lowndes.....	145	108	2,700	6,795	3,544	228,050	115,064	62,843	310,360
Marshall.....	191	(?)	2,940	(?)	4,794	333,835	123,958	88,252	440,000
Monroe.....	700	436	8,022	13,420	5,729	342,137	161,410	104,785	492,800
Montgomery.....	234	289	5,030	11,453	2,281	170,202	67,908	60,820	264,720
Neshoba.....	955	831	11,860	14,784	4,630	245,690	105,491	98,361	569,040
Newton.....	375	561	3,797	8,772	3,793	268,742	87,932	127,809	368,520
Noxubee.....	30	375	2,543	13,487	4,647	246,749	112,905	69,789	436,480
Oktibbeha.....	155	224	4,175	7,402	2,827	200,220	64,660	53,792	292,480
Panola.....	242	211	3,548	4,046	5,724	308,597	142,095	71,572	445,440
Pearl River.....	4		731		1,239	77,040	28,290	33,907	510,080
Pontotoc.....	614	1,097	3,445	37,475	4,381	256,425	109,598	78,979	310,100
Prentiss.....	1,007	1,431	14,442	20,816	3,713	213,959	84,128	71,544	261,760
Quitman.....	928	139	21,891	1,537	5,717	172,400	122,535	38,772	292,800
Rankin.....	28	109	4,541	4,210	3,250	251,748	72,287	112,053	506,240
Scott.....	55	97	1,162	852	2,982	187,955	65,094	89,045	392,080
Sharkey.....	259	807	7,945	10,681	3,228	163,831	70,552	22,893	270,080
Smith.....	85	591	1,540	9,438	3,105	199,749	70,018	90,924	409,640
Sunflower.....	1,322	3,116	32,238	67,929	14,694	388,899	394,722	32,460	431,360
Tallahatchie.....	1,013	549	25,210	12,815	7,298	270,041	166,808	57,647	492,560
Tate.....	105	170	2,405	6,253	4,093	191,093	91,238	23,611	256,000
Tippah.....	428	497	7,084	10,333	3,554	241,172	89,374	52,331	285,440
Tishomingo.....	710	412	9,840	7,313	2,534	177,664	59,700	103,429	273,920
Tunica.....	541	805	14,011	21,585	5,408	173,214	125,037	36,407	267,520
Union.....	880	1,350	17,450	34,210	3,724	210,870	88,258	99,971	293,080
Washington.....	1,770	2,893	48,771	86,118	8,905	281,842	218,397	54,090	462,720
Webster.....	44	453	1,593	12,907	2,183	189,495	66,820	85,848	260,240
Winston.....	299	117	4,267	2,482	3,413	240,149	80,257	111,230	382,080
Yalobusha.....	181	504	4,580	23,420	2,727	223,600	71,885	96,134	313,000
Yazoo.....	321	97	11,686	3,794	7,166	350,824	187,830	104,386	679,200
All other counties.....	252	2,435	4,631	60,125	54,688	3,083,872	1,344,418	1,080,062	8,882,560

¹ No drainage on farms reported in Adams, Franklin, Greene, and Hancock Counties in 1930; nor in Adams, Clarke, Greene, Jefferson Davis, Marlon, Pearl River, Wall-hall, and Warren Counties for 1920.
² Included in "All other counties."

DRAINAGE—MISSISSIPPI

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE,

ITEM (See definitions in Introduction)		THE STATE	Adams	Alcorn	Benton	Bolivar	Cal- houn	Carroll	Chick- saw
LAND AREA									
1	Approximate land area..... 1930..... acres..	20, 071, 080	272, 040	247, 040	253, 440	562, 560	370, 500	399, 300	320, 040
2	Land in enterprises..... 1930..... acres..	2, 088, 496	28, 949	32, 882	7, 498	374, 135	106, 020	31, 418	27, 858
3	..... 1920..... acres..	1, 601, 444	29, 183	20, 883	4, 000	184, 890	29, 852	8, 200	22, 218
4	Increase, ¹ 1920-1930..... per cent..	80. 6	-0. 8	22. 3	87. 5	102. 3	257. 2	283. 1	25. 4
5	Area of all enterprises (overlapping areas included)..... 1930..... acres..	3, 159, 944	28, 949	32, 882	7, 498	475, 025	106, 020	32, 298	27, 858
6	Excess over land in enterprises (total areas overlapping)..... acres..	171, 448				101, 400		880	
CONDITION AND USE OF LAND									
7	Land unfit to raise any crop..... 1930..... acres..	289, 155	18, 949	800	400	9, 000	2, 000	1, 850	498
8	Land unfit to raise any crop prior to drainage..... acres..	1, 475, 098	25, 949	10, 234	3, 946	112, 400	37, 500	10, 350	18, 100
9	Decrease since drainage ² per cent..	80. 6	27. 0	95. 1	89. 9	62. 0	94. 7	90. 4	97. 2
10	Land fit to raise a normal crop..... 1930..... acres..	2, 484, 598	8, 000	31, 882	6, 101	355, 915	85, 270	21, 181	23, 477
11	Land fit to raise a normal crop prior to drainage..... acres..	915, 088		15, 554	2, 301	193, 575	16, 500	4, 750	0, 377
12	Increase since drainage ² per cent..	100. 0		105. 0	165. 1	88. 0	416. 8	345. 9	208. 2
13	Land fit to raise a partial crop..... 1930..... acres..	207, 748	2, 000	200	997	9, 220	19, 350	8, 387	3, 883
14	Land fit to raise a partial crop prior to drainage..... acres..	593, 342	3, 000	1, 094	1, 251	65, 100	52, 020	7, 318	3, 372
15	Decrease since drainage ² per cent..	55. 3	33. 3	81. 7	20. 3	80. 5	63. 2	+14. 6	+15. 2
16	Improved land..... 1930..... acres..	1, 950, 356	10, 000	25, 232	6, 075	334, 361	56, 000	16, 970	20, 910
17	..... 1920..... acres..	941, 239	5, 253	13, 102	1, 600	125, 386	12, 072	6, 000	19, 052
18	Increase, ¹ 1920-1930..... per cent..	107. 2	90. 4	92. 6	279. 7	166. 7	331. 7	143. 8	0. 8
Unimproved land—									
19	Woodland..... 1930..... acres..	905, 712	18, 949	5, 450	390	37, 404	49, 620	13, 413	6, 948
20	Other..... 1930..... acres..	132, 428		2, 200	1, 033	2, 310	1, 000	1, 035	
21	Land in occupied farms..... 1930..... acres..	2, 002, 899	8, 000	27, 168	6, 601	334, 561	67, 620	18, 038	22, 645
22	Land in planted crops..... 1930..... acres..	1, 801, 947	8, 000	25, 168	6, 075	332, 341	66, 000	18, 000	18, 500
23	Woodland cleared and cultivated since drainage..... 1930..... acres..	787, 806	3, 000	15, 070	2, 250	136, 250	24, 400	0, 260	13, 804
24	Land idle..... 1930..... acres..	975, 970	18, 949	5, 450	1, 140	38, 200	41, 000	-15, 193	3, 790
25	Land available for settlement..... 1930..... acres..	687, 363		5, 420	350	37, 330	39, 000	12, 125	2, 179
DRAINAGE WORKS, 1930									
26	Ditches—								
27	Completed..... miles..	4, 022. 1	20. 0	90. 8	17. 5	502. 4	102. 0	14. 1	67. 5
	Additional under construction..... miles..	42. 0							
28	Tile drains—								
	Completed..... miles..	43. 5				3. 5			
29	Levees and dikes—								
30	Completed..... miles..	227. 7						11. 0	
	Additional under construction..... miles..	10. 2							
31	Pumping plants—								
32	Engine or motor capacity..... horsepower..	870							
33	Pump capacity..... gals. per min..	103, 000							
	Land served by pumps ⁴ acres..	8, 040							
34	Land drained by ditches only ⁵ acres..	2, 326, 288	28, 949	32, 882	7, 498	373, 664	106, 020	3, 810	27, 858
35	Length of ditches..... miles..	3, 363. 0	20. 0	90. 8	17. 5	501. 9	102. 0	7. 4	67. 5
36	Land drained by tile only..... acres..	2, 400							
37	Length of tile..... miles..	20. 0							
38	Land drained by ditches and tile..... acres..	5, 131				471			
39	Length of ditches..... miles..	30. 5				0. 5			
40	Length of tile..... miles..	23. 5				3. 5			
41	Land having ditches and levees ⁶ acres..	554, 410						27, 608	
42	Length of ditches..... miles..	457. 9						6. 7	
43	Length of levees..... miles..	221. 9						11. 0	
44	Land drained by pumps and other drainage works ⁶ acres..	100, 317							
45	Length of ditches..... miles..	212. 7							
46	Length of levees..... miles..	16. 0							
47	Land protected by levees of an outside agency..... acres..	1, 548, 244				366, 315		12, 655	
CAPITAL INVESTED AND COST PER ACRE									
48	Capital invested in enterprises to Jan. 1, 1930..... dollars..	23, 601, 443	25, 000	103, 062	52, 464	3, 554, 856	300, 000	194, 200	216, 500
49	..... 1920..... dollars..	7, 076, 164	17, 950	131, 220	23, 500	843, 473	148, 000	32, 000	214, 500
50	Increase, ¹ 1920-1930..... per cent..	233. 5	41. 0	47. 1	123. 3	321. 5	163. 5	500. 0	0. 9
51	Estimated cost of enterprises when completed..... 1930..... dollars..	23, 902, 443	25, 000	103, 062	52, 464	3, 554, 856	300, 000	194, 200	216, 500
52	..... 1920..... dollars..	8, 561, 264	20, 650	131, 220	23, 500	1, 022, 473	148, 000	32, 000	214, 500
53	Average, per acre when completed..... 1930..... dollars..	8. 00	0. 86	5. 87	7. 00	0. 50	3. 66	6. 18	7. 77
54	..... 1920..... dollars..	5. 35	0. 71	4. 88	5. 88	5. 53	4. 06	3. 00	9. 65
Invested in and required for completion of—									
55	Enterprises having ditches only..... 1930..... dollars..	17, 073, 440	25, 000	103, 062	52, 464	3, 553, 256	300, 000	22, 000	216, 500
56	Average, per acre..... dollars..	7. 60	0. 86	5. 87	7. 00	9. 51	3. 66	5. 77	7. 77
57	Enterprises having tile drains only..... 1930..... dollars..	20, 000							
58	Average, per acre..... dollars..	3. 33							
59	Enterprises having ditches and tile drains..... 1930..... dollars..	51, 600				1, 600			
60	Average, per acre..... dollars..	10. 06				3. 40			
61	Enterprises having ditches and levees..... 1930..... dollars..	5, 181, 122						172, 200	
62	Average, per acre..... dollars..	0. 35						0. 24	
63	Enterprises having pumps and other drainage works..... 1930..... dollars..	976, 281							
64	Average, per acre..... dollars..	9. 73							

¹ Included in "Other counties."

² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.

³ Ditches located in Carroll County.

⁴ See text, "Pumping plants," p. 197.

⁵ When works under construction have been completed.

⁶ Area of enterprises having some land served by pumps.

DRAINAGE—MISSISSIPPI

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE,

ITEM (See definitions in Introduction)		Montgomery	Neshoba	Newton	Oktibbeha	Panola	Pontotoc	Prentiss	Quitman
LAND AREA									
1	Approximate land area.....1930.....acres.....	254,720	359,040	363,520	202,480	445,440	316,160	261,760	252,800
2	Land in enterprises.....1930.....acres.....	12,817	18,100	20,182	11,038	115,421	10,870	23,822	177,519
3	.....1920.....acres.....	(?)	11,418		12,160	19,034	17,109	18,844	72,647
4	Increase, ¹ 1920-1930.....per cent.....		58.5		-0.2	470.0	16.1	26.4	144.4
5	Area of all enterprises (overlapping areas included).....1930.....acres.....	12,817	18,100	20,182	11,038	115,421	10,870	23,822	185,725
6	Excess over land in enterprises (total areas overlapping).....acres.....								8,206
CONDITION AND USE OF LAND									
7	Land unfit to raise any crop.....1930.....acres.....	500		4,217		23,531		100	25,099
8	Land unfit to raise any crop prior to drainage.....acres.....	11,500	10,300	10,039	6,500	54,221	9,120	15,600	90,269
9	Decrease since drainage.....per cent.....	95.7	100.0	60.4	100.0	56.6	100.0	99.4	71.2
10	Land fit to raise a normal crop.....1930.....acres.....	10,500	18,100	10,057	10,038	77,290	10,506	22,300	130,890
11	Land fit to raise a normal crop prior to drainage.....acres.....	700	1,300	7,035	3,538	37,250	7,830	6,026	68,413
12	Increase since drainage ².....per cent.....			31.7	133.7	107.5	110.0	271.7	104.5
13	Land fit to raise a partial crop.....1930.....acres.....	1,817		5,908	1,000	14,600	3,364	1,323	11,030
14	Land fit to raise a partial crop prior to drainage.....acres.....	617	500	1,908	1,000	23,950	2,914	2,190	18,837
15	Decrease since drainage ².....per cent.....	+194.5	100.0	+209.6		30.0	-15.4	39.8	38.3
16	Improved land.....1930.....acres.....	5,900	6,100	9,157	7,038	62,600	16,700	20,558	78,021
17	.....1920.....acres.....	(?)	400		5,798	11,820	13,576	10,144	30,284
18	Increase, ³ 1920-1930.....per cent.....				21.4	429.6	23.0	102.7	157.6
Unimproved land—									
19	Woodland.....1930.....acres.....	6,917	3,800	9,060	4,000	41,090	1,885	2,023	92,054
20	Other.....1930.....acres.....		8,500	1,905		11,731	1,785	1,241	7,444
21	Land in occupied farms.....1930.....acres.....	5,900	6,100	8,000	7,038	72,590	17,300	21,039	121,910
22	Land in planted crops.....1930.....acres.....	5,600	6,100	7,000	7,038	50,800	16,300	20,446	74,911
23	Woodland cleared and cultivated since drainage.....1930.....acres.....	4,660	4,800	3,200	4,538	31,431	2,670	4,465	18,520
24	Land idle.....1930.....acres.....	6,617	10,300	8,525	1,000	47,921	1,970	2,210	68,857
25	Land available for settlement.....1930.....acres.....	6,417	11,000	8,525	4,000	31,200	1,175	957	40,500
DRAINAGE WORKS, 1930									
26	Ditches—								
27	Completed.....miles.....	17.5	43.5	42.0	17.0	80.0	54.0	80.4	169.8
	Additional under construction.....miles.....								
28	Tile drains—								
	Completed.....miles.....								
29	Levees and dikes—								
30	Completed.....miles.....					14.0		1.0	80.5
	Additional under construction.....miles.....								
31	Pumping plants—								
32	Engine or motor capacity.....horsepower.....								
33	Pump capacity.....gals. per min.....								
	Land served by pumps ⁴.....acres.....								
34	Land drained by ditches only ⁵.....acres.....	12,817	18,100	20,182	11,038	80,521	10,870	23,222	60,642
35	Length of ditches.....miles.....	17.5	43.5	42.0	17.0	65.0	54.0	79.4	74.8
36	Land drained by tile only.....acres.....								
37	Length of tile.....miles.....								
38	Land drained by ditches and tile.....acres.....								
39	Length of ditches.....miles.....								
40	Length of tile.....miles.....								
41	Land having ditches and levees ⁶.....acres.....					25,000		600	120,877
42	Length of ditches.....miles.....					15.0		1.0	95.0
43	Length of levees.....miles.....					14.0		1.0	80.6
44	Land drained by pumps and other drainage works ⁴.....acres.....								
45	Length of ditches.....miles.....								
46	Length of levees.....miles.....								
47	Land protected by levees of an outside agency.....acres.....								
CAPITAL INVESTED AND COST PER ACRE									
48	Capital invested in enterprises to Jan. 1, 1930.....dollars.....	68,000	241,000	132,000	85,000	1,390,029	150,707	214,024	2,286,772
49	.....1920.....dollars.....	(?)	95,000		60,000	73,375	122,582	134,910	150,012
50	Increase, ¹ 1920-1930.....per cent.....		153.7		41.7		22.9	50.3	
51	Estimated cost of enterprises when completed.....1930.....dollars.....	68,000	241,000	132,000	85,000	1,390,029	150,707	214,024	2,286,772
52	.....1920.....dollars.....	(?)	180,000		60,000	130,375	122,582	134,910	380,012
53	Average, per acre when completed.....1930.....dollars.....	5.31	13.31	6.54	7.70	12.04	7.68	9.02	12.88
54	.....1920.....dollars.....	(?)	15.76		4.04	6.54	7.16	7.16	5.23
Invested in and required for completion of—									
55	Enterprises having ditches only.....1930.....dollars.....	68,000	241,000	132,000	85,000	960,029	150,707	202,024	334,000
56	Average, per acre.....dollars.....	5.31	13.31	6.54	7.70	10.72	7.68	8.74	6.60
57	Enterprises having tile drains only.....1930.....dollars.....								
58	Average, per acre.....dollars.....								
59	Enterprises having ditches and tile drains.....1930.....dollars.....								
60	Average, per acre.....dollars.....								
61	Enterprises having ditches and levees.....1930.....dollars.....					430,000		12,000	1,952,772
62	Average, per acre.....dollars.....					16.60		20.00	15.39
63	Enterprises having pumps and other drainage works.....1930.....dollars.....								
64	Average, per acre.....dollars.....								

¹ Includes only Attala and Lowndes Counties in 1930; and Attala, Leake, Montgomery, Tishomingo, and Winston Counties for 1920.

² Included in "Other counties."

³ A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.

⁴ See text, "Pumping plants," p. 197.

⁵ When works under construction have been completed.

⁶ Area of enterprises having some land served by pumps.

DRAINAGE—MISSISSIPPI

AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

Scott	Sharkey	Sunflower	Tallahatchie	Tate	Tippah	Tishomingo	Tunica	Union	Washington	Webster	Winston	Yalobusha	Yazoo	Other counties	
382,080	270,080	431,360	402,560	256,000	285,440	273,020	287,520	203,680	402,720	266,240	882,080	313,600	579,200	776,080	1
9,788	129,805	142,425	168,751	30,589	14,275	10,217	96,455	35,807	402,149	9,040	15,540	18,719	100,856	15,700	2
		90,460	26,300	34,030	12,637	(?)	18,000	29,919	858,140	4,050	(?)	14,900	25,500	13,907	3
		57.4	541.6	7.6	13.9		408.7	19.9	12.3	94.7		25.6	295.5	12.4	4
9,788	129,805	145,425	168,751	30,589	14,275	10,217	96,455	35,807	434,804	9,040	15,540	18,719	100,856	15,700	5
		3,000							32,745						6
3,750	2,587	11,010	15,742	5,400	1,000		16,210	750		700	3,500	1,900	17,000	8,200	7
7,300	64,878	50,444	76,000	21,900	7,810	3,000	36,205	22,555	271,253	5,500	8,500	10,100	54,000	15,200	8
48.6	96.0	78.2	70.5	75.3	87.2	100.0	55.3	96.7	100.0	87.3	58.8	81.2	68.5	46.1	9
4,300	115,718	118,318	134,410	28,460	10,610	0,917	62,277	28,861	393,207	8,531	9,250	15,110	81,356	6,800	10
1,000	30,261	62,923	40,740	8,300	4,730	5,317	37,791	10,083	38,375	2,219	3,760	7,110	36,856	500	11
330.0	282.5	88.0	121.3	240.4	124.3	80.5	64.8	170.2	924.0	284.5	146.7	112.5	120.7		12
1,738	11,500	13,097	18,599	2,729	2,665	300	17,962	0,256	8,042	400	2,790	1,709	2,500	700	13
1,488	34,070	29,058	31,351	0,329	1,735	1,000	22,399	2,629	92,521	1,921	3,290	1,599	10,000		14
+16.8	66.8	54.9	40.7	56.9	-53.6	70.0	10.8	-138.0	90.3	78.7	15.2	-13.3	75.0		15
1,050	73,000	105,395	95,095	25,960	11,041	7,717	62,192	28,460	204,792	6,350	2,000	13,350	41,693	4,000	16
		55,449	11,700	15,721	0,036	(?)	3,161	15,805	108,900	2,618	(?)	6,720	14,100	6,001	17
		90.1	712.8	65.1	22.2			80.1	33.1	142.6		98.7	195.1	-34.3	18
7,738	50,205	30,604	63,345	7,400	1,539	2,000	23,059	5,745	137,357	2,578	11,800	3,740	46,857	11,700	19
1,000		0,306	10,311	3,229	1,645	500	11,204	1,656		712	1,740	1,629	12,301		20
1,750	71,400	115,102	118,040	25,960	11,607	7,617	65,692	29,028	220,500	6,350	2,000	16,296	70,897	3,980	21
1,050	69,400	97,495	94,811	25,960	11,041	7,617	62,192	27,750	190,400	4,850	1,600	13,250	38,608	3,180	22
300	13,200	46,844	32,045	14,000	2,830	2,600	4,705	13,125	143,100	2,000	1,300	3,800	8,700	3,980	23
7,738	50,005	20,043	62,599	9,629	1,300	2,300	32,963	5,820	194,712	4,421	13,500	5,250	40,789	11,700	24
4,000	52,618	17,773	30,280	8,720	505	1,000	15,847	1,520	175,469	2,612	10,000	1,769	18,789	3,700	25
21.0	185.5	161.5	137.0	42.5	50.2	22.0	88.5	79.9	595.7	20.0	26.3	20.5	77.4	25.0	26
													4.0	5.0	27
			20.0												28
			15.5						14.7				47.0		29
													9.2		30
									270				100		31
									81,000				22,000		32
									4,040				4,000		33
9,788	120,805	142,425	63,298	36,589	14,275	10,217	96,455	35,807	301,317	9,040	15,540	18,719	24,969	15,700	34
21.0	185.5	161.5	48.0	42.5	50.2	22.0	88.5	79.9	374.0	20.0	26.3	20.5	49.0	30.0	35
			2,400												36
			20.0												37
															38
															39
															40
			103,053						4,515				71,897		41
			80.0						10.0				31.4		42
			15.5						4.7				50.2		43
									96,317				4,000		44
									211.7				1.0		45
									10.0				6.0		46
									402,149				17,897		47
	88,400	83,881	150,113												
100,000	1,120,306	696,591	1,549,415	213,750	156,768	78,100	897,500	264,400	3,114,896	72,000	144,000	177,596	504,000	110,553	48
		490,050	45,300	160,000	99,476	(?)	54,812	202,200	1,368,229	22,919	(?)	54,000	31,000	88,438	49
		42.1		26.5	57.6			30.8	127.7	214.1		228.9	31.8	50	
100,000	1,120,306	696,591	1,549,415	213,750	156,768	78,100	897,500	264,400	3,114,896	72,000	144,000	177,596	504,000	110,553	51
		490,050	94,300	184,000	99,476	(?)	134,312	202,200	1,921,229	22,919	(?)	114,000	31,000	88,438	52
10.35	8.70	4.89	9.18	5.84	10.98	7.04	9.30	7.37	7.75	7.47	9.27	9.49	7.19	8.70	53
		5.42	3.59	5.41	7.93	(?)	7.08	6.76	5.30	4.03	(?)	7.65	1.22	6.33	54
100,000	1,120,306	696,591	410,000	213,750	156,768	78,100	897,500	264,400	2,105,085	72,000	144,000	177,596	150,000	136,553	55
		4.89	0.48	5.84	10.98	7.04	9.30	7.37	7.29	7.47	9.27	9.49	6.01	8.70	56
		5.42	8.33												57
															58
															59
															60
			1,110,415						14,600				503,500	7.00	61
			10.80						3.23				72,000		62
									904,281				18.00		63
									9.39						64

MISSOURI

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



MISSOURI

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—Approximately one-third of the land in drainage enterprises in Missouri is located north of the Missouri River. The drainage enterprises of this region generally cover the alluvial bottoms between the hills, and protect these lands from excessive overflow of the adjacent streams. Except in the enterprises immediately adjacent to the Missouri and Mississippi Rivers, the drainage improvements consist almost entirely in straightening and enlarging the natural stream channels so that only occasional and excessive floods will overflow the bottom lands.

Nearly 62 per cent of all land in enterprises is located in the lowlands of southeastern Missouri. This is a large flat area, most of which was originally swampy and covered with timber. That portion lying east of the Sikeston Ridge drains directly into the Mississippi River through gates in the levees, while the portion lying west of this ridge drains into the St. Francis River and thence into the Mississippi.

Approximately 73 per cent of all land in enterprises within the State was reported as improved, 18 per cent as woodland, and 9 per cent as other unimproved land. Of the total, 8 per cent was unfit to raise any crop for lack of drainage and 28 per cent was idle in 1929. The average cost of drainage was \$15.03 per acre. For southeastern Missouri, exclusive of Perry County, the reports show 71 per cent of the land in enterprises as improved; 2 per cent as unfit to raise any crop for lack of drainage; 24 per cent as woodland; and 27 per cent as idle.

The total precipitation for 1929 varied from approximately 32 to 62 inches, and averaged almost 47 inches, which is 7 inches more than normal.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number..	255,940	263,004	-7,064	-2.7
Farms reporting drainage.....number..	17,408	11,917	5,491	46.1
All land in farms.....acres..	33,743,019	34,774,679	-1,031,660	-3.0
Farm land provided with drainage.....acres..	1,156,889	859,663	297,226	34.6
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres..	43,985,280	43,985,280		
Land in drainage enterprises.....acres..	3,160,022	2,590,204	569,818	21.3
Improved land.....acres..	2,309,267	1,474,302	834,965	56.6
Unimproved land:				
Woodland.....acres..	565,068	1,074,860	-509,792	-47.4
Other.....acres..	275,687	47,042	228,645	486.0
Land unfit to raise any crop for lack of drainage.....acres..	253,251	2,454,360	-201,109	-44.3
Land drained, fit to raise normal crop.....acres..	2,530,697	(3)		
Land partly drained, fit for partial crop.....acres..	366,074	242,258	123,816	51.1
Land in occupied farms.....acres..	2,427,599	(3)		
Land in planted crops.....acres..	2,067,727	(3)		
Land idle.....acres..	879,897	(3)		
Ditches, completed.....miles..	4,980.5	3,438.7	1,521.8	44.3
Tile drains, completed.....miles..	123.4	38.8	84.6	218.0
Capital invested in enterprises.....dollars..	47,340,174	20,723,128	26,617,046	128.4
Average, per acre.....dollars..	15.03	7.98	7.05	88.3

¹ A minus sign (-) denotes decrease.
² "Swampy or subject to overflow."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 367 drainage enterprises are shown for Missouri with an average area of 11,203 acres. There are 168 such enterprises of 5,000 acres or more, 186 of between 500 and 5,000 acres, and 13 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 961,548 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	4,111,570	100.0	3,104,880	100.0	3,150,022
100 to 199 acres.....	206	(?)	177	(?)	206
200 to 499 acres.....	3,907	0.1	1,053	(?)	3,207
500 to 999 acres.....	28,667	0.7	13,164	0.4	21,303
1,000 to 4,999 acres.....	373,337	9.1	239,414	7.7	293,033
5,000 to 9,999 acres.....	460,062	10.9	341,884	11.0	377,976
10,000 to 49,999 acres.....	1,721,812	41.9	1,567,927	50.2	1,210,054
50,000 to 99,999 acres.....	922,594	22.4	546,213	17.6	843,894
100,000 acres and over.....	610,985	14.9	405,063	13.0	399,650

¹ The sum of the areas of individual enterprises, including overlap.

² Less than one-tenth of 1 per cent.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects*, *county drains*, or *township drains*, according to the public officials in control.

Enterprises under the control of individuals, or organizations engaged in the draining of land for purposes of development, subdivision, and sale, are classed as *commercial developments*.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	3,150,022	100.0	47,340,174	100.0
Drainage districts.....	3,135,031	99.5	46,800,451	98.9
County drains.....	4,430	0.1	51,735	0.1
Commercial developments.....	5,390	0.2	380,000	0.8
Individually owned projects.....	4,565	0.2	107,988	0.2

Type of drainage.—There were 343 enterprises, covering 2,999,803 acres of land, with an invested capital of \$44,493,060, which reported their works as completed; while 24 enterprises, covering 150,219 acres of land, with an invested capital of \$2,847,114, estimated that \$562,340 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 4,960 miles of ditches, 123 miles of tile drains, and 931 miles of levees. These figures do not

include drains or levees, installed by individual farmers, supplemental to the works of an enterprise. There were 11 pumping plants reported.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	3,150,022	100.0	47,340,174	100.0
Gravity drainage only.....	3,004,272	97.3	43,000,539	92.9
Ditches and levees.....	2,987,290	94.8	42,031,580	90.7
Tile drains and levees.....	6,951	0.2	79,800	0.2
Ditches, tile drains, and levees.....	72,001	2.3	955,159	2.0
Drainage, all or part by pumping.....	83,750	2.7	3,373,035	7.1
All drainage by pumping.....	61,700	1.7	2,503,135	5.3
Part gravity and part pumping.....	31,051	1.0	870,500	1.8

Pumping plants.—Of the 11 pumping plants reported, 8 are located in the Mississippi River bottoms above the mouth of the Missouri, and 3 are located on lands along the Missouri River. These 11 plants had a total engine and motor capacity of 2,533 horsepower, and a pump capacity of 607,430 gallons per minute. The area served was 71,604 acres. This acreage is somewhat smaller than the total area tributary to the pumps, as some outside lands drain into the area served.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER: 1930 AND 1920

KIND OF POWER	Enterprises	Engine or motor capacity		Pump capacity	Land served
		Number	H. p.			Per cent
All enterprises.....	1930	11	2,533	100.0	607,430
	1920	8	2,785	100.0	552,000
Electric.....	1930	2	700	27.6	100,000
	1920	1	500	18.0	75,000
Internal combustion.....	1930	7	833	32.9	137,430
	1920	2	375	13.5	70,000
Steam.....	1930	2	1,000	39.5	200,000
	1920	5	1,910	68.0	407,000

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Engine or motor capacity	Land served
		Number	G. p. m.			Per cent
All enterprises.....	10	607,430	100.0	2,533	71,604
Centrifugal.....	15	600,430	98.8	2,458	71,020
Rotary.....	1	7,000	1.2	75	575

Arrears and delinquency.—There were 66 enterprises with 52 per cent of the invested capital and covering approximately 43 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 301 enterprises were reported as not in arrears. Reports of 171 enterprises, covering 2,126,427 acres, show a total of 927,207 acres delinquent in drainage taxes; 179 enterprises, covering 949,631 acres, reported no delinquency; while 17 enterprises failed to report.

On account of the overlapping of enterprises, the area delinquent contains some land that has been reported delinquent in 2 drainage projects, but the data available do not permit of an accurate determination of the acreage that has been twice reported. From the study of the reports, it is believed that this

duplication would total from 5 to 10 per cent of the area shown delinquent.

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	3,150,022	100.0	47,340,174	100.0	927,207
Enterprises in arrears.....	1,350,734	42.9	24,619,680	52.0	751,712
With some delinquent land.....	1,339,006	42.5	24,479,980	51.7	751,712
With no report on delinquency.....	10,828	0.4	139,700	0.3	-----
Enterprises not in arrears.....	1,799,288	57.1	22,720,494	48.0	175,495
With some delinquent land.....	786,521	25.0	12,666,411	26.8	175,495
With no delinquent land.....	949,681	30.1	8,909,950	18.8	-----
With no report on delinquency.....	63,136	2.0	1,244,133	2.6	-----

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported.

In the lowlands of southeastern Missouri the principal purpose of drainage was the reclamation of swampy land, while in the remainder of the State protection against overflow and improvement of land in farms was the dominant purpose.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	3,150,022	100.0	47,340,174	100.0
Reclamation of swamp land not previously in farms.....	1,737,899	55.2	25,237,233	53.3
Improvement of land already in farms.....	403,020	12.8	6,815,862	14.4
Protection against overflow.....	1,009,004	32.0	15,287,079	32.3

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Acres	Overlapped acres	Dollars	Per cent
All enterprises.....	3,150,022	100.0	4,111,570	961,548	47,340,174	100.0
1880-1889.....	300	(?)	360	-----	10,000	(?)
1890-1899.....	63,150	2.0	63,150	-----	253,026	0.5
1900-1904.....	423,226	13.4	475,708	52,482	1,968,990	4.2
1905-1909.....	1,183,462	37.6	1,381,559	198,097	17,186,970	36.3
1910-1914.....	655,261	20.8	894,542	239,281	10,428,541	22.0
1915-1919.....	350,562	11.1	479,072	128,510	8,700,404	18.4
1920-1924.....	419,541	13.3	642,008	222,467	6,909,483	14.6
1925-1929.....	54,460	1.7	175,171	120,711	1,882,682	4.0

¹ Includes overlap.

² Less than one-tenth of 1 per cent.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement Acres
	Total	Condition of land			Land available for settlement Acres	
		Improved land	Wood-land	Other unimproved land		
All enterprises.....	3,150,022	2,309,267	73.3	563,068	275,687	379,670
1880-1889.....	300	360	100.0	-----	-----	-----
1890-1899.....	63,150	62,600	99.1	550	-----	-----
1900-1904.....	423,226	333,272	78.7	61,009	28,945	20,076
1905-1909.....	1,183,462	808,411	68.3	305,406	69,585	220,310
1910-1914.....	655,261	485,238	74.1	135,694	34,329	97,602
1915-1919.....	350,562	289,203	82.5	35,300	25,999	13,800
1920-1924.....	419,541	282,181	67.3	24,309	113,061	12,091
1925-1929.....	54,460	48,002	88.1	2,680	3,778	300

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 280 enterprises, covering 2,698,326 acres of land and having an invested capital of \$41,700,354; while 87 enterprises, with an invested capital of \$5,639,820 and covering 451,696 acres of land, did not have systematic maintenance.

There were 17 enterprises, with an invested capital of \$3,506,502 and covering 158,931 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 350 enterprises, with an invested capital of \$43,833,672 and covering 2,991,091 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	3,150,022	100.0	47,340,174	100.0
By district forces.....	1,648,944	52.4	21,650,321	45.6
By contract.....	1,153,043	36.6	21,020,410	44.4
By work apportioned to landowners.....	72,828	2.3	1,103,778	2.4
Other, none, and not reported.....	274,607	8.7	3,656,065	7.7

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 61 per cent of the land reporting showed some cost, and 39 per cent showed no cost in 1929. The average cost for all enterprises was 14 cents per acre, while that for enterprises drained all or part by pumping was \$1.54 per acre. This latter figure is probably higher than normal as the rainfall in May, June, and July was excessive. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost Acres	COST REPORTED	
		Total Dollars	Per acre Dollars
All enterprises reporting.....	3,150,022	440,096	0.14
Gravety drainage only.....	3,086,272	311,765	0.10
Ditches and levees.....	2,987,260	291,221	0.10
Tile drains and levees.....	6,551	1,530	0.22
Ditches, tile drains, and levees.....	72,061	19,017	0.26
Drainage, all or part by pumping.....	88,750	128,928	1.54

DRAINAGE—MISSOURI

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 17,408	Number 11,917	Acres 1,150,880	Acres 859,063		Number 255,940	Acres 33,743,010	Acres 15,040,272		Acres 7,700,000	Acres 43,985,280
The State									
Adair.....	80	53	5,177	3,134	2,170	317,303	145,907	54,454	365,440
Andrew.....	137	135	5,854	3,769	2,239	250,302	148,993	31,454	273,020
Atchison.....	347	380	32,639	31,307	1,012	323,972	225,762	14,232	337,020
Audrain.....	10	21	1,525	1,490	2,197	391,225	240,090	32,042	438,400
Barton.....	70	64	2,000	1,045	2,140	320,135	207,641	18,008	381,440
Bates.....	174	193	20,525	10,202	3,381	506,874	203,350	40,880	550,800
Bollinger.....	99	32	6,235	1,044	2,135	281,320	101,270	114,699	389,760
Boone.....	19	10	1,029	1,260	2,095	306,230	100,811	62,760	440,320
Buchanan.....	89	100	3,533	2,959	2,355	228,540	141,921	27,215	201,120
Butler.....	372	154	13,812	6,545	2,030	167,907	92,744	47,545	447,360
Caldwell.....	37	75	1,479	2,364	1,820	205,613	142,350	17,371	277,120
Callaway.....	24	11	2,140	663	2,753	443,272	188,497	114,286	517,120
Cape Girardeau.....	169	141	14,090	21,690	2,599	312,400	152,390	71,090	371,200
Carroll.....	318	388	40,231	40,842	2,768	404,514	247,187	21,461	449,020
Cass.....	106	148	7,061	5,168	3,021	416,028	229,793	38,114	461,440
Chariton.....	214	138	18,553	17,721	2,927	410,000	232,403	41,125	491,520
Clark.....	117	166	11,002	15,599	1,742	275,013	135,685	30,302	318,720
Clay.....	22	21	1,125	2,029	1,870	216,064	98,006	17,079	257,280
Clinton.....	44	73	3,101	3,462	1,628	256,733	137,326	15,701	270,720
Cole.....	23	25	719	1,745	1,497	218,697	83,735	67,367	248,060
Cooper.....	31	40	871	1,207	2,264	320,417	198,286	50,840	357,120
Davess.....	190	60	10,170	1,840	2,500	334,872	180,604	39,840	360,000
Dunklin.....	858	920	60,399	41,082	3,892	226,573	192,716	15,381	339,200
Franklin.....	68	(²)	1,002	(²)	3,318	444,267	178,921	148,320	562,500
Gentry.....	70	22	6,415	875	2,132	294,663	150,603	31,746	313,600
Grundy.....	248	52	22,520	4,572	1,800	264,062	131,722	32,213	277,120
Harrison.....	72	19	4,053	1,800	3,085	431,881	221,114	37,759	401,440
Henry.....	50	08	3,943	4,867	2,868	410,483	234,753	45,290	476,160
Holt.....	168	172	10,888	18,811	1,069	217,737	162,634	16,765	285,440
Howard.....	17	45	610	2,827	1,670	268,018	110,748	43,415	290,520
Jackson.....	152	180	6,038	6,836	3,404	294,939	141,463	31,135	390,400
Jasper.....	38	77	1,350	1,039	3,044	331,960	198,708	46,405	406,400
Johnson.....	203	82	14,025	5,493	3,329	486,394	242,045	45,430	531,840
Knox.....	25	32	2,484	2,030	1,743	304,530	141,109	30,671	328,060
Lafayette.....	500	532	35,082	35,894	2,970	373,675	232,870	23,421	391,080
Lewis.....	92	61	10,633	6,645	1,644	282,817	149,428	40,428	322,560
Lincoln.....	52	73	9,243	10,351	2,251	327,319	153,318	66,451	388,480
Linn.....	93	32	8,205	4,749	2,357	300,757	171,683	34,762	400,640
Livingston.....	160	97	13,584	6,710	2,007	284,463	167,802	39,442	339,840
Macon.....	135	60	12,156	3,504	3,430	466,531	215,460	50,424	517,780
Marion.....	67	65	13,041	6,898	1,581	244,089	127,948	37,271	279,040
Mercer.....	76	(²)	5,201	(²)	1,828	200,180	122,228	30,161	289,920
Mississippi.....	1,006	434	105,594	56,640	1,870	177,785	158,500	10,958	264,320
New Madrid.....	2,244	579	150,522	51,018	3,825	258,037	224,845	17,629	417,280
Nodaway.....	375	488	17,854	23,083	3,437	524,095	320,199	28,046	557,440
Osage.....	30	15	604	699	1,880	337,262	98,324	161,464	376,520
Pemiscot.....	4,447	911	104,120	39,749	5,540	211,092	187,922	13,631	291,840
Perry.....	16	41	578	1,788	1,802	249,054	117,830	70,179	295,680
Pettis.....	25	100	1,276	22,088	2,813	400,597	224,584	44,332	438,400
Platte.....	41	93	6,523	8,304	2,357	369,040	174,403	68,268	417,620
Pike.....	64	152	2,100	3,882	1,803	232,205	141,527	40,420	265,600
Platte.....	46	44	2,173	1,580	2,076	311,394	148,800	43,924	330,880
Putnam.....	21	(²)	1,296	(²)	1,651	202,313	128,091	45,478	307,840
Ralls.....	32	60	1,163	2,785	2,182	260,075	117,257	50,053	314,240
Randolph.....	150	204	13,496	12,971	2,707	324,293	181,153	32,677	361,600
Ray.....	166	156	20,099	21,635	2,021	284,415	163,428	54,919	342,400
St. Charles.....	129	137	2,323	6,328	3,058	172,720	113,370	20,317	311,680
St. Louis.....	619	583	53,888	58,173	2,764	420,795	243,419	27,920	482,560
Saline.....	18	(²)	2,187	(²)	1,146	174,270	74,630	17,031	197,760
Schuyler.....	171	97	6,250	4,001	1,614	257,069	125,942	20,812	280,960
Scotland.....	89	648	12,723	80,629	1,706	217,036	170,622	18,101	268,160
Scott.....	30	49	2,398	2,805	1,946	200,684	158,850	34,073	325,760
Shelby.....	30	809	114,637	80,250	3,543	350,178	219,858	64,894	521,600
Stoddard.....	1,083	49	5,585	2,745	2,041	388,807	174,287	38,141	415,360
Sullivan.....	45	177	2,036	7,100	3,206	450,346	264,003	51,240	536,960
Vernon.....	50	(²)	2,438	(²)	1,047	211,838	71,054	106,793	496,000
Wayne.....	70	50	4,286	1,514	1,209	159,213	83,055	14,998	199,600
Worth.....									
All other counties.....	337	737	7,141	20,527	95,123	12,744,060	4,342,343	4,757,196	10,116,800

¹ No drainage on farms reported in Carter, Ozark, Ste. Genevieve, Shannon, Stone, and Texas Counties in 1930; nor in Carter, Douglas, McDonald, Ozark, Stone, and Wright Counties for 1920.
² Included in "All other counties."

DRAINAGE—MISSOURI

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER

ITEM (See definitions in Introduction)		THE STATE	Adair	Andrew	Atchison	Bates	Bollinger	Buchanan	Butler
LAND AREA									
1	Approximate land area.....1930.....acres.....	43,985,280	365,440	278,020	337,920	556,800	380,760	261,120	447,360
2	Land in enterprises.....1930.....acres.....	3,150,022	11,265	24,311	80,034	45,027	27,340	10,715	232,406
3	.....1920.....acres.....	2,506,204	8,800	(¹)	46,982	49,026	33,765	(¹)	232,800
4	Increase, ² 1920-1930.....per cent.....	21.3	28.0	76.5	70.4	-7.5	-19.0		-0.2
5	Area of all enterprises (overlapping areas included).....1930.....acres.....	4,111,570	11,265	24,311	109,734	45,927	27,340	10,715	232,406
6	Excess over land in enterprises (total areas overlapping).....acres.....	961,548			29,700				
CONDITION AND USE OF LAND									
7	Land unfit to raise any crop.....1930.....acres.....	253,251	400	2,000	5,300	8,000			11,261
8	Land unfit to raise any crop prior to drainage.....acres.....	1,930,108	1,700	13,124	39,854	22,000	25,973		128,000
9	Decrease since drainage ³.....per cent.....	86.9	76.5	80.2	86.7	63.6	100.0		91.2
10	Land fit to raise a normal crop.....1930.....acres.....	2,530,697	4,600	18,183	74,628	17,927	23,296	10,715	193,000
11	Land fit to raise a normal crop prior to drainage.....acres.....	680,946	1,100	9,766	30,312	12,027	1,367	10,715	86,585
12	Increase since drainage ².....per cent.....	271.6	318.2	86.2	656.3	38.7			122.1
13	Land fit to raise a partial crop.....1930.....acres.....	360,074	0,265	3,528	106	20,000	4,044		28,146
14	Land fit to raise a partial crop prior to drainage.....acres.....	538,968	8,465	1,421	30,312	11,000			17,621
15	Decrease since drainage ³.....per cent.....	32.1	26.0	-148.3	99.7	+81.8			+60.6
16	Improved land.....1930.....acres.....	2,309,267	10,233	22,662	74,109	10,560	12,546	10,715	112,070
17	.....1920.....acres.....	1,474,302	7,200	(¹)	43,364	24,813	1,712	(¹)	63,800
18	Increase, ² 1920-1930.....per cent.....	56.6	42.1		70.9	-21.4	632.8		75.7
19	Unimproved land--								
20	Woodland.....1930.....acres.....	565,068	545	1,436		18,427	10,750		106,250
21	Other.....1930.....acres.....	276,687	487	213	5,925	8,000	4,044		14,086
22	Land in occupied farms.....1930.....acres.....	2,427,699	10,965	23,250	79,409	19,600	12,546	10,715	107,220
23	Land in planted crops.....1930.....acres.....	2,067,727	5,900	17,928	72,595	19,600	11,686	10,400	91,950
24	Woodland cleared and cultivated since drainage.....acres.....	820,856	800	302	158	6,000			40,160
25	Land idle.....1930.....acres.....	879,897	5,365	4,300	800	26,427	11,636	100	120,925
26	Land available for settlement.....1930.....acres.....	379,679	300			2,427	14,794		100,815
DRAINAGE WORKS, 1930									
27	Ditches--								
28	Completed.....miles.....	4,960.5	17.5	68.6	111.3	31.0	41.0	19.2	260.0
29	Additional under construction.....miles.....	50.3			10.0			2.0	
30	Tile drains--								
31	Completed.....miles.....	123.4	4.0		10.0				
32	Additional under construction.....miles.....	10.0			10.0				
33	Levees and dikes--								
34	Completed.....miles.....	931.4			30.5		18.0		57.0
35	Additional under construction.....miles.....	6.9							
36	Pumping plants--								
37	Engine or motor capacity.....horsepower.....	2,533							
38	Pump capacity.....gals. per min.....	607,430							
39	Land served by pumps.....acres.....	71,604							
40	Land drained by ditches only ³.....acres.....	1,980,218	9,565	24,311	22,872	45,927		10,715	116,171
41	Length of ditches.....miles.....	2,980.7	13.5	68.6	66.8	31.0		21.2	52.0
42	Land drained by tile only.....acres.....	4,151							
43	Length of tile.....miles.....	10.1							
44	Land drained by ditches and tile.....acres.....	55,203	1,700		13,664				
45	Length of ditches.....miles.....	55.3	4.0		20.0				
46	Length of tile.....miles.....	32.7	4.0		20.0				
47	Land having ditches and levees ³.....acres.....	1,007,042			43,493		27,340		117,235
48	Length of ditches.....miles.....	1,743.2			34.5		41.0		208.0
49	Length of levees.....miles.....	776.4			30.5		18.0		57.0
50	Land having tile drains and levees.....acres.....	2,800							
51	Length of tile.....miles.....	2.0							
52	Length of levees.....miles.....	1.5							
53	Land having ditches, tile drains, and levees.....acres.....	16,858							
54	Length of ditches.....miles.....	45.1							
55	Length of tile.....miles.....	1.8							
56	Length of levees.....miles.....	14.7							
57	Land drained by pumps and other drainage works ⁴.....acres.....	83,750							
58	Length of ditches.....miles.....	186.5							
59	Length of tile.....miles.....	76.8							
60	Length of levees.....miles.....	145.7							
61	Land protected by levees of an outside agency.....acres.....	1,117,778			86,806	5,000			
CAPITAL INVESTED AND COST PER ACRE									
62	Capital invested in enterprises to Jan. 1, 1930.....dollars.....	47,340,174	135,059	509,800	858,741	747,000	257,873	214,000	2,741,600
63	.....1920.....dollars.....	20,723,128	53,328	(¹)	386,748	625,797	5,000	(¹)	1,264,672
64	Increase, ² 1920-1930.....per cent.....	128.4	153.3		122.0	19.4			116.8
65	Estimated cost of enterprises when completed.....1930.....dollars.....	47,902,514	135,059	509,800	958,741	747,000	257,873	224,240	2,741,600
66	.....1920.....dollars.....	24,749,735	70,328	(¹)	512,988	700,108	5,000	(¹)	2,204,672
67	Average, per acre when completed.....1930.....dollars.....	15.21	11.99	20.97	11.98	16.26	0.43	20.93	11.80
68	.....1920.....dollars.....	9.53	7.99	(¹)	10.92	14.11	0.15	(¹)	9.73
69	Invested in and required for completion of--								
70	Enterprises having ditches only.....1930.....dollars.....	22,309,652	102,059	509,800	358,500	747,000		224,240	470,660
71	Average, per acre.....dollars.....	11.27	10.67	20.97	15.67	16.26		20.93	4.09
72	Enterprises having tile drains only.....1930.....dollars.....	61,800							
73	Average, per acre.....dollars.....	14.89							
74	Enterprises having ditches and tile drains.....1930.....dollars.....	693,075	33,000		250,000				
75	Average, per acre.....dollars.....	12.56	19.41		18.30				
76	Enterprises having ditches and levees.....1930.....dollars.....	20,897,268			350,241		257,873		2,271,000
77	Average, per acre.....dollars.....	20.75			8.05		9.43		19.37
78	Enterprises having tile drains and levees.....1930.....dollars.....	18,000							
79	Average, per acre.....dollars.....	6.43							
80	Enterprises having ditches, tile drains, and levees.....1930.....dollars.....	362,084							
81	Average, per acre.....dollars.....	21.48							
82	Enterprises having pumps and other drainage works.....1930.....dollars.....	3,560,635							
83	Average, per acre.....dollars.....	42.52							

¹ Included in "Other counties." ² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000. ³ When works under construction have been completed. ⁴ Area of enterprises having some land served by pumps.

DRAINAGE—MISSOURI

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE,

TERM (See definitions in Introduction)		Knox	Lafayette	Lewis	Lincoln	Linn	Livingston	Marion
LAND AREA								
1	Approximate land area..... 1930..... acres..	328,900	391,080	322,560	388,480	400,640	330,840	270,040
2	Land in enterprises..... 1930..... acres..	11,497	7,022	19,650	25,578	18,605	93,083	22,953
3	..... 1920..... acres..	0,811	12,070	16,125	16,800	(1)	48,207	23,704
4	Increase, ² 1920-1930..... per cent..	68.8	-41.9	21.9	52.3		93.1	-3.5
5	Area of all enterprises (overlapping areas included)..... 1930..... acres..	11,497	7,022	19,650	25,578	18,605	93,302	22,953
6	Excess over land in enterprises (total areas overlapping)..... acres..						219	
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop..... 1930..... acres..		400	4,800	2,370	7,000	67,860	2,000
8	Land unfit to raise any crop prior to drainage..... acres..	6,720	2,540	12,869	15,110	15,360	44,577	13,953
9	Decrease since drainage ² per cent..	100.0	84.3	62.7	84.3	54.4	+52.2	85.7
10	Land fit to raise a normal crop..... 1930..... acres..	11,337	6,622	7,981	23,208	9,300	8,199	10,000
11	Land fit to raise a normal crop prior to drainage..... acres..	160	2,155	1,000	10,468	3,000	35,000	5,000
12	Increase since drainage ² per cent..		207.3	320.1	121.7	212.0	-76.6	280.0
13	Land fit to raise a partial crop..... 1930..... acres..	160		6,869		2,305	17,024	1,953
14	Land fit to raise a partial crop prior to drainage..... acres..	4,617	2,327	4,881		305	13,600	4,000
15	Decrease since drainage ² per cent..	96.5	100.0	+40.7		+65.7	+26.1	51.2
16	Improved land..... 1930..... acres..	10,640	6,482	15,944	21,758	7,270	11,887	21,256
17	..... 1920..... acres..	3,481	10,871	14,040	16,050	(1)	39,165	20,084
18	Increase, ² 1920-1930..... per cent..	205.7	-40.4	13.6	35.6		-60.6	5.8
19	Unimproved land—							
20	Woodland..... 1930..... acres..	857	540	1,106	2,700	2,345	3,000	580
21	Other..... 1930..... acres..			2,000	1,120	9,050	78,196	1,118
22	Land in occupied farms..... 1930..... acres..	11,497	7,022	17,150	21,918	17,360	17,283	21,953
23	Land in planted crops..... 1930..... acres..	8,000	4,530	9,550	9,450	7,270	11,887	19,250
24	Woodland cleared and cultivated since drainage..... 1930..... acres..	310	1,000	2,300	200	1,000	187	11,030
25	Land idle..... 1930..... acres..	2,291	310	8,019	13,528	11,090	75,024	2,703
26	Land available for settlement..... 1930..... acres..			200	2,000		1,000	
DRAINAGE WORKS, 1930								
27	Ditches—							
28	Completed..... miles..	16.5	32.0	47.0	57.3	18.0	82.3	49.0
29	Additional under construction..... miles..				3.8			
30	Tile drains—							
31	Completed..... miles..			2.3				24.5
32	Additional under construction..... miles..							
33	Levees and dikes—							
34	Completed..... miles..			27.0	52.5		3.0	37.2
35	Additional under construction..... miles..							
36	Pumping plants—							
37	Engine or motor capacity..... horsepower..			150	550			1,200
38	Pump capacity..... gals. per min..			22,000	100,000			300,000
39	Land served by pumps..... acres..			8,500	11,900			22,953
40	Land drained by ditches only ³ acres..	11,497	7,022	8,369	3,078	18,005	85,245	
41	Length of ditches..... miles..	16.5	32.0	16.0	1.8	18.0	76.3	
42	Land drained by tile only..... acres..							
43	Length of tile..... miles..							
44	Land drained by ditches and tile ³ acres..							
45	Length of ditches..... miles..							
46	Length of tile..... miles..							
47	Land having ditches and levees ³ acres..			1,500	8,600		7,838	
48	Length of ditches..... miles..			6.0	32.8		7.0	
49	Length of levees..... miles..			3.0	29.5		3.0	
50	Land having tile drains and levees..... acres..							
51	Length of tile..... miles..							
52	Length of levees..... miles..							
53	Land having ditches, tile drains, and levees..... acres..							
54	Length of ditches..... miles..							
55	Length of tile..... miles..							
56	Length of levees..... miles..							
57	Land drained by pumps and other drainage works ⁴ acres..			9,781	13,900			22,953
58	Length of ditches..... miles..			25.0	26.5			40.0
59	Length of tile..... miles..			2.3				24.5
60	Length of levees..... miles..			24.0	23.0			37.2
61	Land protected by levees of an outside agency..... acres..							
CAPITAL INVESTED AND COST PER ACRE								
62	Capital invested in enterprises to Jan. 1, 1930..... dollars..	93,777	43,500	802,393	615,500	544,166	1,052,550	1,237,424
63	..... 1920..... dollars..	55,082	50,965	399,113	278,400	(1)	278,710	919,005
64	Increase, ² 1920-1930..... per cent..	70.2	-14.6	102.6	125.1		277.7	34.6
65	Estimated cost of enterprises when completed..... 1930..... dollars..	93,777	43,500	812,393	659,000	544,166	1,052,550	1,237,424
66	..... 1920..... dollars..	55,082	50,965	399,113	278,400	(1)	326,710	919,005
67	Average, per acre when completed..... 1930..... dollars..	8.16	6.19	41.34	25.78	30.15	11.31	54.78
68	..... 1920..... dollars..	8.09	4.22	24.87	16.27	(1)	6.78	38.65
69	Invested in and required for completion of—							
70	Enterprises having ditches only..... 1930..... dollars..	93,777	43,500	72,182	32,000	544,166	867,580	
71	Average, per acre..... dollars..	8.16	6.19	8.62	10.40	20.15	10.18	
72	Enterprises having tile drains only..... 1930..... dollars..							
73	Average, per acre..... dollars..							
74	Enterprises having ditches and tile drains..... 1930..... dollars..							
75	Average, per acre..... dollars..							
76	Enterprises having ditches and levees..... 1930..... dollars..			125,000	271,500		185,000	
77	Average, per acre..... dollars..			83.33	81.67		23.60	
78	Enterprises having tile drains and levees..... 1930..... dollars..							
79	Average, per acre..... dollars..							
80	Enterprises having ditches, tile drains, and levees..... 1930..... dollars..							
81	Average, per acre..... dollars..							
82	Enterprises having pumps and other drainage works..... 1930..... dollars..			615,211	356,000			1,237,424
83	Average, per acre..... dollars..			62.90	25.61			54.78

Included in "Other counties." ² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000. ³ When works under construction have been completed. ⁴ Area of enterprises having some land served by pumps.

DRAINAGE—MISSOURI

AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

Mercer	Mississippi	New Madrid	Nodaway	Pemiscot	Perry	Platte	Ray	Ripley	St. Charles	St. Louis	Saline	Schuyler	Scotland	Scott		
280,020	264,320	417,280	557,440	201,840	295,080	265,000	361,000	401,280	342,400	311,080	482,500	197,760	280,960	268,160	1	
14,631	235,300 204,845 14.9	380,722 371,287 2.5	40,830 16,208 151.0	270,082 270,118 0.2	25,000 25,000	0,000 4,014 34.3	14,102 7,448 00.1	30,766 20,570 4.0	26,458 18,275 44.8	7,240 4,509 00.7	33,372 7,184 364.5	0,003 (1)	89,027 16,110 489.2	111,028 164,385 -28.1	2 3 4	
14,631	405,601 170,391	803,295 422,573	40,830	280,201 18,510	25,000	0,000	14,102	30,766	26,458	7,240	33,372	0,003	93,717 4,090	130,005 27,077	5 6	
4,000 5,400 25.0	7,603 04,678 02.0	0,002 327,595 08.2	3,746 10,582 80.0	----- 157,082 100.0	5,000 10,000 50.0	-----	000 3,250 31.5	000 16,000 94.4	2,100 2,705 22.4	-----	2,821 17,843 87.0	500 4,040 87.0	40 42,473 99.9	0,500 50,570 84.1		
8,785 004 811.3	184,601 05,720 181.0	354,313 22,745	34,420 12,004 165.0	263,233 92,170 185.0	20,000 10,000 100.0	0,000	0,212 0,360 45.1	27,422 11,422 140.1	24,358 3,343 028.6	7,240 0,156 17.7	22,204 13,870 00.0	5,303 760 007.1	86,827 84,166 154.1	72,080 32,803 122.0	10 11 12	
1,840 8,267 77.7	43,000 74,002 42.6	20,407 30,382 32.8	2,055 8,254 67.8	7,449 20,860 64.3	5,000 100.0	0,000	4,350 4,562 4.6	2,434 3,334 27.0	20,410 100.0	1,000 1,650 100.0	8,847 1,000 +436.2	200 1,213 83.5	2,160 12,388 82.6	28,578 18,595 -53.7	13 14 15	
0,085	172,455 130,575 32.1	269,806 190,039 42.0	38,248 14,624 161.5	223,713 81,641 174.0	20,000 22,000 -0.1	0,000 4,014 22.1	13,582 0,307 00.0	15,500 17,745 -12.7	24,153 17,070 41.6	7,240 4,500 60.7	28,130 0,713 310.2	5,003 (1)	86,027 0,807	00,605 110,441 -22.2	16 17 18	
1,300 4,240	56,445 6,400	109,860 1,000	1,048 934	45,139 1,830	3,000 2,000	600	80 500	13,500 1,760	205 2,100	-----	1,140 4,093	800 200	910 1,100	7,878 12,545	19 20	
14,631 0,400 100	172,002 164,533 35,802	265,604 265,077 181,904	40,772 30,108 684	223,063 217,622 103,350	25,000 20,000 13,000	0,000 0,000	13,062 12,382 100	15,500 13,500 3,700	25,758 19,350	4,230 4,230	31,380 23,330 895	5,503 2,300 300	88,427 59,070 9,778	98,420 77,580 33,006	21 22 23	
2,140	68,831	104,081 41,020	3,424	48,381 41,130	3,000	600	1,100	16,000 7,922	0,805	3,010	8,950	2,403	27,293 600	18,313 12,080	24 25	
20.8	207.0	612.1 4.5	87.2 2.2	580.2	30.0	5.0	30.7	29.5	40.5	13.0	60.3 2.0	15.8	96.4	192.3 16.0	26 27	
-----	21.4	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	-----	1.2	28 29	
-----	39.8	90.0	-----	47.0	-----	-----	-----	-----	3.0	-----	19.0 5.1	-----	-----	16.0	30 31	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	75 7,000 575	-----	-----	-----	32 33 34	
14,631 29.8	142,740 187.5 4,151 19.1	233,296 395.0	40,830 89.4	194,117 401.2	25,000 30.0	-----	1,950 0.0	30,766 29.5	23,358 30.5	7,240 13.0	14,400 88.0	0,003 15.8	89,027 90.4	71,007 127.3	35 36 37 38	
-----	30,211 14.5 2.3 58,198 5.0 39.8	----- 147,420 250.7 90.6	-----	76,565 179.0 47.0	-----	0,000 5.0 10.0	0,712 11.7 2.8	-----	3,160 10.0 3.0	-----	10,072 27.8 20.1	-----	-----	8,010 16.0 1.2 30,712 65.0 16.0	39 40 41 42 43 44	
-----	-----	-----	-----	-----	-----	-----	5,500 13.0 0.5 5.0	-----	-----	-----	-----	-----	-----	-----	-----	45 46 47 48 49 50 51
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2,300 5.5	-----	-----	-----	52 53	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.0	-----	-----	-----	54 55 56	
-----	235,300	304,241	-----	192,072	25,000	-----	-----	-----	-----	-----	-----	-----	-----	72,310	-----	
171,310	2,203,610 1,435,050 53.0	0,825,333 3,640,050 87.5	630,253 130,000 384.8	5,050,231 2,350,988 139.4	165,880 122,000 80.0	37,500 15,000 150.0	238,500 77,175 209.0	99,015 00,200 9.7	204,182 79,330 157.4	201,364 39,204 412.5	453,535 82,542 449.5	87,571 (1)	491,893 144,324 240.8	1,035,057 089,981 65.2	57 58 59	
171,310	2,203,610 1,070,300 11.71 8.20	0,825,333 3,970,150 17.93 10.71	643,253 130,000 15.75 8.02	5,050,231 3,624,605 20.87 13.42	165,880 122,000 6.04 4.88	37,500 15,000 5.68 3.05	238,500 77,175 10.84 10.30	99,015 00,200 3.22 3.05	204,182 80,330 7.72 4.40	201,364 39,204 82,542 27.79 8.71	524,535 82,542 14.50 11.49	87,571 (1)	491,893 144,324 5.53 9.55	1,746,057 1,008,081 15.73 6.54	60 61 62 63	
171,310 11.71	1,275,288 8.03 01,890 14.89 272,000 9.00 594,622 10.22	2,673,504 11.46	643,253 15.75	3,574,702 18.42	165,880 6.04	-----	30,000 15.38	99,015 3.22	138,182 5.92	201,364 27.79	303,000 21.04	87,571 14.59	491,893 5.53	754,258 10.52	64 65 66 67 68 69 70 71 72 73 74 75 76 77	
-----	-----	-----	-----	2,075,520 27.11	-----	37,500 5.68	08,500 10.21	-----	66,000 21.29	-----	191,535 11.49	-----	-----	124,700 14.47 807,099 28.23	78 79 80 81 82	
-----	-----	-----	-----	-----	-----	-----	140,000 25.45	-----	-----	-----	30,000 13.04	-----	-----	-----	83 84	

DRAINAGE—MISSOURI

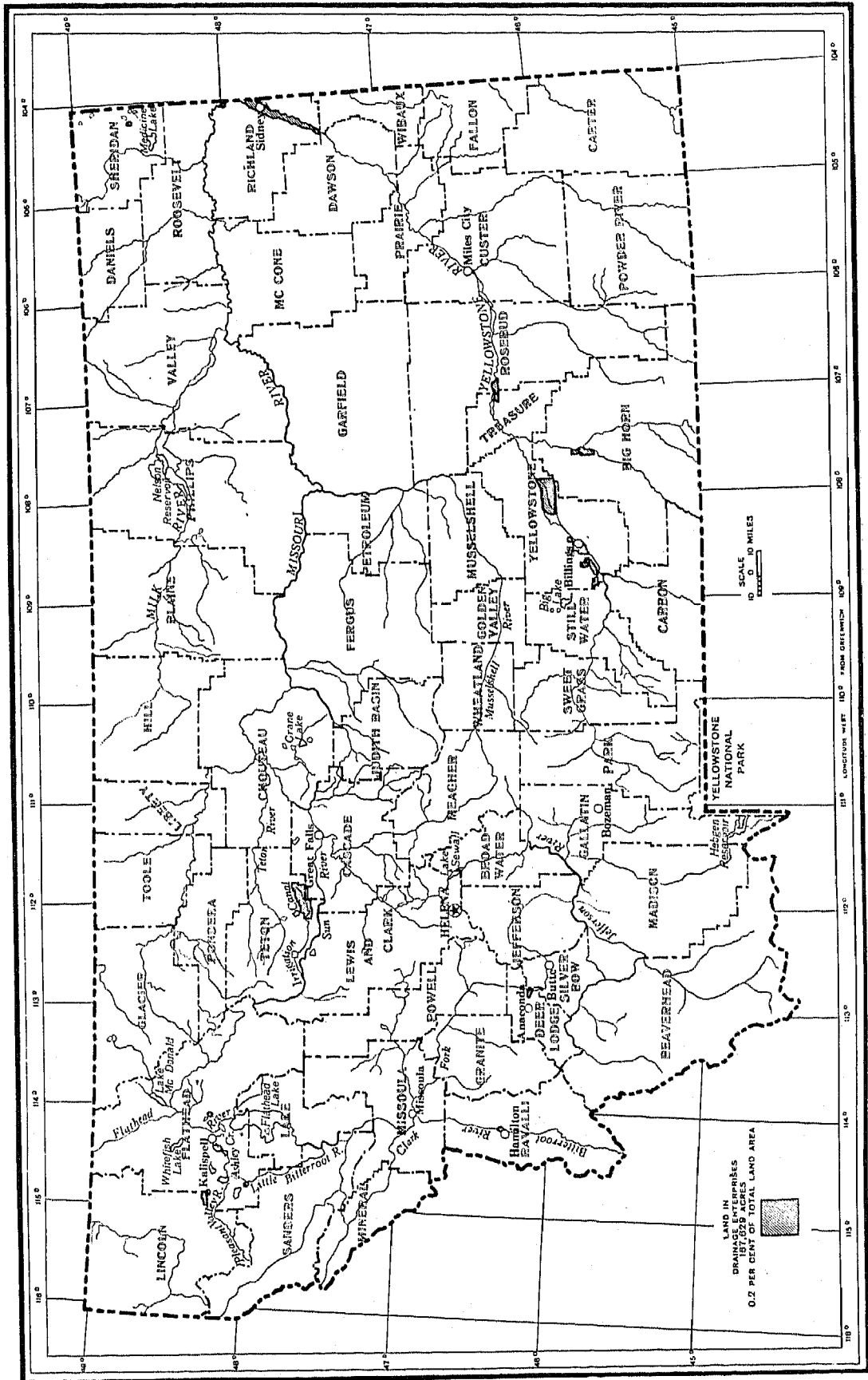
COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Shelby	Stoddard	Sullivan	Wayne	Other counties ¹
LAND AREA						
1	Approximate land area..... 1930..... acres.....	325,760	521,000	415,360	406,000	4,052,060
2	Land in enterprises..... 1930..... acres.....	13,800	341,524	11,410	12,333	75,777
3	..... 1920..... acres.....	9,697	375,037	.....	0,000	61,949
4	Increase, ² 1920-1930..... per cent.....	42.3	-8.9	.....	37.0	22.3
5	Area of all enterprises (overlapping areas included)..... 1930..... acres.....	13,800	465,548	11,410	12,333	76,207
6	Excess over land in enterprises (total areas overlapping)..... acres.....	.....	124,024	.....	.....	430
CONDITION AND USE OF LAND						
7	Land unfit to raise any crop..... 1930..... acres.....	3,000	.....	.....	.....	0,260
8	Land unfit to raise any crop prior to drainage..... acres.....	0,400	335,631	7,846	12,333	37,156
9	Decrease since drainage..... per cent.....	68.1	100.0	100.0	100.0	75.1
10	Land fit to raise a normal crop..... 1930..... acres.....	5,900	332,704	8,846	12,333	50,514
11	Land fit to raise a normal crop prior to drainage..... acres.....	1,500	5,893	3,504	.....	18,004
12	Increase since drainage ³ per cent.....	293.3	.....	148.2	.....	190.0
13	Land fit to raise a partial crop..... 1930..... acres.....	4,000	8,730	2,504	.....	10,003
14	Land fit to raise a partial crop prior to drainage..... acres.....	2,000	.....	.....	.....	19,717
15	Decrease since drainage ² per cent.....	+69.0	.....	.....	.....	49.3
16	Improved land..... 1930..... acres.....	10,650	286,038	9,028	11,717	50,253
17	..... 1920..... acres.....	7,453	194,315	.....	900	40,497
18	Increase, ² 1920-1930..... per cent.....	42.9	47.7	.....	.....	46.3
19	Unimproved land—	.....	.....	.....	.....	.....
20	Woodland..... 1930..... acres.....	1,350	54,586	1,100	016	5,720
21	Other..... 1930..... acres.....	1,800	.....	1,282	.....	10,708
22	Land in occupied farms..... 1930..... acres.....	13,800	297,914	11,410	12,333	70,977
23	Land in planted crops..... 1930..... acres.....	7,450	204,857	9,028	11,471	44,398
24	Woodland cleared and cultivated since drainage..... 1930..... acres.....	1,560	212,573	200	11,717	4,070
25	Land idle..... 1930..... acres.....	5,300	54,645	1,000	862	20,705
25	Land available for settlement..... 1930..... acres.....	.....	43,610	.....	.....	.....
DRAINAGE WORKS, 1930						
26	Ditches—	.....	.....	.....	.....	.....
27	Completed..... miles.....	14.7	570.0	23.5	16.0	125.4
28	Additional under construction..... miles.....	.....	.....	.....	.....	1.8
29	Tile drains—	.....	.....	.....	.....	.....
30	Completed..... miles.....	.....	.....	.....	.....	.....
31	Additional under construction..... miles.....	.....	.....	.....	.....	.....
32	Levees and dikes—	.....	.....	.....	.....	.....
33	Completed..... miles.....	10.2	52.0	.....	2.0	60.8
34	Additional under construction..... miles.....	.....	.....	.....	.....	1.8
35	Pumping plants—	.....	.....	.....	.....	.....
36	Engine or motor capacity..... horsepower.....	.....	.....	.....	.....	253
37	Pump capacity..... gals. per min.....	.....	.....	.....	.....	40,430
38	Land served by pumps..... acres.....	.....	.....	.....	.....	17,186
39	Land drained by ditches only ⁴ acres.....	1,800	225,052	11,410	.....	37,702
40	Length of ditches..... miles.....	4.5	294.0	23.5	.....	82.3
41	Land drained by tile only..... acres.....	.....	.....	.....	.....	.....
42	Length of tile..... miles.....	.....	.....	.....	.....	.....
43	Land drained by ditches and tile..... acres.....	.....	.....	.....	.....	.....
44	Length of ditches..... miles.....	.....	.....	.....	.....	.....
45	Length of levees..... miles.....	.....	.....	.....	.....	.....
46	Land having ditches and levees ⁴ acres.....	12,000	116,472	.....	12,333	19,149
47	Length of ditches..... miles.....	10.2	276.0	.....	16.0	24.4
48	Length of levees..... miles.....	10.2	52.0	.....	2.0	20.1
49	Land having tile drains and levees..... acres.....	.....	.....	.....	.....	.....
50	Length of tile..... miles.....	.....	.....	.....	.....	.....
51	Length of levees..... miles.....	.....	.....	.....	.....	.....
52	Land having ditches, tile drains, and levees..... acres.....	.....	.....	.....	.....	.....
53	Length of ditches..... miles.....	.....	.....	.....	.....	.....
54	Length of tile..... miles.....	.....	.....	.....	.....	.....
55	Length of levees..... miles.....	.....	.....	.....	.....	.....
56	Land drained by pumps and other drainage works ⁴ acres.....	.....	.....	.....	.....	18,926
57	Length of ditches..... miles.....	.....	.....	.....	.....	20.6
58	Length of tile..... miles.....	.....	.....	.....	.....	.....
59	Length of levees..... miles.....	.....	.....	.....	.....	20.5
60	Land protected by levees of an outside agency..... acres.....	.....	16,335	.....	.....	100
CAPITAL INVESTED AND COST PER ACRE						
61	Capital invested in enterprises to Jan. 1, 1930..... dollars.....	104,000	5,125,588	189,349	325,834	1,300,232
62	..... 1920..... dollars.....	90,588	2,659,540	.....	3,100	847,910
63	Increase, ² 1920-1930..... per cent.....	14.8	92.7	.....	.....	54.4
64	Estimated cost of enterprises when completed..... 1930..... dollars.....	104,000	5,125,588	189,349	325,834	1,324,332
65	..... 1920..... dollars.....	90,588	2,906,940	.....	155,000	1,045,536
66	Average, per acre when completed..... 1930..... dollars.....	7.54	15.01	16.60	26.42	17.48
67	..... 1920..... dollars.....	9.34	7.99	.....	17.22	16.88
68	Invested in and required for completion of—	.....	.....	.....	.....	.....
69	Enterprises having ditches only..... 1930..... dollars.....	34,000	1,093,640	189,349	.....	428,714
70	Average, per acre..... dollars.....	18.89	4.86	16.60	.....	11.37
71	Enterprises having tile drains only..... 1930..... dollars.....	.....	.....	.....	.....	.....
72	Average, per acre..... dollars.....	.....	.....	.....	.....	.....
73	Enterprises having ditches and tile drains..... 1930..... dollars.....	.....	.....	.....	.....	.....
74	Average, per acre..... dollars.....	.....	.....	.....	.....	.....
75	Enterprises having ditches and levees..... 1930..... dollars.....	70,000	4,031,948	.....	325,834	341,018
76	Average, per acre..... dollars.....	5.83	34.62	.....	26.42	17.84
77	Enterprises having tile drains and levees..... 1930..... dollars.....	.....	.....	.....	.....	.....
78	Average, per acre..... dollars.....	.....	.....	.....	.....	.....
79	Enterprises having ditches, tile drains, and levees..... 1930..... dollars.....	.....	.....	.....	.....	.....
80	Average, per acre..... dollars.....	.....	.....	.....	.....	.....
81	Enterprises having pumps and other drainage works..... 1930..... dollars.....	.....	.....	.....	.....	554,000
82	Average, per acre..... dollars.....	.....	.....	.....	.....	20.27

¹ Includes Boone, Caldwell, Callaway, Cole, Franklin, Jackson, Macon, Moniteau, Osage, Pettis, Pike, Putnam, and Worth Counties in 1930; and Andrew, Buchanan, Caldwell, Callaway, Clay, Grundy, Howard, Jackson, Linn, Macon, Osage, Pike, Putnam, Schuyler, and Worth Counties for 1920.
² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.
³ When works under construction have been completed. ⁴ Area of enterprises having some land served by pumps.

MONTANA

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



MONTANA

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—Approximately 7 per cent of the land in drainage enterprises is located west of the Continental Divide and with one exception the reclamation of swampy or overflowed lands was the object of drainage. The remaining land is located east of the Continental Divide. Almost all of this land is irrigated and the principal object of drainage was the removal of alkali and seepage resulting from irrigation.

Considering all land in drainage enterprises, approximately 68 per cent is located in the Yellowstone River Basin, 25 per cent in the Missouri River Basin, and 7 per cent in the Columbia River Basin. Approximately 22 per cent of the total is in Richland County, 34 per cent in Yellowstone County, and 21 per cent in Teton County.

The mean annual rainfall for the State is 15.44 inches. However, 1929 was a very dry year as the average rainfall was about 13 inches. A small portion of the western slope of the State has a mean annual rainfall of over 20 inches.

Where the drainage work was done directly by an irrigation enterprise, the drainage enterprise has been considered as identical with the irrigation enterprise as all irrigable lands were usually assessed for the necessary drainage works. Of the 119,545 acres located in such enterprises, 44,400 acres are now served by drainage works, while 8,700 acres are in need of drainage.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....	47,405	57,077	-10,182	-17.6
Farms reporting drainage.....	596	756	-100	-21.2
All land in farms.....	44,650,162	35,070,056	9,588,406	27.3
Farm land provided with drainage.....	59,005	51,146	7,859	15.4
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....	93,523,840	93,523,840		
Land in drainage enterprises.....	107,620	108,082	-1,063	-0.6
Improved land.....	148,768	141,252	7,516	5.3
Unimproved land.....	18,861	27,430	-8,569	-31.2
Land unfit to raise any crop for lack of drainage.....	6,388	² 19,030	-13,242	-67.4
Land drained, fit to raise normal crop.....	152,871	(3)		
Land partly drained, fit for partial crop.....	8,370	⁴ 21,064	-13,594	-61.9
Land in occupied farms.....	150,844	(3)		
Land in planted crops.....	114,206	(3)		
Land idle.....	18,170	(3)		
Ditches, completed.....	284.2	102.1	182.1	178.4
Tile drains, completed.....	76.7	50.7	26.0	51.3
Capital invested in enterprises.....	1,870,206	664,000	1,214,306	182.6
Average, per acre.....	11.21	8.04	7.27	184.5

¹ A minus sign (—) denotes decrease.
² "Seeped, alkali, swampy, or subject to overflow."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, there are 27 drainage enterprises in Montana with an average area of 6,208 acres. There are 6 enterprises of 5,000 acres or more, 19 between 500 and 5,000 acres, and 2 of less than 500 acres.

The area of enterprises equals the land in enterprises, as there is no overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	167,629	100.0	108,682	100.0	167,629
100 to 199 acres.....	120	0.1	.....	.....	120
200 to 499 acres.....	387	0.2	.....	.....	387
500 to 999 acres.....	4,003	2.4	1,307	0.8	4,003
1,000 to 4,999 acres.....	34,167	20.4	23,711	14.1	34,167
5,000 to 9,999 acres.....	11,702	7.0	19,664	11.7	11,702
10,000 to 49,999 acres.....	117,080	69.9	24,000	14.2	117,080
100,000 acres and over.....	.....	.....	100,000	50.3	.....

¹ No overlap.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Drainage projects under the control of the officers of an irrigation organization are classed as *irrigation enterprises*. In such cases the drainage is incidental to land reclamation by irrigation, and both the drainage and irrigation operations are functions of the one enterprise. Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

It is probable that several enterprises listed as drainage districts are county drains under the control of a county drainage commissioner, but no separation was attempted as the data were not sufficiently definite to clearly establish the character of these enterprises.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	167,629	100.0	1,879,296	100.0
Drainage districts.....	39,984	23.9	554,684	29.6
Irrigation enterprises.....	119,645	71.3	1,147,612	61.1
Individually owned projects.....	8,100	4.8	177,000	9.4

Type of drainage.—There were 25 enterprises, covering 128,632 acres of land and with an invested capital of \$1,599,525, which reported their works as completed; while 2 enterprises, covering 38,997 acres of land, with an invested capital of \$279,771, estimated that \$110,131 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 284 miles of ditches and 77 miles of

tile drains. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. No enterprise reported land served by pumps.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	167,629	100.0	1,879,296	100.0
Gravity drainage only.....	167,629	100.0	1,879,296	100.0
Ditches.....	73,095	43.6	660,641	35.6
Tile drains.....	3,817	2.3	59,904	3.2
Ditches and tile drains.....	90,717	54.1	1,149,851	61.2

Arrears and delinquency.—There were 2 enterprises, with approximately 2 per cent of the invested capital and covering approximately 4 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 25 enterprises were reported as not in arrears. Reports of 3 enterprises, covering 70,500 acres, show a total of 6,720 acres delinquent in drainage taxes; 22 enterprises, covering 90,059 acres, reported no delinquency; while 2 enterprises failed to report.

STATE TABLE 5.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	167,629	100.0	1,879,296	100.0	6,720
Enterprises in arrears.....	7,070	4.2	28,000	1.5	.....
With no report on delinquency.....	7,070	4.2	28,000	1.5	.....
Enterprises not in arrears.....	160,559	95.8	1,851,296	98.5	6,720
With some delinquent land.....	70,500	42.1	929,616	49.5	6,720
With no delinquent land.....	90,059	53.7	921,680	49.0	.....

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swampy land, land in farms, land damaged by alkali or seepage from irrigation, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported.

In that portion of the State west of the Continental Divide reclamation of swampy land or land subject to overflow was, with one exception, the primary purpose of drainage; while in the arid section of the State, east of the divide, removal of alkali and seepage resulting from irrigation was the usual object in drainage.

STATE TABLE 6.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	167,629	100.0	1,879,296	100.0
Reclamation of swamp land not previously in farms.....	7,000	4.2	60,000	3.5
Improvement of land already in farms.....	35,558	21.2	485,884	25.9
Removal of alkali and seepage from irrigation.....	124,684	74.4	1,323,712	70.4
Protection against overflow.....	387	0.2	3,700	0.2

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. Where the drainage work was done directly by an irrigation enterprise, the year in which drainage was undertaken is used instead of the year of organization of the irrigation project.

STATE TABLE 7.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹ Acres	Capital invested to Jan. 1, 1930	
	Acres	Per cent		Dollars	Per cent
All enterprises.....	167,629	100.0	167,629	1,879,296	100.0
1905-1909.....	19,041	11.7	19,041	163,380	8.7
1910-1914.....	6,075	3.6	6,075	164,304	8.7
1915-1919.....	8,692	5.2	8,692	53,000	2.8
1920-1924.....	88,508	52.8	88,508	1,104,996	58.8
1925-1929.....	44,713	26.7	44,713	393,616	21.0

¹ No overlap.

STATE TABLE 8.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES				
	Total	Condition of land			Land available for settlement Acres
		Improved land	Unimproved land	Acres	
All enterprises.....	167,629	148,768	88.7	18,861	7,243
1905-1909.....	19,041	19,061	97.0	580	—
1910-1914.....	6,075	4,275	70.4	1,800	1,800
1915-1919.....	8,692	7,792	89.6	900	—
1920-1924.....	88,508	77,727	87.8	10,781	5,443
1925-1929.....	44,713	39,913	89.3	4,800	—

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Number	Acres	Acres	
The State.....	696	756	59,005	51,146	47,496	44,659,152	11,308,021	1,810,006	63,523,840
Big Horn.....	71	(²)	10,818	(³)	1,086	1,803,366	214,174	57,308	3,178,240
Blaine.....	11	4	1,549	950	1,288	1,220,085	279,750	17,318	2,700,560
Deer Lodge.....	29	57	3,838	1,127	1,442	1,23,049	20,830	10,888	476,800
Flathead.....	36	111	1,580	7,808	1,349	202,258	94,628	117,682	3,310,720
Gallatin.....	21	48	1,438	5,881	1,336	722,657	204,410	56,203	1,595,520
Jefferson.....	10	6	1,645	870	385	226,525	47,960	8,240	1,044,480
Lewis and Clark.....	13	(²)	821	(³)	612	947,245	89,858	117,880	2,206,080
Phillips.....	11	7	1,870	780	1,470	1,515,119	301,988	24,580	3,313,920
Powell.....	7	13	6,020	2,642	343	736,698	80,756	165,358	1,490,560
Ravalli.....	29	42	1,102	1,100	1,286	292,172	77,872	38,893	1,530,240
Richland.....	17	7	872	1,047	1,341	905,762	364,160	10,745	1,345,920
Teton.....	8	(²)	2,148	(³)	1,028	975,637	356,800	2,639	1,461,760
Valley.....	14		2,483		1,833	1,535,400	626,023	16,104	3,207,040
Yellowstone.....	233	260	17,737	15,592	1,748	1,018,795	208,754	16,467	1,668,480
All other counties.....	86	201	4,484	13,169	32,247	32,304,694	8,275,044	1,153,439	64,833,920

¹ No drainage on farms reported in Carter, Chouteau, Custer, Daniels, Fallon, Garfield, Glacier, Hill, Liberty, Musselshell, Petroleum, Pondera, Prairie, Roosevelt, Toole, and Wibaux Counties in 1930; nor in Carter, Chouteau, Custer, Garfield, Hill, Liberty, Pondera, Powder River, Prairie, Roosevelt, Sheridan, Stillwater, Valley, Wheatland, and Wibaux Counties in 1920.
² Includes 153,600 acres in Yellowstone National Park (part of) not shown in detail.

³ Included in "All other counties."
⁴ Part taken to form part of Lake in 1923.
⁵ Part annexed to Yellowstone National Park in 1929.
⁶ Part of Chouteau annexed in 1921.
⁷ Part taken to form part of Daniels in 1920.
⁸ Part annexed to Carbon in 1925.

Systematic maintenance was reported by 24 enterprises, covering 158,659 acres of land and having an invested capital of \$1,842,296. There were 3 enterprises, with an invested capital of \$37,000 and covering 8,970 acres of land, that did not have systematic maintenance.

There were 5 enterprises, with an invested capital of \$797,300 and covering 43,170 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 22 enterprises, with an invested capital of \$1,081,996 and covering 124,459 acres of land, did not report any such equipment.

STATE TABLE 9.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	167,629	100.0	1,879,296	100.0
By district forces.....	146,362	87.3	1,608,392	80.3
By contract.....	9,327	5.6	118,604	6.3
By work apportioned to landowners.....	11,940	7.1	252,300	13.4

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 85 per cent of the land reporting showed some cost, and 15 per cent showed no cost in 1929. The average cost was 11 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 10.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
All enterprises reporting.....	125,654	14,211	0.11
Gravity drainage only.....	125,654	14,211	0.11
Ditches.....	31,120	7,047	0.23
Tile drains.....	3,817	200	0.07
Ditches and tile drains.....	90,717	6,964	0.08

DRAINAGE—MONTANA

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Big Horn	Cascade ¹	Deer Lodge	Flathead ²	Lincoln
LAND AREA							
1	Approximate land area..... 1930..... acres..	98,523,840	3,178,240	1,733,120	476,800	3,310,720	2,319,300
2	Land in enterprises..... 1930..... acres..	167,629	12,100	6,592	3,000	4,120	3,000
3	..... 1920..... acres..	168,632			1,000	(³)	(³)
4	Increase, ⁴ 1920-1930..... per cent..	-0.6			200.0		
5	Area of all enterprises ⁶ 1930..... acres..	167,629	12,100	6,592	3,000	4,120	3,000
CONDITION AND USE OF LAND							
6	Land unfit to raise any crop..... 1930..... acres..	6,383		192		1,700	
7	Land unfit to raise any crop prior to drainage..... acres..	58,969	500	1,000	2,000	3,240	3,000
8	Decrease since drainage..... per cent..	89.2	100.0	89.9	100.0	47.5	100.0
9	Land fit to raise a normal crop..... 1930..... acres..	152,871	12,100	6,400	2,000	2,220	3,000
10	Land fit to raise a normal crop prior to drainage..... acres..	83,042	7,600	4,692			
11	Increase since drainage ⁴ per cent..	84.1	59.2	30.4			
12	Land fit to raise a partial crop..... 1930..... acres..	8,370			1,000	200	
13	Land fit to raise a partial crop prior to drainage..... acres..	25,627	4,000		1,000	880	
14	Decrease since drainage..... per cent..	67.3	100.0			77.3	
15	Improved land..... 1930..... acres..	148,768	11,100	6,000	1,200	2,420	3,000
16	..... 1920..... acres..	141,262			1,000	(³)	(³)
17	Increase, ⁴ 1920-1930..... per cent..	5.3			20.0		
18	Unimproved land..... 1930..... acres..	18,861	1,000	592	1,800	1,700	
19	Land in occupied farms..... 1930..... acres..	160,844	12,100	6,040	1,200	4,120	3,000
20	Land in planted crops..... 1930..... acres..	114,266		4,500	1,200	2,220	3,000
21	Land idle..... 1930..... acres..	18,170		1,692	1,800	1,900	
22	Land available for settlement..... 1930..... acres..	7,243		400	1,800		
DRAINAGE WORKS, 1930							
23	Ditches—Completed..... miles..	284.2	50.0	8.0	3.0	11.1	7.5
24	Additional under construction..... miles..	25.0				3.0	
25	Tile drains—Completed..... miles..	76.7			8.0	3.0	
26	Land drained by ditches only ⁷ acres..	73,095	12,100	6,592		4,000	3,000
27	Length of ditches..... miles..	138.2	50.0	3.0		14.1	7.5
28	Land drained by tile only..... acres..	3,817				120	
29	Length of tile..... miles..	10.3				3.0	
30	Land drained by ditches and tile ⁷ acres..	90,717			3,000		
31	Length of ditches..... miles..	171.0			3.0		
32	Length of tile..... miles..	66.4			8.0		
CAPITAL INVESTED AND COST PER ACRE							
33	Capital invested in enterprises to Jan. 1, 1930..... dollars..	1,870,296	225,000	20,740	120,000	30,000	30,000
34	..... 1920..... dollars..	664,090			3,000	(³)	(³)
35	Increase, ⁴ 1920-1930..... per cent..	182.6					
36	Estimated cost of enterprises when completed..... 1930..... dollars..	1,989,427	225,000	20,740	120,000	50,000	30,000
37	..... 1920..... dollars..	846,466			3,000	(³)	(³)
38	Average, per acre when completed..... 1930..... dollars..	11.87	18.00	3.15	40.00	12.28	12.00
39	..... 1920..... dollars..	5.02			3.00		
40	Invested in and required for completion of—Enterprises having ditches only..... 1930..... dollars..	689,541	225,000	20,740		50,000	30,000
41	Average, per acre..... dollars..	9.43	18.60	3.15		12.50	12.00
42	Enterprises having tile drains only..... 1930..... dollars..	59,904				600	
43	Average, per acre..... dollars..	15.69				5.00	
44	Enterprises having ditches and tile drains..... 1930..... dollars..	1,239,982			120,000		
45	Average, per acre..... dollars..	13.67			40.00		

¹ Part taken to form part of Judith Basin in 1920.

² Part taken to form part of Lake in 1923.

³ Includes 153,600 acres in Yellowstone National Park (part of) not shown in detail.

⁴ Included in "Other counties."

⁵ A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.

⁶ No overlap.

⁷ When works under construction have been completed.

DRAINAGE—MONTANA

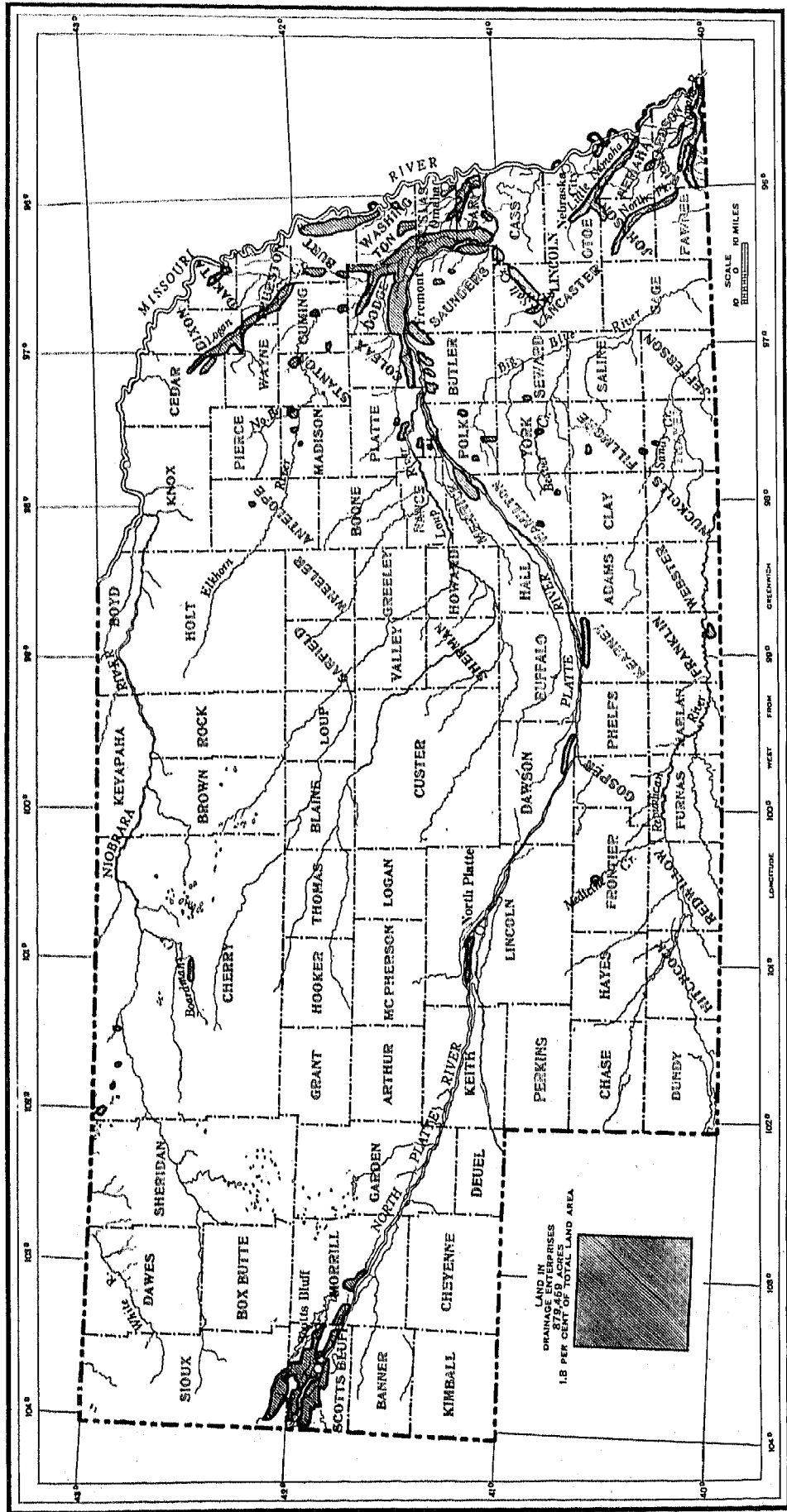
COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Riechland	Rosebud	Teton ¹	Treasure	Yellow- stone ²	Other counties ³
LAND AREA							
1	Approximate land area.....1930.....acres..	1,345,020	3,195,520	1,461,700	614,400	1,068,480	4,112,000
2	Land in enterprises.....1930.....acres..	37,097	3,539	35,383	3,531	56,077	2,290
3	.....1920.....acres..	1,600				47,732	118,850
4	Increase, ⁴ 1920-1930.....per cent..					10.4	-98.1
5	Area of all enterprises ⁵.....1930.....acres..	37,097	3,539	35,383	3,531	56,077	2,290
CONDITION AND USE OF LAND							
6	Land unfit to raise any crop.....1930.....acres..	1,500	450	300	450	1,706	
7	Land unfit to raise any crop prior to drainage.....1920.....acres..	1,800	950	10,100	950	33,870	650
8	Decrease since drainage.....per cent..	16.7	52.6	97.0	52.6	94.7	100.0
9	Land fit to raise a normal crop.....1930.....acres..	32,597	2,650	35,083	2,650	52,031	2,140
10	Land fit to raise a normal crop prior to drainage.....1920.....acres..	27,157	1,950	25,283	1,950	13,270	1,140
11	Increase since drainage.....per cent..	20.0	35.9	38.8	35.9	292.1	87.7
12	Land fit to raise a partial crop.....1930.....acres..	3,000	439		431	3,150	150
13	Land fit to raise a partial crop prior to drainage.....1920.....acres..	8,140	639		631	6,837	500
14	Decrease since drainage.....per cent..	63.1	31.3		31.7	68.0	70.0
15	Improved land.....1930.....acres..	34,597	3,089	30,740	3,081	51,301	2,240
16	.....1920.....acres..	1,000				42,032	96,720
17	Increase, ⁴ 1920-1930.....per cent..					10.5	-97.7
18	Unimproved land.....1930.....acres..	2,500	450	4,643	450	5,076	50
19	Land in occupied farms.....1930.....acres..	35,097	3,539	30,000	3,531	40,027	2,290
20	Land in planted crops.....1930.....acres..	30,000	2,850	20,490	2,850	45,069	2,087
21	Land idle.....1930.....acres..	1,000	500	5,607		5,021	50
22	Land available for settlement.....1930.....acres..			5,043			
DRAINAGE WORKS, 1930							
23	Ditches—						
24	Completed.....miles..	39.3		24.8	1.0	132.7	11.8
	Additional under construction.....miles..	22.0					
25	Tile drains—						
	Completed.....miles..	1.1			2.0	62.6	
26	Land drained by ditches only ⁶.....acres..			35,383		0,730	2,290
27	Length of ditches.....miles..			24.8		27.0	11.8
28	Land drained by tile only.....acres..					3,097	
29	Length of tile.....miles..					7.3	
30	Land drained by ditches and tile ⁶.....acres..	37,097	3,539		3,531	43,550	
31	Length of ditches.....miles..	61.3	(⁷)		1.0	105.7	
32	Length of tile.....miles..	1.1	(⁷)		2.0	55.3	
CAPITAL INVESTED AND COST PER ACRE							
33	Capital invested in enterprises to Jan. 1, 1930.....dollars..	270,771	14,100	169,250	13,000	952,084	26,245
34	.....1920.....dollars..	76,569				409,382	176,039
35	Increase, ⁴ 1920-1930.....per cent..	253.0				132.7	-85.1
36	Estimated cost of enterprises when completed.....1930.....dollars..	360,902	14,100	169,250	13,000	952,084	26,245
37	.....1920.....dollars..	76,569				480,815	280,082
38	Average, per acre when completed.....1930.....dollars..	9.73	3.98	4.78	3.94	16.72	11.46
39	.....1920.....dollars..	47.86				10.20	2.37
40	Invested in and required for completion of—						
41	Enterprises having ditches only.....1930.....dollars..			169,250		102,300	26,245
	Average, per acre.....dollars..			4.78		10.68	11.46
42	Enterprises having tile drains only.....1930.....dollars..					50,304	
43	Average, per acre.....dollars..					10.04	
44	Enterprises having ditches and tile drains.....1930.....dollars..	360,902	14,100		13,000	731,080	
45	Average, per acre.....dollars..	9.73	3.98		3.94	16.79	

¹ Part of Chouteau annexed in 1921.² Part annexed to Carbon in 1926.³ Includes Dawson, Ravalli, and Sheridan Counties in 1930; and Flathead, Gallatin, Lincoln, Ravalli, and Stillwater Counties for 1920.⁴ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.⁵ No overlap.⁶ When works under construction have been completed.⁷ Ditches and tile located in Treasure County.

NEBRASKA

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



NEBRASKA

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—By far the greater portion of the land in drainage enterprises in Nebraska is located in the eastern part of the State, in those counties adjacent to the Missouri and Platte Rivers. In a large number of enterprises, protection from overflow was the primary purpose in drainage.

Approximately 95 per cent of the land in enterprises was reported as improved; 1 per cent, as woodland; and 4 per cent, as other unimproved land. Less than 2 per cent was unfit to raise any crop for lack of drainage.

The total rainfall for the year 1929 was approximately 23 inches, or about half an inch below normal; but the total for the months of May to August, inclusive, was 80 per cent of normal. The mean annual rainfall varies from 15.5 inches in the western to 33 inches in the southeastern portion of the State. Irrigation is extensively practiced in several of the western counties.

Where the drainage work is done directly by an irrigation enterprise, the drainage enterprise has been considered as identical with the irrigation enterprise, as all irrigable lands are usually assessed for the necessary drainage work. Of the 179,385 acres located in such an enterprise, 90,000 acres are now served by drainage works and 14,000 acres are reported as in need of drainage. This land is located in the North Platte Project of the United States Bureau of Reclamation, in the extreme western part of the State.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number..	129,458	124,417	5,041	4.1
Farms reporting drainage.....number..	2,349	2,356	-7	-0.3
All land in farms.....acres..	44,708,565	42,225,475	2,483,090	5.9
Farm land provided with drainage.....acres..	207,942	214,428	-6,486	-3.0
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres..	49,157,120	49,157,120		
Land in drainage enterprises.....acres..	879,459	607,780	271,720	44.7
Improved land.....acres..	833,511	551,617	281,904	51.1
Unimproved land:				
Woodland.....acres..	8,031	6,342	1,689	20.6
Other.....acres..	37,917	49,871	-11,954	-24.0
Land unfit to raise any crop for lack of drainage.....acres..	10,139	² 14,019	-3,880	-27.7
Land drained, fit to raise normal crop.....acres..	829,681	(3) 49,871		
Land partly drained, fit for partial crop.....acres..	39,639	⁴ 19,575	20,064	102.5
Land in occupied farms.....acres..	804,159	(3)		
Land in planted crops.....acres..	743,178	(3)		
Land idle.....acres..	45,755	(3)		
Ditches, completed.....miles..	1,202.3	734.5	467.8	63.7
Tile drains, completed.....miles..	93.4	350.4	-257.0	-74.0
Capital invested in enterprises.....dollars..	6,847,070	4,588,578	2,258,492	40.2
Average, per acre.....dollars..	7.79	7.55	0.24	3.2

¹ A minus sign (-) denotes decrease.

² "Swampy, subject to overflow, seeped, or alkali."

³ Not called for on schedule.

⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, there are 138 drainage enterprises in Nebraska with an average area of 6,478 acres. There are 47 such enterprises of 5,000 acres or more, 81 of between 500 and 5,000 acres, and 10 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 14,440 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	893,890	100.0	708,450	100.0	870,450
Less than 100 acres.....	80	(?)	320	(?)	80
100 to 199 acres.....	160	(?)			160
200 to 499 acres.....	2,464	0.3	1,200	0.2	2,304
500 to 999 acres.....	15,640	1.8	14,570	2.1	14,190
1,000 to 4,999 acres.....	130,630	15.6	173,102	24.4	135,590
5,000 to 9,999 acres.....	149,998	16.8	115,103	16.2	144,038
10,000 to 49,999 acres.....	413,263	46.2	275,562	38.0	413,263
50,000 to 99,999 acres.....	172,646	19.3	128,500	18.1	160,840

¹ The sum of the areas of individual enterprises, including overlap.
² Less than one-tenth of 1 per cent.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects*, *county drains*, or *township drains*, according to the public officials in control.

Drainage projects under the control of the officers of an irrigation organization are classed as *irrigation enterprises*. In such cases the drainage is incidental to land reclamation by irrigation, and both the drainage and irrigation operations are functions of the one enterprise.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	870,450	100.0	6,847,070	100.0
Drainage districts.....	531,998	60.6	5,248,033	76.6
County drains.....	165,080	18.8	479,099	7.0
Irrigation enterprises.....	179,355	20.4	1,043,238	15.3
Individually owned projects.....	3,680	0.3	74,700	1.1

Type of drainage.—There were 132 enterprises, covering 753,783 acres of land, with an invested

capital of \$6,102,019, that reported their works as completed.

There were 6 enterprises, covering 125,676 acres of land, with an invested capital of \$745,051, which estimated that \$98,950 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 1,202 miles of ditches, 93 miles of tile drains, and 117 miles of levees. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. There was 1 enterprise that reported 300 acres of land served by pumps and also 3 wells pumped for drainage.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	870,459	100.0	6,847,070	100.0
Gravity drainage only.....	847,190	96.3	6,704,036	97.9
Ditches and levees.....	710,607	80.8	5,355,402	78.2
Tile drains.....	2,900	0.3	70,500	1.0
Ditches, tile drains, and levees.....	133,683	15.2	1,278,134	18.7
Drainage, part gravity and part pumping.....	32,260	3.7	143,034	2.1

Pumping plants.—Only 1 enterprise reported land served by pumps. This was located in the Pathfinder Irrigation District in Sioux County. Water is pumped from 3 drainage wells in order to protect about 300 acres from damage by alkali and seepage.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER, 1930

KIND OF POWER	Enterprises	Motor capacity		Pump capacity	Land served
		Number	II. p.			Per cent	G. p. m.	Acres
All enterprises, ¹ electric only.....	1	70	100.0	2,200	300

¹ No pumping plants reported in 1920.

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Motor capacity	Land served
		Number	G. p. m.			Per cent	II. p.	Acres
All enterprises, centrifugal only.....	3	2,200	100.0	70	300

Arrears and delinquency.—There were 5 enterprises, with approximately 7 per cent of the invested capital and covering less than 4 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 133 enterprises reported no arrearage. There were 8 enterprises, covering 92,573 acres, that reported a total of 12,960 acres delinquent in drainage taxes; 120 enterprises, covering 735,009 acres, reported no delinquency; while 10 enterprises failed to report.

DRAINAGE—NEBRASKA

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Sarpy	Saunders	Scotts Bluff	Sioux	Stanton	Thurston	Washing- ton	Other counties ¹
LAND AREA									
1	Approximate land area..... 1930..... acres.....	153,600	493,840	402,720	1,315,200	275,840	247,080	243,200	4,574,880
2	Land in enterprises..... 1930..... acres.....	30,000	32,020	142,377	32,269	4,680	10,220	37,745	35,798
3	..... 1920..... acres.....	32,850	30,960	16,124	4,344		12,300	25,840	30,630
4	Increase, ² 1920-1930..... per cent.....	-8.7	3.4	783.0	642.8		31.9	40.1	-0.7
5	Area of all enterprises (overlapping areas included)..... 1930..... acres.....	30,840	32,020	145,177	32,269	4,680	10,980	37,745	35,958
6	Excess over land in enterprises (total areas overlapping)..... 1930..... acres.....	840		2,800			760		160
CONDITION AND USE OF LAND									
7	Land unfit to raise any crop..... 1930..... acres.....		1,496	2,043	345				350
8	Land unfit to raise any crop prior to drainage..... 1930..... acres.....	13,150	12,810	64,008	5,000	1,300	1,000	3,912	6,521
9	Decrease since drainage..... per cent.....	100.0	88.3	96.8	93.1	100.0	100.0	100.0	94.0
10	Land fit to raise a normal crop..... 1930..... acres.....	20,560	25,774	133,236	30,439	4,680	10,220	37,745	33,798
11	Land fit to raise a normal crop prior to drainage..... 1930..... acres.....	14,150	7,200	60,212	25,784	3,380	9,236	30,833	0,302
12	Increase since drainage..... per cent.....	108.9	255.0	92.5	18.0	38.5	75.0	22.4	431.2
13	Land fit to raise a partial crop..... 1930..... acres.....	440	4,750	7,098	1,485				1,650
14	Land fit to raise a partial crop prior to drainage..... 1930..... acres.....	2,700	11,950	9,157	1,485		5,984	3,000	22,915
15	Decrease since drainage..... per cent.....	83.7	60.3	22.5			100.0	100.0	92.8
16	Improved land..... 1930..... acres.....	23,780	25,774	140,994	31,020	4,680	10,220	37,745	34,048
17	..... 1920..... acres.....	32,050	20,040	14,110	3,004		12,300	22,760	32,895
18	Increase, ² 1920-1930..... per cent.....	-25.8	-11.2	890.2	694.8		31.9	65.8	3.5
Unimproved land—									
19	Woodland..... 1930..... acres.....	880	280						280
20	Other..... 1930..... acres.....	5,840	5,065	1,383	1,240				1,470
21	Land in occupied farms..... 1930..... acres.....	24,080	32,020	142,377	31,200	4,680	10,220	37,745	35,148
22	Land in planted crops..... 1930..... acres.....	21,360	22,504	114,098	22,354	3,260	13,360	34,260	27,400
23	Woodland cleared and cultivated since drainage..... 1930..... acres.....	1,600							150
24	Land idle..... 1930..... acres.....	5,900	1,400	11,305	2,715	1,000			630
25	Land available for settlement..... 1930..... acres.....	5,320							
DRAINAGE WORKS, 1930									
Ditches—									
26	Completed..... miles.....	65.8	20.4	143.0	19.0	5.3	22.0	70.1	57.8
27	Additional under construction..... miles.....		2.5	5.0					2.0
Tile drains—									
28	Completed..... miles.....		0.3	10.5	5.0		2.0		3.7
Levees and dikes—									
29	Completed..... miles.....	5.0	8.3			0.5	0.5	11.0	18.5
Pumping plants—									
30	Motor capacity..... horsepower.....				70				
31	Pump capacity..... gals. per min.....				2,200				
32	Land served by pumps..... acres.....				300				
Wells—									
33	Pumped for drainage..... number.....				3				
34	Land drained by ditches only ³ acres.....	23,755	9,120	73,879		2,240	7,048	10,079	19,568
35	Length of ditches..... miles.....	46.8	8.1	90.0		2.5	10.0	21.1	35.8
36	Land drained by tile only..... acres.....								500
37	Length of tile..... miles.....								0.5
38	Land drained by ditches and tile..... acres.....			68,498			1,910		2,530
39	Length of ditches..... miles.....			58.0			5.0		4.5
40	Length of tile..... miles.....			10.5			2.0		3.2
41	Land having ditches and levees..... acres.....	6,245	3,000			2,440	7,262	21,666	13,200
42	Length of ditches..... miles.....	19.0	0.3			2.8	7.0	55.0	19.6
43	Length of levees..... miles.....	5.0	0.3			0.5	0.5	11.0	18.5
44	Land having ditches, tile drains, and levees ⁴ acres.....		10,000						
45	Length of ditches..... miles.....		14.5						
46	Length of tile..... miles.....		0.3						
47	Length of levees..... miles.....		8.0						
48	Land drained by pumps and other drainage works ⁴ acres.....				32,269				
49	Length of ditches..... miles.....				19.0				
50	Length of tile..... miles.....				5.0				
51	Land protected by levees of an outside agency..... acres.....								600
CAPITAL INVESTED AND COST PER ACRE									
52	Capital invested in enterprises to Jan. 1, 1930..... dollars.....	393,253	93,059	911,080	143,034	127,323	199,425	150,630	470,540
53	..... 1920..... dollars.....	262,177	57,403	380,000	118,048		180,100	203,874	404,012
54	Increase, ² 1920-1930..... per cent.....	50.0	62.1	139.8	21.2		10.7	-20.1	16.2
55	Estimated cost of enterprises when completed..... 1930..... dollars.....	393,253	96,059	921,080	143,034	127,323	199,425	150,630	486,590
56	..... 1920..... dollars.....	266,177	58,696	560,800	198,058		180,100	203,874	404,012
57	Average, per acre when completed..... 1930..... dollars.....	13.11	3.00	6.47	4.43	27.20	12.30	3.99	13.69
58	..... 1920..... dollars.....	8.10	1.90	34.78	46.50		14.64	7.89	10.22
Invested in and required for completion of—									
59	Enterprises having ditches only..... 1930..... dollars.....	203,253	17,719	406,522		60,623	49,425	67,298	100,043
60	Average, per acre..... dollars.....	12.34	1.94	5.50		27.00	7.01	4.19	10.05
61	Enterprises having tile drains only..... 1930..... dollars.....								2,500
62	Average, per acre..... dollars.....								5.00
63	Enterprises having ditches and tile drains..... 1930..... dollars.....			514,558			40,000		90,004
64	Average, per acre..... dollars.....			7.51			20.94		35.97
65	Enterprises having ditches and levees..... 1930..... dollars.....	100,000	4,000			66,700	110,000	83,332	100,453
66	Average, per acre..... dollars.....	16.01	1.03			27.34	15.15	3.85	14.88
67	Enterprises having ditches, tile drains, and levees..... 1930..... dollars.....		74,340						
68	Average, per acre..... dollars.....		3.91						
69	Enterprises having pumps and other drainage works..... 1930..... dollars.....				143,034				
70	Average, per acre..... dollars.....				4.43				

¹ Includes Antelope, Cass, Cedar, Dakota, Fillmore, Franklin, Frontier, Hamilton, Seward, Thayer, Wayne, and York Counties in 1930; and Antelope, Cass, Cherry, Dakota, Dixon, Fillmore, Knox, Madison, Morrill, Nance, Platte, Polk, Seward, Thayer, Wayne, and York Counties for 1920.

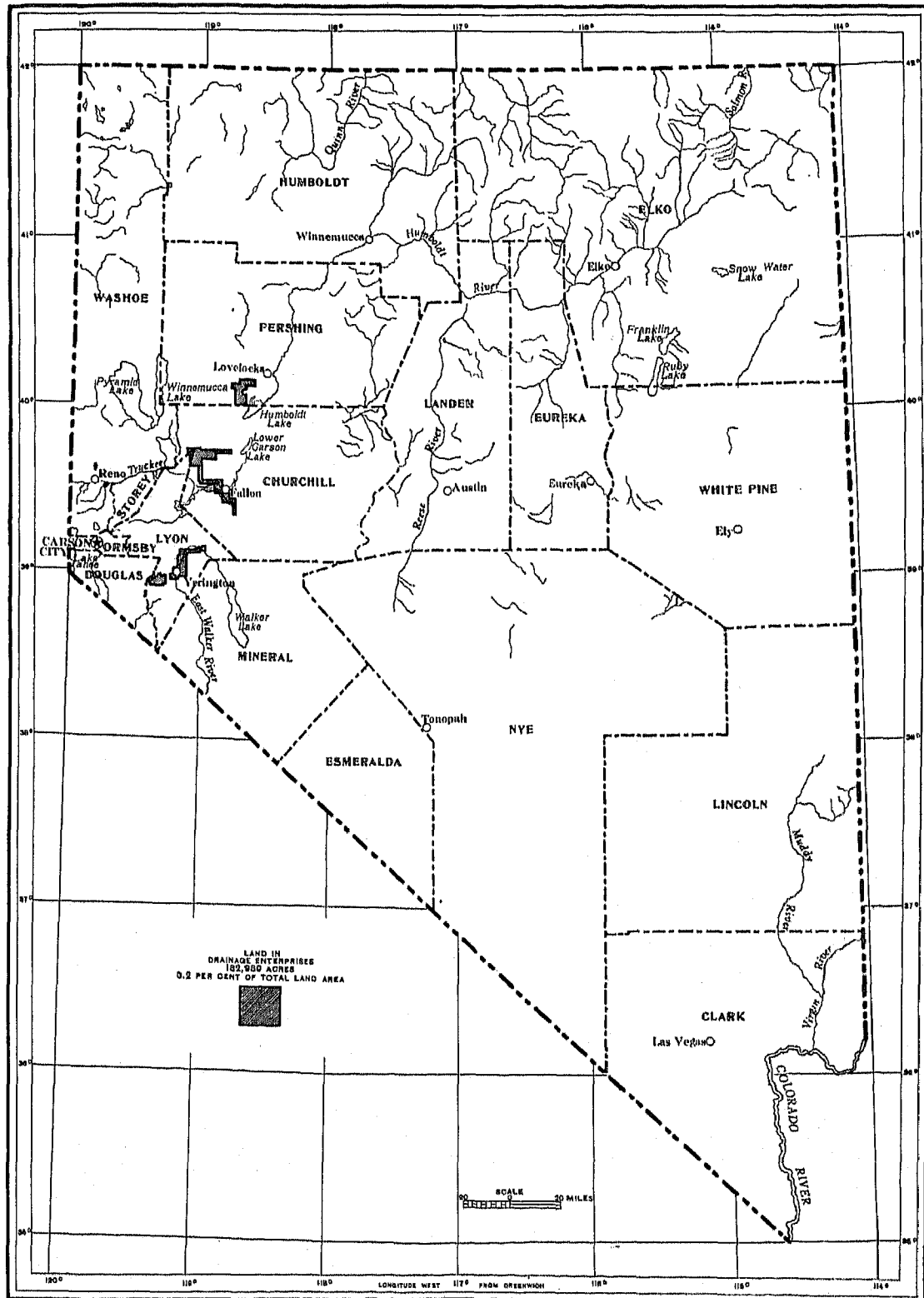
² A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.

³ When works under construction have been completed.

⁴ Area of enterprises having some land served by pumps.

NEVADA

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



NEVADA

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—About half of the drained lands of Nevada are located in the Newlands irrigation project, in the west central

portion of the State. This district was constructed by the United States Bureau of Reclamation.

Where the drainage work is done directly by an irrigation enterprise, the drainage enterprise has been considered as identical with the irrigation enterprise as all irrigable lands are usually assessed for the necessary drainage works. The only enterprise of this type in Nevada is the Newlands irrigation project which reported all but approximately 5,000 acres as now served by drainage works. On a number of enterprises drainage from seepage and alkali has been anticipated and the necessary drains installed before actual damage had occurred.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief from overflow for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number.....	3,442	3,163	270	8.8
Farms reporting drainage.....number.....	672	385	287	74.6
All land in farms.....acres.....	4,030,006	2,367,163	1,723,743	73.1
Farm land provided with drainage.....acres.....	107,039	46,262	60,787	131.4
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres.....	70,285,440	70,285,440		
Land in drainage enterprises.....acres.....	162,080	15,040	147,040	922.6
Improved land.....acres.....	122,018	7,070	114,948	402.6
Unimproved land.....acres.....	40,062	7,970	32,092	402.6
Land unfit to raise any crop for lack of drainage.....acres.....	130	² 5,261	-5,122	-97.4
Land drained, fit to raise normal crop.....acres.....	160,100	(3)		
Land partly drained, fit for partial crop.....acres.....	2,732	⁴ 7,103	-4,431	-61.8
Land in occupied farms.....acres.....	155,491	(3)		
Land in planted crops.....acres.....	111,512	(3)		
Land idle.....acres.....	45,306	(3)		
Ditches, completed.....miles.....	334.8	10.0	318.2	
Tile drains, completed.....miles.....	4.0	4.0		
Capital invested in enterprises.....dollars.....	1,349,774	117,851	1,231,923	
Average, per acre.....dollars.....	8.28	7.39	0.89	12.0

¹ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.
² "Seeped or alkali."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 7 drainage enterprises are shown for Nevada with an average area of 23,283 acres. There are 4 such enterprises of 5,000 acres or more, and 3 of between 500 and 5,000 acres.

The area of enterprises equals the land in enterprises, as there is no overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres
	1930		1920		
	Acres	Per cent 100.0	Acres	Per cent 100.0	
All enterprises.....	162,980	100.0	15,940	100.0	162,980
1,000 to 4,999 acres.....	7,740	4.8			7,740
10,000 to 49,999 acres.....	77,956	47.8	15,940	100.0	77,056
50,000 to 99,999 acres.....	77,284	47.4			77,284

¹ No overlap.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Drainage projects under the control of the officers of an irrigation organization are classed as *irrigation enterprises*. In such cases the drainage is incidental to land reclamation by irrigation, and both the drainage and irrigation operations are functions of the one enterprise.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	162,980	100.0	1,349,774	100.0
Drainage districts.....	80,760	49.5	323,000	23.9
Irrigation enterprises.....	82,224	50.5	1,026,774	76.1

Type of drainage.—There were 5 enterprises, covering 51,590 acres of land and with an invested capital of \$355,091, which reported their works as completed; while 2 enterprises, covering 111,390 acres of land and with an invested capital of \$994,683, estimated that \$50,400 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 335 miles of ditches, 4 miles of tile drains, and 33 miles of levees. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. Only 1 enterprise reported land served by pumps.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	162,980	100.0	1,349,774	100.0
Gravity only, ditches and levees....	85,090	52.6	400,091	29.6
Drainage, part gravity and part pumping.....	77,284	47.4	949,683	70.4

Pumping plants.—The only drainage pumps reported were located on the Newlands irrigation project in Churchill County. These 2 plants had a total capacity of 900 gallons per minute and were driven by electric motors. There was 1 centrifugal and 1 screw type of pump.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER, 1930

KIND OF POWER	Enterprises Number	Motor capacity		Pump capacity G. p. m. 900	Land served Acres
		H. p. 18	Per cent 100.0		
All enterprises, ¹ electric only.....	1				50

¹ No pumping plants reported in 1920.

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps Number	Pump capacity		Motor capacity H. p. 18	Land served Acres
		G. p. m. 900	Per cent 100.0		
All enterprises, screw and centrifugal only.....	2				50

Arrears and delinquency.—No enterprises were reported as in arrears in payment of principal or interest on bonds or other obligations, and only 1 enterprise reported land delinquent in drainage taxes. The area delinquent was 7,400 acres.

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres	Per cent 100.0	Dollars	Per cent 100.0	
All enterprises.....	162,980	100.0	1,349,774	100.0	7,400
Enterprises not in arrears.....	162,980	100.0	1,349,774	100.0	7,400
With some delinquent land.....	30,000	18.4	95,000	7.0	7,400
With no delinquent land.....	132,980	81.6	1,254,774	93.0	

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain land in farms, land damaged by alkali or seepage from irrigation, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported. All the drainage enterprises in Nevada are located on irrigated land, and the purpose of drainage was mainly to remove alkali or seepage resulting from irrigation.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	162,980	100.0	1,349,774	100.0
Improvement of land already in farms.	47,050	29.4	75,000	5.0
Removal of alkali or seepage from irrigation.....	112,224	68.9	1,121,774	83.1
Protection against overflow.....	2,800	1.7	153,000	11.3

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. Where the drainage work was done directly by an irrigation enterprise, the year in which drainage was undertaken is used instead of the year of organization of the irrigation project.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹	Capital invested to Jan. 1, 1930	
	Acres	Per cent		Dollars	Per cent
All enterprises.....	162,980	100.0	162,980	1,349,774	100.0
1870-1879.....	1,200	0.7	1,200	3,000	0.2
1890-1899.....	1,600	1.0	1,600	150,000	11.1
1910-1914.....	30,000	18.4	30,000	95,000	7.0
1915-1919.....	82,224	50.5	82,224	1,026,774	76.1
1925-1929.....	47,956	29.4	47,956	75,000	5.0

¹ No overlap.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES				Land available for settlement
	Total	Condition of land		Unimproved land	
		Improved land	Per cent		
All enterprises.....	162,980	122,918	75.4	40,062	7,480
1870-1879.....	1,200	1,200	100.0		
1890-1899.....	1,600	1,600	100.0		
1910-1914.....	30,000	25,000	83.3	5,000	2,733
1915-1919.....	82,224	47,301	57.5	34,923	4,750
1925-1929.....	47,956	47,817	99.7	139	

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown. The supervisors of each drainage district make an annual estimate of the cost of maintenance and operation for the succeeding year. This estimate is certified to the county assessor, who levies the amount against the lands of the district in proportion to the original assessment of benefits. In irrigation enterprises the drainage works are maintained as a part of the irrigation system.

Systematic maintenance was reported by all enterprises. These covered 162,980 acres of land and had an invested capital of \$1,349,774. There were 3 enterprises, with an invested capital of \$1,056,774 and covering 96,074 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 4 enterprises, with an invested capital of \$293,000 and covering 66,906 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	162,980	100.0	1,349,774	100.0
By district forces.....	130,180	79.9	1,101,774	81.6
By work apportioned to landowners..	32,800	20.1	248,000	18.4

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 73 per cent of the land reported some cost, while 27 per cent reported no cost in 1929. The average cost was 7 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
All enterprises reporting.....	162,980	\$10,800	\$0.07
Gravity drainage only, ditches and levees.....	85,600	2,325	0.03
Drainage, part by pumping.....	77,284	8,475	0.11

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Number	Acres	Acres	
The State.....	672	385	107,039	46,252	3,442	4,080,906	494,307	60,373	70,285,440
Churchill.....	482	223	60,082	21,847	614	88,021	41,901	1,708	3,232,000
Douglas.....	9	18	1,003	787	135	140,338	10,443	47,304	400,120
Lyon.....	51	(²)	12,622		350	187,732	34,878	2,907	965,760
Nye.....	4	9	1,034	1,397	142	88,002	13,775	417	11,708,100
Pershing.....	30	54	19,844	15,275	119	111,261	31,255		3,873,020
Storey.....	8		508		9	1,504	482	37	160,040
Washoe.....	2	38	11,122	1,428	474	434,877	30,110	3,762	4,000,040
All other counties.....	0	43	224	5,518	1,610	3,027,511	310,307	10,148	45,875,200

¹ No drainage on farms reported in Clark, Esmeralda, Eureka, Humboldt, Lander, Mineral, and Ormsby Counties in 1930; nor in Clark and Storey Counties for 1920.
² Included in "All other counties".

DRAINAGE—NEVADA

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

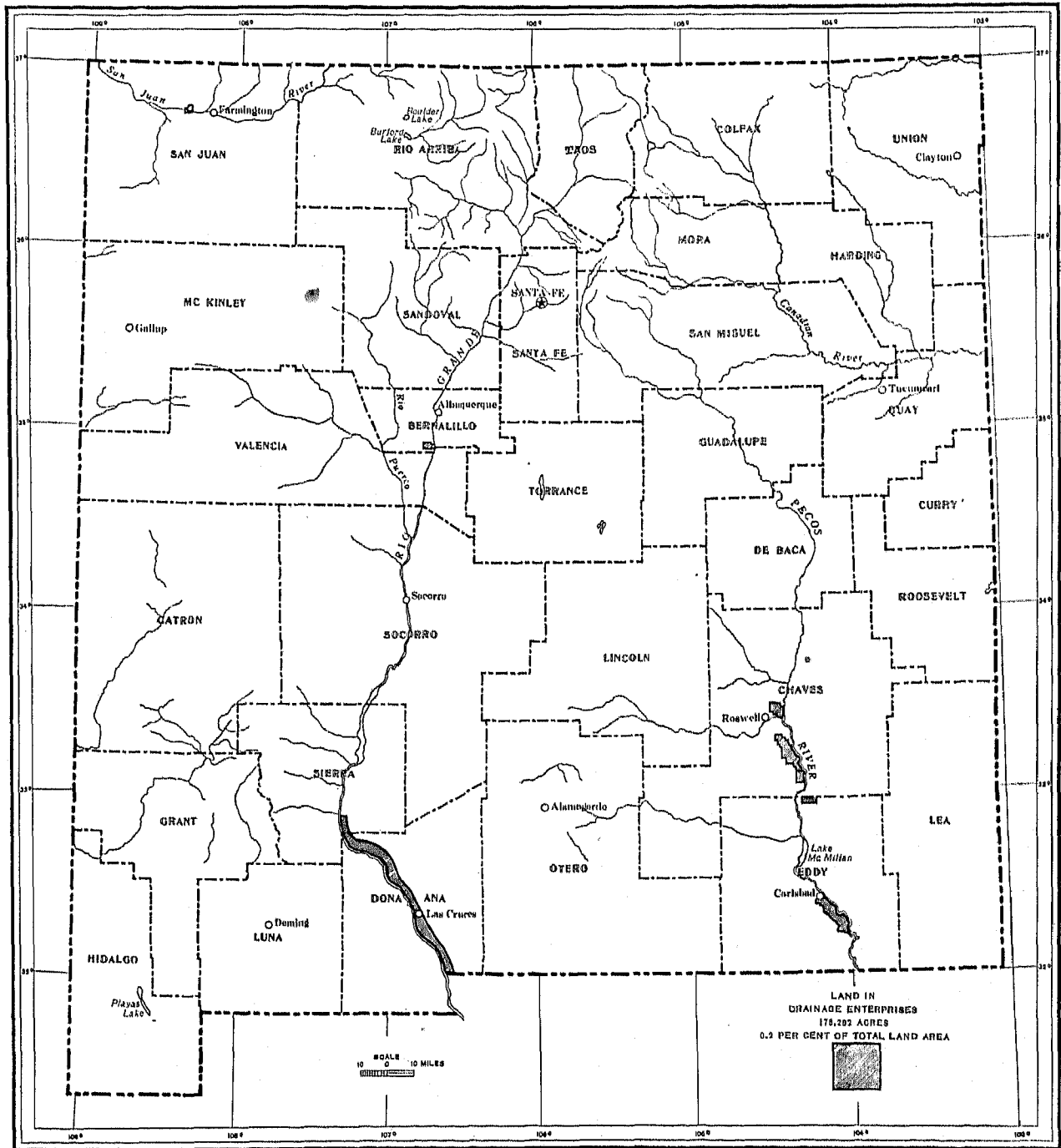
ITEM (See definitions in Introduction)		THE STATE	Churchill	Lyon	Pershing	Washoe
LAND AREA						
1	Approximate land area.....1930.....acres..	70,285,440	3,232,000	995,700	3,873,920	4,000,040
2	Land in enterprises.....1930.....acres..	102,980	77,284	52,800	30,000	2,800
3	.....1920.....acres..	15,040	15,040			
4	Increase, ¹ 1920-1930.....per cent..	922.5	384.8			
5	Area of all enterprises ².....1930.....acres..	102,980	77,284	52,800	30,000	2,800
CONDITION AND USE OF LAND						
6	Land unfit to raise any crop.....1930.....acres..	139		139		
7	Land unfit to raise any crop prior to drainage.....acres..	53,029	44,284	3,745	5,000	
8	Decrease since drainage.....per cent..	96.7	100.0	96.3	100.0	
9	Land fit to raise a normal crop.....1930.....acres..	100,100	74,074	52,035	30,000	2,800
10	Land fit to raise a normal crop prior to drainage.....acres..	90,561	33,000	47,551	10,000	
11	Increase since drainage ¹.....per cent..	76.8	126.3	10.7	200.0	
12	Land fit to raise a partial crop.....1930.....acres..	2,732	2,010	122		
13	Land fit to raise a partial crop prior to drainage.....acres..	10,400		1,600	15,000	2,800
14	Decrease since drainage ¹.....per cent..	85.0		92.4	100.0	100.0
15	Improved land.....1930.....acres..	122,018	43,706	51,412	25,000	2,800
16	.....1920.....acres..	7,970	7,970			
17	Increase, ¹ 1920-1930.....per cent..		448.4			
18	Unimproved land.....1930.....acres..	40,062	33,578	1,484	5,000	
19	Land in occupied farms.....1930.....acres..	155,491	72,707	52,717	27,207	2,800
20	Land in planted crops.....1930.....acres..	111,512	43,706	50,306	15,000	2,800
21	Land idle.....1930.....acres..	45,306	20,001	1,305	15,000	
22	Land available for settlement.....1930.....acres..	7,480	4,577	170	2,733	
DRAINAGE WORKS, 1930						
23	Ditches—					
24	Completed.....miles..	334.8	240.0	32.8	40.0	13.0
24	Additional under construction.....miles..	11.8	3.8	8.0		
25	Tile drains—					
25	Completed.....miles..	4.0	4.0			
26	Levees and dikes—					
26	Completed.....miles..	33.0	23.0			10.0
27	Pumping plants—					
27	Motor capacity.....horsepower..	18	18			
28	Pump capacity.....gallons per minute..	900	900			
29	Land served by pumps.....acres..	50	50			
30	Land drained by ditches only ³.....acres..	84,096		52,806	30,000	1,200
31	Length of ditches.....miles..	83.8		40.8	40.0	3.0
32	Land having ditches and levees.....acres..	1,600				1,600
33	Length of ditches.....miles..	10.0				10.0
34	Length of levees.....miles..	10.0				10.0
35	Land drained by pumps and other drainage works ⁴.....acres..	77,284	77,284			
36	Length of ditches.....miles..	262.8	262.8			
37	Length of tile.....miles..	4.0	4.0			
38	Length of levees.....miles..	23.0	23.0			
CAPITAL INVESTED AND COST PER ACRE						
39	Capital invested in enterprises to Jan. 1, 1930.....dollars..	1,340,774	940,683	152,091	95,000	153,000
40	.....1920.....dollars..	117,851	117,851			
41	Increase, ¹ 1920-1930.....per cent..		705.8			
42	Estimated cost of enterprises when completed.....1930.....dollars..	1,400,174	955,083	197,091	95,000	153,000
43	.....1920.....dollars..	117,851	117,851			
44	Average, per acre when completed.....1930.....dollars..	8.50	12.36	3.73	3.17	84.64
	.....1920.....dollars..	7.30	7.30			
45	Invested in and required for completion of—					
46	Enterprises having ditches only.....1930.....dollars..	295,091		197,091	95,000	3,000
47	Average, per acre.....dollars..	3.51		3.73	3.17	2.50
48	Enterprises having ditches and levees.....1930.....dollars..	150,000				150,000
49	Average, per acre.....dollars..	93.75				93.75
50	Enterprises having pumps and other drainage works.....1930.....dollars..	955,083	955,083			
51	Average, per acre.....dollars..	12.36	12.36			

¹ Per cent not shown when more than 1,000.
² No overlap.

³ When works under construction have been completed.
⁴ Area of enterprises having some land served by pumps.

NEW MEXICO

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



NEW MEXICO

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—Nearly all of the land in drainage enterprises lies in the southern portion of the State, in the valleys of the Rio Grande and the Pecos River. Half of this land is located in the Rio Grande Project of the United States Bureau of Reclamation.

All drainage enterprises cover lands that are also irrigated and the primary purpose of drainage was the removal of seepage and alkali resulting from irrigation. Approximately 9 per cent of the land was reported as unfit to raise any crop for lack of drainage.

Where the drainage work is done directly by an irrigation enterprise, the drainage enterprise has been considered as identical with the irrigation enterprise as all irrigable lands are usually assessed for the necessary drainage works. Of the 116,455 acres located in such enterprises, about 26,000 are not now served by drainage works, but will probably require drainage some time in the future. The greater portion of this land, not yet drained, is located in the Carlsbad Project, constructed by the United States Bureau of Reclamation.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief from overflow for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number..	31,404	20,844	1,560	5.2
Farms reporting drainage.....number..	1,871	1,294	577	44.6
All land in farms.....acres..	30,822,034	24,409,633	6,412,401	26.3
Farm land provided with drainage.....acres..	107,352	47,311	60,041	126.9
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres..	78,401,920	78,401,920		
Land in drainage enterprises.....acres..	176,202	140,210	36,073	25.7
Improved land.....acres..	146,557	92,477	54,080	58.5
Unimproved land.....acres..	29,735	47,742	-18,007	-37.7
Land unfit to raise any crop for lack of drainage.....acres..	15,220	² 20,572	-5,352	-26.0
Land drained, fit to raise normal crop.....acres..	144,750	(3)		
Land partly drained, fit for partial crop.....acres..	16,322	⁴ 24,420	-8,098	-33.2
Land in occupied farms.....acres..	151,516	(3)		
Land in planted crops.....acres..	137,570	(3)		
Land idle.....acres..	80,996	(3)		
Ditches, completed.....miles..	282.9	124.0	158.9	128.1
Tile drains, completed.....miles..	305.4	282.2	23.2	8.2
Capital invested in enterprises.....dollars..	3,279,371	1,710,706	1,568,575	91.7
Average, per acre.....dollars..	18.60	12.20	6.40	52.5

¹ A minus sign (-) denotes decrease. ² "Seeped, alkali, or subject to overflow." ³ Not called for on schedule. ⁴ "Suffering a loss of crops from defective drainage."

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. Where the drainage work was done directly by an irrigation enterprise, the year in which drainage was undertaken is used instead of the year of organization of the irrigation project.

STATE TABLE 7.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹ Acres 176,292	Capital invested to Jan. 1, 1930	
	Acres 176,292	Per cent 100.0		Dollars 3,279,371	Per cent 100.0
All enterprises.....					
1905-1909.....	25,055	14.2	25,055	145,240	4.4
1910-1914.....	44,097	25.0	44,097	971,555	29.6
1915-1919.....	102,400	58.1	102,400	2,117,596	64.6
1920-1924.....	3,400	1.9	3,400	43,980	1.3
1925-1929.....	1,340	0.8	1,340	1,000	(²)

¹ No overlap.

² Less than one-tenth of 1 per cent.

STATE TABLE 8.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement Acres 13,400
	Total Acres 176,292	Condition of land			Unimproved land Acres 20,735	
		Improved land Acres 140,557	Per cent 83.1	Unimproved land Acres 20,735		
All enterprises.....						
1905-1909.....	25,055	25,055	100.0			
1910-1914.....	44,097	28,662	64.8	15,535		
1915-1919.....	102,400	89,000	86.9	13,400	13,400	
1920-1924.....	3,400	3,100	91.2	300		
1925-1929.....	1,340	840	62.7	500		

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown. Systematic maintenance was reported by all enterprises.

There were 3 enterprises, with an invested capital of \$1,972,836 and covering 113,055 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 8 enterprises, with an invested capital of \$1,306,535 and covering 63,237 acres of land, did not report any such equipment.

STATE TABLE 9.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	176,292	100.0	3,279,371	100.0
By district forces.....	172,892	98.1	3,235,301	98.7
By contract.....	3,400	1.9	43,980	1.3

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost in 1929, in order to determine a fair average cost of maintenance for the State. Approximately 99 per cent of the land reporting showed some cost, and 1 per cent showed no cost in 1929. The average cost was 31 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 10.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost Acres 176,292	COST REPORTED	
		Total	Per acre
		Dollars	Dollars
All enterprises reporting.....		55,107	0.31
Gravity drainage only.....	176,292	55,107	0.31
Ditches and levees.....	92,740	42,750	0.46
Tile drains.....	25,972	5,602	0.22
Ditches and tile drains.....	57,580	6,755	0.12

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930 Number 31,404	FARM LAND, 1930			Approximate land area, 1930 Acres 78,401,920
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 1,871	Number 1,294	Acres 107,352	Acres 47,311		Acres 30,822,034	Acres 1,790,190	Acres 1,818,134	
The State.....									
Bernalillo.....	35	(²)	1,104	(²)	1,248	84,870	21,040	22,040	770,960
Chaves.....	283	108	30,066	13,198	883	2,314,115	56,507	3,392	3,866,880
Colfax.....	3	11	872	883	798	1,920,848	88,510	83,492	2,430,720
Dona Ana.....	1,142	227	65,643	14,128	2,120	426,555	84,414	10,985	2,445,440
Eddy.....	43	21	3,230	2,738	1,054	1,532,301	53,035	134	2,716,800
San Miguel.....	86	151	603	1,200	1,070	1,908,763	52,026	260,447	3,132,160
Sierra.....	17	28	743	541	449	880,399	5,568	5,687	1,995,520
Taos.....	116	121	1,506	2,978	1,423	147,247	27,741	24,254	1,441,280
All other counties.....	146	627	2,637	11,636	21,750	21,694,850	1,410,283	1,401,697	59,596,160

¹ No drainage on farms reported in Catron, De Baca, Grant, Harding, Hidalgo, Lea, Luna, McKinley, Roosevelt, and Torrance Counties in 1930; nor in Hidalgo, Lea, Lincoln, Luna, Roosevelt, Santa Fe, Torrance, and Valencia Counties for 1920.

² Included in "All other counties."

DRAINAGE—NEW MEXICO

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Bernalillo	Chaves	Dona Ana	Eddy	San Juan	Sierra
LAND AREA								
1	Approximate land area.....1930.....acres..	78,401,920	770,900	3,800,880	2,445,440	2,716,800	3,504,640	1,095,520
2	Land in enterprises.....1930.....acres..	170,292	3,400	51,207	84,000	32,255	1,340	4,000
3	.....1920.....acres..	140,219		53,983	74,000	12,230		
4	Increase, ¹ 1920-1930.....per cent..	25.7		-5.0	13.5	163.6		
5	Area of all enterprises ¹.....1930.....acres..	170,292	3,400	51,207	84,000	32,255	1,340	4,000
CONDITION AND USE OF LAND								
6	Land unfit to raise any crop.....1930.....acres..	15,220		4,020	0,800	700	400	800
7	Land unfit to raise any crop prior to drainage.....acres..	60,808	1,700	22,503	24,500	11,200	400	500
8	Decrease since drainage.....per cent..	75.0	100.0	82.2	60.0	93.8		40.0
9	Land fit to raise a normal crop.....1930.....acres..	144,750	3,400	42,355	68,000	27,755	540	2,700
10	Land fit to raise a normal crop prior to drainage.....acres..	50,524	000	21,020	11,000	15,355	640	2,000
11	Increase since drainage.....per cent..	186.5	460.7	101.4	518.2	80.8		35.0
12	Land fit to raise a partial crop.....1930.....acres..	16,322		4,922	0,200	3,800	400	1,000
13	Land fit to raise a partial crop prior to drainage.....acres..	64,000	1,100	7,700	48,500	5,700	400	1,500
14	Decrease since drainage.....per cent..	74.9	100.0	30.1	87.2	33.3		33.3
15	Improved land.....1930.....acres..	146,557	3,100	31,503	81,000	28,055	840	2,000
16	.....1920.....acres..	92,477		40,843	37,000	8,034		
17	Increase, ¹ 1920-1930.....per cent..	58.5		-32.6	118.0	224.9		
18	Unimproved land.....1930.....acres..	29,735	300	19,735	3,000	4,200	500	2,000
19	Land in occupied farms.....1930.....acres..	151,510	3,400	30,221	81,000	28,055	840	2,000
20	Land in planted crops.....1930.....acres..	137,670	1,880	28,915	77,200	27,335	440	1,800
21	Woodland cleared and cultivated since drainage.....1930.....acres..	60,000			58,000			2,000
22	Land idle.....1930.....acres..	30,008	1,520	19,550	4,000	4,920		1,000
23	Land available for settlement.....1930.....acres..	13,400		4,200	4,000	4,200		1,000
DRAINAGE WORKS, 1930								
24	Ditches—Completed.....miles..	282.0	7.0	0.8	243.0	23.8	0.3	2.0
25	Additional under construction.....miles..	29.5			24.5		4.5	0.5
26	Tile drains—Completed.....miles..	305.4		278.5		26.0		
27	Levees and dikes—Completed.....miles..	12.0	2.0		10.0			
28	Land drained by ditches only ¹.....acres..	5,340					1,340	4,000
29	Length of ditches.....miles..	7.3					4.8	2.5
30	Land drained by tile only.....acres..	25,072		25,072				
31	Length of tile.....miles..	130.0		130.0				
32	Land drained by ditches and tile.....acres..	57,580		25,325		32,255		
33	Length of ditches.....miles..	30.6		0.8		23.8		
34	Length of tile.....miles..	175.4		148.5		26.9		
35	Land having ditches and levees ¹.....acres..	87,400	3,400		84,000			
36	Length of ditches.....miles..	274.5	7.0		267.5			
37	Length of levees.....miles..	12.0	2.0		10.0			
CAPITAL INVESTED AND COST PER ACRE								
38	Capital invested in enterprises to Jan. 1, 1930.....dollars..	3,279,371	43,980	1,116,555	1,812,506	200,240	1,000	15,000
39	.....1920.....dollars..	1,710,796		924,442	675,000	211,354		
40	Increase, ¹ 1920-1930.....per cent..	91.7		20.8	215.2	37.3		
41	Estimated cost of enterprises when completed.....1930.....dollars..	3,474,031	43,980	1,116,555	1,093,856	200,210	10,000	20,000
42	.....1920.....dollars..	2,006,296		1,003,692	1,675,000	237,601		
43	Average, per acre when completed.....1930.....dollars..	16.71	12.94	21.77	23.74	0.00	7.46	5.00
44	.....1920.....dollars..	20.73		20.26	21.28	19.42		
45	Invested in and required for completion of—Enterprises having ditches only.....1930.....dollars..	30,000					10,000	20,000
46	Average, per acre.....dollars..	5.62					7.46	5.00
47	Enterprises having tile drains only.....1930.....dollars..	401,935		401,935				
48	Average, per acre.....dollars..	18.04		18.04				
49	Enterprises having ditches and tile drains.....1930.....dollars..	914,800		624,620		290,210		
50	Average, per acre.....dollars..	16.89		24.60		9.00		
51	Enterprises having ditches and levees.....1930.....dollars..	2,037,836	43,980		1,093,856			
52	Average, per acre.....dollars..	23.32	12.94		23.74			

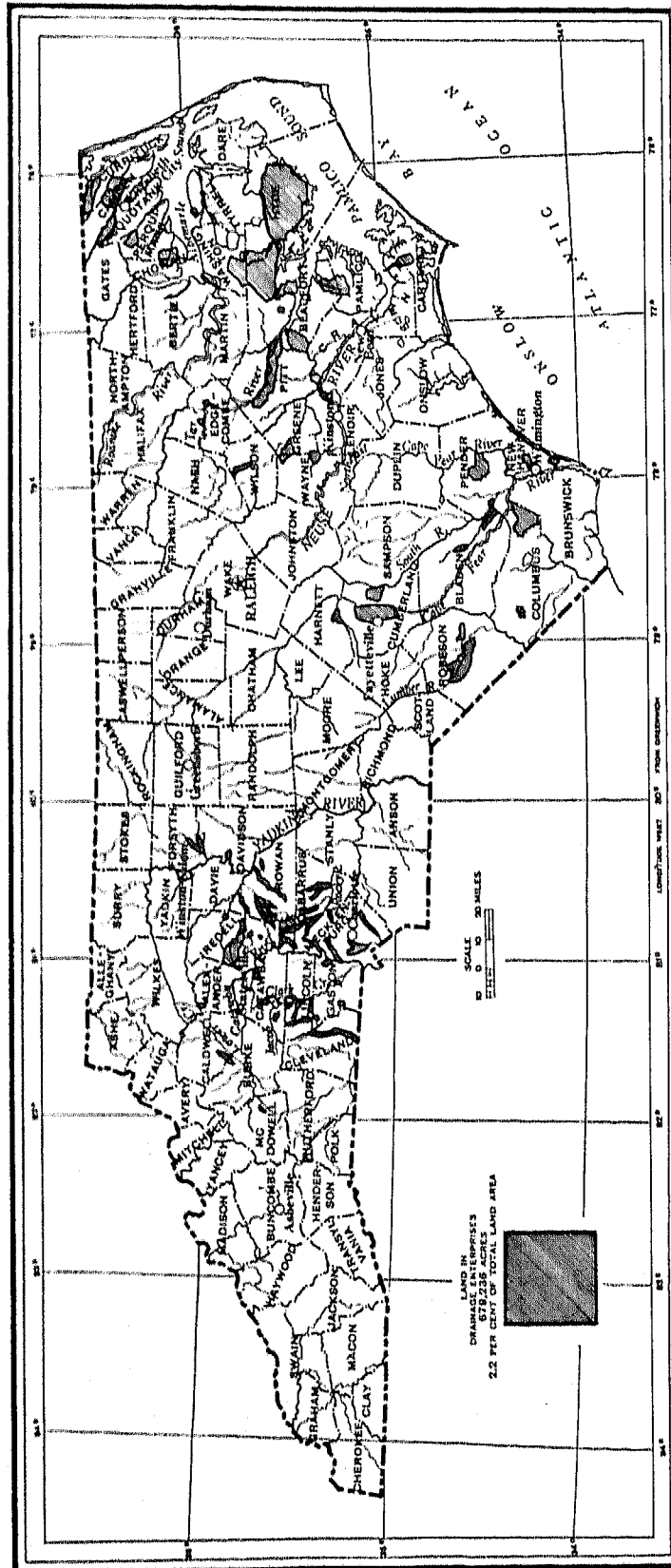
¹ A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.

² No overlap.

³ When works under construction have been completed.

NORTH CAROLINA

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



NORTH CAROLINA

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—About 85 per cent of the land in drainage enterprises in North Carolina is located in the eastern or Coastal Plain section of the State. These enterprises generally cover large flat areas, chiefly composed of cut-over and swampy land. In the vicinity of Albemarle and Pamlico Sounds the land is particularly flat and only a few feet above sea level. The remaining 15 per cent

of land in enterprises is located in the Piedmont region in the western part of the State. This land lies in the rather narrow bottoms of the hill streams and the purpose of drainage is to prevent damage from overflow.

About 38 per cent of all land in enterprises is located in the peninsula between Albemarle Sound and the Pamlico River. This land includes 100,000 acres served by pumps.

The average precipitation for 1929 was 62 inches, which is the second highest during the past 43 years. The mean annual amount for the State is 50 inches.

Approximately 45 per cent of the land in enterprises was reported as improved; 12 per cent was unfit to raise any crop for lack of drainage; and 54 per cent was idle in 1929. The average cost of drainage was \$6.95 per acre.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number.....	279,708	269,703	0,045	3.7
Farms reporting drainage.....number.....	30,618	45,246	-15,228	-33.7
All land in farms.....acres.....	18,055,103	20,021,736	-1,966,633	-9.8
Farm land provided with drainage.....acres.....	645,679	1,060,933	-421,264	-39.5
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres.....	31,193,600	31,193,600		
Land in drainage enterprises.....acres.....	679,236	542,828	136,408	25.1
Improved land.....acres.....	305,597	204,928	100,669	49.1
Unimproved land:				
Woodland.....acres.....	209,991	244,576	-34,615	-14.2
Other.....acres.....	163,678	93,324	70,354	75.4
Land unfit to raise any crop for lack of drainage.....acres.....	79,267	² 77,404	1,773	2.3
Land drained, fit to raise normal crop.....acres.....	438,992	³		
Land partly drained, fit for partial crop.....acres.....	160,977	¹ 12,771	148,206	
Land in occupied farms.....acres.....	331,121	³		
Land in planted crops.....acres.....	267,525	³		
Land idle.....acres.....	363,415	³		
Ditches, completed.....miles.....	1,483.5	1,171.3	312.2	26.7
Capital invested in enterprises.....dollars.....	4,710,079	3,623,518	1,086,561	30.2
Average, per acre.....dollars.....	6.95	6.68	0.27	4.0

¹ A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.
² "Swampy or subject to overflow."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 130 drainage enterprises are shown for North Carolina with an average area of 5,296 acres. There are 32 such enterprises of 5,000 acres or more, 78 of between 500 and 5,000 acres, and 20 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 9,200 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	688,436	100.0	552,428	100.0	679,236
Less than 100 acres.....	98	(?)	120	(?)	98
100 to 199 acres.....	418	0.1			418
200 to 499 acres.....	5,075	0.7	2,007	0.5	5,075
500 to 999 acres.....	17,024	2.6	15,928	2.9	17,024
1,000 to 4,999 acres.....	117,967	17.1	90,026	17.4	115,107
5,000 to 9,999 acres.....	81,272	11.8	71,717	13.0	74,872
10,000 to 49,999 acres.....	365,742	53.1	265,040	48.1	365,742
100,000 acres and over.....	100,000	14.5	100,000	18.1	100,000

¹ The sum of the areas of individual enterprises, including overlap.
² Less than one-tenth of 1 per cent.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects, county drains, or township drains*, according to the public officials in control.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	679,236	100.0	4,719,079	100.0
Drainage districts.....	641,225	94.4	4,530,498	96.0
County drains.....	20,641	3.0	124,935	2.6
Individually owned projects.....	17,370	2.6	63,646	1.4

Type of drainage.—There were 123 enterprises, covering 636,749 acres of land and with an invested capital of \$4,608,018, that reported their works as

completed; while 7 enterprises, covering 42,487 acres of land and with an invested capital of \$111,061, estimated that \$129,659 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 1,484 miles of ditches and 22 miles of levees. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. Only 1 pumping plant was reported.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	679,236	100.0	4,719,079	100.0
Gravity drainage only.....	679,236	85.3	3,969,679	84.1
Ditches and levees.....	577,706	85.1	3,961,079	83.9
Ditches, tile drains, and levees.....	1,440	0.2	8,000	0.2
Drainage, all by pumping.....	100,000	14.7	750,000	15.9

Pumping plants.—Only 1 enterprise reported land served by pumps. This pumping plant had 4 pumps operated by steam engines, and served 100,000 acres of land located in Hyde County in the northeastern part of the State. The capacity of the pumps was 1,000,000 gallons per minute and the average lift was 6 feet.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER: 1930 AND 1920

KIND OF POWER	Enterprises	Engine capacity		Pump capacity	Land served
		H. p.	Per cent		
All enterprises, steam only—1930..	1	3,000	100.0	1,000,000	100,000
.....1920..	1	1,000	100.0	1,000,000	100,000

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Engine capacity	Land served
		G. p. m.	Per cent		
All enterprises, centrifugal only...	4	1,000,000	100.0	3,000	100,000

Arrears and delinquency.—There were 21 enterprises with approximately 22 per cent of the invested capital, and covering about 18 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 109 enterprises were reported as not in arrears. Reports of 15 enterprises, covering 111,861 acres, show a total of 95,266 acres delinquent in drainage taxes; 104 enterprises, covering 542,819 acres, reported no delinquency; while 11 enterprises failed to report.

DRAINAGE—NORTH CAROLINA

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres 679,230	Per cent 100.0	Dollars 4,719,079	Per cent 100.0	
All enterprises.....					95,260
Enterprises in arrears.....	122,131	18.0	1,040,030	22.2	93,146
With some delinquent land.....	102,745	15.1	888,339	18.8	93,146
With no report on delinquency.....	19,386	2.9	160,700	3.4	
Enterprises not in arrears.....	557,105	82.0	3,679,049	77.8	2,120
With some delinquent land.....	9,110	1.3	75,000	1.6	2,120
With no delinquent land.....	548,015	80.7	3,604,049	76.2	
With no report on delinquency.....	5,170	0.8	60,000	1.1	

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported.

In the Piedmont region the usual purpose in drainage was the protection of bottom lands from overflow, while in the larger areas of the Coastal Plain region the reclamation of swampy land was the more common purpose.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres 679,230	Per cent 100.0	Dollars 4,719,079	Per cent 100.0
All enterprises.....				
Reclamation of swamp land not previously in farms.....	405,002	59.6	2,776,943	58.8
Improvement of land already in farms.....	208,730	30.7	1,363,848	28.9
Protection against overflow.....	65,504	9.7	578,288	12.3

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres 679,230	Per cent 100.0	Acres 688,430	Overlapped acres 9,200	Dollars 4,719,079	Per cent 100.0
All enterprises.....						
Before 1870.....	2,355	0.4	2,355		20,000	0.4
1905-1909.....	30,780	4.5	30,780		224,877	4.8
1910-1914.....	251,512	37.0	200,712	9,200	1,539,957	32.6
1915-1919.....	222,510	32.8	222,510		1,815,322	38.5
1920-1924.....	117,045	17.2	117,045		773,001	16.4
1925-1929.....	55,034	8.1	55,034		346,122	7.3

¹ Includes overlap.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement Acres
	Total	Condition of land			Land available for settlement Acres	
		Improved land	Woodland	Other unimproved land		
	Acres 679,230	Acres 305,597	Per cent 45.0	Acres 209,901	Acres 163,078	Acres 248,147
All enterprises.....						
Before 1870.....	2,355	2,355	100.0			
1905-1909.....	30,780	20,660	67.1	2,290	7,830	3,160
1910-1914.....	251,512	112,921	44.9	103,074	34,017	86,404
1915-1919.....	222,510	60,466	27.2	56,046	105,098	112,360
1920-1924.....	117,045	73,695	62.9	30,336	13,114	40,019
1925-1929.....	55,034	35,600	64.7	10,715	2,719	0,264

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 40 enterprises, covering 258,519 acres of land and having an invested capital of \$1,751,776; while 90 enterprises, with an invested capital of \$2,967,303 and covering 420,717 acres of land, did not have systematic maintenance.

There were 2 enterprises, with an invested capital of \$21,253 and covering 12,940 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 128 enterprises, with an invested capital of \$4,697,826 and covering 666,296 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres 679,230	Per cent 100.0	Dollars 4,719,079	Per cent 100.0
All enterprises.....				
By district forces.....	191,352	28.2	1,490,570	31.7
By contract.....	93,003	13.7	618,278	13.1
By work apportioned to landowners.....	112,895	16.6	831,322	17.6
Other, none, and not reported.....	281,980	41.5	1,872,909	39.7

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 33 per cent of the land reporting showed some cost, and 67 per cent showed no cost in 1929. The average cost was 16 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
	Acres 679,230	Dollars 105,400	Dollars 0.16
All enterprises reporting.....			
Gravity drainage only.....	579,230	55,400	0.10
Ditches and levees.....	877,796	55,400	0.10
Ditches, tile drains, and levees.....	1,440		
Drainage, all by pumping.....	100,000	50,000	0.50

DRAINAGE—NORTH CAROLINA

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 30,018	Number 46,240	Acres 646,670	Acres 1,066,033		Number 270,708	Acres 18,055,103	Acres 7,012,201		Acres 8,326,434	Acres 81,193,000
The State									
Alleghany.....	113	90	897	715	1,384	128,088	26,830	37,143	140,760
Anson.....	170	187	2,459	2,152	3,172	247,200	107,276	102,458	355,840
Asho.....	130	615	1,241	3,877	3,060	244,410	54,080	71,385	273,280
Avery.....	52	(?)	607	(?)	1,410	87,523	10,223	40,804	152,320
Beaufort.....	2,066	2,250	45,328	57,455	3,425	189,017	81,705	65,100	537,000
Bertie.....	1,075	1,841	24,172	22,098	3,474	243,645	61,328	133,352	440,920
Bladen.....	452	1,223	11,050	30,434	2,086	208,550	63,128	124,578	624,040
Brunswick.....	618	592	10,053	13,800	1,519	132,030	24,074	69,472	505,000
Buncombe.....	188	138	1,813	2,749	3,805	230,701	57,550	100,066	450,480
Caldwell.....	53	88	575	893	2,002	103,327	37,706	102,317	361,440
Cherokee.....	441	102	8,400	4,091	840	53,618	10,095	30,600	300,720
Chatham.....	100	(?)	1,470	(?)	3,191	310,377	92,239	174,117	445,440
Chowan.....	403	610	9,088	15,960	1,102	70,093	33,197	20,107	105,000
Clay.....	38	125	502	987	898	60,526	17,439	31,184	104,800
Columbus.....	472	2,005	13,440	58,397	4,297	250,758	82,468	144,520	597,120
Craven.....	800	1,184	10,594	21,782	2,102	127,064	48,238	66,960	422,400
Cumberland.....	496	706	13,850	18,020	2,840	174,972	85,090	59,108	428,800
Duplin.....	1,847	2,638	31,253	54,084	4,070	281,083	100,762	152,318	605,600
Durham.....	80	(?)	1,044	(?)	1,051	110,667	35,100	63,845	100,680
Edgecombe.....	277	1,765	5,817	61,838	4,000	237,413	120,846	92,791	325,700
Forsyth.....	170	155	2,500	1,437	3,340	204,164	87,106	83,092	248,320
Gaston.....	68	148	727	1,030	2,555	161,029	70,585	51,069	232,320
Gates.....	190	589	6,404	15,488	1,400	100,195	41,097	59,827	220,760
Greene.....	224	229	5,800	4,516	3,260	130,456	69,735	54,308	161,280
Gulford.....	62	63	1,331	837	3,364	300,677	110,400	132,499	442,240
Hallfax.....	206	463	7,067	17,034	4,559	310,093	153,701	134,640	432,040
Harnett.....	227	625	1,532	6,221	3,930	204,696	94,456	84,854	370,320
Haywood.....	45	80	537	781	2,125	160,305	30,320	58,084	340,440
Henderson.....	227	148	3,933	3,297	1,983	120,226	38,603	55,830	229,120
Hertford.....	230	954	8,570	18,633	2,117	148,400	55,009	84,472	218,240
Hoke.....	224	237	3,893	4,117	1,885	112,118	63,053	35,589	260,880
Iredell.....	96	217	1,616	2,461	3,066	302,220	133,878	114,551	370,320
Jackson.....	90	108	987	832	2,117	132,029	20,709	72,565	316,160
Johnston.....	922	1,267	6,622	10,049	7,512	372,251	180,564	174,180	516,480
Jones.....	165	62	3,768	1,048	1,535	118,123	40,348	62,524	260,880
Lenoir.....	771	1,502	17,070	47,556	3,765	181,403	91,055	70,162	249,000
Lincoln.....	80	(?)	1,082	(?)	2,607	152,740	78,161	47,992	101,360
Macon.....	103	(?)	799	(?)	1,847	130,415	28,700	68,213	323,320
Martin.....	1,495	274	43,700	14,070	2,051	170,077	66,762	95,233	280,320
Mocklenburg.....	84	183	1,992	2,115	3,773	246,031	124,501	72,819	382,080
Montgomery.....	120	(?)	1,723	(?)	1,474	145,081	42,021	90,230	318,720
Moore.....	93	97	1,066	770	2,062	216,784	57,044	141,300	408,960
Nash.....	431	322	3,415	8,797	5,820	237,014	120,064	104,242	375,040
New Hanover.....	94	60	1,067	1,244	282	15,250	6,033	6,771	138,240
Northampton.....	220	1,128	4,353	21,520	3,870	201,230	108,306	70,587	322,560
Onslow.....	773	740	13,401	15,060	2,394	178,002	52,628	107,981	475,520
Pamlico.....	735	811	36,944	20,213	887	75,691	28,758	43,602	224,000
Pasquotank.....	350	730	18,495	26,700	1,170	83,003	40,580	20,388	142,720
Pender.....	604	349	11,195	10,240	1,984	138,594	40,001	81,367	521,000
Perquimans.....	114	778	3,518	24,847	1,222	91,083	46,005	39,720	101,280
Plt.....	3,552	2,022	72,963	52,706	6,760	232,353	143,104	118,287	401,280
Randolph.....	112	83	949	773	3,977	378,334	110,480	209,647	513,920
Richmond.....	243	25	3,450	580	1,811	164,310	69,547	75,796	333,440
Robeson.....	1,503	2,980	43,487	93,052	7,666	340,020	210,054	100,885	633,600
Rowan.....	158	208	1,483	2,130	3,241	250,325	120,009	80,342	312,960
Rutherford.....	90	(?)	648	(?)	3,791	237,093	89,087	116,742	348,160
Sampson.....	1,613	1,809	30,502	30,340	6,102	375,493	152,349	198,443	567,040
Scotland.....	319	650	7,635	18,031	1,896	105,963	72,108	28,580	223,360
Transylvania.....	105	184	1,533	4,893	730	62,858	14,740	30,495	242,560
Tyrrell.....	387	257	11,090	5,762	540	37,873	17,044	18,845	240,000
Union.....	80	594	1,043	9,732	5,442	317,795	144,534	122,944	361,600
Warren.....	53	85	1,072	1,075	2,889	170,912	69,090	89,108	272,000
Washington.....	520	321	16,118	8,794	1,091	67,557	32,358	31,583	209,280
Wayne.....	1,244	1,080	24,737	35,765	4,907	256,654	140,811	98,746	365,440
Wilkes.....	194	370	1,122	2,142	5,125	365,790	84,403	209,499	470,400
All other counties.....	713	5,623	7,184	132,448	89,191	5,920,530	2,187,991	2,682,888	9,181,440

¹ No drainage on farms reported in Vance County in 1930; nor in Orange and Person Counties for 1920.
² Included in "All other counties."
³ Part of McDowell annexed in 1925.
⁴ Part of Yadkin annexed in 1927.

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COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER

ITEM (See definitions in Introduction)		THE STATE	Beaufort	Bladen	Cabarrus	Camden	Catawba
LAND AREA							
1	Approximate land area..... 1930... acres..	31, 193, 600	537, 600	624, 640	240, 600	140, 800	261, 120
2	Land in enterprises..... 1930... acres..	670, 236	87, 196	6, 740	3, 319	10, 229	6, 145
3	..... 1920... acres..	542, 828	59, 629	7, 533	(?)	11, 014	(?)
4	Increase, ¹ 1920-1930..... per cent..	25. 1	46. 2	-10. 5		61. 4	
5	Area of all enterprises (overlapping areas included)..... 1930... acres..	688, 436	87, 196	6, 740	3, 319	10, 229	6, 145
6	Excess over land in enterprises (total areas overlapping)..... acres..	9, 200					
CONDITION AND USE OF LAND							
7	Land unfit to raise any crop..... 1930... acres..	70, 267	2, 400	1, 350	165	12, 818	1, 095
8	Land unfit to raise any crop prior to drainage..... acres..	478, 003	46, 428	5, 300	2, 000	10, 229	4, 795
9	Decrease since drainage..... per cent..	89. 4	94. 8	74. 5	01. 8	33. 3	77. 2
10	Land fit to raise a normal crop..... 1930... acres..	438, 092	76, 831	5, 240	2, 600	3, 200	4, 530
11	Land fit to raise a normal crop prior to drainage..... acres..	89, 653	12, 400	500	475		1, 000
12	Increase since drainage ² per cent..	389. 6	519. 6	948. 0	447. 4		353. 0
13	Land fit to raise a partial crop..... 1930... acres..	160, 977	7, 065	150	554	3, 211	520
14	Land fit to raise a partial crop prior to drainage..... acres..	111, 580	28, 368	940	844		360
15	Increase since drainage ² per cent..	44. 3	-71. 9	-84. 0	-34. 4		48. 0
16	Improved land..... 1930... acres..	305, 567	42, 384	3, 500	3, 150	6, 411	5, 105
17	..... 1920... acres..	204, 928	24, 803	6, 731	(?)	2, 070	(?)
18	Increase, ³ 1920-1930..... per cent..	49. 1	70. 9	-48. 0		115. 2	
19	Unimproved land—						
20	Woodland..... 1930... acres..	209, 961	34, 856	1, 300	700	2, 000	70
21	Other..... 1930... acres..	163, 678	9, 056	1, 940	469	10, 818	970
22	Land in occupied farms..... 1930... acres..	331, 121	30, 274	3, 240	3, 319	8, 411	5, 775
23	Land in planted crops..... 1930... acres..	267, 525	35, 670	2, 500	2, 050	6, 411	5, 050
24	Woodland cleared and cultivated since drainage..... 1930... acres..	88, 017	20, 457	1, 040	1, 050	2, 000	70
25	Land idle..... 1930... acres..	363, 415	50, 821	4, 040	625	12, 818	555
25	Land available for settlement..... 1930... acres..	248, 147	45, 622	2, 150			
DRAINAGE WORKS, 1930							
26	Ditches—						
27	Completed..... miles..	1, 483. 5	157. 0	20. 0	21. 5	11. 9	60. 0
28	Additional under construction..... miles..	42. 6		1. 5			
29	Tile drains—						
30	Under construction..... miles..	6. 0		6. 0			
31	Levees and dikes—						
32	Completed..... miles..	22. 0		8. 0			
33	Pumping plants—						
34	Engine capacity..... horsepower..	3, 000					
35	Pump capacity..... gals. per min..	1, 000, 000					
36	Land served by pumps..... acres..	100, 000					
37	Land drained by ditches only ⁴ acres..	573, 096	87, 196	3, 000	3, 319	10, 229	6, 145
38	Length of ditches..... miles..	1, 427. 6	157. 0	6. 0	21. 5	11. 9	60. 0
39	Land having ditches and levees..... acres..	3, 800		2, 300			
40	Length of ditches..... miles..	17. 0		9. 0			
41	Length of levees..... miles..	8. 0		7. 0			
42	Land having ditches, tile drains, and levees ⁴ acres..	1, 440		1, 440			
43	Length of ditches..... miles..	6. 5		6. 5			
44	Length of tile..... miles..	6. 0		6. 0			
45	Length of levees..... miles..	1. 0		1. 0			
46	Land drained by pumps and other drainage works ⁵ acres..	100, 000					
47	Length of ditches..... miles..	75. 0					
48	Length of levees..... miles..	13. 0					
CAPITAL INVESTED AND COST PER ACRE							
49	Capital invested in enterprises to Jan. 1, 1930..... dollars..	4, 719, 079	575, 947	64, 000	54, 177	35, 018	138, 035
50	..... 1920..... dollars..	3, 623, 518	304, 250	61, 000	(?)	30, 000	(?)
51	Increase, ¹ 1920-1930..... per cent..	30. 2	89. 3	4. 0		19. 7	
52	Estimated cost of enterprises when completed..... 1930... dollars..	4, 848, 738	575, 947	69, 000	54, 177	35, 018	138, 035
53	..... 1920... dollars..	4, 526, 018	333, 250	61, 000	(?)	30, 000	(?)
54	Average, per acre when completed..... 1930... dollars..	7. 14	6. 01	10. 24	13. 32	1. 87	22. 61
55	..... 1920... dollars..	8. 34	5. 59	8. 10	(?)	2. 52	(?)
56	Invested in and required for completion of—						
57	Enterprises having ditches only..... 1930... dollars..	4, 039, 738	575, 947	30, 000	54, 177	35, 018	138, 035
58	Average, per acre..... dollars..	7. 01	6. 01	10. 00	13. 32	1. 87	22. 61
59	Enterprises having ditches and levees..... 1930... dollars..	46, 000		26, 000			
60	Average, per acre..... dollars..	12. 11		11. 30			
61	Enterprises having ditches, tile drains, and levees..... 1930... dollars..	13, 000		13, 000			
62	Average, per acre..... dollars..	9. 03		9. 03			
63	Enterprises having pumps and other drainage works..... 1930... dollars..	750, 000					
64	Average, per acre..... dollars..	7. 50					

¹ Part of Yadkin annexed in 1927.

² Included in "Other counties."

³ A minus sign (-) denotes decrease. Per cent not shown when more than 1, 000.

DRAINAGE—NORTH CAROLINA

ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

Columbus	Craven	Cumberland	Currituck	Forsyth	Gaston	Greene	Harnett	Hyde	Iredell	Lenoir	Lincoln	Mecklenburg	New Hanover	Pamlico	
597,120	422,400	428,800	180,880	248,320	232,320	161,280	370,320	304,880	376,320	240,000	191,360	382,080	138,240	224,000	1
35,260	4,000	30,711	18,600	3,600	3,015	5,280	0,232	127,713	32,135	4,861	7,070	20,110	4,200	11,500	2
34,000	7,800	23,000	25,915	(?)	(?)	(?)	0,730	128,520	8,079	4,833	(?)	17,224	(?)	10,875	3
3.7	-48.7	33.5	-28.2				-7.4	-0.0	270.3	0.0		16.8		-42.1	4
35,260	4,000	30,711	18,600	3,600	3,015	5,280	0,232	130,513	32,135	4,861	7,070	20,110	4,200	11,500	5
								2,800							6
150	500		6,000	500	430			15,116	800	500	6	434			7
33,340	2,000	18,500	11,000	3,400	2,441	3,000	1,000	107,414	18,735	2,100	4,052	0,565	3,575	11,500	8
99.6	75.0	100.0	48.3	85.3	82.4	100.0	100.0	85.9	65.4	70.2	90.9	93.4	100.0	100.0	9
34,700	3,000	15,711	8,800	2,000	2,751	5,280	0,232	01,507	25,500	3,861	6,000	18,476	3,160	1,000	10
1,420	1,500	11,000	7,000		050	2,280	3,000		8,702	2,201	2,705	6,623	300		11
	100.0	42.8	25.7		323.2	131.1	107.7		100.0	70.8	147.2	170.0	953.3		12
410	500	15,000	3,800	200	434			51,000	5,775	500	161	1,200	1,100	10,500	13
500	500	1,211	200	200	524		2,232	20,290	4,008	600	220	6,931	385		14
-18.0					-17.2		-100.0	151.2	25.3		-20.7	-82.6	185.7		15
5,000	3,000	13,211	10,100	1,400	2,410	2,780	5,000	28,910	22,800	3,861	4,000	11,220	385	1,000	16
5,300	2,100	13,800	8,570	(?)	(?)	(?)	5,048	33,728	7,509	2,376	(?)	14,358	(?)	807	17
-5.7	37.0	-4.3	17.7				-1.0	-14.2	204.0	62.5		-21.9		15.3	18
30,260	500	12,500	2,000	2,000	1,020	2,500	1,232	10,208	6,302	500	3,011	8,567	1,030	10,500	19
	500	5,000	0,500	200	185			88,408	2,874	500	65	332	1,945		20
3,500	3,000	22,711	10,100	3,100	3,193	2,280	0,232	28,910	30,010	3,861	6,850	10,417	200	1,000	21
3,500	3,000	13,200	7,100	1,300	2,310	2,280	5,000	28,910	22,840	3,661	3,700	10,946	200	1,000	22
2,800	2,000	1,500	1,000	1,200	2,595	300	400	15,800	3,020	2,000	1,571	3,785	90	1,000	23
23,500	500	17,000	8,000	2,300	1,132	3,000	1,232	93,234	0,600	1,000	3,370	0,173	3,698	10,500	24
17,000	500	8,000	2,000			3,000		77,238	1,800	1,000		200	4,060	10,500	25
															26
63.0	6.0	44.3	25.5	28.0	32.7	26.0	7.0	07.0	62.3	16.0	27.9	06.3	17.3	235.0	27
												2.1			28
															29
								13.0							30
								3,000							31
								1,000,000							32
								100,000							33
35,260	4,000	30,711	18,600	3,600	3,015	5,280	0,232	27,713	32,135	4,861	7,070	20,110	4,200	11,500	34
03.0	6.0	44.3	25.5	28.0	32.7	26.0	7.0	22.9	62.3	16.0	27.9	07.4	17.3	235.0	35
															36
															37
															38
															39
															40
															41
								100,000							42
								75.0							43
								13.0							44
															45
290,000	24,000	134,000	54,342	137,000	62,204	64,500	30,000	796,878	230,953	31,500	77,250	124,735	54,500	13,253	46
232,000	80,000	70,500	73,000	(?)	(?)	(?)	30,000	800,272	183,725	32,500	(?)	115,101	(?)	90,000	47
25.0	-73.0	75.2	-25.0					-0.4	25.7	-3.1		8.4		-86.2	48
290,000	24,000	134,000	54,342	137,000	62,204	64,500	30,000	796,878	230,953	31,500	77,250	120,804	54,500	13,253	49
232,000	80,000	70,500	73,000	(?)	(?)	(?)	30,000	1,215,272	107,225	32,500	(?)	115,101	(?)	90,000	50
8.22	6.00	4.36	2.92	38.06	17.23	12.20	4.81	6.24	7.19	0.48	10.92	0.31	12.79	1.15	51
6.82	11.41	3.33	2.82	(?)	(?)	(?)	4.46	9.46	22.72	6.72	(?)	0.68	(?)	4.83	52
290,000	24,000	134,000	54,342	137,000	62,204	64,500	30,000	40,878	230,953	31,500	77,250	120,804	54,500	13,253	53
8.22	6.00	4.36	2.92	38.06	17.23	12.20	4.81	1.69	7.10	0.48	10.92	0.31	12.79	1.15	54
															55
															56
															57
								750,000							58
								7.50							59

† When works under construction have been completed.

‡ Area of enterprises having some land served by pumps.

DRAINAGE—NORTH CAROLINA

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Pender	Pitt	Robeson	Rowan	Tyrrell	Washington	Other counties ¹
LAND AREA								
1	Approximate land area..... 1930..acres..	521,600	401,280	633,600	312,960	240,600	209,280	3,472,000
2	Land in enterprises..... 1930..acres..	37,700	48,088	41,700	9,698	3,061	40,544	50,045
3	..... 1920..acres..	(?)	6,200	32,000	7,027	(?)	38,444	102,806
4	Increase, ² 1920-1930..... per cent.....		675.0	27.9	38.0		5.5	-41.7
5	Area of all enterprises (overlapping areas included)..... 1930..acres..	37,700	48,088	41,700	9,698	3,061	40,544	50,045
6	Excess over land in enterprises (total areas overlapping)..... acres.....						6,400	
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop..... 1930..acres..	18,600	1,000	200	343	611	1,544	14,645
8	Land unfit to raise any crop prior to drainage..... acres.....	32,200	30,850	28,033	4,114	2,600	33,500	38,933
9	Decrease since drainage..... per cent.....	42.2	66.8	99.3	91.7	75.0	95.4	02.4
10	Land fit to raise a normal crop..... 1930..acres..	10,400	42,338	28,000	6,600	3,150	28,500	27,717
11	Land fit to raise a normal crop prior to drainage..... acres.....	2,900	10,238	6,867	843	601	1,000	5,139
12	Increase since drainage ³ per cent.....	258.6	313.5	307.7	682.0	370.0		430.3
13	Land fit to raise a partial crop..... 1930..acres..	8,700	4,750	13,500	2,755	200	10,500	17,583
14	Land fit to raise a partial crop prior to drainage..... acres.....	2,600	7,000	5,909	4,741	800	6,044	15,874
15	Increase since drainage ³ per cent.....	234.6	-32.1	128.8	-41.0	-75.0	73.7	10.8
16	Improved land..... 1930..acres..	9,080	43,088	16,100	6,200	3,661	10,950	34,604
17	..... 1920..acres..	(?)	1,700	9,780	5,151	(?)	5,617	54,852
18	Increase, ² 1920-1930..... per cent.....		64.6	20.4			201.8	-35.8
19	Unimproved land—							
20	Woodland..... 1930..acres..	22,420	1,000	10,100	2,824		21,550	10,691
20	Other..... 1930..acres..	5,360	4,000	6,500	674	800	2,044	14,110
21	Land in occupied farms..... 1930..acres..	10,100	42,875	10,100	9,698	2,650	14,950	30,347
22	Land in planted crops..... 1930..acres..	7,980	37,875	10,100	6,000	2,200	12,930	23,755
23	Woodland cleared and cultivated since drainage..... 1930..acres..	1,680	2,000	5,000	3,825	100	7,550	3,505
24	Land idle..... 1930..acres..	22,700	5,213	21,000	2,576	1,761	25,504	31,459
25	Land available for settlement..... 1930..acres..	9,000	4,213	23,200		700	23,050	14,014
DRAINAGE WORKS, 1930								
26	Ditches—							
27	Completed..... miles.....	32.0	35.8	78.0	59.5	0.1	57.7	180.8
27	Additional under construction..... miles.....	33.0	4.0	2.0				
28	Tile drains—							
28	Under construction..... miles.....							
29	Levees and dikes—							
30	Completed..... miles.....	1.0						
30	Pumping plants—							
31	Engine capacity..... horsepower.....							
32	Pump capacity..... gals. per min.....							
32	Land served by pumps..... acres.....							
33	Land drained by ditches only ⁴ acres.....	36,200	48,088	41,700	9,698	3,061	40,544	50,946
34	Length of ditches..... miles.....	57.0	39.8	80.0	59.5	0.1	57.7	180.8
35	Land having ditches and levees..... acres.....	1,500						
36	Length of ditches..... miles.....	8.0						
37	Length of levees..... miles.....	1.0						
38	Land having ditches, tile drains, and levees..... acres.....							
39	Length of ditches..... miles.....							
40	Length of tile..... miles.....							
41	Length of levees..... miles.....							
42	Land drained by pumps and other drainage works..... acres.....							
43	Length of ditches..... miles.....							
44	Length of levees..... miles.....							
CAPITAL INVESTED AND COST PER ACRE								
45	Capital invested in enterprises to Jan. 1, 1930..... dollars.....	125,200	213,100	244,000	218,961	30,325	448,322	444,980
46	..... 1920..... dollars.....	(?)	77,600	165,000	129,026	(?)	334,352	794,192
47	Increase, ² 1920-1930..... per cent.....		174.6	47.9	69.7		34.1	-44.0
48	Estimated cost of enterprises when completed..... 1930..dollars.....	235,200	215,600	250,000	218,961	30,325	448,322	448,980
49	..... 1920..dollars.....	(?)	77,600	165,000	129,026	(?)	440,352	1,133,192
50	Average, per acre when completed..... 1930..dollars.....	6.24	4.48	6.00	22.58	7.66	11.06	7.40
51	..... 1920..dollars.....	(?)	12.52	8.00	18.36	(?)	11.45	11.01
52	Invested in and required for completion of—							
53	Enterprises having ditches only..... 1930..dollars.....	215,200	215,600	250,000	218,961	30,325	448,322	448,980
53	Average, per acre..... dollars.....	5.94	4.48	6.00	22.58	7.66	11.06	7.40
54	Enterprises having ditches and levees..... 1930..dollars.....	20,000						
55	Average, per acre..... dollars.....	13.33						
56	Enterprises having ditches, tile drains, and levees..... 1930..dollars.....							
57	Average, per acre..... dollars.....							
58	Enterprises having pumps and other drainage works..... 1930..dollars.....							
59	Average, per acre..... dollars.....							

¹ Includes Alexander, Burke, Caldwell, Carteret, Chowan, Cleveland, Davidson, Edgecombe, McDowell, Pasquotank, Perquimans, Wayne, and Wilson Counties in 1930; and Alexander, Burke, Cabarrus, Caldwell, Carteret, Catawba, Chowan, Cleveland, Davidson, Edgecombe, Forsyth, Gaston, Greene, Jones, Lincoln, McDowell, New Hanover, Pender, Perquimans, Tyrrell, Wayne, and Wilson Counties for 1920.

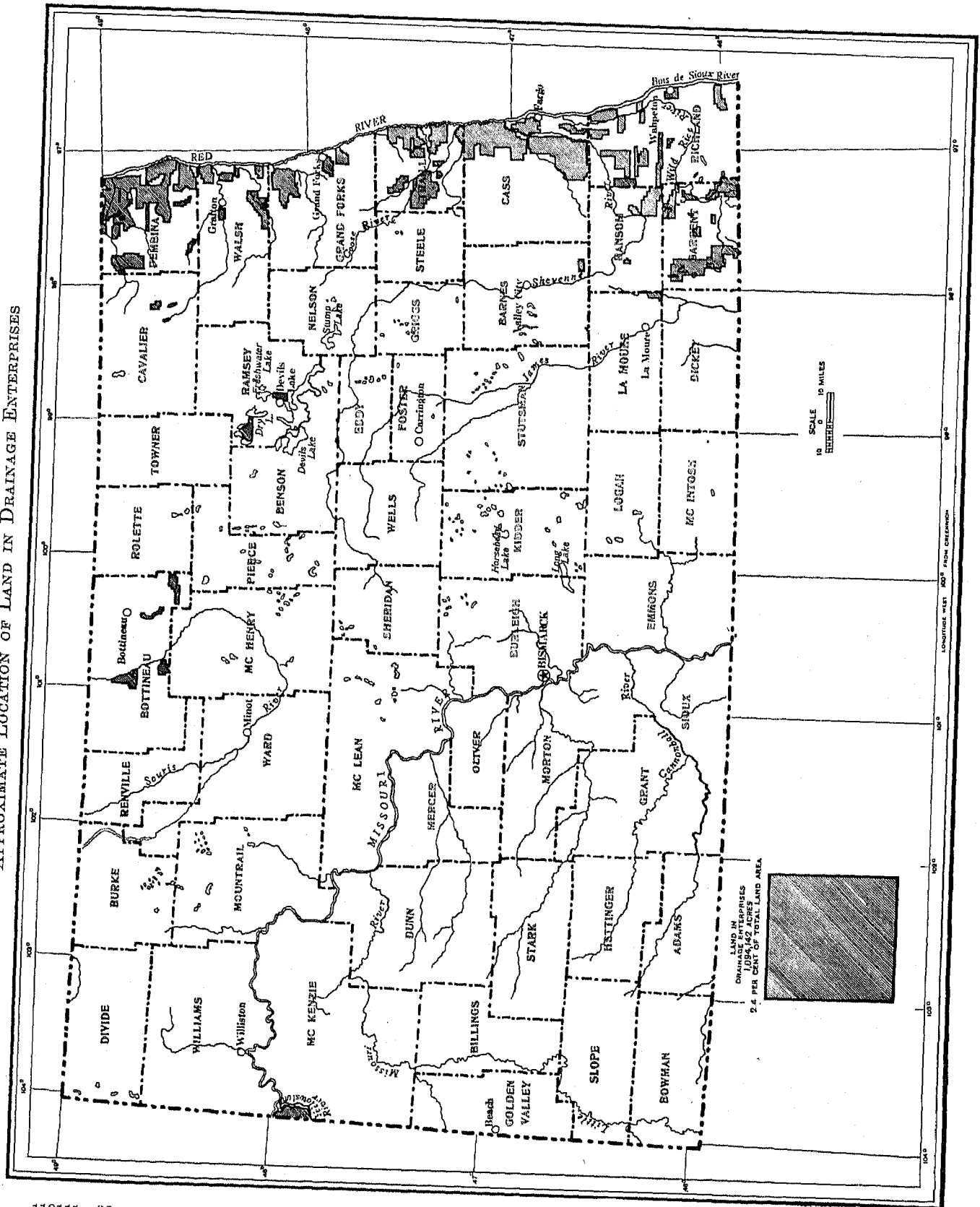
² Included in "Other counties."

³ A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.

⁴ When works under construction have been completed.

NORTH DAKOTA

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



NORTH DAKOTA

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Summary and condition of land in enterprises.—Approximately 97 per cent of the land in drainage enterprises in North Dakota is located in the valley of the Red River in the eastern part of the State. This valley, for the most part, comprises very level land which was once the bed of an old lake, Agassiz. During the last or Pleistocene glacial age the waters reached the Mississippi River through the Minnesota River, but as the glacier receded geological changes reversed the slope of this valley, making it finally tributary to Lake Winnipeg and Hudson Bay. This recession of the glacier and resulting changes in direction of drainage probably account for the fact that most of the tributary streams of the Red River tend to reverse their direction in their lower courses.

Since the snow and ice in the southern portion of this valley melt in the spring before melting begins farther north, the river often jams with ice, causing extensive overflows which, however, usually recede in time for spring planting.

The mean annual rainfall for the State is approximately 18 inches, but 1929 averaged only about 14 inches.

Approximately 98 per cent of the land in drainage enterprises was reported as improved; 1 per cent, as woodland; and 1 per cent, as other unimproved land. Although almost all of the land was in occupied farms, more than 9 per cent was idle.

When the drainage work is done directly by an irrigation enterprise, the drainage enterprise has been considered as identical with the irrigation enterprise as all irrigable lands are usually assessed for the necessary drainage works. Of the 6,089 acres located in such an enterprise, 3,000 acres are now served by drainage works, and 2,000 acres are in need of drainage. This land is located in the Lower Yellowstone Project of the United States Bureau of Reclamation.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....	77,975	77,090	285	0.4
Farms reporting drainage.....	715	682	33	4.8
All land in farms.....	38,657,894	36,214,751	2,443,143	6.7
Farm land provided with drainage.....	150,025	80,054	61,571	69.1
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....	44,017,120	44,017,120		
Land in drainage enterprises.....	1,004,142	1,240,328	-146,186	-11.8
Improved land.....	1,075,260	1,026,574	48,685	4.7
Unimproved land:				
Woodland.....	9,478	(2)		
Other.....	9,405	213,754	-204,340	-65.0
Land unfit to raise any crop for lack of drainage.....	13,440	3 12,332	1,108	9.0
Land drained, fit to raise normal crop.....	1,055,420	(4)		
Land partly drained, fit for partial crop.....	25,273	5 4,810	20,454	424.4
Land in occupied farms.....	1,004,114	(4)		
Land in planted crops.....	908,970	(4)		
Land idle.....	103,641	(4)		
Ditches, completed.....	817.0	708.3	109.3	15.4
Tile drains, completed.....	9.6	0.3	0.3	3.2
Capital invested in enterprises.....	3,148,910	2,208,040	940,870	42.0
Average, per acre.....	2.88	1.78	1.10	61.8

¹ A minus sign (—) denotes decrease. ² Not reported. ³ "Swampy or subject to overflow." ⁴ Not called for on schedule. ⁵ "Suffering a loss of crops from defective drainage."

DRAINAGE—NORTH DAKOTA

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 152 drainage enterprises are shown for North Dakota with an average area of 7,785 acres. There are 87 such enterprises of 5,000 acres or more and 65 of between 500 and 5,000 acres.

The area of enterprises exceeds the land in enterprises by 89,240 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	1,183,382	100.0	1,240,328	100.0	1,004,142
500 to 999 acres.....	2,120	0.2	610	0.1	2,120
1,000 to 4,999 acres.....	184,520	15.6	148,080	12.0	164,730
5,000 to 9,999 acres.....	304,682	33.3	388,300	38.9	366,172
10,000 to 49,999 acres.....	479,500	40.5	501,377	40.4	438,560
50,000 to 99,999 acres.....	122,560	10.4	231,241	18.6	122,560

¹ The sum of the areas of individual enterprises, including overlap.

Character of enterprise.—Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects, county drains, or township drains*, according to the public officials in control.

Drainage projects under the control of the officers of an irrigation organization are classed as *irrigation enterprises*. In such cases the drainage is incidental to land reclamation by irrigation, and both the drainage and irrigation operations are functions of the one enterprise.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	1,004,142	100.0	3,148,010	100.0
County drains.....	1,088,053	99.4	2,997,360	95.2
Irrigation enterprises.....	6,089	0.6	151,553	4.8

Type of drainage.—All enterprises reported their works as completed. These works on January 1, 1930, included, approximately, 818 miles of ditches and 10 miles of tile drains. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. No enterprise reported land served by pumps.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	1,004,142	100.0	3,148,010	100.0
Gravity drainage only.....	1,004,142	100.0	3,148,010	100.0
Ditches.....	1,077,163	98.4	3,070,735	97.5
Tile drains.....	2,000	0.2	39,000	1.2
Ditches and tile drains.....	14,979	1.4	39,184	1.3

Arrears and delinquency.—There were 3 enterprises, with 0.4 per cent of the invested capital and covering about 1 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 149 enterprises were reported as not in arrears. Reports of 2 enterprises, covering 9,069 acres, show a total of 2,270 acres delinquent in drainage taxes; while 150 enterprises, covering 1,085,073 acres, reported no delinquency.

STATE TABLE 5.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	1,004,142	100.0	3,148,010	100.0	2,270
Enterprises in arrears.....	9,412	0.9	11,680	0.4	1,520
With some delinquent land.....	2,980	0.3	7,500	0.3	1,520
With no delinquent land.....	6,432	0.6	4,180	0.1	-----
Enterprises not in arrears.....	1,084,730	99.1	3,137,230	99.6	750
With some delinquent land.....	6,089	0.5	151,553	4.8	750
With no delinquent land.....	1,078,641	98.6	2,985,686	94.8	-----

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, land damaged by alkali or seepage from irrigation, and land subject to overflow, all of which were benefited. However, the land is classified according to the principal purpose reported.

Most of the land in enterprises in North Dakota was in farms before drainage was begun. The ditches were necessary to remove the excess of water from portions of these farms. In the Lower Yellowstone Project of McKenzie County, the removal of alkali and seepage from irrigation was the purpose of drainage.

STATE TABLE 6.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	1,004,142	100.0	3,148,010	100.0
Reclamation of swamp land not previously in farms.....	8,820	0.8	33,800	1.1
Improvement of land already in farms.....	878,807	80.3	2,581,030	82.0
Removal of alkali and seepage from irrigation.....	6,089	0.6	151,553	4.8
Protection against overflow.....	200,426	18.3	381,027	12.1

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. Where the drainage work was done directly by an irrigation enterprise, the year in which drainage was undertaken is used instead of the year of organization of the irrigation project.

DRAINAGE—NORTH DAKOTA

STATE TABLE 7.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Acres	Over-lapped acres	Dollars	Per cent
All enterprises.....	1,094,142	100.0	1,183,382	80,240	3,148,919	100.0
1890-1899.....	73,556	6.7	73,556	-----	60,473	2.2
1900-1904.....	195,210	17.8	209,980	5,770	264,556	8.4
1905-1909.....	370,478	33.9	392,508	22,030	698,695	22.2
1910-1914.....	108,470	9.9	129,190	20,720	270,613	8.6
1915-1919.....	316,709	29.0	338,209	21,500	1,607,299	51.0
1920-1924.....	6,950	0.6	15,150	8,200	60,473	1.9
1925-1929.....	22,769	2.1	33,780	11,020	177,840	5.7

¹ Includes overlap.

STATE TABLE 8.—CONDITION OF LAND, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES ¹				
	Total	Condition of land			Other unimproved land
		Improved land	Wood-land	Other unimproved land	
All enterprises.....	1,094,142	1,075,259	98.3	9,478	9,405
1890-1899.....	73,556	72,786	99.0	730	40
1900-1904.....	195,210	183,377	93.9	5,448	6,385
1905-1909.....	370,478	360,318	97.7	1,160	-----
1910-1914.....	108,470	106,369	98.1	2,000	80
1915-1919.....	316,709	313,709	99.1	100	2,900
1920-1924.....	6,950	6,950	100.0	-----	-----
1925-1929.....	22,769	22,729	99.8	40	-----

¹ No land available for settlement.

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 39 enterprises, covering 254,400 acres of land and having an invested capital of \$445,927. There were 113 enterprises, with an invested capital of \$2,702,992 and covering 839,742 acres of land, that did not have systematic maintenance.

There was 1 enterprise, with an invested capital of \$1,540 and covering 3,400 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 151 enterprises, with an invested capital of \$3,147,379 and covering 1,090,742 acres of land, did not report any such equipment.

STATE TABLE 9.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	1,094,142	100.0	3,148,919	100.0
By district forces.....	426,030	38.9	710,350	22.6
By contract.....	137,061	12.5	314,161	10.0
By work apportioned to land-owners.....	201,220	18.4	1,190,625	37.8
Other, none, and not reported.....	329,822	30.2	933,783	29.6

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported *no* cost as well as those that reported *some* cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 25 per cent of the land reporting showed some cost, and 75 per cent showed no cost in 1929. The average cost was 1 cent per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 10.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
All enterprises reporting.....	960,662	13,117	0.01
Gravity drainage only.....	900,662	13,117	0.01
Ditches.....	943,683	12,804	0.01
Tile drains.....	2,000	-----	-----
Ditches and tile drains.....	14,970	313	0.02

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Number	Acres	Acres	
The State.....	715	682	150,625	80,054	77,975	38,657,894	24,528,120	557,742	44,917,120
Bottineau.....	150	148	4,704	11,074	2,100	1,000,470	756,805	49,971	1,076,840
Cass.....	141	77	42,317	19,908	2,595	1,062,562	905,580	15,770	1,128,320
Grand Forks.....	30	10	10,858	1,532	2,061	813,298	637,841	22,286	917,120
McHenry.....	4	-----	628	-----	2,143	1,029,730	692,820	21,212	1,208,320
Pembina.....	160	44	62,300	10,598	1,319	650,011	494,091	52,702	714,880
Ransom.....	14	17	1,764	1,569	1,378	493,108	351,706	14,362	550,400
Richland.....	56	44	13,772	5,470	2,455	830,539	662,628	16,557	910,630
Sargent.....	13	70	1,429	8,048	1,355	494,700	367,081	2,293	547,200
Steele.....	10	7	627	525	993	438,299	302,371	6,024	458,880
Trail.....	41	53	8,227	13,181	1,435	522,562	434,310	12,098	563,600
Walsh.....	9	(²)	861	(²)	2,483	789,704	619,815	34,577	820,430
All other counties.....	78	203	3,132	16,593	67,002	30,523,771	18,243,018	308,904	36,022,400

¹ No drainage on farms reported in Adams, Billings, Bowman, Dunn, Foster, Golden Valley, Grant, Hettinger, McIntosh, Mercer, Morton, Oliver, Pierce, Renville, Sioux, Slope, and Williams Counties in 1930; nor in Billings, Bowman, Burleigh, Dunn, Foster, Golden Valley, Grant, Kidder, Logan, McHenry, Mercer, and Oliver Counties for 1920.

² Included in "All other counties."

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Barnes	Bottineau	Cass	Cavalier	Grand Forks	La Moure
LAND AREA								
1	Approximate land area.....1930.....acres..	44,917,120	966,400	1,075,840	1,128,320	956,160	917,120	734,080
2	Land in enterprises.....1930.....acres..	1,094,142	2,980	30,928	268,340	5,920	59,240	3,299
3	.....1920.....acres..	1,240,328		49,795	201,580	12,700	47,000	3,300
4	Increase, ¹ 1920-1930.....per cent..	-11.8		-37.9	33.1	-53.4	26.0	
5	Area of all enterprises (overlapping areas included).....1930.....acres..	1,183,382	2,980	30,928	311,740	5,920	59,240	3,299
6	Excess over land in enterprises (total areas overlapping).....acres..	80,240			43,400			
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop.....1930.....acres..	13,440			1,000			240
8	Land unfit to raise any crop prior to drainage.....acres..	200,871	1,500	3,798	2,200	3,050	20,105	240
9	Decrease since drainage.....per cent..	93.3	100.0	100.0	54.5	100.0	100.0	100.0
10	Land fit to raise a normal crop.....1930.....acres..	1,055,429	2,980	30,928	267,340	5,940	54,555	2,399
11	Land fit to raise a normal crop prior to drainage.....acres..	811,752	1,480	24,160	200,220	740	10,812	240
12	Increase since drainage.....per cent..	72.5	101.4	28.0	29.6	581.1	404.6	899.0
13	Land fit to raise a partial crop.....1930.....acres..	25,273				880	4,085	900
14	Land fit to raise a partial crop prior to drainage.....acres..	281,519		2,970	59,920	2,130	19,323	2,819
15	Decrease since drainage.....per cent..	91.0		100.0	100.0	58.7	75.8	68.1
16	Improved land.....1930.....acres..	1,075,250	2,980	30,920	268,340	5,920	54,555	2,399
17	.....1920.....acres..	1,020,574		32,000	156,135	4,019	40,580	2,640
18	Increase, ¹ 1920-1930.....per cent..	4.7		-3.4	73.0	47.3	34.4	-0.1
Unimproved land—								
19	Woodland.....1930.....acres..	0,478		8				900
20	Other.....1930.....acres..	0,405					4,685	
21	Land in occupied farms.....1930.....acres..	1,094,114	2,980	30,920	268,340	5,920	59,240	3,299
22	Land in planted crops.....1930.....acres..	908,070	2,682	21,261	243,600	5,740	54,555	1,300
23	Woodland cleared and cultivated since drainage.....1930.....acres..	5,740						
24	Land idle.....1930.....acres..	103,041	208	9,659	18,780		4,685	
DRAINAGE WORKS, 1930								
25	Ditches—Completed.....miles..	817.6	5.0	28.0	204.5	15.5	20.8	0.5
26	Tile drains—Completed.....miles..	0.0						4.5
27	Land drained by ditches only.....acres..	1,077,163	2,980	30,928	268,340	5,920	59,240	
28	Length of ditches.....miles..	810.3	5.0	28.0	204.5	15.5	20.8	
29	Land drained by tile only.....acres..	2,000						
30	Length of tile.....miles..	4.5						
31	Land drained by ditches and tile.....acres..	14,079						3,299
32	Length of ditches.....miles..	7.3						0.5
33	Length of tile.....miles..	5.1						4.5
CAPITAL INVESTED AND COST PER ACRE								
34	Capital invested in enterprises to Jan. 1, 1930.....dollars..	3,148,919	7,500	38,090	1,574,700	19,000	62,230	27,300
35	.....1920.....dollars..	2,208,049		171,066	808,090	15,785	40,894	22,500
36	Increase, ¹ 1920-1930.....per cent..	42.0		-77.2	95.2	20.1	24.7	21.4
37	Estimated cost of enterprises when completed.....1930.....dollars..	3,148,919	7,500	38,090	1,574,700	19,000	62,230	27,300
38	.....1920.....dollars..	2,201,449		171,066	837,090	15,785	40,894	22,500
39	Average, per acre when completed.....1930.....dollars..	2.88	2.52	1.26	5.87	3.30	1.05	8.28
40	.....1920.....dollars..	1.82		3.44	4.16	1.24	1.06	6.82
Invested in—								
41	Enterprises having ditches only.....1930.....dollars..	3,070,735	7,500	38,090	1,574,700	19,000	62,230	
42	Average, per acre.....dollars..	2.85	2.52	1.26	5.87	3.30	1.05	
43	Enterprises having tile drains only.....1930.....dollars..	30,000						
44	Average, per acre.....dollars..	19.50						
45	Enterprises having ditches and tile drains.....1930.....dollars..	30,184						27,300
46	Average, per acre.....dollars..	2.02						8.28

¹ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000, or when less than one-tenth of 1 per cent.

DRAINAGE—NORTH DAKOTA

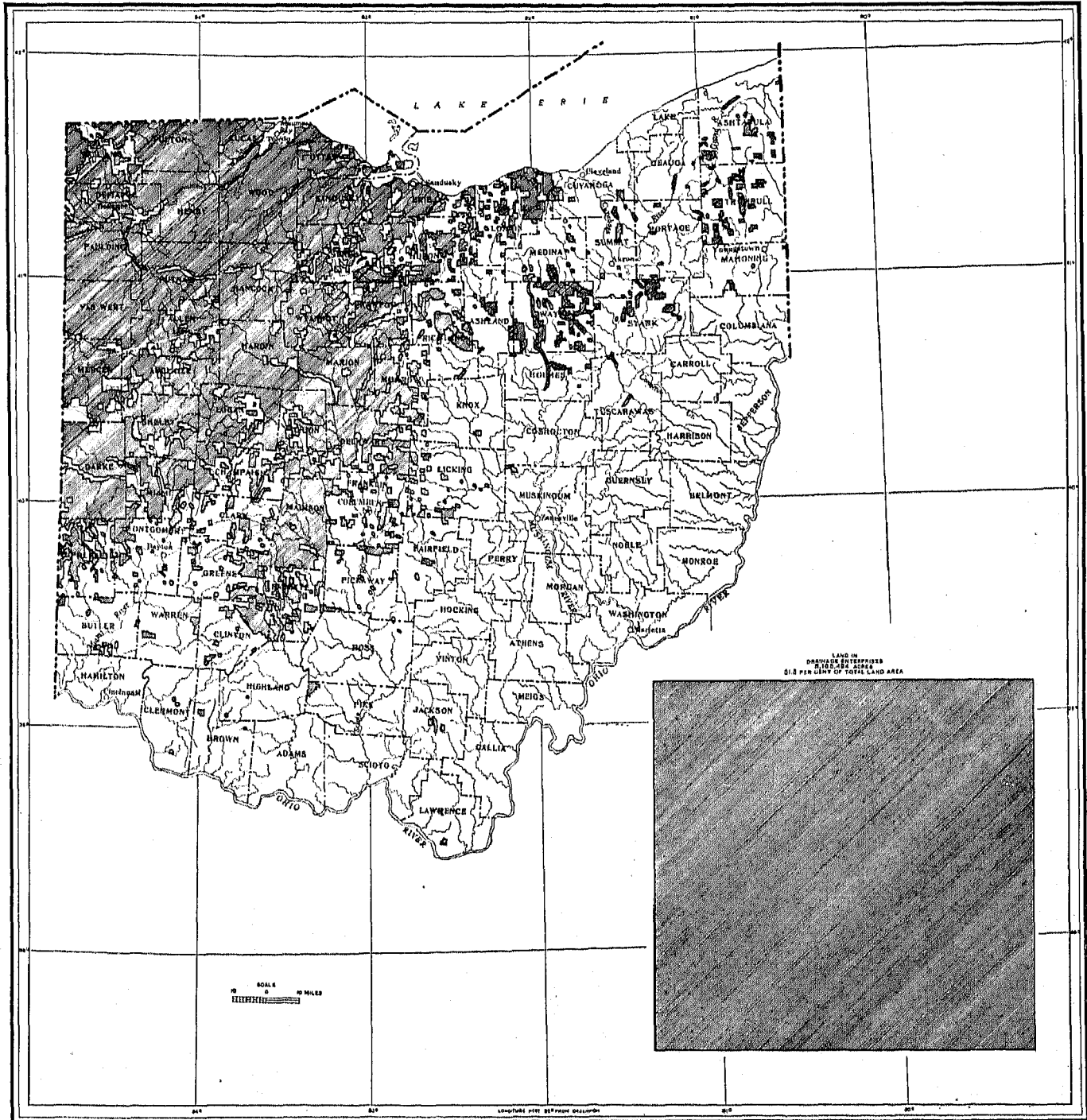
COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		McKenzie	Pembina	Ramsay	Ransom	Richland	Sargent	Traill	Walsh
LAND AREA									
1	Approximate land area.....1930.....acres	1,822,080	714,880	771,200	550,400	919,680	547,200	553,600	820,480
2	Land in enterprises.....1930.....acres	6,089	223,860	14,468	34,000	140,590	119,120	131,110	54,198
3	.....1920.....acres	280,800	12,715	23,640	204,063	205,655	145,460	53,620	1.1
4	Increase, ¹ 1920-1930.....per cent	-20.3	13.8	43.8	-31.1	-42.1	-9.9		
5	Area of all enterprises (overlapping areas included).....1930.....acres	6,089	244,120	14,468	34,000	144,420	119,120	152,860	54,198
6	Excess over land in enterprises (total areas overlapping).....acres		20,260			3,830		21,750	
CONDITION AND USE OF LAND									
7	Land unfit to raise any crop.....1930.....acres	1,300	9,000		80		2,000		
8	Land unfit to raise any crop prior to drainage.....acres	4,390	127,440	11,043	5,580	800	11,815		
9	Decrease since drainage.....per cent	69.8	92.9	100.0	98.6	100.0	83.1		
10	Land fit to raise a normal crop.....1930.....acres	4,089	200,832	14,468	31,020	140,590	114,080	131,110	54,198
11	Land fit to raise a normal crop prior to drainage.....acres	1,089	50,266	3,425	21,000	106,010	85,480	100,830	
12	Increase since drainage ¹.....per cent	275.5	200.5	322.4	62.0	32.6	34.5	30.0	
13	Land fit to raise a partial crop.....1930.....acres	700	13,068		2,000		2,140		
14	Land fit to raise a partial crop prior to drainage.....acres	700	40,154		7,420	33,780	21,825	30,280	54,198
15	Decrease since drainage.....per cent		69.7		73.0	100.0	90.2	100.0	100.0
16	Improved land.....1930.....acres	6,089	212,840	14,468	33,020	140,590	117,120	131,110	54,008
17	.....1920.....acres	256,778	11,443	14,120	171,911	162,151	126,527	40,261	9.6
18	Increase, ¹ 1920-1930.....per cent	-17.1	26.4	140.2	-18.2	-27.8	3.6		
19	Unimproved land—								
20	Woodland.....1930.....acres	0,280							190
20	Other.....1930.....acres	1,740			80		2,000		
21	Land in occupied farms.....1930.....acres	6,089	223,840	14,468	34,000	140,590	119,120	131,110	54,198
22	Land in planted crops.....1930.....acres	4,789	114,892	13,456	30,620	133,604	108,620	122,120	51,080
23	Woodland cleared and cultivated since drainage.....1930.....acres		2,740					3,000	
24	Land idle.....1930.....acres		52,967		72	6,780	3,900	6,500	
DRAINAGE WORKS, 1930									
25	Ditches—								
25	Completed.....miles	33.2	157.1	18.3	20.0	111.5	60.0	110.0	23.6
26	Tile drains—								
26	Completed.....miles		0.1	0.2	2.0		2.8		
27	Land drained by ditches only.....acres	6,089	218,900	10,628	33,000	140,590	115,240	131,110	54,198
28	Length of ditches.....miles	33.2	156.6	14.0	20.0	111.5	58.0	110.0	23.6
29	Land drained by tile only.....acres				1,000		1,000		
30	Length of tile.....miles				2.0		2.5		
31	Land drained by ditches and tile.....acres		4,960	3,840			2,880		
32	Length of ditches.....miles		0.5	4.3			2.0		
33	Length of tile.....miles		0.1	0.2			0.3		
CAPITAL INVESTED AND COST PER ACRE									
34	Capital invested in enterprises to Jan. 1, 1930.....dollars	151,553	239,003	6,653	45,000	243,457	362,713	286,158	53,678
35	.....1920.....dollars	297,282	6,553	45,930	265,608	263,430	224,671	38,001	30.0
36	Increase, ¹ 1920-1930.....per cent	-10.6	1.5	-2.0	-8.3	40.1	27.4		
37	Estimated cost of enterprises when completed.....1930.....dollars	151,553	239,003	6,653	45,000	243,457	362,713	286,158	53,678
38	.....1920.....dollars	207,282	6,553	45,930	266,608	285,830	224,671	38,001	30.0
39	Average, per acre when completed.....1930.....dollars	24.89	1.07	0.46	1.32	1.73	3.30	2.18	0.99
40	.....1920.....dollars	1.00	0.52	1.94	1.30	1.39	1.54	0.72	
41	Invested in—								
42	Enterprises having ditches only.....1930.....dollars	151,553	236,035	4,458	30,000	243,457	363,006	286,158	53,678
43	Average, per acre.....dollars	24.89	1.08	0.42	1.18	1.73	3.06	2.18	0.99
44	Enterprises having tile drains only.....1930.....dollars				6,000		33,000		
45	Average, per acre.....dollars				6.00		33.00		
46	Enterprises having ditches and tile drains.....1930.....dollars		2,968	2,200			6,707		
47	Average, per acre.....dollars		0.60	0.57			2.33		

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

OHIO

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



OHIO

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—Most of the land in drainage enterprises is located in the northwestern part of the State where the land is rather flat or gently rolling. Much of it was improved prior to drainage.

A number of enterprises located in Wayne, Richland, Stark, Summit, Knox, Holmes, and Tuscarawas Counties in the northeastern part of the State, reported high or ridge land which did not require artificial

drainage and, although indirectly benefited, was not benefited sufficiently to be assessed. This land amounted to approximately 168,000 acres.

Approximately 92 per cent of all land in enterprises was reported as fit to raise a normal crop; 7 per cent was fit to raise a partial crop; and 1 per cent was unfit to raise any crop for lack of drainage. Improved land amounted to 92 per cent and idle land to 4 per cent in 1929.

The reports on the condition of land prior to drainage showed that 51 per cent was then fit to raise a normal crop; 28 per cent was fit to raise a partial crop; and 21 per cent was unfit to grow any crop for lack of drainage. The average cost of drainage was \$4.51 per acre, but this figure is probably low, due to the fact that work done by the landowners themselves was not estimated at the equivalent contract price.

The average precipitation for the State, for 1929, was 45.8 inches, which is 7.9 inches greater than normal.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....	number.....	210, 200		
Farms reporting drainage.....	number.....	95, 121	-37, 300	-14. 0
			-34, 000	-20. 0
All land in farms.....	acres.....	21, 514, 059	-2, 001, 820	-8. 5
Farm land provided with drainage.....	acres.....	0, 203, 870	-1, 101, 602	-15. 8
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....	acres.....	26, 073, 600		
Land in drainage enterprises.....	acres.....	8, 165, 404	8, 107, 204	58, 200
Improved land.....	acres.....	7, 604, 274	0, 707, 328	806, 040
Unimproved land:				
Woodland.....	acres.....	487, 081	950, 804	-408, 013
Other.....	acres.....	73, 280	442, 982	-300, 743
Land unfit to raise any crop for lack of drainage.....	acres.....	102, 200	3, 247, 273	-144, 083
Land drained, fit to raise normal crop.....	acres.....	7, 495, 881	(3)	
Land partly drained, fit for partial crop.....	acres.....	567, 323	4, 141, 481	425, 842
Land in occupied farms.....	acres.....	8, 132, 073	(3)	
Land in planted crops.....	acres.....	0, 800, 406	(3)	
Land idle.....	acres.....	350, 758	(3)	
Ditches, completed.....	miles.....	25, 048. 2	24, 084. 0	64. 2
Tile drains, completed.....	miles.....	0, 371. 6	0, 205. 3	166. 3
Capital invested in enterprises.....	dollars.....	36, 836, 440	30, 680, 145	6, 156, 304
Average, per acre.....	dollars.....	4. 51	3. 78	0. 73

¹ A minus sign (-) denotes decrease.

² "Swampy or subject to overflow."

³ Not called for on schedule.

⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 26,191 drainage enterprises are shown for Ohio with an average area of 917 acres. There are 5 such enterprises of 50,000 acres or more, 548 of between 5,000 and 50,000 acres, 11,696 of between 500 and 5,000 acres, and 13,942 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 15,845,135 acres, which is the amount of overlap. This large amount of overlapping of enterprises in Ohio is due in part to the fact that many of the ditches are maintained and repaired by forming new enterprises and reassessing the benefited lands for the cost of the necessary work. The land covered by drainage enterprises was determined by plotting the enterprises on county maps having a scale of a half-inch to the mile. However, the results are only approximate as the individual schedules did not contain a description of the boundaries of the enterprises but gave only the township in which located, the name of the lake or stream receiving the discharge, and the location of the enterprise outlet. The discrepancy, in thus determining the land in enterprises, will probably not exceed 5 per cent in any county.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	24,010,029	100.0	23,404,812	100.0	8,165,494
Less than 100 acres.....	149,697	0.6	658,053	2.8	85,793
100 to 199 acres.....	508,037	2.1	2,405,990	10.6	261,966
200 to 499 acres.....	2,619,498	10.9	3,928,812	16.8	1,157,800
500 to 999 acres.....	4,364,144	18.2	9,615,230	41.0	1,740,864
1,000 to 4,999 acres.....	10,532,356	43.0	2,860,517	12.1	3,618,930
5,000 to 9,999 acres.....	2,549,773	10.6	3,152,280	13.4	655,813
10,000 to 49,999 acres.....	2,073,427	12.4	703,025	3.3	580,580
50,000 to 99,999 acres.....	312,767	1.3			45,680

¹ The sum of the areas of individual enterprises, including overlap.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects*, *county drains*, or *township drains*, according to the public officials in control.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital Invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	8,165,494	100.0	36,836,449	100.0
County drains.....	8,140,850	99.7	36,084,738	99.6
Township drains.....	24,644	0.3	151,711	0.4

Type of drainage.—All enterprises reported their works as completed.

The works completed to January 1, 1930, included approximately 25,048 miles of ditches, 9,372 miles of tile drains, less than 1 mile of levee, and 1 pumping

plant. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise.

It is probable that there is some duplication in the total length of ditches since the reports of some enterprises do not show the portions of their ditches constructed by earlier enterprises.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	8,165,494	100.0	36,836,449	100.0
Gravity drainage only.....	8,165,146	100.0	36,832,040	100.0
Ditches.....	5,017,201	61.4	21,818,760	59.2
Tile drains.....	1,694,156	20.8	7,621,493	20.7
Ditches and tile drains.....	1,453,789	17.8	7,392,687	20.1
Drainage, all by pumping.....	348	(¹)	3,500	(¹)

¹ Less than one-tenth of 1 per cent.

Pumping plants.—Only 1 pumping enterprise, serving 348 acres, was reported for 1930. The capacity of the engine was 25 horsepower and that of the pump, 5,000 gallons per minute.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER: 1930 AND 1920

KIND OF POWER	Enterprises	Engine capacity		Pump capacity	Land served	
		Number	H. p.			Per cent	G. p. m.	Acres
All enterprises.....	1930.....	1	25	100.0	5,000	348
	1920.....	4	125	100.0	3,600	1,755
Internal combustion.....	1930.....	1	25	100.0	5,000	348
	1920.....	1	25	20.0	500	175
Steam.....	1930.....	2	65	62.0	600	650
	1920.....	1	35	28.0	2,500	900

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Engine capacity	Land served
		G. p. m.	Per cent			H. p.	Acres
All enterprises, centrifugal only.....	1	5,000	100.0	25	348

Arrears and delinquency.—There were 2 enterprises, with two-tenths of 1 per cent of the invested capital and covering one-tenth of 1 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 26,189 enterprises reported no arrearage. There were 7 enterprises, covering 17,722 acres, that reported a total of 2,979 acres delinquent in drainage taxes; while the remaining enterprises reported no delinquency.

The extremely small amount of arrearage and delinquency in Ohio is principally due to the condition of the land, which is largely improved and in productive use, and to the low cost of drainage per acre. About 20,000 enterprises, many of which were constructed years ago, have been overlapped or covered by later enterprises organized primarily to improve or maintain older ditches. In these later enterprises only a small amount of original construction was involved and the cost was correspondingly low.

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent
	Acres	Per cent	Dollars	Per cent	Acres
All enterprises.....	8,165,494	100.0	36,836,449	100.0	2,979
Enterprises in arrears.....	11,068	0.1	69,781	0.2	1,195
With some delinquent land.....	11,068	0.1	69,781	0.2	1,195
Enterprises not in arrears.....	8,154,426	99.9	36,766,668	99.8	1,784
With some delinquent land.....	6,654	0.1	8,404	(1)	1,784
With no delinquent land.....	8,147,772	99.8	36,758,264	99.8	

¹ Less than one-tenth of 1 per cent.

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes. An enterprise, prior to drainage, may contain swamp land, improved land in farms, and land subject to overflow. The object in drainage may be to reclaim or benefit all such lands. However, the land is classified according to the principal purpose reported.

The enterprises reporting the principal purpose of drainage as the "Improvement of land already in farms," doubtless contained a considerable amount of wet land which was either unfit or only partially fit for cultivation prior to drainage.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	8,165,494	100.0	36,836,449	100.0
Reclamation of swamp land not previously in farms.....	53,398	0.7	324,653	0.9
Improvement of land already in farms.....	8,097,122	98.8	36,379,712	98.8
Protection against overflow.....	44,974	0.5	132,084	0.3

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Acres	Overlapped acres	Dollars	Per cent
All enterprises.....	8,165,494	100.0	24,010,629	15,846,135	36,836,449	100.0
Before 1870.....	692,823	8.5	828,410	135,687	956,727	2.6
1870-1879.....	1,349,068	16.5	2,165,850	816,782	3,018,405	8.2
1880-1889.....	2,092,904	25.6	4,499,578	2,406,674	5,591,608	15.2
1890-1899.....	1,299,461	15.9	4,738,241	3,438,780	4,684,972	12.7
1900-1904.....	716,502	8.8	2,894,733	2,178,231	3,608,773	9.8
1905-1909.....	850,232	10.4	2,827,227	1,976,996	5,642,245	15.3
1910-1914.....	460,161	5.6	1,919,595	1,450,484	3,972,943	10.8
1915-1919.....	323,835	4.0	1,467,463	1,143,618	3,724,554	10.1
1920-1924.....	165,237	2.0	1,184,100	1,018,863	2,776,758	7.5
1925-1929.....	215,271	2.7	1,485,442	1,270,171	2,859,464	7.8

¹ Includes overlap.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement
	Total	Condition of land			Land available for settlement	
		Improved land	Wood-land	Other unimproved land		
All enterprises.....	8,165,494	7,604,274	93.1	487,981	73,239	7,313
Before 1870.....	692,823	661,750	95.5	26,642	4,431	211
1870-1879.....	1,349,068	1,239,972	91.9	98,611	10,485	1,408
1880-1889.....	2,092,904	1,938,136	92.6	136,703	18,071	14
1890-1899.....	1,299,461	1,198,021	92.2	87,577	13,863	1,560
1900-1904.....	716,502	672,518	93.9	37,437	6,547	771
1905-1909.....	850,232	800,044	94.1	40,682	9,506	1,895
1910-1914.....	460,161	434,528	94.4	21,929	3,704	579
1915-1919.....	323,835	302,607	93.5	18,140	3,028	403
1920-1924.....	165,237	153,776	93.1	10,266	1,255	134
1925-1929.....	215,271	202,868	94.2	10,054	2,349	358

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown. When the maintenance work involves the cleaning out, deepening, and widening of county drains, the proceedings are similar to those for constructing a new drain and the cost is assessed against the land benefited. Many enterprises are thus reorganized for maintenance work and this accounts for much of the overlapping of enterprises in Ohio. Public drains are usually repaired and maintained under the supervision of county commissioners who either apportion the necessary work to landowners or let contracts for the same.

Systematic maintenance was reported by 5,239 enterprises, covering 2,204,640 acres of land and having an invested capital of \$8,953,317; while the remaining enterprises, covering 5,960,854 acres of land and having an invested capital of \$27,883,132, did not have systematic maintenance. The results show that about one-fourth of the land in drainage enterprises is located in projects having systematic maintenance. The enterprises covering the remaining three-fourths of this land evidently do their maintenance work at irregular intervals depending upon the necessity for the work and the funds available.

There were 646 enterprises, with an invested capital of \$1,075,882 and covering 212,473 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while the remaining enterprises, with an invested capital of \$35,760,567 and covering 7,953,021 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	8,165,494	100.0	36,836,449	100.0
By district forces.....	169,013	2.0	1,012,442	2.7
By contract.....	3,488,707	42.7	13,982,950	38.0
By work apportioned to landowners.....	1,752,227	21.5	7,375,047	20.0
Other, none, and not reported.....	2,761,547	33.8	14,466,004	39.3

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost in 1929, in order to determine a fair average cost of maintenance for the State. Approximately 1 per cent of the land reporting showed some cost, and the remainder showed no cost in 1929. The average cost for all enterprises was only one-fourth of a cent per acre. The costs shown are very low, due largely to the fact that much of the maintenance work is done by again organizing the land as new enterprises and assessing it for the maintenance costs. Considerable maintenance work is also done by allotting sections of the ditches to landowners who, in fact, pay their portion of the cost in labor instead of money.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
	Acres	Dollars	Dollars
All enterprises reporting.....	8,117,462	19,247	(1)
Gravity drainage only.....	8,117,114	18,447	(1)
Ditches.....	4,095,511	8,145	(1)
Tile drains.....	1,080,777	3,734	(1)
Ditches and tile drains.....	1,434,820	6,508	(1)
Drainage, all by pumping.....	348	800	2.30

¹ Less than 1 cent.

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Number	Acres	Acres	
The State.....	95,121	130,117	6,203,870	7,365,532	219,266	21,514,059	11,200,395	2,773,020	26,073,000
Adams.....	48	48	1,147	1,121	2,820	206,069	94,257	60,019	349,440
Allen.....	2,226	2,721	138,501	173,347	2,084	230,424	150,292	25,010	259,849
Ashland.....	914	1,403	34,086	48,000	2,143	232,630	120,060	30,797	269,440
Ashtabula.....	698	1,100	14,190	22,374	4,333	337,303	158,935	67,496	462,720
Athens.....	110	162	1,542	2,240	2,009	227,874	57,097	41,020	311,680
Auglaize.....	2,049	2,341	148,027	162,203	2,491	240,846	100,159	27,460	254,080
Belmont.....	94	142	1,195	1,617	3,120	272,342	100,180	32,447	339,200
Brown.....	360	526	19,359	26,956	3,302	284,188	113,897	24,095	307,840
Buller.....	795	1,178	42,833	52,070	2,460	260,606	152,572	26,097	286,280
Carroll.....	129	247	1,087	2,867	1,708	206,090	83,077	28,452	247,680
Champaign.....	986	1,543	80,385	117,490	2,134	250,148	155,194	10,764	269,440
Clark.....	1,109	1,548	77,043	100,502	2,260	231,001	142,743	17,073	260,480
Clermont.....	150	168	6,860	8,253	3,022	245,187	112,415	22,004	297,000
Cllnton.....	1,422	1,619	130,944	129,658	2,103	249,420	142,172	17,237	268,040
Columbiana.....	526	1,411	6,852	20,000	3,308	261,534	132,098	33,327	341,760
Coshocton.....	239	591	5,341	8,452	2,736	316,042	108,061	43,784	357,120
Crawford.....	1,654	2,275	127,521	148,022	2,121	232,260	148,592	28,020	261,700
Cuyahoga.....	292	1,106	5,600	22,627	1,229	55,155	30,450	7,545	206,320
Darke.....	4,067	4,870	240,424	280,280	4,825	301,588	249,084	20,134	375,040
Defiance.....	1,573	2,002	113,540	114,728	2,061	234,388	156,030	33,923	250,200
Delaware.....	1,082	2,445	167,041	130,503	2,793	260,401	141,731	27,804	284,500
Erle.....	880	1,363	40,141	65,773	1,709	134,508	92,183	11,761	163,840
Fairfield.....	1,751	2,391	107,229	130,930	2,985	280,402	164,912	26,414	316,800
Fayette.....	1,289	1,623	176,721	176,240	1,669	247,700	153,305	10,308	264,320
Franklin.....	1,871	3,033	134,401	189,062	2,968	248,925	157,232	13,518	330,880
Fulton.....	2,281	2,929	130,583	168,120	2,805	241,051	163,590	28,032	250,200
Gallia.....	251	275	5,064	4,713	2,760	252,797	65,178	47,343	287,300
Geauga.....	357	739	6,940	10,907	1,884	172,240	68,479	38,804	260,240
Greene.....	1,382	1,454	108,471	103,728	2,185	238,873	147,497	21,208	265,000
Guernsey.....	219	300	4,215	6,122	2,046	276,108	80,500	40,400	331,520
Hamilton.....	127	270	2,912	5,897	2,341	140,353	68,227	13,707	200,480
Hancock.....	2,402	3,024	202,577	225,207	2,919	311,301	210,205	31,046	342,400
Hardin.....	1,970	2,887	181,467	218,802	2,542	277,744	180,135	26,929	302,720
Harrison.....	199	341	4,411	6,378	1,767	260,611	61,942	24,798	256,040
Henry.....	2,195	2,623	180,469	191,095	2,549	250,413	192,047	20,313	264,060
Highland.....	1,037	1,163	53,476	53,118	3,020	336,430	150,536	31,135	351,360
Hocking.....	134	228	3,973	5,774	1,426	170,490	47,814	46,823	263,040
Holmes.....	689	770	12,762	10,078	2,249	242,610	113,284	41,775	267,520
Huron.....	1,410	1,798	78,477	96,483	2,453	273,492	162,226	32,787	316,160
Jackson.....	129	264	3,100	6,755	1,544	191,189	52,033	41,355	258,560
Knox.....	993	1,217	23,187	41,693	2,724	301,880	128,143	35,300	328,320
Lake.....	345	767	8,388	18,543	1,059	67,740	35,504	11,868	154,240
Lawrence.....	71	129	1,675	2,510	2,270	187,140	53,120	62,650	283,620
Licking.....	1,387	2,423	81,211	116,315	4,027	380,894	170,959	30,854	428,160
Logan.....	1,610	2,212	121,072	142,831	2,450	258,711	154,381	30,503	248,040
Lorain.....	1,188	1,942	99,045	61,687	3,038	238,781	136,145	28,424	318,080
Lucas.....	1,028	1,214	51,729	54,262	2,065	120,160	91,713	6,478	218,880
Madison.....	1,137	1,432	176,975	203,352	1,577	270,414	184,997	17,547	318,050
Mahoning.....	939	1,043	13,368	21,867	2,283	176,097	82,147	25,013	273,280
Marion.....	1,521	1,806	101,511	194,221	1,851	231,241	147,399	16,867	261,760
Medina.....	1,270	1,829	42,474	55,164	2,074	224,888	125,223	36,343	278,400
Meigs.....	178	258	2,471	3,144	2,359	218,382	60,310	42,842	263,680
Mercer.....	2,232	2,871	168,489	193,128	2,708	270,256	187,325	20,470	288,000
Miami.....	1,055	2,508	105,725	155,869	2,830	238,504	168,853	16,036	261,120
Montgomery.....	1,883	3,072	81,304	119,301	3,092	232,062	149,541	18,350	291,200
Morgan.....	123	213	1,416	2,733	2,241	242,004	58,412	36,001	267,280
Morrow.....	1,023	2,302	77,219	106,770	2,351	231,738	114,217	32,777	257,960
Muskingum.....	352	527	7,114	8,520	3,265	351,988	111,181	41,562	424,960

¹ Drainage on farms was reported in all counties in 1930 and also in 1929.

DRAINAGE—OHIO

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930—Continued

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Number	Acres	Acres	
Noble.....	82	84	1,112	1,152	2,317	230,732	62,007	23,418	255,360
Ottawa.....	1,232	1,494	74,352	77,111	1,834	137,610	103,095	10,445	172,800
Paulding.....	1,517	2,225	169,701	184,356	1,800	244,420	180,217	17,700	264,320
Perry.....	455	527	13,675	18,528	1,933	188,025	72,467	26,082	255,360
Pickaway.....	1,417	1,748	140,302	179,660	2,039	302,444	180,947	12,780	313,600
Pike.....	70	104	4,038	2,775	1,592	204,806	72,511	70,459	273,920
Portage.....	1,048	1,800	23,400	33,046	2,705	235,749	114,435	41,297	333,440
Preble.....	2,039	2,066	138,122	162,170	2,769	258,647	164,084	24,905	306,440
Putnam.....	2,419	3,114	199,424	233,253	2,825	283,103	205,076	22,382	308,480
Richland.....	1,526	2,008	73,547	90,480	2,709	278,086	148,789	44,808	321,020
Ross.....	657	855	47,877	57,062	2,404	348,944	159,300	69,811	427,520
Sandusky.....	1,985	2,270	123,783	140,070	2,641	235,348	169,228	21,873	264,320
Seton.....	145	180	5,054	6,590	2,062	213,635	70,041	83,510	398,720
Seneca.....	1,767	2,210	128,463	136,088	2,893	324,350	223,934	35,367	352,000
Shelby.....	1,523	2,356	115,482	172,283	2,398	242,201	163,712	23,632	264,320
Stark.....	1,354	2,164	31,138	55,086	3,435	260,726	157,888	23,291	362,240
Summit.....	492	1,130	12,666	26,534	1,570	120,710	69,055	17,573	261,120
Trumbull.....	763	1,220	18,433	27,202	2,951	248,069	168,973	47,819	405,120
Tuscarawas.....	631	900	12,811	15,533	2,728	275,710	114,357	34,151	355,200
Union.....	1,911	2,400	154,698	176,124	2,294	251,312	147,357	23,319	285,410
Van Wert.....	2,017	2,802	172,870	206,702	2,415	244,640	183,887	19,745	259,840
Vinton.....	101	144	2,336	2,823	1,075	153,966	34,383	50,107	203,680
Warren.....	820	948	33,497	40,361	2,224	230,168	127,871	25,926	264,320
Washington.....	94	154	1,332	1,795	3,718	331,823	98,320	61,025	403,200
Wayne.....	1,608	2,502	47,663	75,237	3,661	322,128	193,677	42,973	356,480
Williams.....	2,074	2,601	133,231	144,642	2,567	250,712	156,650	36,044	293,040
Wood.....	3,142	2,361	245,936	166,778	3,727	355,595	281,803	25,208	391,080
Wyandot.....	1,502	2,088	129,524	159,790	2,025	239,707	147,507	22,211	259,840
All other counties.....	21	61	152	722	4,159	421,102	131,537	80,282	547,200

¹ Drainage on farms was reported in all counties in 1930 and also in 1920.

DRAINAGE—OHIO

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

	ITEM (See definitions in Introduction)	THE STATE	Allen	Ashland	Ashtabula	Aughajze	Butler	Champaign
LAND AREA								
1	Approximate land area..... 1930..... acres..	26,073,600	259,840	260,440	402,720	254,080	280,280	200,440
2	Land in enterprises..... 1930..... acres..	8,105,494	217,605	15,607	20,004	245,075	15,326	130,022
3	..... 1920..... acres..	8,107,204	225,015	9,180	18,902	240,034	(¹)	156,191
4	Increase, ² 1920-1930..... per cent..	0.7	-3.3	69.8	63.3	1.7		-10.4
5	Area of all enterprises (overlapping areas included)..... 1930..... acres..	24,010,020	451,581	17,039	20,004	732,721	15,326	176,980
6	Excess over land in enterprises (total areas overlapping)..... acres..	15,845,135	233,886	1,432		487,646		46,353
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop..... 1930..... acres..	102,200	30	700	600	5,487	350	
8	Land unfit to raise any crop prior to drainage..... acres..	1,701,712	41,409	5,521	16,614	52,551	7,008	48,441
9	Decrease since drainage..... per cent..	94.0	90.9	80.2	90.4	89.0	95.0	100.0
10	Land fit to raise a normal crop..... 1930..... acres..	7,495,881	217,615	12,700	28,464	239,155	14,070	130,205
11	Land fit to raise a normal crop prior to drainage..... acres..	4,144,557	161,756	5,953	720	100,874	6,880	70,492
12	Increase since drainage ³ per cent..	80.9	34.5	114.8		43.3	117.7	84.7
13	Land fit to raise a partial crop..... 1930..... acres..	567,323	50	2,057		433		417
14	Land fit to raise a partial crop prior to drainage..... acres..	2,319,225	14,440	4,133	11,730	26,660	1,440	11,689
15	Decrease since drainage..... per cent..	75.5	90.7	50.2	100.0	98.3	100.0	96.4
16	Improved land..... 1930..... acres..	7,004,274	197,004	12,856	28,104	218,215	14,056	130,158
17	..... 1920..... acres..	6,707,328	175,350	7,807	9,081	201,303	(¹)	145,464
18	Increase, ⁴ 1920-1930..... per cent..	13.4	12.4	63.4	200.5	8.3		-10.5
19	Unimproved land—							
10	Woodland..... 1930..... acres..	487,981	20,540	1,145		25,000	1,050	464
20	Other..... 1930..... acres..	73,239	82	1,606	960	1,164	220	
21	Land in occupied farms..... 1930..... acres..	8,132,973	217,501	15,527	29,064	243,505	14,510	130,022
22	Land in planted crops..... 1930..... acres..	6,800,406	102,460	6,437	26,093	210,983	13,998	116,094
23	Woodland cleared and cultivated since drainage..... 1930..... acres..	1,200,043	107,387	329		30,010	1,830	45
24	Land idle..... 1930..... acres..	350,758	840	4,093	1,080	1,491	888	
25	Land available for settlement..... 1930..... acres..	7,313				780		
DRAINAGE WORKS, 1930								
26	Ditches—							
26	Completed..... miles..	25,048.2	685.7	73.0	46.2	518.5	5.0	160.8
27	The drains—							
27	Completed..... miles..	9,371.6	224.3	1.7	0.5	335.8	8.1	131.0
28	Levees and dikes—							
28	Completed..... miles..	0.3						
29	Pumping plants—							
29	Engine capacity..... horsepower..	25						
30	Pump capacity..... gals. per min..	5,000						
31	Land served by pumps..... acres..	348						
32	Land drained by ditches only..... acres..	5,017,201	137,545	15,025	28,938	137,540	3,380	62,217
33	Length of ditches..... miles..	21,835.1	624.0	73.1	46.2	482.4	2.6	147.1
34	Land drained by tile only..... acres..	1,094,156	52,052	370	126	81,802	7,446	46,112
35	Length of tile..... miles..	5,820.8	106.4	0.7	0.5	300.8	5.7	80.5
36	Land drained by ditches and tile..... acres..	1,453,789	27,108	212		25,643	4,500	22,203
37	Length of ditches..... miles..	3,212.6	61.7	0.5		36.1	2.4	22.7
38	Length of tile..... miles..	3,550.8	67.0	1.0		26.0	2.4	41.5
39	Land drained by pumps and other drainage works ⁴ acres..	348						
40	Length of ditches..... miles..	6.3						
41	Length of levees..... miles..	0.3						
42	Land protected by levees of an outside agency..... acres..	2,065					2,000	
CAPITAL INVESTED AND COST PER ACRE								
43	Capital invested in enterprises to Jan. 1, 1930..... dollars..	36,836,440	935,928	82,194	75,450	1,371,768	102,787	438,705
44	..... 1920..... dollars..	36,680,145	581,015	58,700	71,680	1,009,034	(¹)	521,301
45	Increase, ² 1920-1930..... per cent..	20.1	60.8	40.0	4.8	35.9		-15.8
46	Estimated cost of enterprises when completed..... 1930..... dollars..	36,836,440	935,928	82,194	75,450	1,371,768	102,787	438,705
47	..... 1920..... dollars..	30,771,020	600,915	58,700	71,989	1,012,904	(¹)	583,002
48	Average, per acre when completed..... 1930..... dollars..	4.51	4.30	5.27	2.60	5.60	6.71	3.36
49	..... 1920..... dollars..	3.80	2.67	6.30	3.80	4.20	(¹)	3.41
50	Invested in—							
50	Enterprises having ditches only..... 1930..... dollars..	21,818,760	549,670	80,110	69,541	608,231	36,587	165,518
51	Average, per acre..... dollars..	4.35	4.00	5.33	2.40	4.88	10.82	3.14
52	Enterprises having tile drains only..... 1930..... dollars..	7,021,493	244,908	318	5,918	516,240	10,234	146,887
53	Average, per acre..... dollars..	4.50	4.03	0.80	46.97	6.20	1.37	3.10
54	Enterprises having ditches and tile drains..... 1930..... dollars..	7,392,087	141,251	1,757		188,297	55,966	96,300
55	Average, per acre..... dollars..	5.09	5.10	8.20		7.34	12.44	4.32
56	Enterprises having pumps and other drainage works..... 1930..... dollars..	3,500						
57	Average, per acre..... dollars..	10.06						

¹ Included in "Other counties."

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

³ Office estimator; the figures reported exceeded the improved acreage in all farms in the county as determined by the census of agriculture.

⁴ Area of enterprises having some land served by pumps.

DRAINAGE—OHIO

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE,

ITEM (See definitions in Introduction)		Clark	Clinton	Crawford	Cuyahoga	Darke	Defiance	Delaware
LAND AREA								
1	Approximate land area.....1930.....acres.....	260,480	263,040	261,760	266,320	375,040	259,200	284,800
2	Land in enterprises.....1930.....acres.....	45,200	57,227	174,415	20,009	345,514	226,481	215,865
3	.....1920.....acres.....	19,505	20,040	145,097	8,519	346,125	250,267	272,530
4	Increase, ¹ 1920-1930.....per cent.....	131.7	185.6	20.2	247.6	-0.2	-9.6	-20.8
5	Area of all enterprises (overlapping areas included).....1930.....acres.....	49,940	57,227	331,944	31,015	885,411	847,724	457,405
6	Excess over land in enterprises (total areas overlapping).....acres.....	4,740	.....	157,529	1,406	539,897	621,243	241,540
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop.....1930.....acres.....	301	.....	150	20	89	3,190	3,295
8	Land unfit to raise any crop prior to drainage.....acres.....	17,798	22,913	13,497	9,069	45,512	14,976	34,081
9	Decrease since drainage.....per cent.....	98.3	100.0	98.9	99.8	99.8	78.7	90.0
10	Land fit to raise a normal crop.....1930.....acres.....	44,468	57,227	164,183	26,098	345,380	150,666	197,600
11	Land fit to raise a normal crop prior to drainage.....acres.....	26,335	22,911	115,849	16,103	228,399	100,272	106,987
12	Increase since drainage.....per cent.....	98.9	149.8	41.7	65.8	51.2	50.3	84.6
13	Land fit to raise a partial crop.....1930.....acres.....	431	.....	10,082	2,891	45	72,625	15,070
14	Land fit to raise a partial crop prior to drainage.....acres.....	1,067	11,403	45,099	4,437	71,603	111,233	73,897
15	Decrease since drainage ².....per cent.....	59.6	100.0	77.6	34.8	99.9	34.7	79.6
16	Improved land.....1930.....acres.....	44,837	57,227	154,039	27,159	343,400	201,132	192,003
17	.....1920.....acres.....	13,040	20,040	123,753	6,284	314,643	194,430	227,865
18	Increase, ² 1920-1930.....per cent.....	221.4	185.6	24.5	332.2	9.2	3.4	-15.5
Unimproved land—								
19	Woodland.....1930.....acres.....	82	.....	18,524	1,230	2,084	25,021	22,000
20	Other.....1930.....acres.....	281	.....	1,852	1,220	.....	328	203
21	Land in occupied farms.....1930.....acres.....	45,000	57,227	174,272	27,337	345,106	226,481	215,685
22	Land in planted crops.....1930.....acres.....	34,662	28,843	102,743	21,243	280,027	184,897	187,196
23	Woodland cleared and cultivated since drainage.....1930.....acres.....	18	.....	4,413	4,050	16,257	39,332	51,241
24	Land idle.....1930.....acres.....	.....	370	20,435	8,122	21,691	17,370	173
25	Land available for settlement.....1930.....acres.....	.....	.....	10	.....	.....	.....	50
DRAINAGE WORKS, 1930								
Ditches—								
26	Completed.....miles.....	133.5	41.8	320.4	55.4	525.5	971.3	503.2
Tile drains—								
27	Completed.....miles.....	54.4	44.9	362.8	.....	420.0	59.0	575.0
Levees and dikes—								
28	Completed.....miles.....	.....	.....	.....	.....	.....	.....	.....
Pumping plants—								
29	Engine capacity.....horsepower.....	.....	.....	.....	.....	.....	.....	.....
30	Pump capacity.....gals. per min.....	.....	.....	.....	.....	.....	.....	.....
31	Land served by pumps.....acres.....	.....	.....	.....	.....	.....	.....	.....
32	Land drained by ditches only.....acres.....	21,988	34,550	52,514	20,000	159,307	169,415	64,444
33	Length of ditches.....miles.....	101.5	30.7	193.8	55.4	312.3	850.9	254.5
34	Land drained by tile only.....acres.....	6,850	11,374	68,493	.....	79,002	5,056	67,538
35	Length of tile.....miles.....	29.9	33.1	221.8	.....	245.9	13.0	220.4
36	Land drained by ditches and tile.....acres.....	16,356	11,303	53,408	.....	107,055	51,410	83,883
37	Length of ditches.....miles.....	32.0	11.1	135.0	.....	213.2	120.4	248.7
38	Length of tile.....miles.....	27.5	11.8	141.0	.....	174.7	40.6	355.5
39	Land drained by pumps and other drainage works.....acres.....	.....	.....	.....	.....	.....	.....	.....
40	Length of ditches.....miles.....	.....	.....	.....	.....	.....	.....	.....
41	Length of levees.....miles.....	.....	.....	.....	.....	.....	.....	.....
42	Land protected by levees of an outside agency.....acres.....	.....	.....	.....	.....	.....	.....	.....
CAPITAL INVESTED AND COST PER ACRE								
43	Capital invested in enterprises to Jan. 1, 1930.....dollars.....	182,266	156,189	710,977	89,025	1,333,441	767,504	840,440
44	.....1920.....dollars.....	133,225	39,251	632,076	53,872	2,000,095	651,468	610,455
45	Increase, ³ 1920-1930.....per cent.....	36.8	297.9	12.5	65.3	-33.3	17.8	37.8
46	Estimated cost of enterprises when completed.....1930.....dollars.....	182,266	156,189	710,977	89,025	1,333,441	767,504	840,440
47	.....1920.....dollars.....	133,225	39,251	632,076	64,872	2,000,095	651,468	617,685
48	Average, per acre when completed.....1930.....dollars.....	4.03	2.73	4.08	3.01	3.86	3.39	3.94
49	.....1920.....dollars.....	6.83	1.96	4.30	7.61	5.78	2.00	2.27
Invested in—								
50	Enterprises having ditches only.....1930.....dollars.....	81,173	84,412	150,557	89,025	410,149	551,041	160,858
51	Average, per acre.....dollars.....	3.69	2.44	2.87	3.01	2.57	3.20	2.50
52	Enterprises having tile drains only.....1930.....dollars.....	34,623	45,766	293,944	.....	450,698	14,370	205,850
53	Average, per acre.....dollars.....	5.05	4.02	4.29	.....	5.70	2.54	3.05
54	Enterprises having ditches and tile drains.....1930.....dollars.....	66,470	26,611	200,473	.....	472,594	201,493	482,738
55	Average, per acre.....dollars.....	4.06	2.30	4.09	.....	4.41	3.92	6.75
56	Enterprises having pumps and other drainage works.....1930.....dollars.....	.....	.....	.....	.....	.....	.....	.....
57	Average, per acre.....dollars.....	.....	.....	.....	.....	.....	.....	.....

¹ Included in "Other counties."

² A minus sign (-) denotes decrease. A plus sign (+) denotes increase.

³ Office estimate; the figures reported exceeded the improved acreage in all farms in the county as determined by the census of agriculture.

DRAINAGE—OHIO

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE,

ITEM (See definitions in Introduction)		Madison	Marion	Medina	Mercer	Miami	Montgomery	Morrow
LAND AREA								
1	Approximate land area..... 1930..... acres..	318,080	261,700	278,400	288,000	261,120	201,200	257,920
2	Land in enterprises..... 1930..... acres..	288,740	235,471	22,116	261,521	150,195	38,160	120,674
3	..... 1920..... acres..	236,431	237,580	17,859	250,863	225,720	10,482	111,111
4	Increase, ² 1920-1930..... per cent..	22.1	-0.9	23.8	4.3	-29.5	264.1	14.0
5	Area of all enterprises (overlapping areas included)..... 1930..... acres..	419,042	600,144	23,816	667,437	334,807	46,850	202,170
6	Excess over land in enterprises (total areas overlapping)..... acres..	130,302	424,673	1,700	405,916	175,702	8,681	76,695
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop..... 1930..... acres..		6,183		5,287		20	
8	Land unfit to raise any crop prior to drainage..... acres..	145,511	70,736	4,581	59,826	8,026	5,710	8,299
9	Decrease since drainage..... per cent..	100.0	92.2	100.0	91.2	100.0	99.6	100.0
10	Land fit to raise a normal crop..... 1930..... acres..	288,740	162,806	21,316	238,750	150,195	38,149	119,482
11	Land fit to raise a normal crop prior to drainage..... acres..	143,229	42,591	13,305	127,837	142,094	31,115	58,761
12	Increase since drainage ² per cent..	101.6	268.8	59.5	80.8	12.0	22.6	103.3
13	Land fit to raise a partial crop..... 1930..... acres..		76,482	800	17,484			7,192
14	Land fit to raise a partial crop prior to drainage..... acres..		113,144	4,170	73,558	9,075	1,344	59,014
15	Decrease since drainage ² per cent..		32.4	80.8	70.3	100.0	100.0	87.9
16	Improved land..... 1930..... acres..	288,740	217,489	21,962	210,000	140,186	38,021	121,024
17	..... 1920..... acres..	214,806	174,142	10,753	222,988	202,013	9,308	97,763
18	Increase, ² 1920-1930..... per cent..	34.7	24.9	104.2	-1.5	-30.8	308.5	24.7
Unimproved land—								
19	Woodland..... 1930..... acres..		10,263		41,865	18,870	143	4,750
20	Other..... 1930..... acres..		1,719	154	50	130	5	
21	Land in occupied farms..... 1930..... acres..	288,740	234,021	22,116	261,070	158,138	38,160	120,674
22	Land in planted crops..... 1930..... acres..	180,245	210,460	14,598	202,154	137,386	34,799	113,875
23	Woodland cleared and cultivated since drainage..... 1930..... acres..		74,662		40,397	271	1,041	10,275
24	Land idle..... 1930..... acres..		10,904	160	10,886	13,210	210	4,368
25	Land available for settlement..... 1930..... acres..				3			
DRAINAGE WORKS, 1930								
Ditches—								
26	Completed..... miles..	541.9	643.4	59.1	687.3	185.9	46.1	136.3
Tile drains—								
27	Completed..... miles..		662.3	0.3	218.4	520.1	71.2	215.4
Levees and dikes—								
28	Completed..... miles..							
Pumping plants—								
29	Engine capacity..... horsepower..							
30	Pump capacity..... gals. per min..							
31	Land served by pumps..... acres..							
32	Land drained by ditches only..... acres..	288,740	52,687	22,066	171,005	23,321	17,306	23,718
33	Length of ditches..... miles..	541.9	430.5	59.1	603.2	123.4	35.7	88.4
34	Land drained by tile only..... acres..		86,018	50	51,410	89,740	13,766	70,028
35	Length of tile..... miles..		375.8	0.3	154.6	340.0	59.7	143.8
36	Land drained by ditches and tile..... acres..		96,766		30,100	40,134	7,097	26,028
37	Length of ditches..... miles..		203.0		84.1	62.5	10.4	47.0
38	Length of tile..... miles..		286.5		63.8	182.5	11.5	71.0
39	Land drained by pumps and other drainage works ⁴ acres..							
40	Length of ditches..... miles..							
41	Length of levees..... miles..							
42	Land protected by levees of an outside agency..... acres..						605	
CAPITAL INVESTED AND COST PER ACRE								
43	Capital invested in enterprises to Jan. 1, 1930..... dollars..	729,507	2,047,850	89,287	871,017	988,087	277,140	286,448
44	..... 1920..... dollars..	686,563	706,480	65,430	898,792	884,625	54,685	224,208
45	Increase, ² 1920-1930..... per cent..	6.3	189.0	36.5	-3.0	11.1	406.8	27.7
46	Estimated cost of enterprises when completed..... 1930..... dollars..	729,507	2,047,850	89,287	871,017	988,087	277,140	286,448
47	..... 1920..... dollars..	686,563	706,480	65,430	898,792	884,625	54,685	224,208
48	Average, per acre when completed..... 1930..... dollars..	2.53	8.70	4.04	3.33	6.18	7.26	2.26
49	..... 1920..... dollars..	2.90	2.97	3.66	3.58	3.92	5.22	2.02
Invested in—								
50	Enterprises having ditches only..... 1930..... dollars..	729,507	1,102,143	88,370	537,756	146,596	50,597	61,748
51	Average, per acre..... dollars..	2.53	4.01	4.01	3.14	6.20	2.92	2.60
52	Enterprises having tile drains only..... 1930..... dollars..		350,881	608	190,554	516,850	170,379	134,238
53	Average, per acre..... dollars..		4.08	18.16	3.71	5.76	12.38	1.77
54	Enterprises having ditches and tile drains..... 1930..... dollars..		504,826		143,307	319,641	56,164	90,462
55	Average, per acre..... dollars..		5.22		3.66	6.93	7.91	3.36
56	Enterprises having pumps and other drainage works..... 1930..... dollars..							
57	Average, per acre..... dollars..							

¹ Included in "Other counties."

² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.

³ Office estimate; the figures reported exceeded the improved acreage in all farms in the county as determined by the census of agriculture.

⁴ Area of enterprises having some land served by pumps.

DRAINAGE—OHIO

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Van Wert	Warren	Wayne	Williams	Wood	Wyandot	Other counties ¹
LAND AREA								
1	Approximate land area..... 1930..... acres.....	250,840	264,320	350,480	263,040	301,680	250,840	3,820,760
2	Land in enterprises..... 1930..... acres.....	254,870	0,271	162,101	198,031	370,002	233,355	27,513
3	..... 1920..... acres.....	257,527	(?)	61,061	230,911	380,300	214,600	28,820
4	Increase, ² 1920-1930..... per cent.....	-1.0		162.0	-16.0	-5.0	-4.6	-4.4
5	Area of all enterprises (overlapping areas included)..... 1930..... acres.....	1,567,265	0,271	203,238	352,183	2,470,533	518,282	27,513
6	Excess over land in enterprises (total areas overlapping)..... acres.....	1,312,395		41,137	153,262	2,100,533	314,927	
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop..... 1930..... acres.....	2,108	000	15,530	3,461	854	520	2,020
8	Land unfit to raise any crop prior to drainage..... acres.....	10,762	1,497	25,918	24,270	21,203	14,829	7,950
9	Decrease since drainage..... per cent.....	80.4	59.9	40.0	85.7	90.0	90.5	74.5
10	Land fit to raise a normal crop..... 1930..... acres.....	251,693	8,074	112,000	146,640	307,611	220,447	23,488
11	Land fit to raise a normal crop prior to drainage..... acres.....	103,503	4,800	83,220	95,233	150,884	101,000	13,579
12	Increase since drainage..... per cent.....	53.0	68.2	35.7	54.0	120.9	116.1	73.0
13	Land fit to raise a partial crop..... 1930..... acres.....	1,064	507	33,653	48,821	1,537	12,388	2,026
14	Land fit to raise a partial crop prior to drainage..... acres.....	80,405	2,074	52,054	79,428	188,825	110,536	6,014
15	Decrease since drainage..... per cent.....	93.7	70.9	36.4	38.5	90.2	89.4	60.3
16	Improved land..... 1930..... acres.....	226,621	0,271	122,618	174,674	300,577	221,694	22,060
17	..... 1920..... acres.....	220,721	(?)	51,054	108,444	314,841	205,752	23,471
18	Increase, ² 1920-1930..... per cent.....	2.7		140.2	-12.0	16.4	7.7	-2.2
19	Unimproved land—							
20	Woodland..... 1930..... acres.....	28,109		34,284	24,155	2,104	11,173	3,396
21	Other..... 1930..... acres.....	140		5,199	102	1,321	488	1,181
22	Land in occupied farms..... 1930..... acres.....	254,570	0,271	160,237	198,844	300,907	233,355	26,223
23	Land in planted crops..... 1930..... acres.....	225,923	5,300	88,548	154,180	343,782	210,060	18,010
24	Woodland cleared and cultivated since drainage..... 1930..... acres.....	50,135	500	520	23,872	10	31,721	2,702
25	Land idle..... 1930..... acres.....	17,024	1,029	8,566	21,380	226	5,702	3,760
26	Land available for settlement..... 1930..... acres.....							575
DRAINAGE WORKS, 1930								
26	Ditches—							
27	Completed..... miles.....	1,406.5	15.8	277.5	533.0	2,255.5	540.0	85.5
27	Tile drains—							
28	Completed..... miles.....	184.2	1.3	5.1	182.1	04.2	223.0	1.2
28	Levees and dikes—							
29	Completed..... miles.....							
29	Pumping plants—							
30	Engine capacity..... horsepower.....							
30	Pump capacity..... gals. per min.....							
31	Land served by pumps..... acres.....							
32	Land drained by ditches only..... acres.....	197,807	5,976	163,406	91,774	357,397	101,093	25,460
33	Length of ditches..... miles.....	1,310.5	11.5	202.7	384.0	2,212.4	363.3	82.7
34	Land drained by tile only..... acres.....	18,264			41,989	6,838	42,870	145
35	Length of tile..... miles.....	120.0			77.3	69.2	82.0	0.5
36	Land drained by ditches and tile..... acres.....	38,799	3,295	8,605	65,108	5,707	80,392	1,038
37	Length of ditches..... miles.....	177.0	4.3	14.8	140.0	43.1	185.7	2.8
38	Length of tile..... miles.....	57.0	1.3	5.1	104.8	25.0	141.0	0.7
39	Land drained by pumps and other drainage works..... acres.....							
40	Length of ditches..... miles.....							
41	Length of levees..... miles.....							
42	Land protected by levees of an outside agency..... acres.....							
CAPITAL INVESTED AND COST PER ACRE								
43	Capital invested in enterprises to Jan. 1, 1930..... dollars.....	1,031,698	20,000	427,599	556,914	2,540,618	812,205	106,466
44	..... 1920..... dollars.....	1,544,952	(?)	310,283	512,940	1,723,307	550,087	231,243
45	Increase, ² 1920-1930..... per cent.....	5.6		33.0	8.0	47.4	45.3	-28.0
46	Estimated cost of enterprises when completed..... 1930..... dollars.....	1,031,698	20,000	427,599	556,914	2,540,618	812,205	106,466
47	..... 1920..... dollars.....	1,544,952	(?)	310,283	512,940	1,723,307	560,244	231,243
48	Average, per acre when completed..... 1930..... dollars.....	6.40	2.10	2.64	2.80	0.87	3.48	6.04
49	..... 1920..... dollars.....	6.00	(?)	5.18	2.17	4.43	2.32	8.02
50	Invested in—							
51	Enterprises having ditches only..... 1930..... dollars.....	1,231,092	12,800	415,220	244,402	2,363,043	311,171	163,109
52	Average, per acre..... dollars.....	6.22	2.14	2.71	2.06	0.61	3.08	6.41
53	Enterprises having tile drains only..... 1930..... dollars.....	188,145			97,049	101,548	109,387	1,832
54	Average, per acre..... dollars.....	10.30			2.31	14.85	3.95	12.03
55	Enterprises having ditches and tile drains..... 1930..... dollars.....	212,461	7,200	12,370	215,373	70,027	331,007	1,525
56	Average, per acre..... dollars.....	5.48	2.19	1.42	3.30	13.18	3.71	0.79
57	Enterprises having pumps and other drainage works..... 1930..... dollars.....							
58	Average, per acre..... dollars.....							

¹ Includes only Brown, Clermont, Geauga, Highland, Jackson, Knox, Lawrence, Mahoning, Muskingum, Perry, Ross, and Tuscarawas Counties in 1930; and Brown, Butler, Clermont, Geauga, Hamilton, Highland, Holmes, Jackson, Knox, Lawrence, Mahoning, Muskingum, Perry, Pike, Ross, Scioto, Tuscarawas, and Warren Counties for 1920.

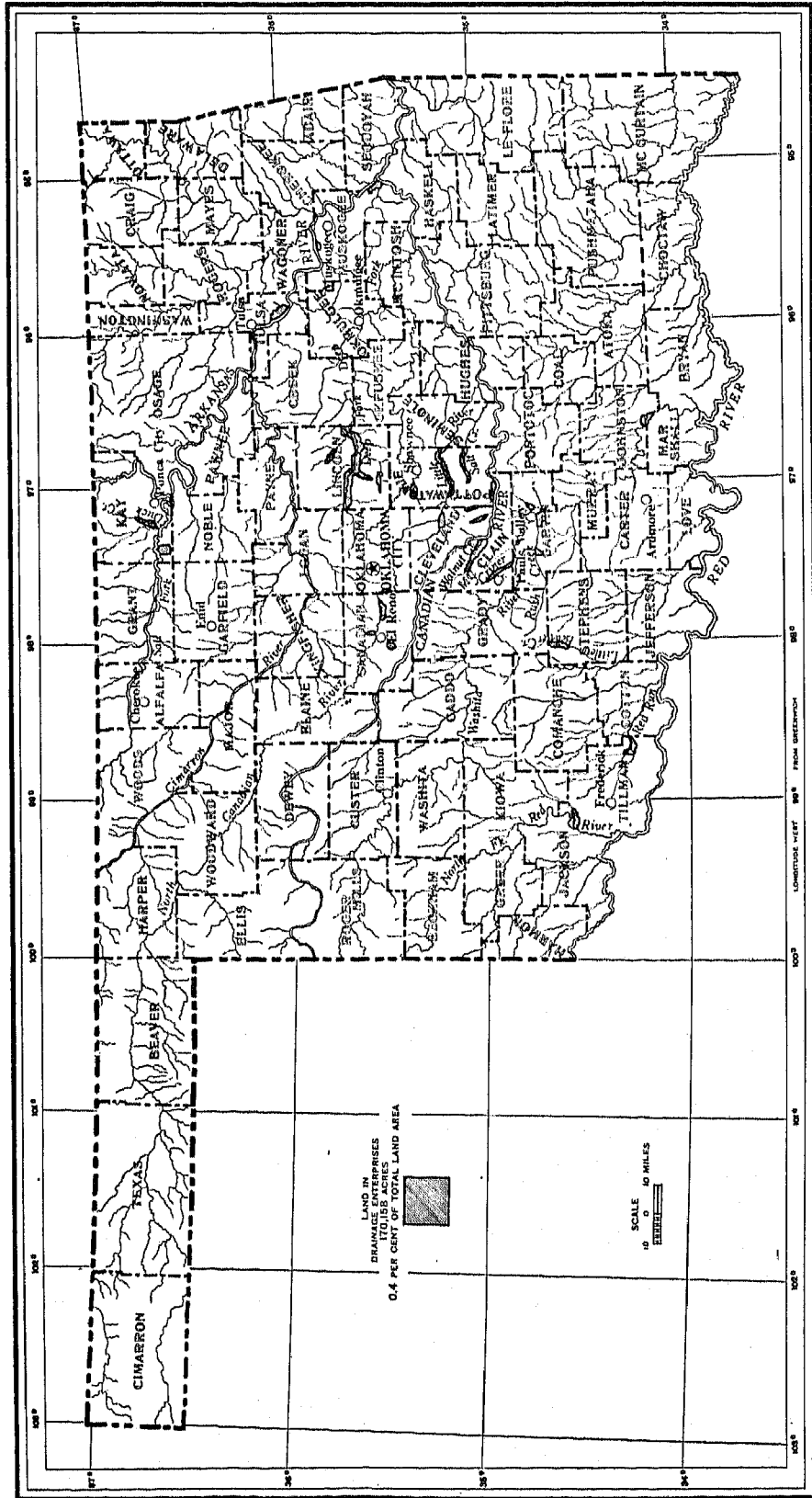
² Included in "Other counties."

³ A minus (-) denotes decrease.

⁴ Office estimate; the figures reported exceeded the improved acreage in all farms in the county as determined by the census of agriculture.

OKLAHOMA

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



OKLAHOMA

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—By far the greater part of the land in drainage enterprises in Oklahoma is located near the central portion of the State. In most instances, these enterprises were

organized to protect bottom lands from overflow; and much of the drainage work consisted in straightening and improving the stream channels, so that only exceptional floods would overflow the adjacent lands.

Of the land in drainage enterprises approximately 84 per cent was reported as improved, 7 per cent as woodland, and 9 per cent as other unimproved land. Of the total, approximately 3 per cent was classed as unfit to raise any crop for lack of drainage.

The mean annual precipitation varies from 17.5 inches in the extreme western part of the State to 43.6 inches in the eastern portion, while the State average is 35.4 inches. The average for 1929 was about 2 inches above normal.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the improvement works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....	203,866	101,088	11,878	6.2
Farms reporting drainage.....	1,857	2,032	-175	-8.6
All land in farms.....	33,700,817	31,951,034	1,838,883	5.8
Farm land provided with drainage.....	91,649	107,014	-15,365	-14.4
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....	44,424,960	44,424,900		
Land in drainage enterprises.....	170,158	12,150	158,008	
Improved land.....	142,706	8,845	133,921	
Unimproved land:				
Woodland.....	11,923	3,305	8,618	200.8
Other.....	15,469		15,469	
Land unfit to raise any crop for lack of drainage.....	5,734	² 2,250	3,484	154.8
Land drained, fit to raise normal crop.....	143,221	³		
Land partly drained, fit for partial crop.....	21,203	⁴ 1,838	19,365	
Land in occupied farms.....	163,936	³		
Land in planted crops.....	135,956	³		
Land idle.....	20,092	³		
Ditches, completed.....	303.0	18.6	284.4	
Capital invested in enterprises.....	2,283,598	70,415	2,207,183	
Average, per acre.....	13.42	6.20	7.13	113.4

¹ A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.
² "Swampy or subject to overflow."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 33 drainage enter-

prises, with an average area of 5,185 acres, are shown for Oklahoma. There are 12 such enterprises of 5,000 acres or more, 19 of between 500 and 5,000 acres, and 2 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 960 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	171, 118	100. 0	12, 150	100. 0	170, 158
200 to 400 acres.....	670	0. 4	400	3. 3	670
500 to 900 acres.....	46, 576	27. 2	750	6. 2	45, 616
1,000 to 4,000 acres.....	60, 381	35. 3	5, 000	41. 1	60, 381
5,000 to 9,000 acres.....	63, 401	37. 1	6, 000	50. 4	63, 401
10,000 to 49,000 acres.....					

¹ The sum of the areas of individual enterprises, including overlap.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects, county drains, or township drains*, according to the public officials in control.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	170, 158	100. 0	2, 283, 598	100. 0
County drains.....	160, 048	97. 6	2, 233, 198	99. 1
Individually owned projects.....	4, 110	2. 4	20, 400	0. 9

Type of drainage.—There were 30 enterprises, covering 165,778 acres of land and with an invested capital of \$2,233,198, that reported their works as completed.

There were 3 enterprises, covering 4,380 acres of land and with an invested capital of \$50,400, which estimated that \$20,200 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, consisted of 303 miles of ditches. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. No pumping plants, levees, or tile drains were reported.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises, gravity drainage (ditches) only.....	170, 158	100. 0	2, 283, 598	100. 0

Arrears and delinquency.—There were 2 enterprises, with approximately 3 per cent of the invested capital and covering less than 5 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 31 enterprises reported no arrearage. Reports of 3 enterprises, covering 15,125 acres, show a total of 5,848 acres delinquent in drainage taxes; 27

enterprises, covering 122,627 acres, reported no delinquency; while 3 enterprises failed to report.

STATE TABLE 5.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	170, 158	100. 0	2, 283, 598	100. 0	5, 848
Enterprises in arrears.....	8, 270	4. 9	66, 030	2. 9	2, 880
With some delinquent land.....	2, 960	1. 8	28, 000	1. 2	2, 880
With no report on delinquency.....	5, 310	3. 1	38, 030	1. 7	-----
Enterprises not in arrears.....	161, 888	95. 1	2, 217, 568	97. 1	2, 968
With some delinquent land.....	12, 165	7. 1	184, 000	8. 0	2, 968
With no delinquent land.....	122, 627	72. 1	1, 570, 890	68. 8	-----
With no report on delinquency.....	27, 090	15. 9	462, 708	20. 3	-----

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes. An enterprise, prior to drainage, may contain swamp land, improved land in farms, and land subject to overflow. The object in drainage may be to reclaim or benefit all such lands. However, the land is classified according to the principal purpose reported.

Nearly all of the lands in drainage enterprises in Oklahoma are located in stream bottoms subject to overflow following periods of excessive rainfall. The principal purpose of drainage, consequently, was protection against overflow. Doubtless, a considerable part of such lands, subject only to occasional overflows, produce crops in normal years.

STATE TABLE 6.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	170, 158	100. 0	2, 283, 598	100. 0
Improvement of land already in farms.....	22, 500	13. 3	120, 800	5. 3
Protection against overflow.....	147, 658	86. 7	2, 162, 798	94. 7

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used.

STATE TABLE 7.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Acres	Over-lapped acres	Dollars	Per cent
All enterprises.....	170, 158	100. 0	171, 118	900	2, 283, 598	100. 0
1900-1904.....	5, 000	2. 9	5, 000	-----	40, 000	1. 7
1905-1909.....	57, 612	33. 9	57, 612	-----	701, 801	34. 7
1910-1914.....	33, 066	19. 4	33, 066	-----	493, 108	21. 6
1915-1919.....	3, 600	2. 1	4, 000	400	22, 100	1. 0
1920-1924.....	41, 156	24. 2	41, 716	560	526, 143	23. 0
1925-1929.....	20, 694	12. 2	20, 694	-----	410, 350	18. 0

¹ Includes overlap.

STATE TABLE 8.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement
	Total	Condition of land			Acres	
		Improved land	Wood-land	Other unimproved land		
All enterprises.....	Acres 170,158	Acres 142,766	Per cent 83.9	Acres 11,923	Acres 15,469	Acres 1,063
1900-1904.....	5,000	4,850	97.0	150	.....	.....
1905-1909.....	57,012	47,010	82.6	5,300	4,702	.....
1910-1914.....	33,036	20,500	60.1	3,300	3,200	500
1915-1919.....	3,000	3,000	100.0	.....	.....	.....
1920-1924.....	41,156	30,003	88.9	2,173	2,380	393
1925-1929.....	29,094	23,003	79.5	1,000	5,091	170

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 16 enterprises, covering 103,712 acres of land and having an invested capital of \$1,639,843. There were 17 enterprises, with an invested capital of \$643,755 and covering 66,446 acres of land, that did not have systematic maintenance.

Only 1 enterprise, with an invested capital of \$28,000 and covering 2,960 acres of land, reported ownership of excavators or other power equipment used principally for maintenance; while 32 enterprises, with an invested capital of \$2,255,598 and covering 167,198 acres of land, reported no such equipment.

STATE TABLE 9.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	170,158	100.0	2,283,598	100.0
By district forces.....	80,120	47.1	1,374,860	60.2
By contract.....	20,071	12.2	239,750	10.5
By work apportioned to land-owners.....	31,856	18.7	318,483	13.9
Other, none, and not reported.....	37,505	22.0	350,496	15.4

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 37 per cent of the land reporting showed some cost, and 63 per cent showed no cost in 1929. The average cost was 11 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 10.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
All enterprises reporting, gravity drainage (ditches) only.....	Acres 170,158	Dollars 19,527	Dollars 0.11

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Number	Acres	Acres	
The State.....	1,857	2,032	91,040	107,014	203,866	33,790,817	17,333,174	4,050,403	44,424,900
Bryan.....	15	(²)	533	(²)	3,707	427,102	258,000	90,033	503,020
Caddo.....	02	(²)	1,840	(²)	5,901	772,110	463,037	101,756	824,900
Canadian.....	22	33	1,277	2,391	2,901	533,084	330,512	53,483	570,240
Cherokee ³	17	345	554	608	2,429	209,078	103,109	77,870	403,440
Cleveland.....	01	20	4,171	766	2,011	280,713	136,035	72,822	354,560
Cotton.....	21	(²)	884	(²)	2,045	381,238	227,741	8,877	403,200
Craig.....	5	(²)	172	(²)	2,219	387,038	208,107	24,814	484,480
Garfield.....	27	(²)	581	(²)	3,478	710,042	479,350	10,301	679,040
Garvin.....	04	35	4,373	1,050	3,610	416,482	248,500	59,077	525,440
Grady.....	130	10	0,550	1,202	4,890	628,851	409,755	69,343	711,080
Grant.....	24	19	722	1,123	2,757	668,108	458,240	6,122	630,160
Haskell.....	10	(²)	601	(²)	2,218	226,183	117,488	59,741	393,600
Hughes.....	12	(²)	504	(²)	2,993	330,503	168,874	101,743	505,600
Jackson.....	7	(²)	040	(²)	2,849	465,047	338,573	8,513	497,020
Jefferson ⁴	10	.....	840	.....	1,995	475,335	170,090	30,348	470,300
Kay.....	06	22	0,284	989	2,849	600,384	365,956	16,448	597,700
Kiowa ⁵	19	19	871	590	3,532	604,547	386,400	11,462	670,080
Lincoln.....	208	191	17,370	12,316	4,402	550,902	262,151	155,738	613,700
Logan.....	10	(²)	520	(²)	2,833	408,330	210,262	70,870	72,960
McCurtain.....	8	25	506	537	4,221	253,395	150,856	73,147	1,214,080
McIntosh.....	20	87	723	1,785	3,517	310,712	202,352	04,482	453,120
Muskogee.....	43	20	1,760	382	4,487	387,020	201,700	41,090	520,960
Okluskee.....	18	143	1,005	1,007	3,544	316,054	180,297	81,017	398,720
Oklahoma.....	118	63	5,851	2,963	3,111	340,194	174,734	84,199	458,880
Osage.....	8	41	627	20,085	2,354	1,032,848	198,475	200,335	1,457,280
Payne.....	20	(²)	011	(²)	2,928	303,216	185,727	04,254	433,020
Pittsburg.....	8	65	800	8,685	3,716	444,771	191,149	148,559	870,800
Pottawatomie.....	130	350	0,605	15,023	3,760	389,935	192,147	97,350	570,520
Seminole.....	18	55	570	1,498	2,800	256,290	135,004	79,431	405,120
Sequoyah.....	02	21	2,034	1,122	2,769	207,812	116,411	47,442	443,520
Stephens.....	25	(²)	852	(²)	2,922	439,799	200,764	90,132	574,080
Tillman ⁷	62	8	5,830	672	2,763	521,777	370,490	11,720	553,000
Tulsa.....	37	8	1,082	533	2,480	231,705	139,042	31,875	374,400
Wagoner ⁸	39	38	2,150	4,903	3,154	289,401	187,524	27,202	301,000
Washington.....	7	(²)	010	(²)	1,107	190,706	73,060	10,113	272,000
Washita.....	52	(²)	1,783	(²)	4,506	611,634	423,585	8,441	643,840
All other counties.....	281	402	8,454	18,394	80,919	18,081,516	8,610,721	1,864,039	23,097,300

¹ No drainage on farms reported in Cimarron, Ellis, Harper, Marshall, and Texas Counties in 1930; nor in Blaine, Cimarron, Jefferson, Love, and Pawnee Counties for 1920.
² Included in "All other counties."
³ Part annexed to Wagoner in 1924.

⁴ The excess of farm acreage over approximate land area is due to the fact that the entire acreage of a farm is tabulated as in the county in which the headquarters are located, even though a part of the farm may be situated in an adjoining county.
⁵ Part annexed to Love in 1923.
⁶ Part annexed to Tillman in 1924.
⁷ Part of Kiowa annexed in 1924.
⁸ Part of Cherokee annexed in 1924.

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COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Canadian	Cleveland	Johnston	Kay
LAND AREA						
1	Approximate land area.....1930.....acres..	44,424,900	570,240	354,560	421,120	597,700
2	Land in enterprises.....1930.....acres..	170,168	8,093	11,910	5,310	11,000
3	.....1920.....acres..	12,160	(1)		6,000	(1)
4	Increase, ² 1920-1930.....per cent.....				-11.5	
5	Area of all enterprises (overlapping areas included).....1930.....acres..	171,118	9,093	11,910	5,310	11,000
6	Excess over land in enterprises (total areas overlapping).....acres.....	960	400			
CONDITION AND USE OF LAND						
7	Land unfit to raise any crop.....1930.....acres..	5,734	393			
8	Land unfit to raise any crop prior to drainage.....acres.....	101,894	1,850	2,000	4,079	4,000
9	Decrease since drainage.....per cent.....	94.4	78.8	100.0	100.0	100.0
10	Land fit to raise a normal crop.....1930.....acres..	143,221	7,800	9,500	5,310	10,500
11	Land fit to raise a normal crop prior to drainage.....acres.....	36,421	5,050	9,500	5,310	6,000
12	Increase since drainage.....per cent.....	293.2	38.1		900.0	75.0
13	Land fit to raise a partial crop.....1930.....acres..	21,203	500	2,410		500
14	Land fit to raise a partial crop prior to drainage.....acres.....	31,843	1,193	410	700	1,000
15	Decrease since drainage ².....per cent.....	33.4	58.1	-487.8	100.0	50.0
16	Improved land.....1930.....acres..	142,700	7,800	9,410	5,310	10,660
17	.....1920.....acres..	8,845	(1)		3,600	(1)
18	Increase, ² 1920-1930.....per cent.....				47.5	
Unimproved land—						
19	Woodland.....1930.....acres..	11,023	693			350
20	Other.....1930.....acres..	15,400	200	2,600		
21	Land in occupied farms.....1930.....acres..	163,930	7,800	11,500	5,310	11,000
22	Land in planted crops.....1930.....acres..	135,950	7,700	5,610	5,310	10,200
23	Woodland cleared and cultivated since drainage.....1930.....acres..	20,240	3,250		3,200	
24	Land idle.....1930.....acres..	26,092	903			
25	Land available for settlement.....1930.....acres..	1,093	893			
DRAINAGE WORKS, 1930						
Ditches—						
26	Completed.....miles.....	303.0	22.0	40.5	16.1	12.0
27	Additional under construction.....miles.....	6.5		3.5		1.0
28	Land drained by ditches only ³.....acres.....	170,158	8,093	11,910	5,310	11,000
29	Length of ditches.....miles.....	309.5	22.0	44.0	16.1	13.0
CAPITAL INVESTED AND COST PER ACRE						
30	Capital invested in enterprises to Jan. 1, 1930.....dollars.....	2,283,598	53,174	128,200	38,000	100,000
31	.....1920.....dollars.....	70,415	(1)		44,600	(1)
32	Increase, ² 1920-1930.....per cent.....				-14.6	
33	Estimated cost of enterprises when completed.....1930.....dollars.....	2,303,798	53,174	143,200	38,000	101,200
34	.....1920.....dollars.....	77,415	(1)		44,600	(1)
35	Average, per acre when completed.....1930.....dollars.....	13.54	0.12	12.02	7.16	9.20
36	.....1920.....dollars.....	0.37	(1)		7.42	(1)
Invested in—						
37	Enterprises having ditches only, when completed.....1930.....dollars.....	2,303,798	53,174	143,200	38,000	101,200
38	Average, per acre when completed.....dollars.....	13.54	0.12	12.02	7.16	9.20

¹ Included in "Other counties."

² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.

³ When works under construction have been completed.

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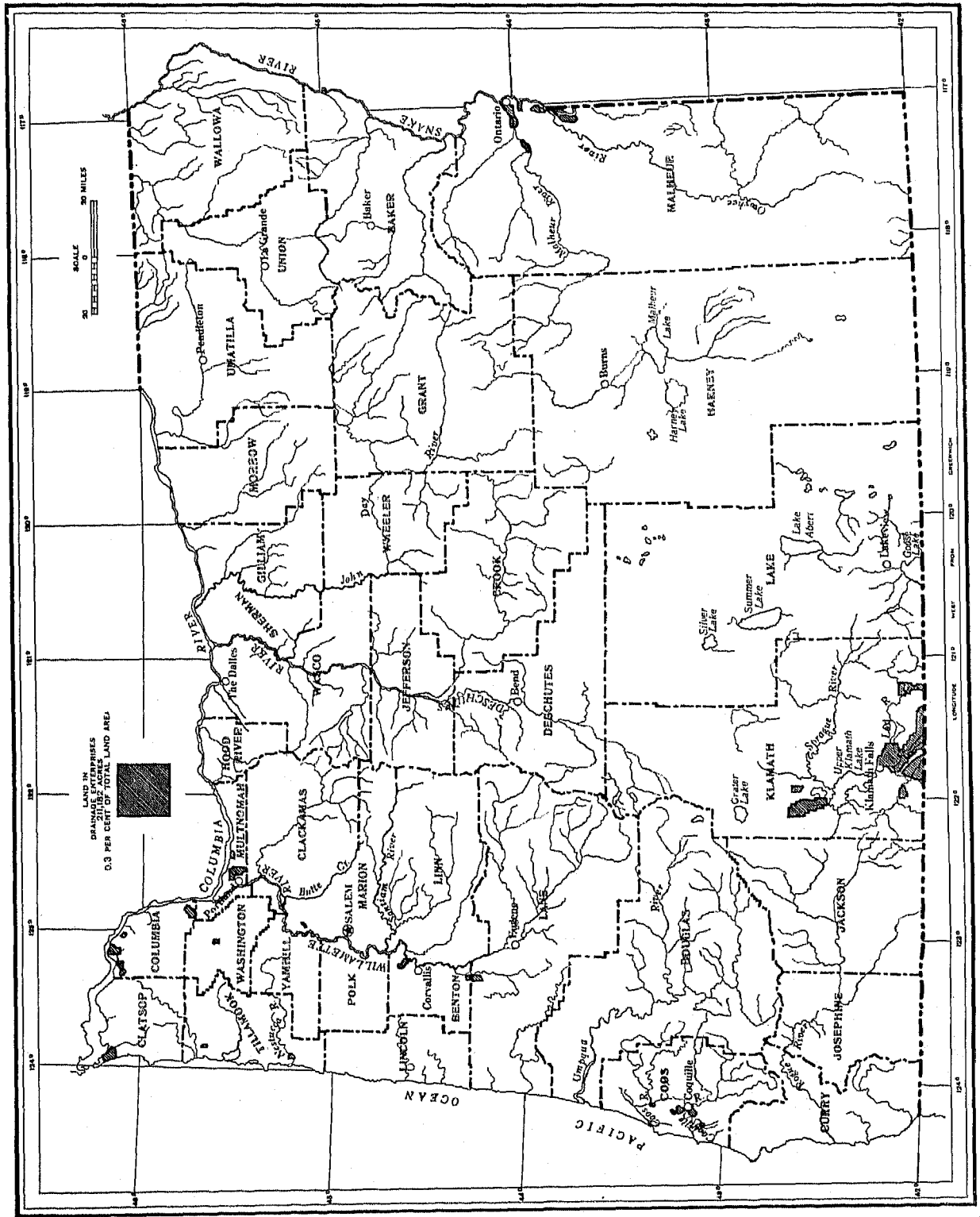
COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Lincoln	McClain	Pottawatomio	Tillman ¹	Tulsa	Other counties ²
LAND AREA							
1	Approximate land area.....1930.....acres..	613,760	350,080	507,520	553,600	374,400	2,175,360
2	Land in enterprises.....1930.....acres..	45,232	17,593	34,804	7,071	8,060	18,595
3	.....1920.....acres..						6,150
4	Increase, ³ 1920-1930.....per cent..						202.4
5	Area of all enterprises (overlapping areas included).....1930.....acres..	45,792	17,593	34,804	7,071	8,060	18,595
6	Excess over land in enterprises (total areas overlapping).....acres..	560					
CONDITION AND USE OF LAND							
7	Land unfit to raise any crop.....1930.....acres..		4,000		771	400	170
8	Land unfit to raise any crop prior to drainage.....acres..	32,900	4,000	31,009	2,521	4,060	14,575
9	Decrease since drainage.....per cent..	100.0		100.0	69.4	91.0	98.8
10	Land fit to raise a normal crop.....1930.....acres..	45,232		34,804	6,800	5,560	17,625
11	Land fit to raise a normal crop prior to drainage.....acres..	7,340		3,400	1,000	1,000	1,910
12	Increase since drainage.....per cent..	516.2		890.8	580.0	466.0	822.8
13	Land fit to raise a partial crop.....1930.....acres..		13,593		400	3,000	800
14	Land fit to raise a partial crop prior to drainage.....acres..	4,902	13,593	395	4,450	3,000	2,110
15	Decrease since drainage.....per cent..	100.0		100.0	91.0		62.1
16	Improved land.....1930.....acres..	37,020	13,593	27,858	6,500	7,000	17,625
17	.....1920.....acres..						6,215
18	Increase, ⁴ 1920-1930.....per cent..						236.0
19	Unimproved land—						
20	Woodland.....1930.....acres..	6,080		3,840	400		500
20	Other.....1930.....acres..	2,132	4,000	3,196	1,071	1,060	410
21	Land in occupied farms.....1930.....acres..	42,240	17,593	34,297	7,071	8,060	17,265
22	Land in planted crops.....1930.....acres..	36,820	13,593	27,298	6,250	7,000	16,265
23	Woodland cleared and cultivated since drainage.....1930.....acres..	5,640		7,200	350	500	100
24	Land idle.....1930.....acres..	8,412	4,000	7,686	1,471	1,800	1,670
25	Land available for settlement.....1930.....acres..						170
DRAINAGE WORKS, 1930							
26	Ditches—						
27	Completed.....miles..	50.5	30.0	63.5	22.7	5.5	31.2
27	Additional under construction.....miles..						2.0
28	Land drained by ditches only ⁴.....acres..	45,232	17,593	34,804	7,071	8,060	18,595
29	Length of ditches.....miles..	59.5	30.0	63.5	22.7	5.5	33.2
CAPITAL INVESTED AND COST PER ACRE							
30	Capital invested in enterprises to Jan. 1, 1930.....dollars..	790,063	261,700	583,897	71,250	20,400	236,000
31	.....1920.....dollars..						31,915
32	Increase, ³ 1920-1930.....per cent..						639.2
33	Estimated cost of enterprises when completed.....1930.....dollars..	790,063	261,700	583,897	71,250	20,400	236,000
34	.....1920.....dollars..						32,915
35	Average, per acre when completed.....1930.....dollars..	17.40	14.88	16.73	8.94	2.20	12.90
36	.....1920.....dollars..						5.35
37	Invested in—						
38	Enterprises having ditches only, when completed.....1930.....dollars..	790,063	261,700	583,897	71,250	20,400	236,000
38	Average, per acre when completed.....dollars..	17.40	14.88	16.73	8.94	2.20	12.90

¹ Part of Kiowa annexed in 1924.² Includes only Alfalfa, Garvin, Muskogee, and Stephens Counties in 1930; and Canadian, Kay, and Muskogee Counties for 1920.³ Per cent not shown when more than 1,000.⁴ When works under construction have been completed.

OREGON

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



OREGON

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—The Cascade Range divides the State of Oregon into a humid and an arid section. That portion west of these mountains has a mean annual rainfall of approximately 49 inches, while that east of the mountains has an annual rainfall of about 16 inches. The year 1929 was very dry. Nearly three-fourths of the land in drainage enterprises is located in the eastern or arid section of the State, and about a third of this land in the eastern section is located above the Upper Klamath Lake in a region that was originally swampy.

The remaining lands in this section are located in an area that is also irrigated. The drainage enterprises in the western or humid section include several "diking districts" located in Clatsop County. A portion of the Great Basin—an area in which the rivers do not reach the sea—covers a large section in the south central part of the State but no drainage enterprises were reported in this region.

When the drainage work is done directly by an irrigation enterprise, the drainage enterprise has been considered as identical with the irrigation enterprise as all irrigable lands are usually assessed for the necessary drainage works. Of the 71,112 acres located in such enterprises, about 30,000 are not now served by drainage works, but will probably require drainage sometime in the future. The greater portion of this land, not yet drained, is located in the Klamath Project, constructed by the United States Bureau of Reclamation.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief from overflow for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....	55,153	50,200	4,047	9.8
Farms reporting drainage.....	0,092	0,618	-526	-7.0
All land in farms.....	10,548,078	13,542,318	3,000,300	22.2
Farm land provided with drainage.....	246,336	220,582	15,754	6.9
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....	61,188,480	61,188,480		
Land in drainage enterprises.....	211,182	4,000	207,182	
Improved land.....	144,253	4,000	140,253	
Unimproved land:				
Woodland.....	0,012		0,012	
Other.....	57,017		57,017	
Land unfit to raise any crop for lack of drainage.....	30,575			
Land drained, fit to raise normal crop.....	158,881	(1)		
Land partly drained, fit for partial crop.....	27,226			
Land in occupied farms.....	140,576	(1)		
Land in planted crops.....	110,987	(1)		
Land idle.....	52,563	(1)		
Ditches, completed.....	405.1		405.1	
Tile drains, completed.....	42.5	13.0	29.5	226.0
Capital invested in enterprises.....	4,166,549	200,000	3,966,549	
Average, per acre.....	19.72	50.00	-30.28	-60.6

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

¹ Not called for on schedule.

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, there are 51 drainage enterprises in Oregon with an average area of 4,141 acres. There are 12 such enterprises of 5,000 acres or more, 28 of between 500 and 5,000 acres, and 11 of less than 500 acres.

The area of enterprises equals the land in enterprises, as there is no overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	211,182	100.0	4,000	100.0	211,182
Less than 100 acres.....	150	0.1			150
100 to 199 acres.....	411	0.2			411
200 to 499 acres.....	1,910	0.9			1,910
500 to 999 acres.....	5,052	2.4			5,052
1,000 to 4,999 acres.....	42,697	20.2	4,000	100.0	42,697
5,000 to 9,999 acres.....	51,451	24.4			51,451
10,000 to 49,999 acres.....	109,511	51.8			109,511

¹ No overlap.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects, county drains, or township drains*, according to the public officials in control.

Drainage projects under the control of the officers of an irrigation organization are classed as *irrigation enterprises*. In such cases the drainage is incidental to land reclamation by irrigation, and both the drainage and irrigation operations are functions of the one enterprise.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises ¹				
Drainage districts.....	120,862	57.2	3,110,181	74.6
State projects.....	976	0.5	70,000	1.7
Irrigation enterprises.....	71,112	33.7	758,268	18.2
Individually owned projects.....	4,500	2.1	2,100	(¹)
Other.....	13,742	6.5	225,000	5.4

¹ Less than one-tenth of 1 per cent.

Type of drainage.—There were 39 enterprises, covering 88,732 acres of land and with an invested capital of \$2,258,717, which reported their works as completed; while 12 enterprises, covering 122,450 acres of land, with an invested capital of \$1,906,832, estimated that \$678,098 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 495 miles of ditches, 42 miles of tile drains, and 121 miles of levees. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. There were 19 enterprises that reported land served by pumps. Only 1 well pumped for drainage was reported.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	211,182	100.0	4,165,549	100.0
Gravity drainage only.....	120,461	57.0	1,287,955	30.9
Ditches and levees.....	61,237	29.0	500,998	13.4
Tile drains.....	500	0.2	20,000	0.5
Ditches and tile drains.....	58,724	27.8	706,957	17.0
Drainage, all or part by pumping--	90,721	43.0	2,877,594	69.1
All drainage by pumping.....	30,417	14.4	1,668,222	40.1
Part gravity and part pumping.....	60,304	28.6	1,209,372	29.0

Pumping plants.—There were 19 enterprises that reported 59,386 acres served by pumps with a total capacity of 488,800 gallons per minute, 2 enterprises having been served by the same pumping plant. The Klamath Project, constructed by the United States Bureau of Reclamation, reported 8,016 acres served by pumps located across the Oregon-California line.

Only 1 rotary and 4 screw pumps were reported; the remaining 26 pumps were all of the centrifugal type. Approximately 80 per cent of the power used was furnished by electric motors.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER, 1930

KIND OF POWER	Enterprises ¹	Engine or motor capacity		Pump capacity	Land served
		Number	II. p.			Per cent	G. p. m.	Acres
All enterprises ²	17	2,173	100.0	488,800	59,386
Electric.....	13	1,693	77.9	402,100	50,973
Internal combustion.....	4	180	8.3	26,700	2,709
Steam.....	1	300	13.8	60,000	5,704

¹ With pumping plants.

² No pumping plants reported in 1920.

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Engine or motor capacity	Land served
		Number	G. p. m.			Per cent	II. p.	Acres
All enterprises.....	31	488,800	100.0	2,173	59,386
Centrifugal.....	24	260,000	53.2	1,455	38,970
Screw.....					18,016
Rotary.....	1	1,800	0.4	16	4,000
Screw and centrifugal.....	6	227,000	46.4	702	8,400

¹ Served by pumps located in Siskiyou County, California.

Arrears and delinquency.—There were 9 enterprises, with approximately 21 per cent of the invested capital and covering about 34 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 42 enterprises were reported as not in arrears. Reports of 13 enterprises, covering 115,057 acres, show a total of 64,747 acres delinquent in drainage taxes; and 32 enterprises, covering 79,726 acres, reported no delinquency; while 6 failed to report.

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	211,182	100.0	4,165,549	100.0	64,747
Enterprises in arrears.....	72,003	34.1	880,194	21.1	57,117
With some delinquent land.....	60,943	28.8	738,044	17.7	57,117
With no delinquent land.....	8,158	3.9	83,510	2.0	-----
With no report on delinquency.....	2,907	1.4	58,040	1.4	-----
Enterprises not in arrears.....	139,119	65.9	3,285,355	78.9	7,630
With some delinquent land.....	54,114	25.6	1,268,992	30.5	7,630
With no delinquent land.....	71,673	33.9	1,252,138	30.1	-----
With no report on delinquency.....	13,432	6.4	764,225	18.3	-----

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, land damaged by alkali or seepage from irrigation, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported.

In that portion of the State lying west of the Cascade Range protection against overflow was the primary purpose of drainage, while in the arid section of the State, east of the Cascade Range, removal of alkali or seepage resulting from irrigation was more commonly the object in drainage. However, in this arid section, north of Upper Klamath Lake, there is a considerable area which was originally swampy and the principal purpose of drainage was the reclamation of swamp land.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	211,182	100.0	4,165,549	100.0
Reclamation of swamp land not previously in farms.....	77,873	36.9	1,435,969	34.5
Improvement of land already in farms.....	11,805	5.0	215,128	5.2
Removal of alkali or seepage from irrigation.....	78,263	37.1	970,468	23.4
Protection against overflow.....	43,181	20.4	1,537,984	36.9

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. Where the drainage work was done directly by an irrigation enterprise, the year in which drainage was undertaken is used instead of the year of organization of the irrigation project.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹	Capital invested to Jan. 1, 1930	
	Acres	Per cent		Dollars	Per cent
All enterprises.....	211,182	100.0	211,182	4,165,549	100.0
1905-1909.....	53,691	25.4	53,691	637,410	15.3
1910-1914.....	4,553	2.2	4,553	190,000	4.6
1915-1919.....	65,257	30.9	65,257	1,741,417	41.8
1920-1924.....	71,208	33.7	71,208	1,429,900	34.3
1925-1929.....	16,473	7.8	16,473	166,822	4.0

¹ No overlap.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					
	Total	Condition of land				Land available for settlement
		Improved land	Woodland	Other unimproved land	Acres	
All enterprises.....	Acres 211,182	Acres 144,253	Per cent 68.3	Acres 9,912	Acres 57,017	Acres 48,784
1905-1909.....	53,691	45,234	84.2	5,437	3,020	9,360
1910-1914.....	4,553	3,040	79.0	600	313	770
1915-1919.....	65,257	35,215	54.0	1,411	28,681	21,043
1920-1924.....	71,208	45,830	64.4	744	24,634	15,911
1925-1929.....	16,473	14,334	87.0	1,720	410	1,700

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 41 enterprises, covering 168,730 acres of land and having an invested capital of \$3,649,598. There were 10 enterprises, with an invested capital of \$515,951 and covering 42,452 acres of land, that did not have systematic maintenance.

There were 10 enterprises, with an invested capital of \$2,346,593 and covering 130,679 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 41 enterprises, with an invested capital of \$1,818,956 and covering 80,503 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	211,182	100.0	4,165,549	100.0
By district forces.....	144,300	68.3	3,183,310	76.4
By contract.....	48,496	23.0	718,030	17.2
By work apportioned to landowners.....	8,800	3.2	48,600	1.2
Other, none, and not reported.....	11,586	5.5	215,609	5.2

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 89 per cent of the land reporting showed some cost, and 11 per cent showed no cost in 1929. The average cost for all enterprises was 48 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
		Dollars	Dollars
All enterprises reporting.....	Acres 204,300	Dollars 98,950	Dollars 0.48
Gravity drainage only.....	120,401	16,594	0.14
Ditches and levees.....	61,237	9,006	0.16
Tile drains.....	500	-----	-----
Ditches and tile drains.....	58,724	6,988	0.12
Drainage, all or part by pumping.....	83,929	82,362	0.98

DRAINAGE—OREGON

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930 Number 55,153	FARM LAND, 1930			Approximate land area, 1930 Acres 61,183,480
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 0,092	Number 0,618	Acres 245,336	Acres 220,582		Acres 10,548,078	Acres 4,172,510	Acres 3,122,215	
The State.....	100	192	3,129	8,033	1,340	222,253	61,305	94,700	440,320
Benton.....	670	806	15,356	14,133	4,747	200,573	111,010	124,490	1,105,520
Clackamas.....	114	59	4,383	1,880	694	74,562	8,900	47,138	525,440
Clatsop.....	281	120	9,174	1,941	1,607	118,004	24,308	65,010	423,680
Columbia.....	330	411	12,272	10,670	1,305	227,874	21,655	154,367	1,041,920
Coos.....	20	15	510	514	342	114,838	6,330	59,216	1,031,680
Curry.....	144	193	5,102	5,176	2,488	656,206	78,747	371,063	3,194,240
Douglas.....	24	24	649	824	632	809,320	63,306	118,700	2,892,300
Grant.....	116	177	825	1,431	967	37,000	18,300	11,194	345,600
Hood River.....	107	125	2,330	2,643	2,214	288,371	81,863	102,370	1,788,160
Jackson.....	82	85	1,061	1,528	1,164	105,361	23,078	54,088	1,047,680
Josephine.....	215	123	53,212	13,764	1,197	560,940	123,720	80,063	3,830,360
Klamath.....	182	417	5,046	11,834	4,069	514,207	124,500	220,820	2,035,680
Lane.....	43	43	700	933	732	106,715	12,358	56,034	645,760
Lincoln ²	166	331	9,114	13,403	3,074	468,708	170,146	136,408	1,445,120
Linn.....	389	79	31,113	7,327	1,345	572,592	109,207	2,441	6,325,120
Malheur.....	900	882	31,218	27,030	4,821	390,563	185,319	115,475	763,520
Marion.....	226	163	5,861	5,127	1,733	76,113	30,883	16,078	277,760
Multnomah.....	284	401	11,601	13,134	1,882	246,363	114,740	87,660	453,120
Polk ²	131	111	3,230	2,012	811	83,031	12,737	35,445	720,000
Tillamook.....	45	54	2,034	4,170	1,270	457,081	155,004	95,065	1,284,480
Union.....	806	1,153	22,003	20,410	3,017	234,798	122,460	77,935	467,840
Washington.....	410	462	13,109	13,330	2,690	287,771	124,600	121,013	450,960
Yamhill.....	106	183	2,245	42,278	10,046	9,406,099	2,385,201	864,168	27,646,720
All other counties.....									

¹ No drainage on farms reported in Gilliam and Harney Counties in 1930; nor in Sherman County for 1920.
² Part of Polk annexed to Lincoln in 1925.

DRAINAGE—OREGON

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Benton	Clatsop	Columbia	Coos	Klamath
LAND AREA							
1	Approximate land area..... 1930..... acres..	61,188,480	440,320	525,440	423,080	1,041,920	3,830,360
2	Land in enterprises..... 1930..... acres..	211,182	4,500	7,000	17,574	5,344	123,912
3	..... 1920..... acres..	4,000					
4	Increase, ¹ 1920-1930..... per cent..						
5	Area of all enterprises ² 1930..... acres..	211,182	4,500	7,000	17,574	5,344	123,912
CONDITION AND USE OF LAND							
6	Land unfit to raise any crop..... 1930..... acres..	30,575	200		285	40	21,300
7	Land unfit to raise any crop prior to drainage..... acres..	131,033	1,150	4,800	9,092	3,777	94,704
8	Decrease since drainage..... per cent..	76.8	82.6	100.0	97.1	98.9	74.3
9	Land fit to raise a normal crop..... 1930..... acres..	153,381	2,500	5,490	16,264	5,110	82,379
10	Land fit to raise a normal crop prior to drainage..... acres..	53,100	1,250	2,200	6,178		16,270
11	Increase since drainage ¹ per cent..	188.9	100.0	149.5	163.2		400.3
12	Land fit to raise a partial crop..... 1930..... acres..	27,226	1,800	1,510	1,025	194	17,233
13	Land fit to raise a partial crop prior to drainage..... acres..	26,459	2,100		1,404	1,507	12,038
14	Increase since drainage ¹ per cent..	2.9	-14.3		-27.0	-87.6	33.2
15	Improved land..... 1930..... acres..	144,253	4,500	1,840	8,621	3,684	78,420
16	..... 1920..... acres..	4,000					
17	Increase, ¹ 1920-1930..... per cent..						
18	Unimproved land—						
19	Woodland..... 1930..... acres..	9,912		4,140	1,566	1,071	
20	..... 1930..... acres..	57,017		1,020	7,387	89	45,486
21	Other..... 1930..... acres..						
22	Land in occupied farms..... 1930..... acres..	146,576	4,500	1,840	10,010	5,101	79,019
23	Land in planted crops..... 1930..... acres..	116,987	3,000	210	8,005	2,101	65,701
24	Woodland cleared and cultivated since drainage..... 1930..... acres..	11,188		880	730	3,743	
25	Land idle..... 1930..... acres..	52,563	100	3,600	8,815	788	30,601
26	Land available for settlement..... 1930..... acres..	48,784		5,160	6,479	2,200	29,901
DRAINAGE WORKS, 1930							
27	Ditches—						
28	Completed..... miles..	495.1	3.5	6.5	69.5	23.0	232.5
29	Additional under construction..... miles..	58.0					55.0
30	Tile drains—						
31	Completed..... miles..	42.5			1.7		8.0
32	Levees and dikes—						
33	Completed..... miles..	121.4		4.2	51.8	0.8	42.0
34	Additional under construction..... miles..	18.0					18.0
35	Pumping plants—						
36	Engine or motor capacity..... horsepower..	2,173			975		230
37	Pump capacity..... gals. per min..	488,800			193,200		42,800
38	Land served by pumps..... acres..	59,386			16,399		26,004
39	Wells—						
40	Pumped for drainage..... number..	1					
41	Land drained by ditches only ³ acres..	20,785	4,500			5,025	1,122
42	Length of ditches..... miles..	79.3	3.5			21.0	3.0
43	Land drained by tile only..... acres..	500					
44	Length of tile..... miles..	2.0					
45	Land drained by ditches and tile ³ acres..	58,724		7,000		319	27,000
46	Length of ditches..... miles..	148.3		6.5		2.0	55.0
47	Length of tile..... miles..	16.8		4.2		0.8	5.0
48	Land having ditches and levees ³ acres..	34,452					
49	Length of ditches..... miles..	65.0					
50	Length of levees..... miles..	10.1					
51	Land drained by pumps and other drainage works ⁴ acres..	90,721			17,574		55,221
52	Length of ditches..... miles..	260.5			69.5		113.5
53	Length of tile..... miles..	23.7			1.7		
54	Length of levees..... miles..	129.3			51.8		55.0
55	Land protected by levees of an outside agency..... acres..	14,978					12,142
CAPITAL INVESTED AND COST PER ACRE							
56	Capital invested in enterprises to Jan. 1, 1930..... dollars..	4,165,549	2,100	50,000	1,051,269	144,098	1,329,977
57	..... 1920..... dollars..	200,000					
58	Increase, ¹ 1920-1930..... per cent..						
59	Estimated cost of enterprises when completed..... 1930..... dollars..	4,843,647	3,100	50,000	1,051,269	144,098	1,926,075
60	..... 1920..... dollars..	200,000					
61	Average, per acre when completed..... 1930..... dollars..	22.94	0.69	7.14	59.82	26.96	15.54
62	..... 1920..... dollars..	50.00					
63	Invested in and required for completion of—						
64	Enterprises having ditches only..... 1930..... dollars..	405,566	3,100			137,675	23,000
65	Average, per acre..... dollars..	15.14	0.69			27.38	20.50
66	Enterprises having tile drains only..... 1930..... dollars..	20,000					
67	Average, per acre..... dollars..	40.00					
68	Enterprises having ditches and tile drains..... 1930..... dollars..	1,068,055					716,666
69	Average, per acre..... dollars..	17.17					17.66
70	Enterprises having ditches and levees..... 1930..... dollars..	212,432		50,000		6,523	162,500
71	Average, per acre..... dollars..	6.17		7.14		20.45	5.65
72	Enterprises having pumps and other drainage works..... 1930..... dollars..	3,197,594			1,051,269		1,033,000
73	Average, per acre..... dollars..	35.25			59.82		18.72

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

² No overlap.

³ When works under construction have been completed.

⁴ Area of enterprises having some land served by pumps.

DRAINAGE—OREGON

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COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Lane	Malheur	Marion	Multnomah	Tillamook	Umatilla	Washing- ton
LAND AREA								
1	Approximate land area..... 1930..... acres..	2,935,680	6,325,120	763,520	277,700	720,000	2,049,020	467,840
2	Land in enterprises..... 1930..... acres..	5,600	22,102	200	12,500	1,491	9,453	1,500
3	..... 1920..... acres..		4,000					
4	Increase, ¹ 1920-1930..... per cent..		452.6					
5	Area of all enterprises ² 1930..... acres..	5,600	22,102	200	12,500	1,491	9,453	1,500
CONDITION AND USE OF LAND								
6	Land unfit to raise any crop..... 1930..... acres..		4,055		250		745	100
7	Land unfit to raise any crop prior to drainage..... acres..	1,800	1,885	200	10,570	675	1,570	200
8	Decrease since drainage ¹ per cent..	100.0	+146.9	100.0	97.7	100.0	52.5	50.0
9	Land fit to raise a normal crop..... 1930..... acres..	3,800	14,060	200	12,250	1,472	8,550	1,300
10	Land fit to raise a normal crop prior to drainage..... acres..	1,300	15,902		1,550	19	7,725	700
11	Increase since drainage ¹ per cent..	192.3	-11.0		687.7		10.7	55.7
12	Land fit to raise a partial crop..... 1930..... acres..	1,800	3,387			19	153	100
13	Land fit to raise a partial crop prior to drainage..... acres..	2,500	4,315		80	797	158	600
14	Increase since drainage ¹ per cent..	-28.0	-21.5		-100.0	-97.6		-83.3
15	Improved land..... 1930..... acres..	3,800	20,435	150	11,481	776	9,340	1,300
16	..... 1920..... acres..		4,000					
17	Increase, ¹ 1920-1930..... per cent..		410.9					
18	Unimproved land—							
19	Woodland..... 1930..... acres..	1,500		50	675	110		200
20	Other..... 1930..... acres..	300	1,607		350	605	113	
21	Land in occupied farms..... 1930..... acres..	3,000	18,325	150	11,232	1,491	8,908	1,500
22	Land in planted crops..... 1930..... acres..	2,000	17,385	150	9,586	50	7,499	1,300
23	Woodland cleared and cultivated since drainage..... 1930..... acres..	15		150	5,475	195		
24	Land idle..... 1930..... acres..	2,585	3,700	50	1,004		320	200
25	Land available for settlement..... 1930..... acres..	1,700	2,130		844		370	
DRAINAGE WORKS, 1930								
26	Ditches—							
27	Completed..... miles..	3.0	42.2	5.5	77.0	8.8	17.0	6.0
28	Additional under construction..... miles..		3.0					
29	Tile drains—							
30	Completed..... miles..		30.0		2.0		0.8	
31	Levees and dikes—							
32	Completed..... miles..				22.5	0.1		
33	Additional under construction..... miles..							
34	Pumping plants—							
35	Engine or motor capacity..... horsepower..		10		662			
36	Pump capacity..... gals. per min..		1,800		251,000			
37	Land served by pumps..... acres..		4,000		12,386			
38	Wells—							
39	Pumped for drainage..... number..		1					
40	Land drained by ditches only ³ acres..	5,600	7,400	200	80	1,358		1,500
41	Length of ditches..... miles..	3.0	28.5	5.5	1.5	7.3		6.0
42	Land drained by tile only..... acres..		500					
43	Length of tile..... miles..		2.0					
44	Land drained by ditches and tile ³ acres..		8,702				9,453	
45	Length of ditches..... miles..		14.7				17.0	
46	Length of tile..... miles..		8.0				0.8	
47	Land having ditches and levees ⁴ acres..					133		
48	Length of ditches..... miles..					1.5		
49	Length of levees..... miles..					0.1		
50	Land drained by pumps and other drainage works ⁴ acres..		5,500		12,420			
51	Length of ditches..... miles..		2.0		75.5			
52	Length of tile..... miles..		20.0		2.0			
53	Length of levees..... miles..				22.5			
54	Land protected by levees of an outside agency..... acres..				2,836			
CAPITAL INVESTED AND COST PER ACRE								
55	Capital invested in enterprises to Jan. 1, 1930..... dollars..	8,000	529,780	2,210	887,425	24,075	110,800	24,000
56	..... 1920..... dollars..		200,000					
57	Increase, ¹ 1920-1930..... per cent..		164.9					
58	Estimated cost of enterprises when completed..... 1930..... dollars..	9,000	549,780	2,210	947,425	24,075	110,800	24,000
59	..... 1920..... dollars..		200,000					
60	Average, per acre when completed..... 1930..... dollars..	1.77	24.88	11.08	75.70	10.76	11.72	16.00
61	..... 1920..... dollars..		50.00					
62	Invested in and required for completion of—							
63	Enterprises having ditches only..... 1930..... dollars..	9,000	170,200	2,210	5,000	21,575		24,000
64	Average, per acre..... dollars..	1.77	24.22	11.08	62.50	15.89		16.00
65	Enterprises having tile drains only..... 1930..... dollars..		20,000					
66	Average, per acre..... dollars..		40.00					
67	Enterprises having ditches and tile drains..... 1930..... dollars..		180,589				110,800	
68	Average, per acre..... dollars..		20.75				11.72	
69	Enterprises having ditches and levees..... 1930..... dollars..					3,400		
70	Average, per acre..... dollars..					25.56		
71	Enterprises having pumps and other drainage works..... 1930..... dollars..		170,000		642,425			
72	Average, per acre..... dollars..		30.91		75.84			

¹ Per cent not shown when more than 1,000. A plus sign (+) denotes increase. A minus sign (−) denotes decrease.

² No overlap.

³ When works under construction have been completed.

⁴ Area of enterprises having some land served by pumps.

SOUTH CAROLINA

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



SOUTH CAROLINA

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Summary and condition of land in enterprises.—About 96 per cent of the land in drainage enterprises in South Carolina lies in the eastern or Coastal Plain section of the State. These enterprises generally cover large flat areas, much of which is cut-over and swampy land.

The remaining 4 per cent of land in enterprises is located in the Piedmont region in the northwestern part of the State. This land lies in the rather narrow bottoms of the hill streams and the purpose of drainage

is to prevent damage from excessive overflow. The reports indicate that the results secured by drainage in this region were not generally satisfactory. This condition was probably due largely to excessive erosion of the hill areas and the consequent filling of the drainage channels.

The average precipitation for the State for 1929 was 66 inches, which is the highest on record. This amount is almost 18 inches greater than normal.

Approximately 36 per cent of the land in enterprises was reported as improved; 16 per cent was unfit to raise any crop for lack of drainage; and 61 per cent was idle in 1929. The average cost of drainage was \$6.08 per acre.

The usual purpose of an organized enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....	157, 931	192, 693	-34, 762	-18.0
Farms reporting drainage.....	14, 324	20, 993	-12, 669	-46.9
All land in farms.....	10, 393, 113	12, 420, 675	-2, 033, 562	-16.4
Farm land provided with drainage.....	372, 956	676, 152	-303, 196	-44.8
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....	19, 516, 800	19, 516, 800		
Land in drainage enterprises.....	208, 240	140, 031	68, 218	48.7
Improved land.....	76, 592	50, 075	10, 517	28.0
Unimproved land:				
Woodland.....	120, 313	94, 955	55, 358	85.2
Other.....	12, 344	10, 001	-3, 657	-22.8
Land unfit to raise any crop for lack of drainage.....	33, 002	² 18, 206	14, 796	81.3
Land drained, fit to raise normal crop.....	139, 587	(3)		
Land partly drained, fit for partial crop.....	35, 660	⁴ 3, 093	32, 567	
Land in occupied farms.....	94, 744	(3)		
Land in planted crops.....	61, 606	(3)		
Land idle.....	126, 396	(3)		
Ditches, completed.....	423. 0	262. 7	160. 3	61. 0
Tile drains, completed.....	150. 0	101. 5	48. 5	47. 8
Capital invested in enterprises.....	1, 205, 276	582, 183	623, 093	117. 3
Average, per acre.....	6. 08	4. 16	1. 92	40. 2

¹ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.
² "Swampy or subject to overflow."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 31 drainage enter-

prises are shown for South Carolina with an average area of 6,718 acres. There are 13 such enterprises of 5,000 acres or more, 16 of between 500 and 5,000 acres, and 2 of less than 500 acres.

The area of enterprises equals the land in enterprises, as there is no overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	208,249	100.0	140,031	100.0	208,249
Less than 100 acres.....	30	(?)	40	(?)	30
200 to 400 acres.....	496	0.2	496		496
500 to 900 acres.....	3,655	1.8	2,198	1.6	3,655
1,000 to 4,000 acres.....	27,109	13.0	19,703	14.1	27,109
5,000 to 9,999 acres.....	44,628	21.4	20,400	14.6	44,628
10,000 to 49,999 acres.....	132,322	63.5	40,000	28.6	132,322
50,000 to 99,999 acres.....			57,600	41.1	

¹ No overlap.
² Less than one-tenth of 1 per cent.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises under the control of individuals, or organizations engaged in the draining of land for purposes of development, subdivision, and sale, are classed as *commercial developments*.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	208,249	100.0	1,265,276	100.0
Drainage districts.....	193,157	92.7	1,023,520	80.9
Commercial developments.....	0,000	2.9	84,750	6.7
Individually owned projects.....	0,092	4.4	157,000	12.4

Type of drainage.—There were 27 enterprises, covering 194,685 acres of land and with an invested capital of \$1,122,276, that reported their works as completed; while 4 enterprises, covering 13,564 acres of land and with an invested capital of \$143,000, estimated that \$68,000 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included 423 miles of ditches, 150 miles of tile drains, and 11 miles of levees. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. No pumping plants were reported.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	208,249	100.0	1,265,276	100.0
Gravity drainage only.....	208,249	100.0	1,265,276	100.0
Ditches.....	207,049	99.4	1,130,276	89.3
Ditches, tile drains, and levees.....	1,200	0.6	135,000	10.7

Arrears and delinquency.—There were 12 enterprises, with approximately 36 per cent of the invested capital and covering about 30 per cent of the land in

organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 19 enterprises were reported as not in arrears. Reports of 21 enterprises, covering 129,045 acres, show a total of 73,789 acres delinquent in drainage taxes; 8 enterprises, covering 70,204 acres, reported no delinquency; while 2 enterprises failed to report.

STATE TABLE 5.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	208,249	100.0	1,265,276	100.0	73,789
Enterprises in arrears.....	63,403	30.4	454,215	35.9	36,150
With some delinquent land.....	54,403	26.1	305,515	28.9	36,150
With no report on delinquency.....	9,000	4.3	88,700	7.0	-----
Enterprises not in arrears.....	144,846	69.6	811,061	64.1	37,639
With some delinquent land.....	74,042	35.9	367,311	29.0	37,639
With no delinquent land.....	70,204	33.7	443,750	35.1	-----

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported.

In the Piedmont region the usual purpose in drainage was the protection of bottom lands from overflow, while in the larger areas of the Coastal Plain region the reclamation of swampy land was the more common purpose.

STATE TABLE 6.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	208,249	100.0	1,265,276	100.0
Reclamation of swamp land not previously in farms.....	140,559	67.5	672,307	53.1
Improvement of land already in farms.....	58,265	28.0	202,201	28.1
Protection against overflow.....	9,425	4.5	300,768	23.8

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used.

STATE TABLE 7.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹	Capital invested to Jan. 1, 1930	
	Acres	Per cent		Dollars	Per cent
All enterprises.....	208,249	100.0	208,249	1,265,276	100.0
1900-1904.....	500	0.2	500	2,000	0.2
1910-1914.....	18,003	8.0	18,003	181,250	14.3
1915-1919.....	57,308	27.6	57,308	454,015	35.9
1920-1924.....	88,043	42.3	88,043	408,261	37.0
1925-1929.....	43,735	21.0	43,735	159,750	12.6

¹ No overlap.

STATE TABLE 8.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					
	Total	Condition of land			Land available for settlement	
		Improved land	Wood-land	Other unimproved land		
	Acres	Acres	Per cent	Acres	Acres	Acres
All enterprises.....	208,240	75,592	36.3	120,313	12,344	71,834
1900-1904.....	500	175	35.0	125	200	-----
1910-1914.....	18,003	5,550	29.8	12,511	542	7,392
1915-1919.....	57,308	15,842	27.6	39,254	2,272	28,700
1920-1924.....	88,043	32,954	37.4	50,325	4,704	32,742
1925-1929.....	43,735	21,071	48.2	18,098	4,566	3,000

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 8 enterprises, covering 26,664 acres of land and having an invested capital of \$379,011; while 23 enterprises, with an invested capital of \$886,265 and covering 181,585 acres of land, did not have systematic maintenance.

There were 3 enterprises, with an invested capital of \$259,750 and covering 11,200 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 28 enterprises, with an invested capital of \$1,005,526 and covering 197,049 acres of land, did not report any such equipment.

STATE TABLE 9.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	208,240	100.0	1,205,276	100.0
By district forces.....	10,114	4.8	111,201	8.8
By work apportioned to land-owners.....	3,232	1.6	6,000	0.5
Other, none, and not reported.....	194,903	93.6	1,148,015	90.7

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 40 per cent of the land reporting showed some cost, and 60 per cent showed no cost in 1929. The average cost was 4 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 10.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
	Acres	Dollars	Dollars
All enterprises reporting.....	208,240	8,327	0.04
Gravity drainage only.....	208,240	8,327	0.04
Ditches.....	207,049	3,827	0.02
Ditches, tile drains, and levees.....	1,200	4,500	3.75

DRAINAGE—SOUTH CAROLINA

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COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 14,324	Number 26,993	Acres 372,956	Acres 676,152		Number 157,931	Acres 10,393,113	Acres 5,036,998		Acres 3,902,535	Acres 19,516,800
The State.....									
Abbeville.....	60	97	2,968	958	3,403	212,313	105,799	68,012	326,400
Allendale.....	206	255	6,363	7,855	1,019	122,870	74,935	36,277	278,400
Bamberg ²	299	1,035	3,868	10,814	1,992	144,161	89,471	41,131	242,560
Barnwell.....	42	(3)	1,687	(3)	2,375	108,434	134,490	44,936	334,080
Beaufort.....	50	798	1,872	18,677	2,012	125,840	39,282	51,757	449,280
Berkeley ⁴	66	505	4,123	10,572	2,183	100,834	51,276	121,010	709,920
Calhoun.....	307	121	3,556	2,133	2,466	148,591	85,670	40,046	256,240
Charleston ⁵	332	1,695	10,170	47,305	1,957	155,940	48,751	72,575	599,720
Chester.....	23		513		3,047	239,991	105,967	79,356	378,880
Chesterfield.....	88	775	1,198	7,750	3,555	280,438	139,294	121,072	635,680
Clarendon ⁶	579	760	15,062	23,630	4,260	104,897	113,300	91,007	469,600
Colleton ²	171	1,193	8,552	32,193	3,092	317,243	109,373	147,721	718,680
Darlington.....	862	1,975	30,985	51,881	3,535	240,182	140,353	83,151	387,200
Dillon.....	1,659	960	40,838	28,041	3,096	155,267	91,438	65,201	391,440
Dorchester.....	88	828	2,443	24,712	1,892	149,399	53,465	80,592	392,320
Fairfield.....	137	63	4,898	1,980	2,270	207,318	76,946	75,550	451,840
Florence ⁶	722	2,465	22,115	56,525	5,042	316,898	146,165	137,041	476,160
Georgetown.....	298	610	7,472	17,163	1,045	130,021	20,796	82,032	529,920
Greenwood.....	30	(3)	520	(3)	3,084	225,290	108,608	76,425	392,720
Hampton.....	31	648	4,111	27,635	1,493	164,927	74,812	97,141	328,320
Horry.....	1,027	3,084	27,804	96,896	5,283	314,261	96,615	177,716	741,120
Kershaw ⁷	42	30	831	2,537	3,097	257,901	120,187	109,253	429,440
Lancaster.....	129	72	1,435	847	2,778	196,929	80,230	95,745	329,600
Laurens.....	14	242	635	7,197	4,400	314,498	153,491	101,281	441,600
Lee ⁷	635	840	20,619	14,044	2,688	176,591	115,364	53,516	291,760
Marion.....	392	1,357	13,614	32,951	2,565	121,559	93,676	44,158	338,560
Marlboro.....	1,416	1,400	39,475	40,512	3,410	186,917	124,871	52,282	332,160
Newberry ⁸	78	(3)	1,698	(3)	3,334	269,879	120,469	90,785	398,720
Orangeburg.....	1,335	1,693	26,047	30,857	7,329	422,198	256,300	133,532	723,840
Pickens.....	73	(3)	731	(3)	3,696	219,734	92,391	99,420	338,560
Richland ⁹	104	325	2,236	7,365	2,787	191,439	90,443	79,525	489,600
Saluda.....	54	285	1,152	9,122	2,987	214,649	99,573	88,263	278,400
Spartanburg.....	32	312	890	7,191	8,556	404,957	242,158	108,191	489,600
Sumter ⁸	900	892	20,875	25,847	3,937	229,113	141,186	59,061	498,320
Williamsburg ⁸	888	348	27,994	7,044	4,657	276,111	119,350	131,461	564,480
York ¹⁰	69	(3)	1,583	(3)	5,198	332,979	161,187	197,855	415,360
All other counties.....	183	1,452	3,678	47,162	37,959	2,344,027	1,148,007	852,657	4,081,920

¹ Drainage on farms was reported in all counties in 1930 and all except Chester County, in 1920.

² Part of Colleton annexed to Bamberg in 1920.

³ Included in "All other counties."

⁴ Part of Berkeley annexed to Charleston in 1921. Approximate land area revised in 1925.

⁵ Part of Clarendon annexed to Sumter in 1921, and part of Sumter annexed to Clarendon in 1922. Approximate land area revised in 1925.

⁶ Part of Williamsburg annexed to Florence in 1921. Approximate land area revised in 1925.

⁷ Part of Lexington annexed to Lee in 1921, and part of Lee annexed to Kershaw in 1925.

⁸ Part of Lexington annexed in 1920.

⁹ Part of Lexington annexed in 1922.

¹⁰ Part annexed to Cherokee in 1921.

DRAINAGE—SOUTH CAROLINA

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Anderson	Bamberg ¹	Berkeley ²	Clarendon ³
LAND AREA						
1	Approximate land area..... 1930..... acres..	10,510,800	485,120	242,500	709,920	409,600
2	Land in enterprises..... 1930..... acres..	208,249	3,217	9,000	6,000	7,457
3	..... 1920..... acres..	140,031	(4)	(4)	(4)	4,300
4	Increase, ⁵ 1920-1930..... per cent..	48.7				73.4
5	Area of all enterprises ⁶ 1930..... acres..	208,249	3,217	9,000	6,000	7,457
CONDITION AND USE OF LAND						
6	Land unfit to raise any crop..... 1930..... acres..	33,002	3,217	2,000	2,500	2,631
7	Land unfit to raise any crop prior to drainage..... acres..	113,839	3,217	2,000	4,500	4,690
8	Decrease since drainage..... per cent..	71.0			44.4	43.9
9	Land fit to raise a normal crop..... 1930..... acres..	130,587		5,000	3,500	3,230
10	Land fit to raise a normal crop prior to drainage..... acres..	54,491		5,000	1,500	976
11	Increase since drainage..... per cent..	166.2			133.3	230.0
12	Land fit to raise a partial crop..... 1930..... acres..	35,600		2,000		1,506
13	Land fit to raise a partial crop prior to drainage..... acres..	39,919		2,000		1,701
14	Decrease since drainage..... per cent..	10.7				10.0
15	Improved land..... 1930..... acres..	75,592		5,000	3,500	1,750
16	..... 1920..... acres..	59,075	(4)		(4)	344
17	Increase, ⁵ 1920-1930..... per cent..	28.0				408.7
Unimproved land—						
18	Woodland..... 1930..... acres..	120,313	3,217	4,000	2,500	4,710
19	Other..... 1930..... acres..	12,344				901
20	Land in occupied farms..... 1930..... acres..	94,744		5,000	250	2,062
21	Land in planted crops..... 1930..... acres..	61,606		5,000	250	1,300
22	Woodland cleared and cultivated since drainage..... 1930..... acres..	5,800			1,000	250
23	Land idle..... 1930..... acres..	126,396	3,217	3,000	5,750	4,608
24	Land available for settlement..... 1930..... acres..	71,834		3,000	3,500	
DRAINAGE WORKS, 1930						
Ditches—						
25	Completed..... miles..	423.0	30.7	17.0	5.0	9.5
26	Additional under construction..... miles..	36.5				
Tile drains—						
27	Completed..... miles..	150.0				
Levees and dikes—						
28	Completed..... miles..	11.0				
29	Land drained by ditches only ⁷ acres..	207,049	3,217	0,000	0,000	7,457
30	Length of ditches..... miles..	441.5	36.7	17.0	5.0	9.5
31	Land having ditches, tile drains, and levees..... acres..	1,200				
32	Length of ditches..... miles..	18.0				
33	Length of tile..... miles..	150.0				
34	Length of levees..... miles..	11.0				
CAPITAL INVESTED AND COST PER ACRE						
35	Capital invested in enterprises to Jan. 1, 1930..... dollars..	1,265,270	96,853	88,700	84,750	31,750
36	..... 1920..... dollars..	582,183	(4)		(4)	4,000
37	Increase, ⁵ 1920-1930..... per cent..	117.3				693.8
38	Estimated cost of enterprises when completed..... 1930..... dollars..	1,333,270	96,853	88,700	84,750	31,750
39	..... 1920..... dollars..	936,514	(4)		(4)	12,000
40	Average, per acre when completed..... 1930..... dollars..	6.40	30.11	9.86	14.12	4.26
41	..... 1920..... dollars..	6.69	(4)		(4)	2.79
Invested in and required for completion of—						
42	Enterprises having ditches only..... 1930..... dollars..	1,198,276	96,853	88,700	84,750	31,750
43	Average, per acre..... dollars..	5.70	30.11	9.86	14.12	4.26
44	Enterprises having ditches, tile drains, and levees..... 1930..... dollars..	135,000				
45	Average, per acre..... dollars..	112.60				

¹ Part of Colleton annexed in 1920.
² Part annexed to Charleston in 1921. Approximate land area revised in 1925.
³ Part annexed to Sumter in 1921, and part of Sumter annexed in 1922. Approximate land area revised in 1925.
⁴ Included in "Other counties."
⁵ Per cent not shown when more than 1,000.
⁶ No overlap.
⁷ When works under construction have been completed.

DRAINAGE—SOUTH CAROLINA

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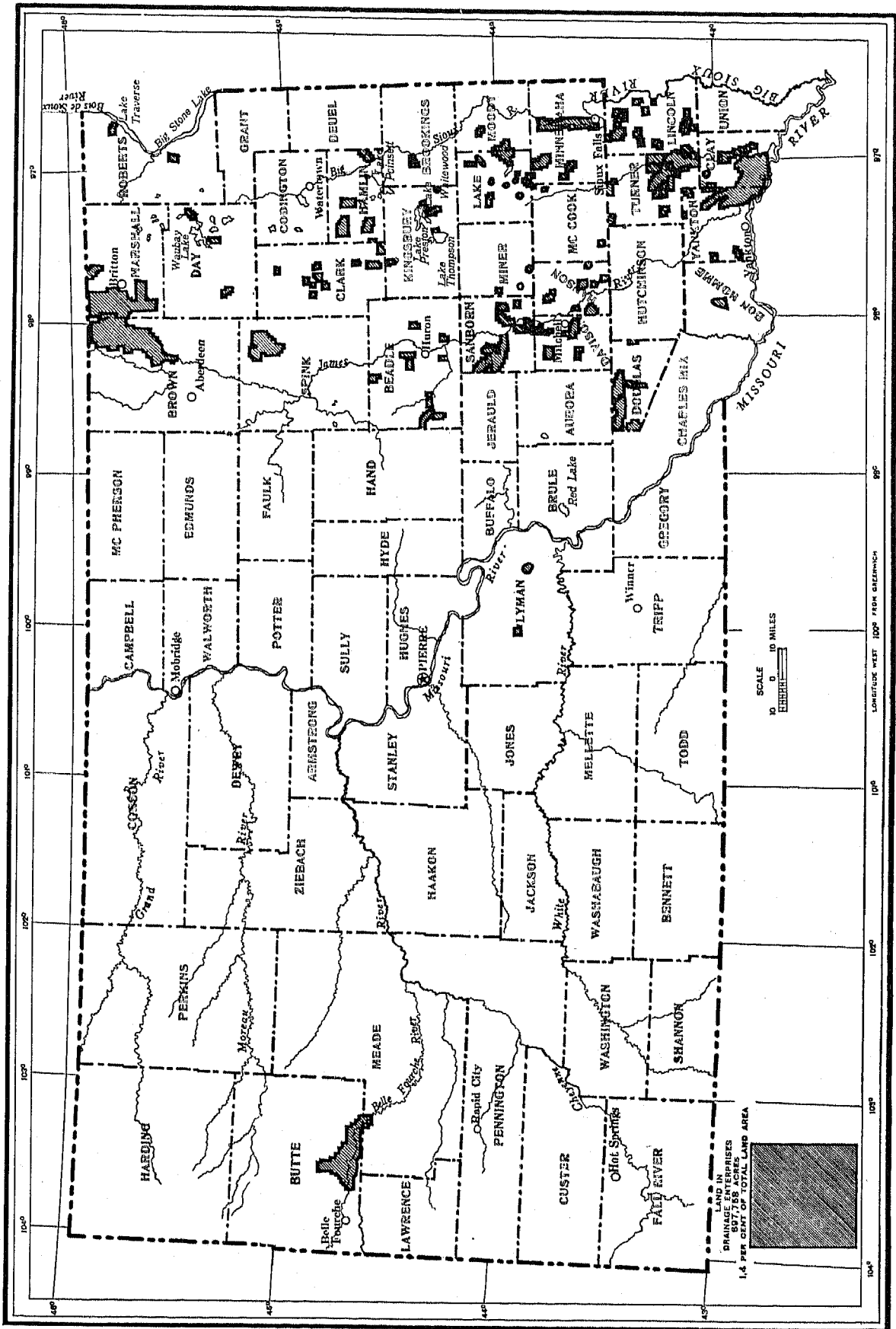
COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Darling- ton	Dillon	Florence ¹	Horry	Orange- burg	Other counties ²
LAND AREA							
1	Approximate land area.....1930.....acres..	387,200	301,440	470,100	741,120	723,840	3,427,840
2	Land in enterprises.....1930.....acres..	18,586	15,861	30,042	6,000	43,593	67,893
3	.....1920.....acres..				(3)	42,816	62,016
4	Increase, ⁴ 1920-1930.....per cent.....					1.8	-26.9
5	Area of all enterprises ⁵.....1930.....acres..	18,586	15,861	30,042	6,000	43,593	67,893
CONDITION AND USE OF LAND							
6	Land unfit to raise any crop.....1930.....acres..			5,756		6,361	10,537
7	Land unfit to raise any crop prior to drainage.....acres..	5,000	0,000	13,018	0,000	30,600	38,214
8	Decrease since drainage.....per cent.....	100.0	100.0	57.7	100.0	79.2	72.4
9	Land fit to raise a normal crop.....1930.....acres..	17,428	15,861	20,622	1,000	17,232	65,714
10	Land fit to raise a normal crop prior to drainage.....acres..	4,058	8,861	10,760		2,132	20,304
11	Increase since drainage ⁴.....per cent.....	251.5	79.0	91.0		798.2	174.4
12	Land fit to raise a partial crop.....1930.....acres..	1,158		4,264	5,000	20,000	1,642
13	Land fit to raise a partial crop prior to drainage.....acres..	8,628	1,000	6,264		10,861	9,375
14	Decrease since drainage ⁴.....per cent.....	86.6	100.0	31.9		-784.1	82.5
15	Improved land.....1930.....acres..	9,700	8,861	10,250	1,000	14,232	21,299
16	.....1920.....acres..				(3)	13,498	46,323
17	Increase, ⁴ 1920-1930.....per cent.....					0.1	-53.0
Unimproved land—							
18	Woodland.....1930.....acres..	8,596	7,000	14,561	5,000	28,861	41,862
19	Other.....1930.....acres..	200		5,881		500	4,732
20	Land in occupied farms.....1930.....acres..	17,878	12,861	19,700	1,000	10,732	24,361
21	Land in planted crops.....1930.....acres..	7,000	8,000	8,875	1,000	10,232	19,949
22	Woodland cleared and cultivated since drainage.....1930.....acres..	1,000		950		1,100	1,500
23	Land idle.....1930.....acres..	11,528	861	10,095	5,000	32,600	43,837
24	Land available for settlement.....1930.....acres..		3,000	0,242	1,000	27,000	28,092
DRAINAGE WORKS, 1930							
25	Ditches—						
26	Completed.....miles.....	38.6	10.0	40.5	20.0	94.5	145.2
27	Additional under construction.....miles.....			34.5			2.0
28	Tile drains—						
29	Completed.....miles.....						150.0
30	Levees and dikes—						
31	Completed.....miles.....						11.0
32	Land drained by ditches only ⁶.....acres.....	18,686	15,861	30,042	0,000	43,593	68,693
33	Length of ditches.....miles.....	38.6	10.0	75.0	20.0	94.5	129.2
34	Land having ditches, tile drains, and levees.....acres.....						1,200
35	Length of ditches.....miles.....						18.0
36	Length of tile.....miles.....						150.0
37	Length of levees.....miles.....						11.0
CAPITAL INVESTED AND COST PER ACRE							
38	Capital invested in enterprises to Jan. 1, 1930.....dollars.....	114,000	60,000	95,000	15,000	179,000	500,223
39	.....1920.....dollars.....				(3)	24,219	553,064
40	Increase, ⁴ 1920-1930.....per cent.....					639.1	-0.7
41	Estimated cost of enterprises when completed.....1930.....dollars.....	114,000	60,000	161,000	15,000	179,000	502,223
42	.....1920.....dollars.....				(3)	179,219	745,295
43	Average, per acre when completed.....1930.....dollars.....	6.13	3.78	5.25	2.50	4.11	7.40
44	.....1920.....dollars.....				(3)	4.19	8.02
45	Invested in and required for completion of—						
46	Enterprises having ditches only.....1930.....dollars.....	114,000	60,000	161,000	15,000	179,000	367,223
47	Average, per acre.....dollars.....	6.13	3.78	5.25	2.50	4.11	5.51
48	Enterprises having ditches, tile drains, and levees.....1930.....dollars.....						135,000
49	Average, per acre.....dollars.....						112.50

¹ Part of Williamsburg annexed in 1921. Approximate land area revised in 1925.
² Includes Chester, Dorchester, Hampton, Lee, Marlboro, Oconee, Pickens, Williamsburg, and York Counties in 1930; and Anderson, Beaufort, Berkeley, Charleston, Colleton, Dorchester, Hampton, Horry, Oconee, Pickens, Williamsburg, and York Counties for 1920.
³ Included in "Other counties."
⁴ A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.
⁵ No overlap.
⁶ When works under construction have been completed.

SOUTH DAKOTA

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



SOUTH DAKOTA

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—By far the greater portion of the drainage enterprises of South Dakota is located in the eastern part of the State, in the basins of the James and Big Sioux Rivers.

The mean annual rainfall varies from approximately 15 inches in the western to 28 inches in the eastern

part of the State and averages 20.2 inches for the State. The average for 1929 was 20.9 inches.

Approximately 95 per cent of the land in drainage enterprises was reported as improved and 5 per cent as unimproved. Of the total, less than 4 per cent was unfit to raise any crop for lack of drainage and about 7 per cent was idle in 1929.

Where the drainage work is done directly by an irrigation enterprise, the drainage enterprise has been considered as identical with the irrigation enterprise, as all irrigable lands are usually assessed for the necessary drainage works. Of the 74,500 acres located in such an enterprise, 14,000 acres are now served by drainage works, and 10,000 acres are in need of drainage. This land is located in the Belle Fourche Project of the United States Bureau of Reclamation. No drainage was reported for this project in 1920.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. The fact that an enterprise which has completed its works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number.....	53, 157	74, 637	8, 520	11. 4
Farms reporting drainage.....number.....	1, 774	4, 077	-2, 303	-56. 5
All land in farms.....acres.....	36, 470, 083	34, 636, 401	1, 833, 592	5. 3
Farm land provided with drainage.....acres.....	120, 251	161, 371	-35, 120	-21. 8
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres.....	40, 106, 520	40, 106, 520		
Land in drainage enterprises.....acres.....	667, 758	222, 062	475, 696	214. 2
Improved land.....acres.....	661, 540	178, 540	483, 000	270. 5
Unimproved land:				
Woodland.....acres.....	588	4	584	-14. 1
Other.....acres.....	35, 630	43, 522	-7, 892	-18. 1
Land unfit to raise any crop for lack of drainage.....acres.....	26, 601	² 0, 067	26, 534	338. 5
Land drained, fit to raise normal crop.....acres.....	614, 210	(3)		
Land partly drained, fit for partial crop.....acres.....	56, 047	4 481	56, 406	
Land in occupied farms.....acres.....	684, 746	(3)		
Land in planted crops.....acres.....	567, 285	(3)		
Land idle.....acres.....	51, 905	(3)		
Ditches, completed.....miles.....	854. 4	237. 8	616. 6	259. 3
Tile drains, completed.....miles.....	315. 3	179. 3	136. 0	75. 0
Capital invested in enterprises.....dollars.....	4, 534, 768	1, 461, 063	3, 073, 705	210. 4
Average, per acre.....dollars.....	6. 50	6. 58	-0. 08	-1. 2

¹ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.
² "Seeped, alkali, swampy, or subject to overflow."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 205 drainage enterprises with an average area of 3,404 acres are shown for South Dakota. There are 26 such enterprises of 5,000 acres or more, 135 of between 500 and 5,000 acres, and 44 of less than 500 acres.

The area of enterprises equals the land in enterprises, as there is no overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	697,758	100.0	234,201	100.0	697,758
Less than 100 acres.....	348	(²)	510	0.2	348
100 to 199 acres.....	872	0.1			872
200 to 499 acres.....	10,635	1.5	10,027	4.3	10,635
500 to 999 acres.....	33,181	4.8	13,495	5.8	33,181
1,000 to 4,999 acres.....	191,305	27.4	68,146	29.1	191,305
5,000 to 9,999 acres.....	97,962	14.0	17,788	7.6	97,962
10,000 to 49,999 acres.....	196,697	28.2	124,220	53.0	196,697
50,000 to 99,999 acres.....	166,768	23.9			166,768

¹ No overlap. ² Less than one-tenth of 1 per cent.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects, county drains, or township drains*, according to the public officials in control.

Drainage projects under the control of the officers of an irrigation organization are classed as *irrigation enterprises*. In such cases the drainage is incidental to land reclamation by irrigation, and both the drainage and irrigation operations are functions of the one enterprise.

Enterprises under the control of individuals or organizations engaged in the draining of land for purposes of development, subdivision, and sale, are classed as *commercial developments*.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	697,758	100.0	4,534,768	100.0
County drains.....	621,258	89.0	4,111,768	90.7
Irrigation enterprises.....	74,500	10.7	420,000	9.3
Commercial developments.....	2,000	0.3	3,000	(¹)

¹ Less than one-tenth of 1 per cent.

Type of drainage.—There were 204 enterprises, covering 625,758 acres of land and with an invested capital of \$4,134,768, which reported their works as completed; while 1 enterprise, covering 72,000 acres of land and with an invested capital of \$400,000, estimated that \$250,000 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 854 miles of ditches and 315 miles of tile drains. These figures do not include drains or

levees installed by individual farmers supplemental to the works of an enterprise. No pumping plants were reported.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	697,758	100.0	4,534,768	100.0
Gravity drainage only.....	697,758	100.0	4,534,768	100.0
Ditches.....	604,139	86.6	3,284,019	72.4
Tile drains.....	68,877	9.9	704,016	17.5
Ditches and tile drains.....	24,742	3.5	456,733	10.1

Arrears and delinquency.—There were 7 enterprises, with approximately 6 per cent of the invested capital and covering about 9 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 198 enterprises reported no arrearage. Reports of 19 enterprises, covering 197,774 acres, show a total of 32,970 acres delinquent in drainage taxes; 175 enterprises, covering 425,018 acres, reported no delinquency; while 11 enterprises failed to report.

STATE TABLE 5.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Acre delinquent
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	697,758	100.0	4,534,768	100.0	32,970
Enterprises in arrears.....	63,800	9.1	283,731	6.3	9,660
With some delinquent land.....	61,200	8.8	276,131	6.1	9,660
With no delinquent land.....	2,600	0.3	7,600	0.2	
Enterprises not in arrears.....	633,958	90.9	4,251,037	93.7	23,310
With some delinquent land.....	136,674	19.6	686,663	15.1	23,310
With no delinquent land.....	422,418	60.5	3,020,687	66.6	
With no report on delinquency.....	74,968	10.8	543,697	12.0	

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, land damaged by alkali or seepage from irrigation, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported.

Most of the land in enterprises in South Dakota was in farms before drainage was begun. The ditches were necessary to remove the excess water from portions of these farms. In the Belle Fourche Project of Butte and Meade Counties the removal of seepage and alkali resulting from irrigation was the purpose of drainage.

STATE TABLE 6.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	697,758	100.0	4,534,768	100.0
Reclamation of swamp land not previously in farms.....	74,006	10.6	640,232	14.1
Improvement of land already in farms.....	504,242	72.3	2,842,111	62.7
Removal of alkali and seepage from irrigation.....	74,500	10.7	420,000	9.3
Protection against overflow.....	45,010	6.4	632,425	13.9

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. Where the drainage work was done directly by an irrigation enterprise, the year in which drainage was undertaken is used instead of the year of organization of the irrigation project.

STATE TABLE 7.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹	Capital invested to Jan. 1, 1930	
	Acres	Per cent		Dollars	Per cent
All enterprises.....	697,758	100.0	697,758	4,534,768	100.0
1905-1909.....	189,195	27.1	189,195	1,137,431	25.1
1910-1914.....	86,563	12.4	86,563	383,757	8.5
1915-1919.....	160,907	23.1	160,907	1,427,819	31.5
1920-1924.....	185,008	26.5	185,008	1,154,211	25.4
1925-1929.....	76,085	10.9	76,085	431,550	9.5

¹ No overlap.

STATE TABLE 8.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement
	Total	Condition of land			Land available for settlement	
		Improved land	Wood-land	Other unimproved land		
All enterprises.....	Acres 697,758	Acres 661,540	Per cent 94.8	Acres 588	Acres 35,030	Acres 13,000
1905-1909.....	189,195	170,715	95.0	588	8,802	-----
1910-1914.....	86,563	84,356	97.5	-----	2,207	-----
1915-1919.....	160,907	153,702	98.0	-----	2,205	-----
1920-1924.....	185,008	171,182	92.5	-----	13,826	-----
1925-1929.....	76,085	67,585	88.8	-----	8,500	13,000

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 36 enterprises, covering 179,005 acres of land and having an invested capital of \$1,543,103; while 169 enterprises, with an invested capital of \$2,991,665 and covering 518,753 acres of land, did not have systematic maintenance.

There were 3 enterprises, with an invested capital of \$979,776 and covering 104,500 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 202 enterprises, with an invested capital of \$3,554,992 and covering 593,258 acres of land, did not report any such equipment.

STATE TABLE 9.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	697,758	100.0	4,534,768	100.0
By district forces.....	284,430	40.8	1,605,555	35.4
By contract.....	283,308	40.6	1,392,330	30.7
By work apportioned to landowners.....	94,117	13.5	1,208,959	26.6
Other, none, and not reported.....	35,893	5.1	237,924	5.3

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported *no* cost as well as those that reported *some* cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 32 per cent of the land reporting showed some cost, and 68 per cent showed no cost in 1929. The average cost was 2 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 10.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
All enterprises reporting.....	Acres 697,758	Dollars 10,763	Dollars 0.02
Gravity drainage only.....	697,758	10,763	0.02
Ditches.....	694,130	10,488	0.02
Tile drains.....	68,877	25	(¹)
Ditches and tile drains.....	24,742	250	0.01

¹ Less than 1 cent.

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COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 1, 774	Number 4, 077	Acres 120, 251	Acres 161, 371		Number 83, 157	Acres 36, 470, 083	Acres 19, 002, 711		Acres 490, 557	Acres 40, 195, 520
The State									
Beadle.....	7	12	500	577	2, 078	765, 657	550, 670	2, 891	800, 000
Bon Homme.....	13	84	099	2, 980	1, 401	357, 577	253, 337	7, 472	366, 720
Brookings.....	05	114	1, 893	3, 296	1, 991	482, 140	305, 279	3, 195	500, 240
Brown.....	02		17, 599		2, 315	1, 021, 496	789, 770	6, 524	1, 120, 000
Butte.....	51	16	2, 158	520	982	804, 160	110, 438	10, 734	1, 464, 960
Clark.....	21	31	063	660	1, 721	570, 308	435, 381	2, 872	623, 360
Clay.....	100	187	0, 275	14, 160	1, 312	247, 359	100, 448	4, 857	257, 920
Codington.....	15	(?)	962	(?)	1, 245	405, 916	310, 284	1, 098	448, 040
Davison.....	24	08	1, 400	4, 771	1, 017	265, 654	105, 044	2, 171	270, 480
Day.....	55	205	1, 303	3, 577	1, 977	628, 742	440, 187	4, 292	670, 040
Deuel.....	50	184	8, 720	7, 801	1, 295	308, 220	228, 125	2, 016	404, 480
Douglas.....	18	42	1, 200	1, 198	1, 028	272, 863	197, 892	1, 222	278, 400
Grant.....	34	151	098	4, 505	1, 380	303, 791	208, 303	4, 833	442, 240
Hamlin.....	26	54	1, 014	3, 887	1, 175	300, 028	244, 084	1, 558	332, 800
Hanson.....	58	175	4, 683	7, 836	928	253, 056	180, 920	1, 869	276, 480
Hutchinson.....	25	162	022	8, 252	1, 753	510, 592	375, 035	5, 048	522, 880
Jerauld.....	7	(?)	562	(?)	855	332, 024	203, 707	1, 334	339, 840
Kingsbury.....	06	205	2, 266	5, 910	1, 678	503, 071	391, 226	3, 730	520, 960
Lake.....	50	314	1, 440	8, 500	1, 352	345, 824	202, 127	4, 001	350, 680
Lincoln.....	225	188	17, 631	8, 559	1, 841	363, 800	288, 880	4, 608	367, 360
McCook.....	02	167	2, 327	2, 808	1, 440	354, 035	261, 006	2, 503	366, 720
Marshall.....	57	96	14, 100	6, 738	1, 298	474, 005	336, 872	3, 599	558, 960
Meade.....	8	3	584	580	1, 819	1, 201, 220	340, 474	33, 812	2, 234, 240
Mitner.....	11	51	613	1, 920	1, 261	346, 165	246, 477	1, 144	363, 520
Minnehaha.....	113	287	5, 340	7, 599	2, 423	500, 715	377, 677	10, 750	521, 000
Moody.....	53	145	2, 175	0, 180	1, 373	322, 869	240, 831	2, 800	357, 280
Roberts.....	48	117	3, 170	4, 544	2, 292	636, 645	473, 804	4, 035	711, 040
Sanborn.....	116	92	0, 701	5, 027	1, 102	347, 041	234, 114	3, 637	368, 040
Spink.....	12	25	845	2, 031	1, 063	917, 151	713, 410	0, 100	967, 040
Turner.....	91	482	0, 382	20, 094	1, 986	384, 347	298, 482	2, 891	394, 880
Union.....	41	70	3, 337	2, 040	1, 547	269, 278	207, 634	4, 001	250, 280
Yankton.....	126	213	4, 706	0, 959	1, 610	317, 018	230, 100	0, 174	334, 720
All other counties.....	40	98	1, 189	0, 084	33, 575	21, 020, 222	8, 044, 358	327, 017	31, 340, 120

¹ No drainage on farms reported in Armstrong, Bennett, Buffalo, Campbell, Corson, Custer, Dewey, Haakon, Harding, Hyde, Jackson, Lyman, Mallette, Perkins, Potter, Shannon, Stanley, Sully, Todd, Walworth, and Washabaugh Counties in 1930; nor in Armstrong, Brown, Buffalo, Campbell, Corson, Edmunds, Gregory, Haakon, Harding, Hughes, Hyde, Jackson, Lyman, McPherson, Mallette, Perkins, Shannon, Stanley, Sully, Todd, Washabaugh, and Ziebach Counties for 1920.

² Included in "All other counties."

DRAINAGE—SOUTH DAKOTA

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER

ITEM (See definitions in Introduction)		THE STATE	Beadle	Brown	Butte	Clark	Clay
LAND AREA							
1	Approximate land area..... 1930..... acres..	49, 195, 520	800, 000	1, 120, 000	1, 404, 000	623, 300	257, 020
2	Land in enterprises..... 1930..... acres..	697, 758	17, 840	103, 230	72, 000	7, 520	62, 564
3	..... 1920..... acres..	222, 082					39, 820
4	Increase, ¹ 1920-1930..... per cent..	214. 2					67. 1
5	Area of all enterprises ¹ 1930..... acres..	697, 758	17, 840	103, 230	72, 000	7, 520	62, 564
CONDITION AND USE OF LAND							
6	Land unfit to raise any crop..... 1930..... acres..	26, 601		10, 500	8, 000		
7	Land unfit to raise any crop prior to drainage..... acres..	237, 429		10, 500	24, 000	1, 538	52, 016
8	Decrease since drainage..... per cent..	88. 8			66. 7	100. 0	100. 0
9	Land fit to raise a normal crop..... 1930..... acres..	614, 210	17, 840	72, 230	63, 000	7, 520	61, 976
10	Land fit to raise a normal crop prior to drainage..... acres..	273, 274	1, 160	72, 730	48, 000	5, 002	6, 376
11	Increase since drainage ² per cent..	124. 8		-0. 7	31. 3	20. 1	87. 0
12	Land fit to raise a partial crop..... 1930..... acres..	56, 947		20, 500	1, 000		688
13	Land fit to raise a partial crop prior to drainage..... acres..	187, 055	10, 680	20, 000		20	4, 172
14	Decrease since drainage ² per cent..	69. 6	100. 0	-2. 5		100. 0	85. 0
15	Improved land..... 1930..... acres..	661, 540	17, 840	92, 730	64, 000	7, 520	61, 976
16	..... 1920..... acres..	178, 540					38, 829
17	Increase, ¹ 1920-1930..... per cent..	270. 5					59. 6
18	Unimproved land—						
19	Woodland..... 1930..... acres..	588		10, 500	8, 000		588
20	Other..... 1930..... acres..	35, 630					
21	Land in occupied farms..... 1930..... acres..	684, 740	17, 840	103, 230	59, 000	7, 520	62, 564
22	Land in planted crops..... 1930..... acres..	597, 285	10, 056	91, 472	46, 000	0, 686	57, 541
23	Woodland cleared and cultivated since drainage..... 1930..... acres..	1, 004					
24	Land idle..... 1930..... acres..	51, 905		10, 500	13, 000		588
25	Land available for settlement..... 1930..... acres..	13, 000			13, 000		
DRAINAGE WORKS, 1930							
26	Ditches—						
27	Completed..... miles..	854. 4	20. 2	40. 5	80. 0	8. 5	89. 2
28	Additional under construction..... miles..	60. 0			60. 0		
29	Tile drains—						
30	Completed..... miles..	315. 3	9. 6			7. 4	4. 5
31	Land drained by ditches only ⁴ acres..	604, 139	14, 880	103, 230	72, 000	2, 880	61, 041
32	Length of ditches..... miles..	836. 9	29. 1	40. 5	140. 0	8. 5	85. 2
33	Land drained by tile only..... acres..	68, 877	1, 760			4, 040	120
34	Length of tile..... miles..	221. 3	4. 6			7. 4	0. 5
35	Land drained by ditches and tile..... acres..	24, 742	1, 200				1, 400
36	Length of ditches..... miles..	77. 5	0. 1				4. 0
37	Length of tile..... miles..	94. 0	5. 0				4. 0
CAPITAL INVESTED AND COST PER ACRE							
38	Capital invested in enterprises to Jan. 1, 1930..... dollars..	4, 534, 768	117, 053	222, 870	400, 000	32, 635	738, 508
39	..... 1920..... dollars..	1, 461, 053					333, 130
40	Increase, ¹ 1920-1930..... per cent..	210. 4					121. 7
41	Estimated cost of enterprises when completed..... 1930..... dollars..	4, 784, 768	117, 053	222, 870	650, 000	32, 635	738, 508
42	..... 1920..... dollars..	1, 732, 729					333, 136
43	Average, per acre..... 1930..... dollars..	6. 86	6. 56	2. 16	0. 03	4. 34	11. 80
44	..... 1920..... dollars..	7. 80					8. 36
45	Invested in—						
46	Enterprises having ditches only, when completed..... 1930..... dollars..	3, 534, 019	95, 380	222, 870	650, 000	8, 112	723, 969
47	Average, per acre..... dollars..	5. 85	6. 41	2. 16	0. 03	2. 82	11. 86
48	Enterprises having tile drains only..... 1930..... dollars..	794, 016	12, 673			24, 523	2, 030
49	Average, per acre..... dollars..	11. 53	7. 20			5. 20	16. 99
50	Enterprises having ditches and tile drains..... 1930..... dollars..	456, 733	9, 000				12, 500
51	Average, per acre..... dollars..	18. 46	7. 50				8. 03

¹ Included in "Other counties."
² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.
³ No overlap.
⁴ When works under construction have been completed.

DRAINAGE—SOUTH DAKOTA

ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

Codington	Davison	Day	Douglas	Hamlin	Hanson	Kings-bury	Lake	Lincoln	McCook	Marshall	Meade	Miner	Minne-haha	
448,640	275,480	670,040	278,400	332,800	275,480	520,000	350,080	307,360	308,720	568,060	2,234,240	363,520	521,000	1
250 (1)	12,960 0,138 111.1	7,130	22,070 7,120 222.6	19,030 (1)	7,460 3,040 105.2	5,510 1,030 186.0	22,277 28,240 -21.1	23,080	780	82,224 47,520 73.0	2,500	233 (1)	42,378 21,444 97.0	2 3 4
250	12,960	7,130	22,070	19,030	7,460	5,510	22,277	23,080	780	82,224	2,500	233	42,378	5
250 100.0	12,960 100.0	700 3,500 80.0	13,500 100.0	19,030 100.0	1,010 100.0	2,470 61.9	5,700 100.0	4,930 100.0	140 100.0	2,102 30,085 93.0	500 100.0	233 100.0	0,030 100.0	6 7 8
250	12,960	3,350 500 570.0	21,810	19,030	7,460 880 748.8	3,539 1,582 123.7	22,277 0,933 221.3	23,080 700	780 400 97.3	65,300 38,840 68.1	2,500 2,000 25.0	233	42,378 11,471 200.4	9 10 11
250 (1)	12,960 5,463 137.2	7,130	21,810 4,984 337.6	19,030 (1)	7,460 3,071 143.2	4,682 1,778 163.3	22,277 22,451 -0.8	23,520	780	78,925 23,760 232.2	2,000	233 (1)	42,378 20,083 111.0	12 13 14 15 16 17
250 225	12,960 7,000	7,120 5,488	22,070 20,248	19,030 17,127	7,460 6,791	5,519 4,430	22,277 18,642	23,080 22,474	780 500	82,222 07,185	2,500 2,000	233 152	42,378 33,518	18 19 20 21
			1,100			837		160		3,200	500			22 23 24
7.5	16.0	15.3	30.8	21.2	2.7	38.2	8.7	20.0		48.5	7.0	3.0	23.0	25 26
3.1	7.5			2.0	20.7	3.0	116.3	48.8	8.5			1.0	12.3	27
	10,280 14.0	7,130 15.3	22,070 30.8	16,620 10.2	1,120 2.7	2,812 8.8		10,080 24.2		82,224 48.5	2,500 7.0	118 3.0	31,240 23.0	28 29
	1,880 4.5			210 0.8	6,340 20.7		13,552 66.8	12,400 48.6	780 8.5			115 1.0	11,138 12.3	30 31
250 7.5 3.1	800 2.0 3.0			2,200 2.0 1.2		3,207 20.4 3.0	8,725 8.7 49.5	600 1.8 0.2						32 33 34
23,621 (1)	34,047 06,420 -47.4	28,000	175,070 21,000 620.5	35,248 (1)	30,038 27,000 47.0	112,928 07,068 68.4	385,447 246,072 56.6	327,700	25,348	206,501 53,000 450.4	20,000	7,052 (1)	615,347 301,436 104.1	35 36 37
23,621 (1) 94.48 (1)	34,047 06,420 2.70 10.82	28,000 4.05	175,070 21,000 7.62 3.37	35,248 (1) 1.85 (1)	30,038 27,000 5.85 7.42	112,928 07,068 20.40 34.75	385,447 363,832 17.30 12.88	327,700 18.84	25,348 32.13	206,501 06,900 3.01 2.04	20,000 8.00	7,052 (1) 30.27 (1)	615,347 326,436 14.52 15.22	38 39 40 41
	18,480 1.80	28,000 4.05	175,070 7.62	27,000 1.03	3,100 2.77	13,872 6.00		10,523 1.83		206,501 3.01	20,000 8.00	4,018 34.65	504,654 18.07	42 43
	12,367 6.58			1,188 5.00	30,838 5.80		166,907 12.32	306,587 24.64	25,348 32.13			3,034 26.38	50,693 4.55	44 45
23,621 94.48	4,100 5.13			7,000 3.18		90,050 30.89	218,540 25.05	2,036 4.48						46 47

DRAINAGE—SOUTH DAKOTA

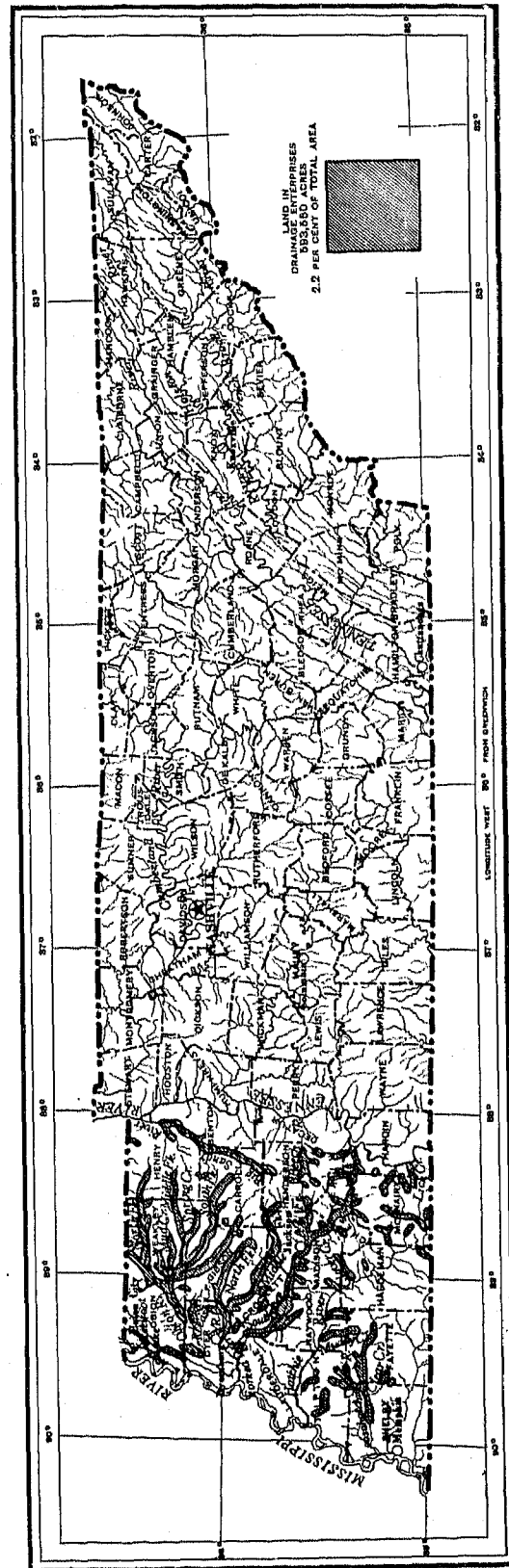
COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Moody	Sanborn	Spink	Turner	Yankton	Other counties ¹
LAND AREA							
1	Approximate land area.....1930.....acres..	337,280	368,040	907,040	394,880	334,720	2,635,520
2	Land in enterprises.....1930.....acres..	5,008	35,050	31,770	59,620	43,265	10,452
3	.....1920.....acres..	6,000	6,700	3,197	32,270	12,085	2,049
4	Increase, ² 1920-1930.....per cent..	-16.6	261.3	893.7	84.8	258.0	255.4
5	Area of all enterprises ³.....1930.....acres..	5,008	35,050	31,770	59,620	43,265	10,482
CONDITION AND USE OF LAND							
6	Land unfit to raise any crop.....1930.....acres..			700	3,559		100
7	Land unfit to raise any crop prior to drainage.....1930.....acres..	2,683	2,040	10,700	19,385	8,714	3,220
8	Decrease since drainage.....per cent..	100.0	100.0	93.5	81.0	100.0	96.9
9	Land fit to raise a normal crop.....1930.....acres..	5,008	35,050	22,670	50,344	43,265	9,742
10	Land fit to raise a normal crop prior to drainage.....1930.....acres..	1,758	4,740	18,070	21,418	23,670	6,078
11	Increase since drainage.....per cent..	184.9	639.5	25.5	135.1	82.7	60.3
12	Land fit to raise a partial crop.....1930.....acres..			8,400	5,717		640
13	Land fit to raise a partial crop prior to drainage.....1930.....acres..	597	27,670	3,000	18,817	10,875	1,184
14	Decrease since drainage ².....per cent..	100.0	100.0	+180.0	69.6	100.0	45.9
15	Improved land.....1930.....acres..	5,008	34,250	31,070	50,040	43,265	10,362
16	.....1920.....acres..	5,400	6,700	3,101	25,347	12,085	2,488
17	Increase, ² 1920-1930.....per cent..	-7.3	253.1	901.9	97.4	258.0	317.3
Unimproved land—							
18	Woodland.....1930.....acres..			700	9,574		100
19	Other.....1930.....acres..		800				
20	Land in occupied farms.....1930.....acres..	5,008	35,050	31,770	59,620	43,265	10,482
21	Land in planted crops.....1930.....acres..	4,500	19,690	23,000	45,362	40,933	9,575
22	Woodland cleared and cultivated since drainage.....1930.....acres..						
23	Land idle.....1930.....acres..		3,740	8,200	4,718	200	
24	Land available for settlement.....1930.....acres..						
DRAINAGE WORKS, 1930							
Ditches—							
25	Completed.....miles..	7.3	61.0	17.0	211.3	46.7	0.8
26	Additional under construction.....miles..						
Tile drains—							
27	Completed.....miles..	15.0	27.0		11.1	0.4	8.1
28	Land drained by ditches only ⁴.....acres..	1,888	26,570	31,770	55,540	41,225	5,918
29	Length of ditches.....miles..	3.3	59.0	17.0	195.3	46.7	0.8
30	Land drained by tile only.....acres..		6,880		2,440	2,040	4,564
31	Length of tile.....miles..		22.0		6.1	0.4	8.1
32	Land drained by ditches and tile.....acres..	3,120	1,000		1,640		
33	Length of ditches.....miles..	4.0			16.0		
34	Length of tile.....miles..	15.0	5.0		5.0		
CAPITAL INVESTED AND COST PER ACRE							
35	Capital invested in enterprises to Jan. 1, 1930.....dollars..	58,334	144,403	30,000	252,859	376,313	33,644
36	.....1920.....dollars..	36,581	60,000	13,028	162,774	67,000	23,558
37	Increase, 1920-1930.....per cent..	59.5	188.8	130.3	55.3	560.2	42.8
38	Estimated cost of enterprises when completed.....1930.....dollars..	58,334	144,403	30,000	252,859	376,313	33,644
39	.....1920.....dollars..	86,581	85,000	13,028	162,774	67,000	23,558
40	Average, per acre.....1930.....dollars..	11.65	4.12	0.94	4.24	8.70	3.21
41	.....1920.....dollars..	14.43	8.76	4.08	5.04	4.72	7.09
Invested in—							
42	Enterprises having ditches only, when completed.....1930.....dollars..	1,688	70,821	30,000	214,607	332,304	12,904
43	Average, per acre.....dollars..	0.89	2.07	0.94	3.80	8.06	2.20
44	Enterprises having tile drains only.....1930.....dollars..		67,200		21,050	43,919	20,650
45	Average, per acre.....dollars..		9.77		8.63	21.53	4.52
46	Enterprises having ditches and tile drains.....1930.....dollars..	50,646	0,382		17,202		
47	Average, per acre.....dollars..	18.16	3.90		10.49		

¹ Includes Bon Homme, Brookings, Lyman, and Roberts Counties in 1930; and Brookings, Codington, Grant, Hamlin, and Miner Counties for 1920.² A minus sign (-) denotes decrease. A plus sign (+) denotes increase.³ No overlap.⁴ When works under construction have been completed.

TENNESSEE

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



TENNESSEE

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—The drainage enterprises in Tennessee lie almost entirely between the Mississippi and Tennessee Rivers

and generally comprise narrow bodies of land along the tributaries of these rivers.

These lowlands were usually too swampy prior to drainage to permit of cultivation and in many cases were subject to overflow on account of the crooked and obstructed condition of the natural channels. The soil is mostly alluvial and quite fertile when drained. Lands along the lower portion of certain of these tributaries are subject to overflow by back-water, due to flood stages in the Mississippi River.

About half the land in enterprises is now improved and the unimproved portion is principally woodland.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief from overflow for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹		
	1930	1920	Amount	Per cent	
FARMS AND DRAINAGE ON FARMS					
All farms.....	number..	246,057	252,774	-7,117	-2.8
Farms reporting drainage.....	number..	4,927	8,887	-3,960	-44.0
All land in farms.....	acres..	18,003,241	19,510,850	-1,507,615	-7.7
Farm land provided with drainage.....	acres..	156,162	254,118	-97,956	-38.5
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES					
Approximate land area of State.....	acres..	26,670,080	26,670,080		
Land in drainage enterprises.....	acres..	593,500	363,071	220,880	63.2
Improved land.....	acres..	286,008	163,218	122,790	75.2
Unimproved land:					
Woodland.....	acres..	219,510	180,945	20,565	15.0
Other.....	acres..	88,042	10,568	77,534	737.8
Land unfit to raise any crop for lack of drainage.....	acres..	133,230	² 104,063	29,167	28.0
Land drained, fit to raise normal crop.....	acres..	367,805	(3)		
Land partly drained, fit for partial crop.....	acres..	92,525	⁴ 20,870	62,640	200.7
Land in occupied farms.....	acres..	413,791	(3)		
Land in planted crops.....	acres..	212,690	(3)		
Land idle.....	acres..	324,409	(3)		
Ditches, completed.....	miles..	1,413.0	777.3	635.7	81.8
Tile drains, completed.....	miles..		0.3	-0.3	-100.0
Capital invested in enterprises.....	dollars..	6,366,747	2,025,044	3,440,803	117.6
Average, per acre.....	dollars..	10.73	8.05	2.68	33.3

¹ A minus sign (-) denotes decrease. ² "Swampy or subject to overflow." ³ Not called for on schedule. ⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, there are 191 drainage enterprises in Tennessee with an average area of 3,138 acres. There are 33 such enterprises of 5,000 acres or more, 130 of between 500 and 5,000 acres, and 28 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 5,832 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres 593,500
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	593,392	100.0	363,671	100.0	593,500
Less than 100 acres.....	97	(?)	121	(?)	97
100 to 199 acres.....	271	(?)	271	(?)	271
200 to 499 acres.....	8,423	1.4	2,166	0.6	8,423
500 to 999 acres.....	28,581	4.8	12,466	3.4	28,581
1,000 to 4,999 acres.....	209,899	35.0	117,061	32.4	209,899
5,000 to 9,999 acres.....	115,598	19.3	91,012	25.2	115,598
10,000 to 49,999 acres.....	230,523	39.4	130,066	36.4	230,523

¹ The sum of the areas of individual enterprises, including overlap.
² Less than one-tenth of 1 per cent.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	593,500	100.0	6,366,747	100.0
Drainage districts.....	592,990	99.9	6,363,247	99.9
Individually owned projects.....	500	0.1	3,500	0.1

Type of drainage.—There were 188 enterprises, covering 561,512 acres of land and with an invested capital of \$6,040,547, that reported their works as completed.

There were 3 enterprises, covering 32,048 acres of land and with an invested capital of \$326,200, which estimated that \$50,065 would be required to complete the drainage works under construction.

The works completed to January 1, 1930 included 1,413 miles of ditches and approximately 30 miles of

levees and dikes. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise, nor the works of levee districts that had not constructed ditches, tile drains, or pumping plants. No enterprise reported land served by pumps.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises, gravity drainage (ditches and levees) only.....	593,500	100.0	6,366,747	100.0

Arrears and delinquency.—There were 106 enterprises, with approximately 70 per cent of the invested capital and covering about 66 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 85 enterprises reported no arrearage. There were 140 enterprises, covering 480,873 acres, that reported a total of 207,034 acres delinquent in drainage taxes; 34 enterprises, covering 61,361 acres, that reported no delinquency; while 17 enterprises, covering 51,326 acres, failed to report.

STATE TABLE 5.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	593,500	100.0	6,366,747	100.0	207,034
Enterprises in arrears.....	398,902	66.4	4,480,018	70.5	174,399
With some delinquent land.....	320,561	55.5	3,964,566	62.1	174,399
With no delinquent land.....	33,801	5.7	312,100	4.9	—
With no report on delinquency.....	30,400	5.2	220,252	3.5	—
Enterprises not in arrears.....	190,068	33.0	1,870,829	29.5	32,635
With some delinquent land.....	151,322	25.5	1,381,011	21.7	32,635
With no delinquent land.....	27,470	4.6	279,017	4.4	—
With no report on delinquency.....	20,866	3.5	219,201	3.4	—

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes. An enterprise, prior to drainage, may contain swamp land, improved land in farms, and land subject to overflow. The object in drainage may be to reclaim or benefit all such lands. However, the land is classified according to the principal purpose reported.

Approximately 53 per cent of the drained land is in enterprises organized primarily to reclaim swamp or marsh land, and the major portion of this land was also protected from overflow by the drainage works.

STATE TABLE 6.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	593,560	100.0	6,366,747	100.0
Reclamation of swamp land not previously in farms.....	314,142	52.8	3,816,439	60.0
Improvement of land already in farms.....	228,764	38.6	2,108,970	33.1
Protection against overflow.....	50,654	8.5	441,338	6.9

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. State Table 7 shows that approximately 82 per cent of the drained land in Tennessee is in enterprises organized from 1910 to 1919, inclusive.

STATE TABLE 7.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Acres	Overlapped acres	Dollars	Per cent
All enterprises.....	593,560	100.0	599,392	5,832	6,366,747	100.0
1910-1914.....	147,245	24.8	147,245	-----	1,302,824	20.5
1915-1919.....	339,585	57.2	345,417	5,832	3,505,130	55.1
1920-1924.....	100,254	16.9	100,254	-----	1,510,207	23.7
1925-1929.....	6,476	1.1	6,476	-----	45,586	0.7

¹ Includes overlap.

STATE TABLE 8.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement
	Total	Condition of land			Other unimproved land	
		Improved land	Woodland	Other unimproved land		
All enterprises.....	Acres 593,560	Acres 286,008	Per cent 48.2	Acres 219,510	Acres 88,042	Acres 44,467
1910-1914.....	147,245	68,316	46.4	60,408	9,521	9,326
1915-1919.....	339,585	160,727	50.0	117,229	52,020	22,689
1920-1924.....	100,254	42,871	42.8	32,673	24,710	12,452
1925-1929.....	6,476	5,094	78.6	200	1,182	-----

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown. The general drainage law provides that the directors of a district may petition the county court to create a special fund for maintaining the drainage works, by levying an assessment not to exceed, in any year, 10 cents per acre upon all land in the district. This assessment is based upon the apportionment of benefits made to meet the cost of original construction.

Systematic maintenance was reported by 64 enterprises, covering 169,338 acres of land and having an invested capital of \$2,068,458. There were 127 enterprises, with an invested capital of \$4,298,289 and covering 424,222 acres of land, that did not have systematic maintenance. No excavators or other power equipment used principally for maintenance were reported as owned by any enterprise.

STATE TABLE 9.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	593,560	100.0	6,366,747	100.0
By district forces.....	219,575	37.0	2,411,876	37.9
By contract.....	198,950	33.5	2,239,751	35.2
By work apportioned to landowners.....	37,708	6.4	204,087	4.6
Other, none, and not reported.....	137,327	23.1	1,420,433	22.3

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 39 per cent of the land reported some cost, and 61 per cent reported no cost in 1929. The average cost was 4 cents per acre. Expenditures for operation and maintenance of drainage works vary greatly from year to year.

STATE TABLE 10.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
All enterprises reporting, gravity drainage (ditches and levees) only.....	Acres 593,560	Dollars 21,021	Dollars 0.04

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 4,927	Number 8,887	Acres 150,162	Acres 254,118		Number 245,057	Acres 18,003,241	Acres 7,065,770		Acres 5,413,347	Acres 26,670,680
The State.....									
Bedford.....	55	330	1,175	5,584	2,801	233,434	126,310	64,625	328,960
Benton.....	79	277	1,621	4,781	1,751	197,309	71,319	77,650	291,840
Bradley.....	49	(²)	735	(²)	1,780	181,579	67,404	71,057	231,680
Carroll.....	160	249	6,505	9,577	4,310	312,232	134,264	81,335	396,100
Cheatham.....	49	(²)	1,098	(²)	1,509	121,501	43,888	47,926	200,900
Chester.....	136	316	4,044	8,248	1,891	149,038	59,178	56,941	200,320
Cocke.....	78	114	1,607	2,895	2,707	197,013	62,711	77,926	273,280
Crockett.....	59	220	2,196	7,168	3,148	141,782	97,090	15,954	170,880
Davidson.....	34	(²)	1,155	(²)	2,939	236,290	86,943	69,307	327,040
Decatur.....	60	373	1,680	7,400	1,654	153,686	54,241	65,602	184,320
Dyer.....	84	220	3,868	7,891	3,911	191,418	140,666	17,201	320,000
Fayette.....	117	7	6,937	384	5,786	336,437	167,154	64,864	395,520
Gibson.....	215	377	7,317	10,709	6,815	323,881	209,398	35,332	405,120
Giles.....	60	(²)	1,121	(²)	4,811	313,800	154,598	65,442	401,920
Greene.....	75	177	2,360	4,118	5,004	325,421	135,114	70,686	392,320
Hamilton.....	15	(²)	522	(²)	2,407	180,517	80,872	71,551	350,720
Hancock.....	74	(²)	599	(²)	1,613	117,716	30,934	44,660	155,920
Hardeman.....	235	105	7,866	3,788	3,396	291,008	97,031	168,499	446,080
Hardin.....	46	336	1,088	6,848	2,708	196,387	68,884	68,884	372,480
Hawkins.....	102	119	1,643	3,022	3,505	258,573	78,205	81,782	368,480
Haywood.....	127	43	3,448	2,751	5,079	223,158	142,903	37,997	325,120
Henderson.....	180	726	5,190	16,194	3,290	299,754	167,358	76,650	343,040
Henry.....	58	134	1,732	5,192	3,290	298,547	126,796	79,359	400,640
Jefferson.....	50	62	2,407	2,642	2,204	176,524	79,318	34,487	199,680
Knox.....	78	(²)	748	(²)	4,039	253,828	104,266	59,493	322,560
Lauderdale.....	21	83	2,216	2,707	3,931	169,617	115,954	27,046	291,840
Lincoln.....	84	(²)	1,807	(²)	4,131	316,611	130,368	77,071	375,080
McNairy.....	480	412	11,334	8,355	3,414	273,757	93,590	105,704	376,320
Madison.....	207	94	5,211	6,790	4,650	266,511	130,548	59,779	353,280
Marshall.....	33	(²)	1,007	(²)	2,207	223,868	92,733	61,922	241,920
Martey.....	30	(²)	801	(²)	3,080	346,025	148,402	70,720	372,480
Meigs.....	18	38	516	1,284	757	121,952	42,471	44,795	132,480
Monroe.....	20	(²)	609	(²)	2,800	228,698	90,683	77,548	430,720
Montgomery.....	147	118	6,888	3,874	4,036	304,385	133,404	57,360	330,240
Obion.....	275	716	19,740	55,183	3,315	276,119	149,650	43,838	353,280
Perry.....	18	(²)	684	(²)	1,070	157,903	37,730	101,923	311,680
Roane.....	31	156	899	2,413	1,304	109,964	57,034	77,323	243,200
Sevier.....	192	(²)	816	(²)	2,031	225,601	77,519	84,640	375,680
Shelby.....	186	(²)	6,975	(²)	8,595	286,836	200,712	31,744	512,640
Sullivan.....	14	(²)	718	(²)	3,186	208,313	70,050	48,678	279,040
Sumner.....	18	26	238	483	4,481	300,864	138,239	53,379	357,120
Tipton.....	124	(²)	3,212	(²)	4,908	291,522	136,233	33,219	232,880
Weakley.....	313	418	14,101	21,061	4,978	369,620	164,448	51,041	371,200
Williamson.....	42	(²)	661	(²)	3,005	321,839	123,456	97,773	375,040
Wilson.....	17	(²)	511	(²)	3,782	336,461	134,170	89,723	362,320
All other counties.....	420	2,641	7,548	41,870	91,942	7,180,917	2,838,604	2,567,381	12,185,000

¹ No drainage on farms reported in Lewis, Moore, Morgan, and Pickett Counties in 1930; nor in Dickson, Houston, Lewis, and Van Buren Counties for 1920.
² Included in "All other counties."

DRAINAGE—TENNESSEE

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Carroll	Chester	Crockett	Dyer	Fayette	Gibson	Hardman	Hardin
LAND AREA										
1	Approximate land area..... 1930..... acres.....	26,679,680	306,160	200,320	170,880	320,000	395,520	405,120	446,080	372,480
2	Land in enterprises..... 1930..... acres.....	593,560	50,442	16,397	32,007	51,902	24,103	67,050	5,865	13,543
3	..... 1920..... acres.....	363,671	33,724	13,125	17,282	43,100	1,928	46,484	5,542	10,345
4	Increase, 1920-1930..... per cent.....	63.2	49.6	24.9	90.4	20.4	.....	44.2	5.8	-30.0
5	Area of all enterprises (overlapping areas included)..... 1930..... acres.....	599,392	50,442	16,397	32,007	51,902	24,103	71,330	5,865	13,543
6	Excess over land in enterprises (total areas overlapping)..... acres.....	5,832	.....	.....	.....	.....	.....	4,280	.....	.....
CONDITION AND USE OF LAND										
7	Land unfit to raise any crop..... 1930..... acres.....	133,230	2,580	2,138	8,623	7,500	15,362	6,496	550	4,480
8	Land unfit to raise any crop prior to drainage..... acres.....	407,262	37,604	12,756	19,226	36,200	21,507	45,132	4,062	8,026
9	Decrease since drainage..... per cent.....	67.3	93.1	83.2	55.1	70.3	23.9	85.6	88.9	49.8
10	Land fit to raise a normal crop..... 1930..... acres.....	367,805	44,305	12,054	20,283	37,700	5,048	54,255	5,115	8,548
11	Land fit to raise a normal crop prior to drainage..... acres.....	91,541	7,370	597	5,752	7,721	811	17,037	803	2,102
12	Increase since drainage ¹ per cent.....	301.8	500.7	.....	252.6	388.3	522.4	218.4	537.0	306.7
13	Land fit to raise a partial crop..... 1930..... acres.....	92,525	3,548	2,205	4,001	6,702	3,693	6,200	200	515
14	Land fit to raise a partial crop prior to drainage..... acres.....	94,767	5,462	3,044	7,029	7,981	1,695	4,881	100	2,515
15	Decrease since drainage ¹ per cent.....	2.4	35.0	27.6	49.5	16.0	+117.9	+20.0	+100.0	79.5
16	Improved land..... 1930..... acres.....	286,008	10,208	7,877	20,773	30,568	4,748	37,034	2,931	9,341
17	..... 1920..... acres.....	163,218	8,043	8,422	8,669	18,853	1,169	22,051	2,201	11,334
18	Increase, 1920-1930..... per cent.....	75.2	138.8	-6.5	139.6	62.1	306.2	61.4	33.2	-17.0
19	Unimproved land—	.....	.....	.....	.....	.....	.....	.....	.....	.....
20	Woodland..... 1930..... acres.....	210,510	9,381	8,340	9,110	14,400	3,800	28,626	1,093	1,426
21	Other..... 1930..... acres.....	88,042	21,853	180	3,024	6,934	15,555	1,390	1,031	2,776
22	Land in occupied farms..... 1930..... acres.....	413,791	48,895	8,407	26,442	36,000	6,768	60,610	3,303	9,360
23	Land in planted crops..... 1930..... acres.....	212,690	17,325	7,805	16,871	23,700	4,011	22,040	2,600	7,191
24	Woodland cleared and cultivated since drainage..... 1930..... acres.....	110,931	4,774	2,142	12,542	9,200	3,400	15,406	3,031	2,471
25	Land idle..... 1930..... acres.....	324,460	27,567	8,592	13,980	23,600	10,749	37,833	3,203	6,233
26	Land available for settlement..... 1930..... acres.....	44,467	.....	.....	.....	.....	9,518	.....	2,312	38
DRAINAGE WORKS, 1930										
27	Ditches—	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	Completed..... miles.....	1,413.0	122.1	75.6	69.0	80.5	70.0	122.1	16.0	40.5
29	Additional under construction..... miles.....	3.5	1.5	.....	.....	.....	.....	.....	.....	.....
30	Levees and dikes—	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	Completed..... miles.....	29.8	.....	.....	.....	.....	.....	.....	.....	.....
32	Land drained by ditches only ² acres.....	562,882	50,442	16,397	32,007	51,902	24,103	67,050	5,865	13,543
33	Length of ditches..... miles.....	1,372.5	123.6	75.6	69.0	89.5	70.0	122.1	16.0	40.5
34	Land having ditches and levees..... acres.....	30,678	.....	.....	.....	.....	.....	.....	.....	.....
35	Length of ditches..... miles.....	44.0	.....	.....	.....	.....	.....	.....	.....	.....
36	Length of levees..... miles.....	20.8	.....	.....	.....	.....	.....	.....	.....	.....
37	Land protected by levees of an outside agency..... acres.....	1,500	.....	.....	.....	.....	.....	.....	.....	.....
CAPITAL INVESTED AND COST PER ACRE										
38	Capital invested in enterprises to Jan. 1, 1930..... dollars.....	6,369,747	435,904	160,719	345,832	588,501	482,119	501,030	44,102	115,056
39	..... 1920..... dollars.....	2,925,944	310,216	124,946	179,355	346,511	14,451	328,095	30,015	95,210
40	Increase, 1920-1930..... per cent.....	117.0	40.5	28.6	92.8	69.8	.....	80.1	10.5	21.5
41	Estimated cost of enterprises when completed..... 1930..... dollars.....	6,416,812	437,669	160,719	345,832	588,501	482,119	501,030	44,102	115,056
42	..... 1920..... dollars.....	3,447,991	360,566	125,941	179,355	466,011	15,660	328,095	46,117	95,210
43	Average, per acre when completed..... 1930..... dollars.....	10.81	8.68	9.80	10.51	11.34	20.00	8.81	7.52	8.54
44	..... 1920..... dollars.....	9.48	10.09	9.00	10.38	10.81	8.12	7.06	8.14	4.92
45	Invested in and required for completion of—	.....	.....	.....	.....	.....	.....	.....	.....	.....
46	Enterprises having ditches only..... 1930..... dollars.....	5,923,172	437,669	160,719	345,832	588,501	482,119	501,030	44,102	115,056
47	Average, per acre..... dollars.....	10.52	8.68	9.80	10.51	11.34	20.00	8.81	7.52	8.54
48	Enterprises having ditches and levees..... 1930..... dollars.....	493,640	.....	.....	.....	.....	.....	.....	.....	.....
49	Average, per acre..... dollars.....	16.00	.....	.....	.....	.....	.....	.....	.....	.....

¹ Per cent not shown when more than 1,000. A minus sign (-) denotes decrease. A plus sign (+) denotes increase.
² When works under construction have been completed.

DRAINAGE—TENNESSEE

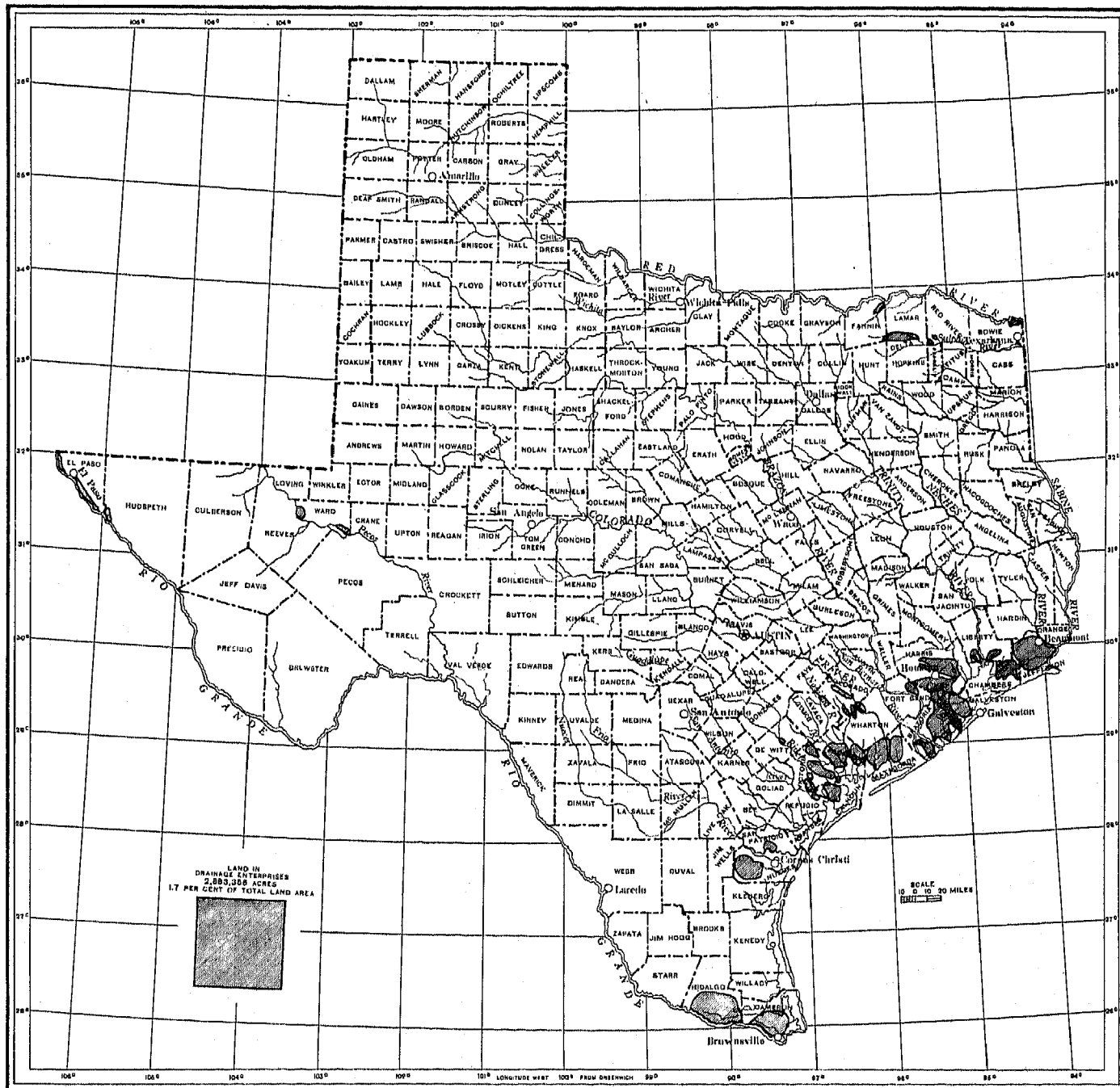
COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Hay-wood	Hender-son	Henry	Mc-Nairy	Madl-son	Oblon	Shelby	Tipton	Weak-loy	Other counties ¹
LAND AREA											
1	Approximate land area..... 1930..... acres..	325, 120	343, 040	400, 040	370, 320	353, 280	353, 280	512, 640	282, 880	371, 200	1, 170, 320
2	Land in enterprises..... 1930..... acres..	37, 200	25, 615	32, 914	25, 333	52, 092	49, 738	17, 547	12, 980	50, 158	21, 768
3	..... 1920..... acres..	35, 334	20, 684	31, 589	12, 729	23, 174	27, 140	.....	.....	12, 400	19, 000
4	Increase, ² 1920-1930..... per cent..	5.3	23.8	4.2	99.0	124.8	83.1	.....	.....	349.3	9.0
5	Area of all enterprises (overlapping areas included)..... 1930..... acres..	37, 200	25, 615	32, 914	25, 333	52, 092	50, 650	17, 547	12, 980	50, 708	21, 768
6	Excess over land in enterprises (total areas overlapping)..... acres..	.....	.....	.....	.....	.....	912	.....	.....	640	.....
CONDITION AND USE OF LAND											
7	Land unfit to raise any crop..... 1930..... acres..	10, 320	3, 048	8, 238	5, 222	0, 000	11, 608	4, 863	950	26, 944	4, 393
8	Land unfit to raise any crop prior to drainage..... acres..	22, 568	10, 869	8, 239	17, 441	50, 767	30, 130	14, 000	6, 700	40, 947	10, 188
9	Decrease since drainage ² per cent..	54.3	80.1	.....	70.0	82.3	61.5	65.3	85.8	34.2	56.9
10	Land fit to raise a normal crop..... 1930..... acres..	18, 440	16, 365	10, 910	15, 474	37, 861	20, 271	6, 500	10, 000	23, 469	11, 598
11	Land fit to raise a normal crop prior to drainage..... acres..	9, 450	2, 180	8, 238	4, 508	275	5, 017	2, 034	3, 400	9, 213	4, 127
12	Increase since drainage ² per cent..	95.1	95.7	32.5	243.2	.....	394.7	219.0	211.8	154.7	181.0
13	Land fit to raise a partial crop..... 1930..... acres..	8, 440	5, 302	13, 757	4, 637	5, 225	8, 859	6, 184	1, 430	5, 745	5, 777
14	Land fit to raise a partial crop prior to drainage..... acres..	5, 188	3, 500	16, 437	3, 384	1, 050	13, 691	1, 513	2, 880	5, 098	7, 453
15	Decrease since drainage ² per cent..	+62.8	+48.7	16.3	+37.0	+397.0	35.3	+308.7	50.3	4.2	22.5
16	Improved land..... 1930..... acres..	16, 307	11, 527	23, 039	16, 974	15, 462	21, 900	6, 500	8, 000	19, 695	14, 734
17	..... 1920..... acres..	20, 059	11, 433	6, 800	7, 041	11, 727	13, 676	.....	.....	2, 791	8, 049
18	Increase, ² 1920-1930..... per cent..	-18.7	0.8	238.8	141.1	31.8	00.1	.....	.....	584.2	82.9
Unimproved land—											
19	Woodland..... 1930..... acres..	16, 413	5, 061	9, 775	3, 504	35, 380	25, 231	4, 400	4, 400	32, 716	6, 544
20	Other..... 1930..... acres..	4, 480	9, 027	100	4, 855	1, 250	2, 007	6, 647	580	4, 347	500
21	Land in occupied farms..... 1930..... acres..	10, 925	25, 015	25, 175	15, 799	25, 168	37, 521	8, 600	11, 700	32, 177	15, 300
22	Land in planted crops..... 1930..... acres..	14, 174	11, 177	10, 933	12, 874	14, 350	13, 900	0, 250	7, 800	10, 942	8, 747
23	Woodland cleared and cultivated since drainage..... 1930..... acres..	13, 370	6, 175	1, 625	3, 148	14, 050	9, 791	6, 200	2, 700	5, 335	3, 572
24	Land idle..... 1930..... acres..	14, 635	13, 037	16, 880	12, 162	36, 719	20, 154	9, 750	4, 400	41, 562	8, 507
25	Land available for settlement..... 1930..... acres..	7, 200	.....	.....	1, 812	0, 610	4, 547	6, 600	.....	2, 070	700
DRAINAGE WORKS, 1930											
Ditches—											
26	Completed..... miles..	71.0	105.0	97.0	100.8	86.3	88.5	37.0	34.0	120.1	59.5
27	Additional under construction..... miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.0
Levees and dikes—											
28	Completed..... miles..	.....	.....	.....	.....	.....	13.8	.....	.....	16.0	.....
29	Land drained by ditches only ³ acres..	37, 200	25, 615	32, 914	25, 333	52, 092	27, 008	17, 547	12, 980	48, 210	21, 768
30	Length of ditches..... miles..	71.0	105.0	97.0	100.8	86.3	88.5	37.0	34.0	90.1	61.5
31	Land having ditches and levees..... acres..	.....	.....	.....	.....	.....	22, 730	.....	.....	7, 948	.....
32	Length of ditches..... miles..	.....	.....	.....	.....	.....	20.0	.....	.....	24.0	.....
33	Length of levees..... miles..	.....	.....	.....	.....	.....	13.8	.....	.....	16.0	.....
34	Land protected by levees of an outside agency..... acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....	1, 500
CAPITAL INVESTED AND COST PER ACRE											
35	Capital invested in enterprises to Jan. 1, 1930..... dollars..	287, 358	212, 485	340, 350	252, 691	376, 767	670, 008	230, 502	245, 000	709, 361	264, 302
36	..... 1920..... dollars..	200, 951	175, 076	116, 975	112, 737	185, 685	392, 750	.....	.....	193, 643	100, 628
37	Increase, ² 1920-1930..... per cent..	38.8	21.4	196.1	124.1	103.0	72.0	.....	.....	266.5	138.0
38	Estimated cost of enterprises when completed..... 1930..... dollars..	287, 358	212, 485	340, 350	252, 691	376, 767	670, 008	230, 502	245, 000	709, 361	262, 302
39	..... 1920..... dollars..	221, 742	188, 576	327, 791	114, 387	185, 685	400, 450	.....	.....	193, 643	100, 062
40	Average, per acre when completed..... 1930..... dollars..	7.72	8.30	11.74	9.97	7.23	13.65	13.65	18.88	12.03	12.05
41	..... 1920..... dollars..	0.28	0.12	10.38	8.90	8.01	14.74	.....	.....	15.48	10.02
Invested in and required for completion of—											
42	Enterprises having ditches only..... 1930..... dollars..	287, 358	212, 485	340, 350	252, 691	376, 767	335, 500	230, 502	245, 000	559, 220	262, 362
43	Average, per acre..... dollars..	7.72	8.30	11.74	9.97	7.23	12.42	13.65	18.88	11.00	12.05
44	Enterprises having ditches and levees..... 1930..... dollars..	.....	.....	.....	.....	.....	349, 490	.....	.....	150, 141	.....
45	Average, per acre..... dollars..	.....	.....	.....	.....	.....	15.11	.....	.....	18.89	.....

¹ Includes Benton, Decatur, Lake, Lauderdale, and Montgomery Counties in 1930; and Benton, Lauderdale, Montgomery, and Sumner Counties for 1920.
² Per cent not shown when more than 1,000 or when less than one-tenth of 1 per cent. A minus sign (-) denotes decrease. A plus sign (+) denotes increase.
³ When works under construction have been completed.

TEXAS

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



TEXAS

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—By far the greater portion of the land in drainage enterprises in Texas is located in those counties near the Gulf coast. Much of this land is very little above sea level and was swampy and subject to overflow prior to drainage. In the western and arid part of the State are several enterprises that undertook drainage in order to remove alkali and seepage resulting from irrigation.

Approximately 70 per cent of the land in drainage enterprises was reported as improved; less than 8 per cent was unfit to raise any crop for lack of drainage; and about 28 per cent was idle in 1929.

The annual rainfall for 1929 varied from approximately 8.4 inches in the western to 66.6 inches in the eastern part of the State and averaged 31 inches, which is 0.1 inch above normal.

Where the drainage work is done directly by an irrigation enterprise, the drainage enterprise has been considered as identical with the irrigation enterprise as all irrigable lands are usually assessed for the necessary works; however, in the census of 1920, only the lands then served by drainage works were included. Of the 87,279 acres located in such enterprises, 79,000 acres are now served by drainage works, and 5,000 acres are in need of drainage. This land is located in the Rio Grande Project of the United States Bureau of Reclamation, and in the Hudspeth County Conservancy and Reclamation District No. 1.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief from overflow for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

STATE TABLE 1.—SUMMARY FOR THE STATE: 1930 AND 1929

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....	495,489	436,033	59,456	13.6
Farms reporting drainage.....	9,072	8,106	966	11.9
All land in farms.....	124,707,130	114,020,621	10,686,509	9.4
Farm land provided with drainage.....	787,460	756,263	31,197	4.1
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....	167,934,720	167,934,720		
Land in drainage enterprises.....	2,883,360	2,166,128	717,232	33.1
Improved land.....	2,011,044	1,107,153	903,891	81.6
Unimproved land:				
Woodland.....	170,511	111,922	58,589	57.7
Other.....	695,801	947,053	-251,252	-26.5
Land unfit to raise any crop for lack of drainage.....	218,017	2201,051	17,566	8.7
Land drained, fit to raise normal crop.....	2,178,417	(2)		
Land partly drained, fit for partial crop.....	486,922	128,766	357,557	277.7
Land in occupied farms.....	1,805,480	(3)		
Land in planted crops.....	1,278,207	(2)		
Land idle.....	810,401	(3)		
Ditches, completed.....	3,661.8	2,728.5	933.3	34.2
Tile drains, completed.....	8.5		8.5	
Capital invested in enterprises.....	12,002,949	5,700,805	6,302,144	110.5
Average, per acre.....	4.16	2.63	1.53	68.2

¹ A minus sign (—) denotes decrease. Per cent not shown when more than 1,000.
² "Swampy, subject to overflow, seeped, or alkali."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 87 drainage enterprises are shown for Texas with an average area of 33,142 acres. There are 18 such enterprises of 50,000 acres or more, 51 between 5,000 and 50,000 acres, and 18 between 500 and 5,000 acres.

The area of enterprises equals the land in enterprises, as there is no overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930
	1930		1920		
	Acres	Per cent 100.0	Acres	Per cent 100.0	
All enterprises.....	2,883,350		2,106,128		2,883,350
200 to 499 acres.....			1,057	0.1	800
500 to 999 acres.....	800	(?)	9,610	0.4	53,733
1,000 to 4,999 acres.....	53,733	1.9	32,032	1.5	54,002
5,000 to 9,999 acres.....	54,002	1.9	740,614	34.6	1,000,763
10,000 to 49,999 acres.....	1,000,763	34.9	918,105	42.4	994,627
50,000 to 99,999 acres.....	994,627	34.6	467,871	21.1	772,871
100,000 acres and over.....	772,871	26.8			

¹ No overlap.

² Less than one-tenth of 1 per cent.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Drainage projects under the control of the officers of an irrigation organization are classed as *irrigation enterprises*. In such cases the drainage is incidental to land reclamation by irrigation, and both the drainage and irrigation operations are functions of the one enterprise.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	2,883,350		12,002,040	
Drainage districts.....	2,787,477	96.0	4,485,317	70.0
Irrigation enterprises.....	87,279	3.0	2,007,632	16.7
Individually owned projects.....	28,600	1.0	510,000	4.3

Type of drainage.—There were 80 enterprises, covering 2,637,785 acres of land and with an invested capital of \$10,071,930, that reported their works as completed.

There were 7 enterprises, covering 245,571 acres of land and with an invested capital of \$1,931,019, which estimated that \$183,679 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 3,662 miles of ditches, 8 miles of tile

drains, and 216 miles of levees. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. There were 2 pumping plants reported.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	2,883,350		12,002,040	
Gravity drainage only.....	2,706,077	97.0	9,005,317	83.3
Ditches and levees.....	2,560,477	88.8	8,405,317	70.5
Ditches, tile drains, and levees.....	235,600	8.2	1,530,000	12.8
Drainage, all or part by pumping.....	87,279	3.0	2,007,632	16.7
All drainage by pumping.....	20,279	0.7	425,040	3.5
Part gravity and part pumping.....	67,000	2.3	1,582,593	13.2

Pumping plants.—Of the 2 pumping enterprises reported, 1 was a part of the Rio Grande Project of the United States Bureau of Reclamation. This pumping plant had a motor capacity of 60 horsepower and a pump capacity of 20,000 gallons per minute. The area served was 800 acres.

The other enterprise was the Hudspeth County Conservancy and Reclamation District No. 1. This enterprise operated 44 drainage wells from which water was pumped to prevent damage from seepage or alkali resulting from irrigation. The combined capacity of the motors was 450 horsepower, and that of the pumps, 13,930 gallons per minute. The average lift was 46 feet, and the area served, 20,279 acres.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER, 1930

KIND OF POWER	Enterprises	Motor capacity		Pump capacity	Land served
		H. p.	Per cent 100.0		
All enterprises, ¹ electric only.....	Number 2	510		G. p. m. 33,930	Acres 21,079

¹ No pumping plants reported in 1920.

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Motor capacity	Land served
		G. p. m.	Per cent 100.0		
All enterprises, centrifugal only.....	Number 53	33,930	100.0	H. p. 510	Acres 21,079

Arrears and delinquency.—There were 5 enterprises, with approximately 6 per cent of the invested capital and covering about 1 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 82 enterprises reported no arrearage. There were 63 enterprises, covering 2,039,401 acres, that reported a total of 274,682 acres delinquent in drainage taxes; 18 enterprises, covering 772,967 acres, that reported no delinquency; while 6 enterprises failed to report.

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres	Per cent 100.0	Dollars	Per cent 100.0	
All enterprises.....	2,883,356	100.0	12,002,949	100.0	274,682
Enterprises in arrears.....	26,938	0.9	739,009	6.2	13,355
With some delinquent land.....	23,327	0.8	585,006	4.9	13,355
With no report on delinquency.....	3,111	0.1	150,000	1.3	
Enterprises not in arrears.....	2,856,418	99.1	11,263,940	93.8	261,327
With some delinquent land.....	2,015,574	69.9	8,046,450	67.0	261,327
With no delinquent land.....	772,967	26.8	2,537,450	21.1	
With no report on delinquency.....	67,877	2.4	680,040	5.7	

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes. An enterprise, prior to drainage, may contain swamp land, improved land in farms, land damaged by alkali and see page from irrigation, and land subject to overflow. The object in drainage may be to reclaim or benefit all such lands. However, the land is classified according to the principal purpose reported.

The enterprises having "Improvement of land already in farms," as the principal purpose of drainage doubtless contained considerable swampy and wet lands which were either unfit or partially fit for cultivation prior to drainage.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	2,883,356	100.0	12,002,949	100.0
Reclamation of swamp land not previously in farms.....	518,242	18.0	2,414,320	20.1
Improvement of land already in farms.....	1,587,777	55.1	4,212,207	35.1
Removal of alkali or seepage from irrigation.....	131,558	4.5	2,125,132	17.7
Protection against overflow.....	645,781	22.4	3,251,290	27.1

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. Where the drainage work was done directly by an irrigation enterprise, the year in which drainage was undertaken is used instead of the year of organization of the irrigation project.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹ Acres	Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0		Dollars	Per cent 100.0
All enterprises.....	2,883,356	100.0	2,883,356	12,002,949	100.0
1905-1909.....	788,973	27.4	788,973	1,607,000	13.4
1910-1914.....	1,126,123	39.0	1,126,123	3,474,666	28.9
1915-1919.....	451,628	15.7	451,628	3,646,083	30.4
1920-1924.....	289,760	10.0	289,760	1,665,720	13.9
1925-1929.....	226,872	7.9	226,872	1,606,480	13.4

¹ No overlap.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement Acres
	Total	Condition of land			Other unimproved land Acres	
		Improved land Acres	Woodland Acres	Per cent		
All enterprises.....	2,883,356	2,011,044	69.7	176,511	695,801	772,223
1905-1909.....	788,973	547,928	69.4	7,371	233,174	174,690
1910-1914.....	1,126,123	808,328	62.0	65,860	361,935	259,969
1915-1919.....	451,628	337,350	74.7	63,997	50,281	109,628
1920-1924.....	289,760	273,422	94.4	12,333	4,005	176,661
1925-1929.....	226,872	154,016	67.9	26,450	46,406	51,260

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 40 enterprises, covering 1,488,003 acres of land and having an invested capital of \$7,870,399; while 47 enterprises, with an invested capital of \$4,132,550 and covering 1,395,353 acres of land, did not have systematic maintenance.

There were 9 enterprises, with an invested capital of \$3,566,382 and covering 490,882 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 78 enterprises, with an invested capital of \$8,436,567 and covering 2,392,474 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	2,883,356	100.0	12,002,949	100.0
By district forces.....	1,442,576	50.0	6,305,490	52.5
By contract.....	1,238,201	43.0	4,152,542	34.6
By work apportioned to landowners.....	31,880	1.1	548,000	4.6
Other, none, and not reported.....	170,020	5.9	990,917	8.3

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 68 per cent of the land reporting showed some cost, and 32 per cent showed no cost in 1929. The average cost was 13 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost Acres	COST REPORTED	
		Total Dollars	Per acre Dollars
	All enterprises reporting.....	2,506,692	334,387	0.13
Gravity drainage only.....	2,422,383	237,115	0.10
Ditches and levees.....	2,186,783	202,115	0.09
Ditches, tile drains, and levees.....	235,000	35,000	0.15
Drainage, all or part by pumping.....	87,270	97,272	1.11

DRAINAGE—TEXAS

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COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 9, 072	Number 8, 106	Acres 787, 460	Acres 766, 263		Number 495, 480	Acres 124, 707, 130	Acres 34, 766, 166		Acres 16, 689, 483	Acres 107, 934, 720
The State.....									
Anderson.....	23	(?)	754	(?)	4, 422	360, 320	170, 204	127, 177	600, 320
Austin.....	139	(?)	5, 005	(?)	3, 112	340, 110	118, 220	76, 908	405, 920
Bell.....	174	22	1, 257	1, 545	5, 430	613, 136	375, 805	115, 167	608, 120
Blanco.....	55	145	3, 477	7, 930	708	404, 504	37, 707	114, 263	480, 000
Bosque.....	18	29	630	1, 494	2, 229	544, 335	192, 127	142, 654	624, 000
Bowie.....	20	8	2, 383	3, 148	5, 451	344, 560	187, 173	105, 223	558, 720
Brazoria.....	510	730	84, 248	86, 337	2, 163	462, 027	97, 840	90, 008	857, 600
Brazos.....	26	93	1, 616	4, 916	2, 493	267, 807	105, 401	101, 114	382, 080
Burleson.....	11	17	570	927	3, 185	308, 413	144, 115	121, 940	437, 760
Burnet.....	14	(?)	851	(?)	1, 548	592, 253	105, 193	366, 806	623, 300
Callahan.....	205	333	47, 427	36, 068	574	134, 107	55, 599	2, 216	360, 320
Cameron.....	693	26	20, 970	1, 506	2, 936	134, 006	108, 734	4, 263	537, 600
Cass.....	15	115	551	3, 092	5, 841	395, 750	206, 678	126, 070	608, 640
Cherokee.....	40		705		6, 003	414, 715	190, 510	146, 625	671, 360
Coleman.....	33	(?)	1, 461	(?)	2, 583	684, 762	262, 840	112, 884	825, 600
Collin.....	155	12	8, 166	411	6, 069	592, 403	405, 803	19, 347	561, 920
Colorado.....	20	126	838	10, 985	2, 580	441, 204	108, 104	134, 817	622, 080
Comanche.....	43	346	2, 452	20, 009	2, 798	513, 725	214, 363	120, 844	606, 720
Cooke.....	91	17	2, 417	618	2, 748	473, 313	221, 785	100, 756	577, 280
Coryell.....	73	311	6, 750	18, 509	3, 101	583, 085	243, 861	104, 158	604, 400
Dallas.....	153	49	11, 162	3, 276	4, 830	431, 127	266, 528	42, 243	546, 760
Delta.....	51	24	2, 288	1, 384	2, 280	142, 489	114, 162	9, 159	167, 040
Denton.....	48	35	1, 897	812	3, 063	529, 254	326, 156	66, 471	609, 280
De Witt.....	102	(?)	5, 540	(?)	3, 548	495, 250	209, 432	160, 242	562, 560
Dickens.....	13		900		1, 228	629, 809	155, 363	10, 985	563, 840
Eastland.....	8		1, 370		1, 990	347, 355	132, 508	152, 546	592, 000
Ellis.....	167	40	7, 781	2, 361	6, 082	527, 339	446, 747	15, 902	624, 000
El Paso.....	724	158	50, 463	14, 052	1, 263	291, 185	61, 488	513	599, 720
Falls.....	43	(?)	3, 381	(?)	6, 014	426, 690	329, 773	49, 136	476, 800
Fannin.....	241	106	10, 350	8, 037	5, 894	459, 650	344, 691	42, 208	539, 320
Fayette.....	333	218	8, 854	4, 991	5, 133	513, 804	210, 490	199, 729	610, 520
Fisher.....	10		1, 038		2, 088	492, 242	243, 100	13, 990	566, 400
Fort Bend.....	309	8	21, 098	2, 052	4, 258	448, 442	212, 612	43, 355	599, 880
Galveston.....	6	130	1, 247	8, 956	674	42, 977	13, 149	2, 801	252, 800
Grayson.....	147	86	5, 431	1, 537	5, 169	538, 553	369, 139	62, 070	603, 800
Hall.....	25		2, 458		1, 835	387, 963	214, 216	1, 550	576, 640
Hamilton.....	6	14	600	456	1, 982	400, 415	170, 004	81, 011	533, 120
Hardeman.....	35	18	4, 788	1, 355	1, 385	346, 905	192, 499	4, 595	487, 040
Harris.....	530	520	51, 282	135, 200	4, 131	478, 164	118, 751	76, 788	1, 058, 560
Henderson.....	65	(?)	2, 769	(?)	4, 471	389, 151	186, 097	146, 908	606, 440
Hidalgo.....	120	46	12, 887	3, 486	4, 321	548, 105	221, 341	43, 248	905, 300
Hill.....	22	(?)	1, 325	(?)	5, 488	539, 385	411, 345	44, 246	618, 240
Hopkins.....	32	20	1, 265	646	5, 065	389, 680	229, 068	64, 079	520, 320
Houston.....	73	(?)	11, 137	(?)	5, 666	401, 644	221, 141	95, 758	787, 840
Hudspeth.....	79		14, 384		1, 174	773	16, 230	57	2, 957, 440
Hunt.....	144	30	6, 240	2, 530	5, 905	408, 800	349, 857	58, 100	571, 520
Jackson.....	491	343	76, 827	38, 182	1, 642	376, 300	99, 194	109, 113	571, 520
Jefferson.....	21	128	1, 168	36, 446	1, 012	251, 800	50, 203	4, 750	588, 800
Kaufman.....	37	102	2, 094	11, 000	5, 131	442, 637	332, 507	56, 529	533, 760
Kendall.....	12	19	667	780	691	388, 440	30, 771	99, 446	382, 720
Lamar.....	180	436	8, 871	25, 099	6, 024	454, 648	313, 253	67, 420	604, 800
Lampasas.....	69	77	4, 020	2, 446	1, 202	412, 398	81, 020	70, 141	473, 000
Lavaca.....	45	(?)	1, 161	(?)	4, 191	547, 693	178, 742	196, 430	608, 000
Lee.....	28	49	999	503	2, 189	309, 295	104, 364	162, 218	350, 080
Liberty.....	97	217	15, 471	39, 438	1, 535	156, 282	59, 866	22, 580	742, 400
McCulloch.....	10	2	707	1, 928	1, 519	621, 349	150, 083	240, 235	686, 720
McLennan.....	63	23	3, 579	2, 556	6, 641	589, 010	435, 418	96, 863	671, 360
Madison.....	4	106	850	1, 835	2, 355	226, 370	94, 611	109, 440	316, 860
Matagorda.....	75	108	8, 260	58, 600	1, 073	442, 375	86, 753	37, 937	727, 040
Milam.....	14	79	881	2, 257	5, 469	491, 852	315, 205	111, 327	613, 760
Neacoches.....	57	105	1, 137	3, 740	4, 480	334, 877	154, 884	123, 629	677, 760
Navyarro.....	72	45	6, 561	2, 661	6, 513	576, 358	429, 925	75, 665	678, 400
Nolan.....	7	(?)	670	(?)	1, 154	421, 725	136, 183	40, 567	563, 200
Nueces.....	328	7	75, 748	3, 167	1, 069	373, 905	300, 111	17, 001	496, 000
Orange.....	7	149	1, 740	12, 365	389	66, 667	9, 321	32, 570	232, 320
Palo Pinto.....	13	21	643	547	1, 200	629, 995	80, 175	326, 705	613, 120
Panola.....	34	(?)	575	(?)	4, 656	302, 116	147, 347	100, 579	638, 880
Presidio.....	5	2	88	493	532	957, 332	24, 560	4, 673	2, 439, 080

¹ No drainage on farms reported in Andrews, Archer, Armstrong, Bailey, Baylor, Borden, Brooks, Carson, Castro, Cochran, Crane, Crockett, Crosby, Culberson, Dallam, Dawson, Deaf Smith, Dimmit, Duval, Ector, Edwards, Floyd, Gaines, Glasscock, Goliad, Gray, Hale, Hansford, Hartley, Hemphill, Hockley, Howard, Hutchinson, Irion, Jeff Davis, Jim Hogg, Kenedy, Kent, King, Kinney, Kleberg, Knox, Lamb, La Salle, Loving, Lynn, McMullen, Martin, Maverick, Medina, Midland, Moore, Ochiltree, Parmer, Potter, Randall, Reagan, Real, Reeves, Roberts, Schleicher, Sherman, Somervell, Starr, Sterling, Sutton, Tarrant, Terry, Throckmorton, Upton, Uvalde, Val Verde, Willacy, Winkler, Yoakum, and Zapata Counties in 1930; nor in Andrews, Aransas, Armstrong, Bailey, Baylor, Bee, Borden, Brewster, Callahan, Carson, Castro, Cherokee, Childress, Cochran, Coke, Concho, Cottle, Crane, Crockett, Crosby, Dallam, Dawson, Deaf Smith, Dickens, Dimmit, Donley, Duval, Eastland, Ector, Edwards, Fisher, Floyd, Foard, Frio, Gaines, Garza, Glasscock, Gray, Hale, Hall, Hansford, Hartley, Hockley, Howard, Hudspeth, Hutchinson, Irion, Jeff Davis, Jim Hogg, Jones, Karnes, King, Kinney, Knox, Lamb, La Salle, Lipscomb, Loving, Lubbock, Lynn, McMullen, Martin, Menard, Midland, Moore, Motley, Newton, Ochiltree, Oldham, Parmer, Potter, Randall, Reagan, Real, Roberts, San Jacinto, Schleicher, Scurry, Shackelford, Shelby, Sherman, Somervell, Starr, Sterling, Sutton, Terry, Throckmorton, Upton, Waller, Wheeler, Wichita, Winkler, Wise, Yoakum, Zapata, and Zavala Counties for 1920.

² Included in "All other counties."
³ Reorganized in 1921 from territory embraced in Cameron, Hidalgo, and Willacy Counties. (In 1921 four counties—Cameron, Hidalgo, Kenedy, and Willacy—were formed from territory formerly embracing three counties—Cameron, Hidalgo, and Willacy.)

⁴ The excess of farm acreage over approximate land area is due to the fact that the entire acreage of a farm is tabulated as in the county in which the headquarters are located, even though a part of the farm may be situated in an adjoining county.

DRAINAGE—TEXAS

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930—Continued

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres	Number	Acres	Acres	Acres	Acres
Red River.....	73	53	2,614	1,220	5,329	419,402	225,077	119,232	664,900
Refugio.....	49	21	13,014	6,221	507	374,149	49,633	17,612	473,600
Robertson.....	8	75	1,140	5,043	4,065	342,005	192,903	89,449	553,080
Runnels.....	7	(?)	531	(?)	2,544	595,202	316,072	108,100	693,120
Rusk.....	62	159	1,143	3,758	6,426	442,432	234,030	126,400	629,120
San Augustine.....	36	(?)	736	(?)	1,823	139,615	61,202	51,221	398,080
San Patricio.....	66	10	7,373	2,892	1,626	367,900	187,946	26,771	432,640
Shelby.....	54		2,842		4,908	301,876	141,445	110,602	533,120
Smith.....	25	191	696	5,660	6,907	446,980	257,696	108,231	588,800
Tarrant.....	32	16	2,740	521	3,366	434,539	202,680	56,211	577,920
Taylor.....	31	(?)	1,000	(?)	2,283	529,861	253,074	91,613	581,120
Van Zandt.....	15	(?)	557	(?)	5,201	442,467	250,130	116,623	581,840
Victoria.....	130	239	27,736	20,114	2,142	795,919	125,032	105,372	569,600
Waller.....	3		1,111		1,463	196,060	54,620	28,865	332,160
Ward.....	187	57	17,735	6,612	303	521,148	14,866	150	529,280
Washington.....	31	135	643	6,239	3,930	327,208	153,420	79,779	401,920
Webb.....	3	6	660	918	522	1,320,612	39,379	3,002	2,060,160
Wharton.....	44	3	17,232	1,465	3,965	483,451	209,459	63,380	711,680
Wilbarger.....	17		1,088		2,139	560,262	223,864	11,060	593,920
Williamson.....	111	30	4,473	943	4,023	625,292	351,988	179,319	722,660
Wilson.....	20	(?)	663	(?)	2,431	361,458	171,650	117,601	520,320
Wise.....	5		739		2,534	452,361	160,111	109,634	552,320
All other counties.....	442	1,240	15,280	51,337	202,518	84,404,659	17,882,643	8,123,011	110,837,120

¹ See footnote 1, p. 309.² Included in "All other counties."³ The excess of farm acreage over approximate land area is due to the fact that the entire acreage of a farm is tabulated as in the county in which the headquarters are located, even though a part of the farm may be situated in an adjoining county.

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Brazoria	Calhoun	Cameron ¹	Colorado	Delta	El Paso
LAND AREA								
1	Approximate land area..... 1930..... acres..	167,034,720	857,000	300,320	537,000	622,080	107,040	590,720
2	Land in enterprises..... 1930..... acres..	2,883,350	352,725	70,570	213,556	40,754	24,168	67,000
3	..... 1920..... acres..	2,106,128	327,962	30,426	202,550	48,250	-----	56,000
4	Increase, ² 1920-1930..... per cent..	33.1	7.7	118.4	6.4	-3.1	-----	19.0
	Area of all enterprises (no overlap)..... 1930..... acres..	2,883,350	352,725	70,570	213,556	40,754	24,168	67,000
CONDITION AND USE OF LAND								
6	Land unfit to raise any crop..... 1930..... acres..	218,617	35,200	20,130	21,700	4,000	12,168	5,000
7	Land unfit to raise any crop prior to drainage..... 1930..... acres..	960,577	141,120	20,119	72,400	34,800	14,100	20,000
8	Decrease since drainage ² per cent..	77.4	75.0	-0.1	70.0	88.5	13.7	75.0
9	Land fit to raise a normal crop..... 1930..... acres..	2,178,417	188,080	31,738	186,150	38,208	9,000	51,000
10	Land fit to raise a normal crop prior to drainage..... 1930..... acres..	1,052,337	114,062	5,000	91,156	6,408	-----	12,000
11	Increase since drainage ² per cent..	107.0	65.0	634.8	104.2	480.4	-----	325.0
12	Land fit to raise a partial crop..... 1930..... acres..	486,322	120,367	27,093	5,700	4,456	3,000	11,000
13	Land fit to raise a partial crop prior to drainage..... 1930..... acres..	864,442	97,504	54,451	50,000	5,456	10,068	35,000
14	Decrease since drainage ² per cent..	43.7	-32.0	49.1	88.6	18.3	70.2	68.0
15	Improved land..... 1930..... acres..	2,011,044	188,080	17,238	134,056	34,000	9,600	60,000
16	..... 1920..... acres..	1,107,153	145,000	27,320	78,000	25,650	-----	28,500
17	Increase, ² 1920-1930..... per cent..	81.6	20.7	-30.0	71.0	32.6	-----	131.6
18	Unimproved land—							
19	Woodland..... 1930..... acres..	170,511	2,205	-----	35,000	5,200	2,500	-----
20	Other..... 1930..... acres..	605,801	162,341	62,332	44,500	7,554	12,168	1,000
21	Land in occupied farms..... 1930..... acres..	1,805,486	334,725	17,238	125,056	32,000	12,000	60,000
22	Land in planted crops..... 1930..... acres..	1,278,207	180,650	17,083	101,500	25,800	9,500	62,000
23	Woodland cleared and cultivated since drainage..... 1930..... acres..	200,524	-----	-----	85,500	-----	1,000	40,000
24	Land idle..... 1930..... acres..	816,461	-----	47,004	90,000	19,498	12,100	4,000
24	Land available for settlement..... 1930..... acres..	772,223	-----	42,167	66,800	10,754	-----	-----
DRAINAGE WORKS, 1930								
25	Ditches—							
26	Completed..... miles..	3,061.8	301.2	102.0	271.0	78.0	38.6	180.0
26	Additional under construction..... miles..	68.0	-----	-----	-----	-----	15.0	15.0
27	Tile drains—							
27	Completed..... miles..	8.5	-----	-----	-----	-----	-----	-----
28	Levees and dikes—							
28	Completed..... mi. es..	215.0	-----	-----	1.5	-----	8.0	25.0
29	Pumping plants—							
29	Motor capacity..... horsepower..	510	-----	-----	-----	-----	-----	00
30	Pump capacity..... gals. per min..	33,930	-----	-----	-----	-----	-----	20,000
31	Land served by pumps..... acres..	21,070	-----	-----	-----	-----	-----	800
32	Wells—							
32	Pumped for drainage..... number..	44	-----	-----	-----	-----	-----	-----
33	Land drained by ditches only ⁴ acres..	2,047,425	352,725	70,570	202,100	40,754	21,500	-----
34	Length of ditches..... miles..	3,144.0	301.2	102.0	261.0	78.0	51.6	-----
35	Land drained by ditches and tile..... acres..	217,000	-----	-----	-----	-----	-----	-----
36	Length of ditches..... miles..	170.0	-----	-----	-----	-----	-----	-----
37	Length of tile..... miles..	8.4	-----	-----	-----	-----	-----	-----
38	Land having ditches and levees ⁴ acres..	513,052	-----	-----	11,450	-----	2,068	-----
39	Length of ditches..... miles..	172.7	-----	-----	20.0	-----	2.0	-----
40	Length of levees..... miles..	170.0	-----	-----	1.5	-----	8.0	-----
41	Land having ditches, tile drains, and levees..... acres..	18,600	-----	-----	-----	-----	-----	-----
42	Length of ditches..... miles..	40.0	-----	-----	-----	-----	-----	-----
43	Length of tile..... miles..	0.1	-----	-----	-----	-----	-----	-----
44	Length of levees..... miles..	8.0	-----	-----	-----	-----	-----	-----
45	Land drained by pumps and other drainage works ⁵ acres..	87,270	-----	-----	-----	-----	-----	67,000
46	Length of ditches..... miles..	202.5	-----	-----	-----	-----	-----	195.0
47	Length of levees..... miles..	37.0	-----	-----	-----	-----	-----	25.0
48	Land protected by levees of an outside agency..... acres..	75,000	-----	-----	15,000	-----	-----	50,000
CAPITAL INVESTED AND COST PER ACRE								
49	Capital invested in enterprises to Jan. 1, 1930..... dollars..	12,002,940	1,131,533	163,564	1,098,820	36,000	418,769	1,582,583
50	..... 1920..... dollars..	5,700,805	1,064,000	60,000	757,120	40,000	-----	635,000
51	Increase, ² 1920-1930..... per cent..	110.6	6.3	172.6	45.1	-10.0	-----	149.2
52	Estimated cost of enterprises when completed..... 1930..... dollars..	12,186,628	1,131,533	163,564	1,118,820	36,000	438,750	1,682,583
53	..... 1920..... dollars..	6,400,805	1,064,000	60,000	757,120	140,000	-----	1,235,000
54	Average, per acre when completed..... 1930..... dollars..	4.23	3.21	2.06	5.24	0.77	18.15	26.11
55	..... 1920..... dollars..	2.95	3.25	1.05	3.74	2.90	-----	22.05
56	Invested in and required for completion of—							
56	Enterprises having ditches only..... 1930..... dollars..	6,334,325	1,131,533	163,564	1,037,100	36,000	310,849	-----
57	Average, per acre..... dollars..	3.09	3.21	2.06	5.13	0.77	14.46	-----
58	Enterprises having ditches and tile drains..... 1930..... dollars..	1,030,000	-----	-----	-----	-----	-----	-----
59	Average, per acre..... dollars..	4.75	-----	-----	-----	-----	-----	-----
60	Enterprises having ditches and levees..... 1930..... dollars..	2,214,071	-----	-----	81,720	-----	127,010	-----
61	Average, per acre..... dollars..	4.32	-----	-----	7.13	-----	47.94	-----
62	Enterprises having ditches, tile drains, and levees..... 1930..... dollars..	500,000	-----	-----	-----	-----	-----	-----
63	Average, per acre..... dollars..	26.88	-----	-----	-----	-----	-----	-----
64	Enterprises having pumps and other drainage works..... 1930..... dollars..	2,107,032	-----	-----	-----	-----	-----	1,682,583
65	Average, per acre..... dollars..	24.15	-----	-----	-----	-----	-----	25.11

¹ Reorganized in 1921 from territory embraced in Cameron, Hidalgo, and Willacy Counties. (In 1921 four counties—Cameron, Hidalgo, Kenedy, and Willacy—were formed from territory formerly embracing three counties—Cameron, Hidalgo, and Willacy.)
² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.
³ Office estimate; the reported figures exceeded the improved acreage in all farms in the county as determined by the census of agriculture.
⁴ When works under construction have been completed.
⁵ Area of enterprises having some land served by pumps.

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE,

ITEM (See definitions in Introduction)		Fannin	Fort Bend	Galveston	Harris	Hudspeth	Jackson
LAND AREA							
1	Approximate land area..... 1930..... acres.....	536,320	506,880	252,800	1,058,500	2,957,440	571,520
2	Land in enterprises..... 1930..... acres.....	16,605	41,758	110,000	328,720	20,270	161,029
3	..... 1920..... acres.....		36,915	93,911	238,266		137,873
4	Increase, ¹ 1920-1930..... per cent.....		13.1	17.1	38.0		16.8
5	Area of all enterprises (no overlap)..... 1930..... acres.....	16,605	41,758	110,000	328,720	20,270	161,029
CONDITION AND USE OF LAND							
6	Land unfit to raise any crop..... 1930..... acres.....	1,000		20,350	54,618	500	12,000
7	Land unfit to raise any crop prior to drainage..... acres.....	10,105	13,000	45,400	107,007	17,270	57,081
8	Decrease since drainage..... per cent.....	90.1	100.0	55.2	49.4	97.1	79.2
9	Land fit to raise a normal crop..... 1930..... acres.....	15,605	41,758	60,650	220,788	16,000	136,283
10	Land fit to raise a normal crop prior to drainage..... acres.....	3,000	10,000	21,350	140,264		72,585
11	Increase since drainage ² per cent.....	420.2	317.6	226.2	57.4		87.8
12	Land fit to raise a partial crop..... 1930..... acres.....			20,000	53,314	3,770	12,746
13	Land fit to raise a partial crop prior to drainage..... acres.....	3,500	18,758	43,250	80,450	3,000	30,703
14	Decrease since drainage ² per cent.....	100.0	100.0	53.8	33.7	+20.0	58.0
15	Improved land..... 1930..... acres.....	0,250	31,000	60,000	253,016	13,938	100,517
16	..... 1920..... acres.....		27,686	* 25,809	142,148		96,265
17	Increase, ¹ 1920-1930..... per cent.....		12.0	158.3	78.6		13.8
Unimproved land—							
18	Woodland..... 1930..... acres.....	6,355	3,000		63,800	6,341	17,425
19	Other..... 1930..... acres.....	1,000	7,158	43,100	10,906		34,087
20	Land in occupied farms..... 1930..... acres.....	0,250	31,000	23,150	158,254	13,586	100,017
21	Land in planted crops..... 1930..... acres.....	0,250	31,000	2,400	97,102	12,586	70,000
22	Woodland cleared and cultivated since drainage..... 1930..... acres.....	4,300	4,000		14,446	13,586	4,000
23	Land idle..... 1930..... acres.....	7,355		21,000	231,618	7,255	46,908
24	Land available for settlement..... 1930..... acres.....	6,355		65,750	123,030	6,103	35,000
DRAINAGE WORKS, 1930							
25	Ditches— Completed..... miles.....	10.0	65.0	195.0	484.5	7.5	630.0
26	Additional under construction..... miles.....						
Tile drains—							
27	Completed..... miles.....		0.1				
Levees and dikes—							
28	Completed..... miles.....	31.8	8.0			12.0	
Pumping plants—							
29	Motor capacity..... horsepower.....					450	
30	Pump capacity..... gals. per min.....					13,030	
31	Land served by pumps..... acres.....					20,270	
Wells—							
32	Pumped for drainage..... number.....					44	
33	Land drained by ditches only ⁴ acres.....		23,158	110,000	328,720		161,029
34	Length of ditches..... miles.....		25.0	195.0	484.5		630.0
35	Land drained by ditches and tile..... acres.....						
36	Length of ditches..... miles.....						
37	Length of tile..... miles.....						
38	Land having ditches and levees ⁴ acres.....	16,605					
39	Length of ditches..... miles.....	10.0					
40	Length of levees..... miles.....	31.8					
41	Land having ditches, tile drains, and levees..... acres.....		18,600				
42	Length of ditches..... miles.....		40.0				
43	Length of tile..... miles.....		0.1				
44	Length of levees..... miles.....		8.0				
45	Land drained by pumps and other drainage works ⁴ acres.....					20,270	
46	Length of ditches..... miles.....					7.5	
47	Length of levees..... miles.....					12.0	
48	Land protected by levees of an outside agency..... acres.....		10,000				
CAPITAL INVESTED AND COST PER ACRE							
49	Capital invested in enterprises to Jan. 1, 1930..... dollars.....	303,000	565,000	193,000	1,204,000	425,040	522,572
50	..... 1920..... dollars.....		180,000	165,000	615,000		453,452
51	Increase, ¹ 1920-1930..... per cent.....		213.9	17.0	110.4		15.2
52	Estimated cost of enterprises when completed..... 1930..... dollars.....	303,000	565,000	193,000	1,204,000	425,040	522,572
53	..... 1920..... dollars.....		180,000	165,000	615,000		453,452
54	Average, per acre when completed..... 1930..... dollars.....	18.25	13.53	1.75	3.94	20.96	3.25
55	..... 1920..... dollars.....		4.88	1.76	2.58		3.20
Invested in and required for completion of—							
56	Enterprises having ditches only..... 1930..... dollars.....		65,000	193,000	1,204,000		522,572
57	Average, per acre..... dollars.....		2.81	1.75	3.94		3.25
58	Enterprises having ditches and tile drains..... 1930..... dollars.....						
59	Average, per acre..... dollars.....						
60	Enterprises having ditches and levees..... 1930..... dollars.....	303,000					
61	Average, per acre..... dollars.....	18.25					
62	Enterprises having ditches, tile drains, and levees..... 1930..... dollars.....		500,000				
63	Average, per acre..... dollars.....		26.88				
64	Enterprises having pumps and other drainage works..... 1930..... dollars.....					425,040	
65	Average, per acre..... dollars.....					20.96	

¹ Includes Bowie, Chambers, De Witt, Henderson, Hidalgo, and Wharton Counties in 1930; and Chambers, De Witt, Henderson, Hidalgo, Orange, and Wharton Counties for 1920.

² A minus sign (−) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.

³ Office estimate; the reported figures exceeded the improved acreage in all farms in the county as determined by the census of agriculture.

⁴ When works under construction have been completed.

⁵ Area of enterprises having some land served by pumps.

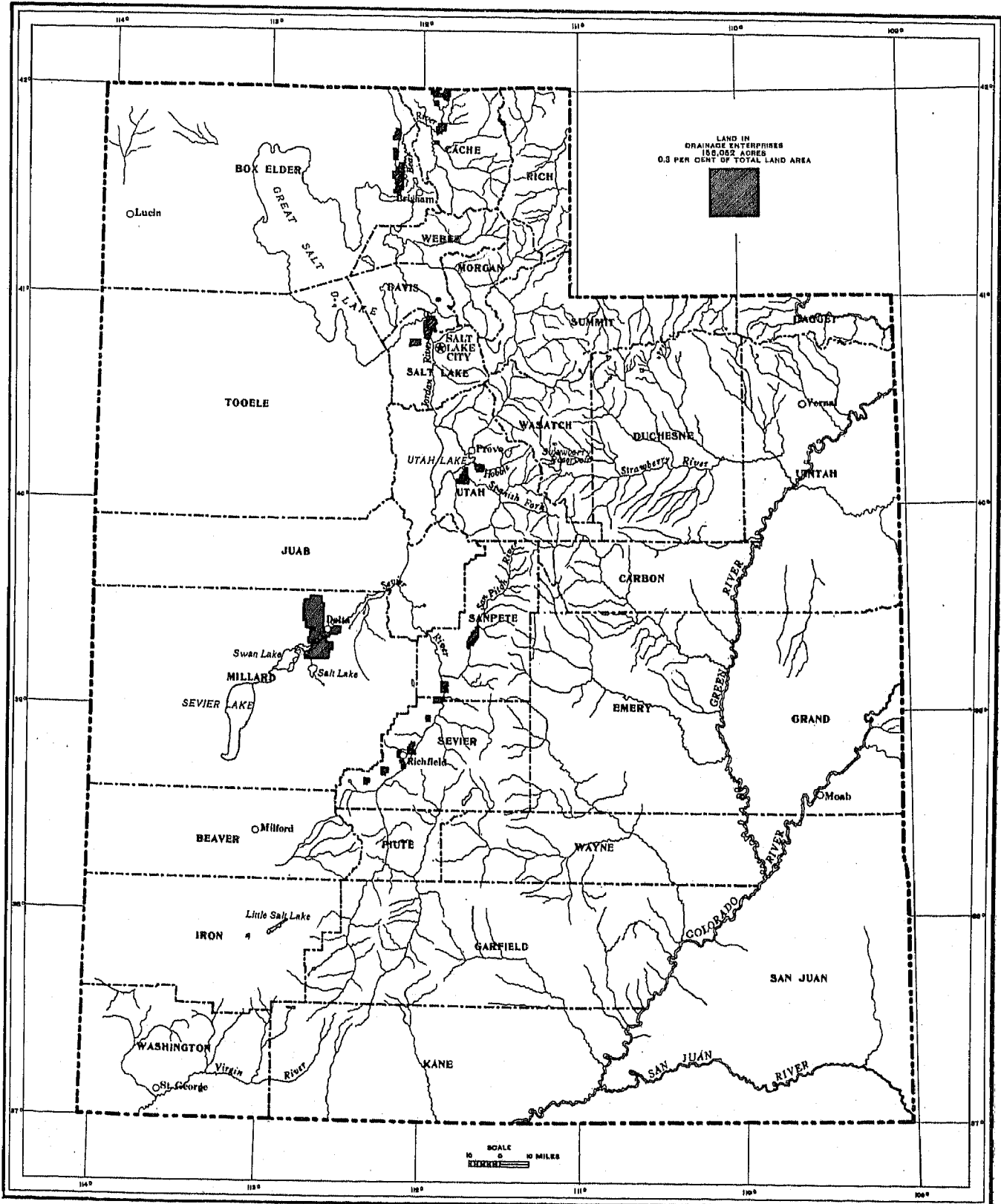
DRAINAGE—TEXAS

AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

Jefferson	Lamar	Liberty	Matagorda	Nueces	Red River	Refugio	San Patricio	Victoria	Ward	Wichita	Other counties ¹	
588,800	604,800	742,400	727,040	496,000	604,960	473,600	432,640	500,600	520,280	386,560	3,320,120	1
284,434	17,816	60,800	215,198	109,115	9,764	15,000	31,135	126,607	40,945	3,332	507,046	2
46,275		91,112	223,394	23,763				133,000	47,440		423,585	3
514.7		-33.3	-3.7	350.2				-4.8	-13.7		10.7	4
284,434	17,816	60,800	215,198	109,115	9,764	15,000	31,135	126,607	40,945	3,332	507,046	5
	1,500	200	2,863		1,381	3,000	100	2,852	11,000		8,977	6
163,434	4,754	30,400	60,812		8,715	16,000	500	23,211	16,000		80,741	7
100.0	68.4	99.3	95.9		84.2	80.0	80.0	87.7	31.3		88.9	8
284,434	16,316	50,000	202,335	109,115	8,383	2,000	28,000	114,071	11,745	3,332	335,921	9
121,000	10,062	30,400	33,220	30,000	1,049		20,000	78,248	11,745		234,758	10
135.1	62.2	86.2	509.1	263.7	699.1		11.2	46.0			43.1	11
		4,000	10,000					8,784	18,200		162,148	12
	3,000		112,166	79,115				4,035	13,200		191,647	13
	100.0		91.1	100.0				53.0	+37.9	100.0	15.3	14
284,434	12,062	50,400	181,335	109,115	6,823	12,000	23,081	91,180	15,745	3,332	281,523	15
20,824		57,863	107,218	9,508				102,760	17,064		134,861	16
		-2.5	8.4					-11.3	-10.9		108.8	17
	5,754	4,400	2,000		2,941		7,454				11,437	18
			31,803			3,000		35,417	25,200		214,080	19
100,734	12,062	7,100	170,914	109,115	6,823	15,000	23,081	95,108	11,745	3,332	408,600	20
96,934	10,562	7,100	45,000	98,204	0,823	12,000	23,081	84,538	11,745		257,040	21
	3,500			20,115	3,100		500				0,477	22
183,000	7,254	53,700	12,863		2,941	3,000	2,454	16,072	29,200	3,332	14,227	23
183,700	5,254	53,500	41,418		1,500		7,454	10,180	18,200		88,800	24
285.0	57.0	60.5	241.0	120.0	22.8	11.8	42.5	222.0	90.0	5.5	74.0	25
				81.0		5.5					1.5	26
3.4											5.0	27
	45.0		20.0		33.8						24.8	28
												29
												30
												31
												32
69,434		60,800	123,780	109,115		15,000	31,135	120,607	40,945	3,332	141,721	33
120.0		66.5	211.0	151.0		17.3	42.5	222.0	60.0	5.5	40.5	34
215,000											2,000	35
165.0											5.0	36
3.4											5.0	37
	17,816		91,418		9,764						303,325	38
	57.0		30.0		22.8						30.9	39
	45.0		20.0		33.8						24.8	40
												41
												42
												43
												44
												45
												46
												47
												48
1,000,200	401,041	177,500	940,000	220,260	315,000	17,617	130,500	203,352	90,000	27,500	571,500	49
92,000		157,500	676,824	158,429				215,850	83,000		348,000	50
		12.7	40.1	30.0				22.0	8.4		63.9	51
1,000,200	401,041	177,500	940,000	257,429	315,000	19,617	130,500	203,352	90,000	27,500	570,000	52
92,000		157,500	676,824	158,429				215,850	83,000		348,000	53
3.86	22.51	2.92	4.40	2.39	32.26	1.31	4.48	2.08	2.20	8.25	1.14	54
1.99		1.73	3.03	6.67				1.62	1.75		0.82	55
90,200		177,500	300,000	257,429		19,617	130,500	203,352	90,000	27,500	140,000	56
1.43		2.92	2.96	2.36		1.31	4.48	2.08	2.20	8.25	0.99	57
1,000,000											30,000	58
4.65											15.00	59
	401,041		530,000		315,000						400,000	60
	22.51		6.34		32.26						1.12	61
												62
												63
												64
												65

UTAH

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



UTAH

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—The drainage enterprises of Utah are located on irrigated lands in the central and north central portions of the State and are all within the Great Basin, a large area extending into several States, and with no rivers reaching the sea. To some extent damage from seepage and alkali has been anticipated and the necessary drains installed before material damage had occurred.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief from overflow for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number.....	27, 150	25, 602	1, 407	5. 8
Farms reporting drainage.....number.....	2, 710	2, 729	-13	-0. 5
All land in farms.....acres.....	5, 013, 101	5, 050, 410	502, 001	11. 1
Farm land provided with drainage.....acres.....	118, 801	74, 316	44, 485	59. 9
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres.....	52, 507, 760	52, 507, 700		
Land in drainage enterprises.....acres.....	150, 052	113, 823	42, 220	37. 1
Improved land.....acres.....	137, 062	97, 314	40, 048	41. 8
Unimproved land:				
Woodland.....acres.....	4, 750	(2)		
Other.....acres.....	13, 331	10, 509	-3, 178	-10. 2
Land unfit to raise any crop for lack of drainage.....acres.....	5, 600	³ 88, 181	-82, 581	-93. 6
Land drained, fit to raise normal crop.....acres.....	142, 941	(4)		
Land partly drained, fit for partial crop.....acres.....	7, 511	⁵ 76, 803	-69, 292	-90. 2
Land in occupied farms.....acres.....	100, 518	(4)		
Land in planted crops.....acres.....	90, 368	(4)		
Land idle.....acres.....	60, 046	(4)		
Ditches, completed.....miles.....	304. 3	120. 3	184. 0	153. 0
Tile drains, completed.....miles.....	1, 044. 6	509. 1	1, 345. 4	224. 0
Capital invested in enterprises.....dollars.....	4, 772, 000	1, 005, 473	3, 766, 527	374. 6
Average, per acre.....dollars.....	30. 58	8. 83	21. 75	246. 3

¹A minus sign (-) denotes decrease.
²Not reported.
³"Swampy, seeped, or alkali."

⁴Not called for on schedule.
⁵"Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 32 drainage enterprises are shown for Utah with an average area of 4,877 acres. There are 7 such enterprises of 5,000 acres or more, 24 of between 500 and 5,000 acres, and 1 of less than 500 acres.

The area of enterprises equals the land in enterprises, as there is no overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	156, 052	100. 0	113, 823	100. 0	156, 052
100 to 199 acres.....	100	0. 1	100	1. 5	100
500 to 999 acres.....	1, 831	1. 2	1, 740	1. 5	1, 831
1, 000 to 4, 999 acres.....	53, 081	34. 0	20, 104	25. 6	53, 081
5, 000 to 9, 999 acres.....	15, 545	10. 0	5, 280	4. 6	15, 545
10, 000 to 49, 999 acres.....	85, 405	54. 7	77, 600	68. 3	85, 405

¹No overlap.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises under the control of individuals or organizations engaged in the draining of land for purposes of development, subdivision, and sale, are classed as *commercial developments*.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	150,052	100.0	4,772,000	100.0
Drainage districts.....	144,852	92.8	4,512,000	94.6
Commercial developments.....	9,100	5.8	250,000	5.2
Individually owned projects.....	2,100	1.4	10,000	0.2

Type of drainage.—There were 29 enterprises, covering 147,432 acres of land, with an invested capital of \$4,733,200, which reported their works as completed; while 3 enterprises, covering 8,620 acres of land, with an invested capital of \$38,800, estimated that \$32,000 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 304 miles of ditches, 1,944 miles of tile drains, and 2 miles of levees. These figures do not include drains or levees installed by individual farmers supplemental to the works of an enterprise. No enterprise reported land served by pumps.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	150,052	100.0	4,772,000	100.0
Gravity drainage only.....	150,052	100.0	4,772,000	100.0
Ditches and levees.....	10,324	12.4	254,000	5.3
Tile drains.....	12,210	7.8	305,000	6.4
Ditches and tile drains.....	124,518	79.8	4,212,100	88.3

Arrears and delinquency.—There were 13 enterprises, with approximately 80 per cent of the invested capital and covering about 66 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 19 enterprises reported no arrearage. Reports of 22 enterprises, covering 133,642 acres, show a total of 95,549 acres delinquent in drainage taxes; 9 enterprises, covering 18,110 acres, reported no delinquency; while 1 failed to report.

STATE TABLE 5.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	150,052	100.0	4,772,000	100.0	95,549
Enterprises in arrears.....	102,051	65.8	3,700,100	70.0	90,325
With some delinquent land.....	102,051	65.8	3,700,100	79.0	90,325
Enterprises not in arrears.....	53,401	34.2	972,000	20.4	5,224
With some delinquent land.....	30,991	19.8	615,000	12.0	5,224
With no delinquent land.....	18,110	11.0	327,000	6.9	-----
With no report on delinquency.....	4,300	2.8	30,000	0.6	-----

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain land in farms, land damaged by alkali and seepage from irrigation, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported. All the drainage enterprises in Utah are located on irrigated land and the purpose of drainage was mainly to remove alkali and seepage from irrigation.

STATE TABLE 6.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	150,052	100.0	4,772,000	100.0
Improvement of land already in farms.....	22,020	14.5	472,900	9.9
Removal of alkali and seepage from irrigation.....	123,870	79.4	4,137,775	80.7
Protection against overflow.....	9,553	0.1	161,325	3.4

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. Where the drainage work was done directly by an irrigation enterprise, the year in which drainage was undertaken is used instead of the year of organization of the irrigation project.

STATE TABLE 7.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹	Capital invested to Jan. 1, 1930	
	Acres	Per cent		Dollars	Per cent
All enterprises.....	150,052	100.0	150,052	4,772,000	100.0
1910-1914.....	5,150	3.3	5,150	60,000	1.3
1915-1919.....	125,333	80.3	125,333	4,205,500	88.1
1920-1924.....	19,554	12.6	19,554	465,100	9.8
1925-1929.....	0,010	0.0	0,010	88,400	0.8

¹ No overlap.

DRAINAGE—UTAH

STATE TABLE 8.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					
	Total	Condition of land			Land available for settlement	
		Improved land		Wood-land		Other unim-proved land
	Acres	Acres	Per cent	Acres	Acres	Acres
All enterprises.....	156,052	137,962	88.4	4,759	13,331	20,651
1910-1914.....	5,150	5,150	100.0			
1915-1919.....	125,338	109,548	87.4	4,759	11,031	19,751
1920-1924.....	19,554	17,254	88.2		2,300	900
1925-1929.....	6,010	6,010	100.0			

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown. The supervisors of each enterprise annually make an estimate of the cost of operation and maintenance for the succeeding year, and apportion it against the land in the enterprise in proportion to the benefits to each tract.

Systematic maintenance was reported by 22 enterprises, covering 78,349 acres of land and having an invested capital of \$1,954,000. There were 10 enterprises, with an invested capital of \$2,818,000 and covering 77,703 acres of land, that did not have systematic maintenance.

There were 3 enterprises, with an invested capital of \$2,530,000 and covering 75,146 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 29 enterprises, with an invested capital of \$2,242,000 and covering 80,906 acres of land, did not report any such equipment.

STATE TABLE 9.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	156,052	100.0	4,772,000	100.0
By district forces.....	132,127	84.7	4,204,300	88.1
By contract.....	10,725	10.7	304,700	6.4
By work apportioned to landowners..	5,100	3.3	163,000	3.4
Other, none, and not reported.....	2,100	1.3	10,000	0.2

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 96 per cent of the land reported some cost, and 4 per cent reported no cost in 1929. The average cost was 19 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 10.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
	Acres	Dollars	Dollars
All enterprises reporting.....	156,052	29,828	0.19
Gravity drainage only.....	156,052	29,828	0.19
Ditches and levees.....	19,324	6,200	0.32
Tile drains.....	12,210	1,400	0.12
Ditches and tile drains.....	124,518	22,129	0.18

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Number	Acres	Acres	
The State.....	2,716	2,729	118,801	74,316	27,159	5,013,101	1,495,497	101,336	52,597,760
Box Elder.....	367	502	19,973	24,342	1,977	657,805	210,000	3,003	3,481,160
Cache.....	334	164	11,571	3,541	2,372	392,098	158,205	27,085	744,000
Davis.....	392	338	10,047	5,816	1,481	162,357	40,043	6,280	176,000
Millard.....	610	86	45,132	5,274	1,243	268,000	105,450	2,082	4,100,040
Salt Lake.....	170	254	3,148	3,483	2,032	134,582	82,543	2,355	483,840
Sanpete.....	73	70	3,570	785	1,703	460,208	96,094	20,170	1,034,240
Sovier.....	175	230	6,760	7,822	1,038	121,721	52,802	13,737	1,205,030
Utah.....	438	506	12,100	10,070	3,501	460,485	114,315	30,215	1,301,760
Weber.....	219	436	4,873	7,206	1,770	310,164	51,050	8,070	346,240
All other counties.....	38	134	1,612	5,911	9,076	2,620,055	552,037	76,897	39,561,600

¹ No drainage on farms reported in Daggett, Duchesne, Grand, Iron, Kane, Morgan, Piute, San Juan, Washington, and Wayne Counties in 1930; nor in Grand, Piute, Rich, and Wayne Counties for 1920.

DRAINAGE—UTAH

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Box Elder	Cache	Millard	Salt Lake	Sevier	Utah	Other counties ¹
LAND AREA									
1	Approximate land area..... 1930..... acres..	52,507,700	3,484,160	744,960	4,100,040	483,840	1,265,020	1,301,700	1,210,240
2	Land in enterprises..... 1930..... acres..	150,052	16,000	9,420	53,007	9,253	13,810	11,981	10,001
3	..... 1920..... acres..	113,823	12,600	(?)	70,034	4,080	11,647	(?)	8,772
4	Increase, 1920-1930..... per cent..	37.1	33.2		9.2	120.8	18.0		25.3
5	Area of all enterprises ² 1930..... acres..	150,052	16,000	9,420	53,007	9,253	13,810	11,981	10,001
CONDITION AND USE OF LAND									
6	Land unfit to raise any crop..... 1930..... acres..	5,600		200	2,000	1,400	760	420	820
7	Land unfit to raise any crop prior to drainage..... acres..	50,901	6,725	1,100	35,247	7,043	3,085	1,700	3,801
8	Decrease since drainage..... per cent..	90.0	100.0	81.8	94.3	81.7	70.4	75.3	78.4
9	Land fit to raise a normal crop..... 1930..... acres..	142,941	14,000	8,820	81,007	7,853	10,650	10,000	9,021
10	Land fit to raise a normal crop prior to drainage..... acres..	41,910	4,575	550	25,030	1,210	5,280	4,155	500
11	Increase since drainage ⁴ per cent..	241.1	225.7		218.8	540.0	101.7	140.1	
12	Land fit to raise a partial crop..... 1930..... acres..	7,511	2,000	400			2,400	1,561	1,150
13	Land fit to raise a partial crop prior to drainage..... acres..	54,241	5,600	7,770	22,820	400	4,845	6,116	6,090
14	Decrease since drainage..... per cent..	86.2	64.3	64.8	100.0	100.0	50.5	74.5	82.8
15	Improved land..... 1930..... acres..	137,002	12,900	9,420	77,438	4,653	12,910	10,550	10,001
16	..... 1920..... acres..	97,314	7,245	(?)	70,634	200	6,485	(?)	6,750
17	Increase, 1920-1930..... per cent..	41.8	78.0		1.0		90.1		49.5
Unimproved land—									
18	Woodland..... 1930..... acres..	4,769			4,259			500	
19	Other..... 1930..... acres..	13,331	4,000		2,000	4,000	900	931	900
20	Land in occupied farms..... 1930..... acres..	109,518	12,900	9,220	40,374	4,653	12,730	10,550	10,001
21	Land in planted crops..... 1930..... acres..	90,398	11,800	8,298	44,070	1,400	9,950	9,800	4,450
22	Woodland cleared and cultivated since drainage..... 1930..... acres..	1,760			1,000		600	100	
23	Land idle..... 1930..... acres..	90,940	5,000	200	38,552	7,853	2,300	1,400	5,641
24	Land available for settlement..... 1930..... acres..	20,651	3,000		12,551	3,200		1,000	900
DRAINAGE WORKS, 1930									
Ditches—									
25	Completed..... miles..	304.3	10.0	16.2	220.0	18.5	4.0	15.0	14.6
26	Additional under construction..... miles..	6.8		1.8					5.0
Tile drains—									
27	Completed..... miles..	1,944.5	250.0	54.0	1,225.0	25.0	80.5	233.0	68.0
Levees and dikes—									
28	Completed..... miles..	2.0						2.0	
Land drained by ditches only ⁵ acres..									
29	..... 1930..... acres..	18,724	2,100	5,320		5,253			6,051
30	..... 1920..... acres..	40.5	4.0	17.0		8.5			17.0
Land drained by tile only..... acres..									
31	..... 1930..... acres..	12,210		600			11,610		
32	..... 1920..... acres..	71.5		4.0			67.5		
Land drained by ditches and tile..... acres..									
33	..... 1930..... acres..	124,518	14,800	3,500	83,097	4,000	2,200	11,381	4,940
34	..... 1920..... acres..	292.6	6.0	1.0	220.0	10.0	4.0	13.0	2.6
35	Length of ditches..... miles..	1,873.0	250.0	50.0	1,225.0	25.0	22.0	233.0	68.0
Land having ditches and levees..... acres..									
36	..... 1930..... acres..	600						600	
37	..... 1920..... acres..	2.0						2.0	
38	Length of levees..... miles..	2.0						2.0	
CAPITAL INVESTED AND COST PER ACRE									
39	Capital invested in enterprises to Jan. 1, 1930..... dollars..	4,772,000	281,000	171,800	3,163,000	271,325	322,500	310,000	252,375
40	..... 1920..... dollars..	1,005,473	188,500	(?)	424,157	5,000	213,816	(?)	170,000
41	Increase, 1920-1930..... per cent..	374.6	49.1		638.7		50.8		48.4
42	Estimated cost of enterprises when completed..... 1930..... dollars..	4,804,000	281,000	180,800	3,163,000	271,325	322,500	310,000	275,375
43	..... 1920..... dollars..	2,870,773	188,500	(?)	2,028,057	80,000	333,316	(?)	240,000
44	Average, per acre when completed..... 1930..... dollars..	30.78	16.63	19.19	37.70	29.32	23.35	25.87	25.05
45	..... 1920..... dollars..	25.22	14.85	(?)	26.48	19.61	28.02	(?)	27.30
Invested in—									
46	Enterprises having ditches only, when completed..... 1930..... dollars..	296,900	10,000	28,800		131,325			96,775
47	Average, per acre..... dollars..	14.25	4.70	5.41		25.00			15.99
48	Enterprises having tile drains only..... 1930..... dollars..	305,000		12,000			203,000		
49	Average, per acre..... dollars..	24.98		20.00			25.24		
50	Enterprises having ditches and tile drains..... 1930..... dollars..	4,212,100	271,000	140,000	3,163,000	140,000	29,500	290,000	178,000
51	Average, per acre..... dollars..	38.83	18.31	40.00	37.79	35.00	13.41	25.48	36.15
52	Enterprises having ditches and levees..... 1930..... dollars..	20,000						20,000	
53	Average, per acre..... dollars..	33.33						33.33	

¹ Includes Davis and Sanpete Counties in 1930; and Cache and Utah Counties for 1920.
² Included in "Other counties."
³ No overlap.
⁴ Per cent not shown when more than 1,000.
⁵ When works under construction have been completed.

VIRGINIA

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 but no organized drainage enterprises were reported for Virginia in that year.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Summary and condition of land in enterprises.—Only 3 drainage enterprises were reported for Virginia, all of which are located in Norfolk County, in the southeastern corner of the State. Of these, 1 was constructed by slave labor prior to the Civil War, and the other 2 were organized since 1919. All 3 enterprises lie in the Coastal Plain region and were con-

structed primarily to reclaim swampy and wet land, most of which was unfit for cultivation until drained.

The mean precipitation for the State in 1929 was approximately 46 inches, or 3.5 inches above normal; while that for Norfolk County was about 43 inches, or approximately 1 inch below normal.

Approximately 40 per cent of the land in enterprises was reported as improved; none was unfit to raise any crop for lack of drainage; while 63 per cent was idle in 1929. The average cost of drainage was \$16.06 per acre.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

STATE TABLE 1.—SUMMARY FOR THE STATE, 1930

ITEM (See definitions in Introduction)	Census of 1930	ITEM (See definitions in Introduction)	Census of 1930
FARMS AND DRAINAGE ON FARMS		AREA, DRAINS, AND INVESTMENT IN ENTERPRISES— Continued	
All farms.....number.....	170,610	Land in drainage enterprises—Continued.	
Farms reporting drainage.....number.....	4,291	Land drained, fit to raise normal crop.....acres.....	13,138
All land in farms.....acres.....	16,728,620	Land partly drained, fit for partial crop.....acres.....	1,904
Farm land provided with drainage.....acres.....	120,284	Land in occupied farms.....acres.....	5,704
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES¹		Land in planted crops.....acres.....	4,748
Approximate land area of State.....acres.....	25,767,680	Land idle.....acres.....	0,500
Land in drainage enterprises.....acres.....	15,042	Ditches, completed.....miles.....	40.0
Improved land.....acres.....	6,042	Capital invested in enterprises.....dollars.....	241,608
Unimproved land:		Average, per acre.....dollars.....	16.06
Woodland.....acres.....	8,500		
Other.....acres.....	500		

¹ No drainage enterprises reported in 1920.

AREA AND CAPITAL

Area of enterprises.—All enterprises in Virginia are located within the boundaries of Norfolk County and have an average area of 5,014 acres. The areas of 2 of these are between 1,000 and 5,000 acres, while the third contains nearly 10,000 acres. There was no overlapping of enterprises.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE, 1930¹

SIZE GROUP	AREA OF ENTERPRISES ²		Land in enterprises
	Acres	Per cent	
All enterprises.....	15,042	100.0	15,042
1,000 to 4,999 acres.....	5,504	36.6	5,504
5,000 to 9,999 acres.....	9,538	63.4	9,538

¹ No drainage enterprises reported in 1920.

² No overlap.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	15,042	100.0	241,608	100.0
Drainage districts.....	11,738	78.0	235,000	97.3
Individually owned projects.....	3,304	22.0	6,608	2.7

Type of drainage.—The works completed to January 1, 1930, included approximately 40 miles of ditches. No tile drains, levees, or pumping plants were reported, and no uncompleted work was shown. These figures do not include drains or levees, installed by individual farmers, supplemental to the works of an enterprise.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	15,042	100.0	241,608	100.0
Gravity drainage (ditches) only.....	15,042	100.0	241,608	100.0

Arrears and delinquency.—None of the 3 enterprises was reported as in arrears in payment of principal or interest on bonds or other obligations. One enterprise reported a total of 100 acres delinquent in drainage taxes, while the remaining 2 enterprises reported no delinquency.

STATE TABLE 5.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent
	Acres	Per cent	Dollars	Per cent	
All enterprises.....	15,042	100.0	241,608	100.0	100
Enterprises not in arrears.....	15,042	100.0	241,608	100.0	100
With some delinquent land.....	9,538	63.4	190,000	78.0	100
With no delinquent land.....	5,504	36.6	51,608	21.4	0

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported.

The enterprises of this State are located in the rather flat portion of the Coastal Plain region and the reclamation of swampy and wet land was the principal object of drainage.

STATE TABLE 6.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	15,042	100.0	241,608	100.0
Reclamation of swamp land not previously in farms.....	11,738	78.0	235,000	97.3
Improvement of land already in farms.....	3,304	22.0	6,608	2.7

Date of organization.—A period of one or more years may elapse between the date of organization

and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used.

STATE TABLE 7.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹	Capital invested to Jan. 1, 1930	
	Acres	Per cent		Dollars	Per cent
All enterprises.....	15,042	100.0	15,042	241,608	100.0
Before 1870.....	3,304	22.0	3,304	6,608	2.7
1920-1924.....	9,538	63.4	9,538	190,000	78.7
1925-1929.....	2,200	14.6	2,200	45,000	18.6

¹ No overlap.

STATE TABLE 8.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement
	Total	Condition of land			Land available for settlement	
		Improved land	Woodland	Other unimproved land		
All enterprises.....	15,042	6,042	40.2	8,500	500	9,000
Before 1870.....	3,304	3,304	100.0	0	0	0
1920-1924.....	9,538	1,538	16.1	7,500	500	8,000
1925-1929.....	2,200	1,200	54.5	1,000	0	1,000

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 1 enterprise, covering 2,200 acres of land and having an invested capital of \$45,000; while 2 enterprises, with an invested capital of \$196,608 and covering 12,842 acres of land, did not have systematic maintenance.

None of these enterprises reported ownership of excavators or other power equipment used principally for maintenance, and all 3 showed no expenditures for operation and maintenance during the year 1929.

STATE TABLE 9.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	15,042	100.0	241,608	100.0
By contract.....	2,200	14.6	45,000	18.6
By work apportioned to landowners.....	9,538	63.4	190,000	78.7
Other, none, and not reported.....	3,304	22.0	6,608	2.7

DRAINAGE—VIRGINIA

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COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930 Number 170,610	FARM LAND, 1930			Approximate land area, 1930 Acres 25,707,080
	1930	1920	1930	1920		All land in farms Acres 16,728,620	Crop land Acres 5,058,317	Woodland Acres 6,605,166	
	Number 4,201	Number 6,890	Acres 120,284	Acres 225,008					
The State.....									
Accomac.....	174	832	7,288	10,447	2,024	175,532	79,917	60,321	321,280
Albemarle.....	63	197	1,300	3,636	2,527	346,035	88,571	140,215	478,080
Augusta.....	73	102	1,075	2,817	2,635	346,047	162,604	60,162	641,020
Bath.....	15	(²)	525	(²)	640	132,428	22,277	76,201	348,800
Bland.....	10	51	778	530	603	126,160	19,074	62,768	230,400
Brunswick.....	185	107	4,400	2,046	2,031	250,216	70,141	120,141	350,480
Carroll.....	62	193	503	1,594	3,316	253,858	60,400	80,941	203,120
Chesterfield.....	23	48	577	2,168	1,280	110,301	34,059	60,241	300,160
Culpeper.....	48	69	1,500	1,804	1,254	188,774	60,681	43,060	245,760
Dinwiddie.....	30	28	527	533	1,852	211,482	64,410	120,883	380,880
Elizabeth City.....	38	243	1,016	7,337	200	12,654	6,554	2,941	33,920
Fairfax.....	68	65	1,323	799	1,244	125,026	41,784	40,610	266,240
Fauquier.....	113	123	2,364	6,859	1,787	344,911	92,080	77,243	426,240
Fluvanna.....	47	40	1,389	1,667	1,100	127,140	31,685	64,011	182,400
Goochland.....	18	61	732	2,233	1,054	113,482	33,308	52,904	183,680
Grayson.....	290	301	2,413	2,844	2,557	240,246	62,059	65,874	272,000
Hanover.....	27	101	1,712	1,975	1,654	195,583	64,530	93,416	327,680
Isle of Wight.....	80	293	1,407	4,585	1,338	124,913	40,848	59,630	200,960
James City.....	4	(²)	611	(²)	415	60,438	12,581	20,511	104,320
King George.....	9	(²)	810	(²)	844	86,902	27,498	34,670	115,260
Loudoun.....	107	94	1,000	1,960	1,645	283,537	97,873	45,306	332,160
Madison.....	28	107	524	2,481	1,287	150,246	43,948	48,607	207,360
Mathews.....	420	145	8,705	3,683	2,154	162,032	64,270	76,077	239,440
Norfolk.....	370	890	21,513	44,492	1,044	79,408	50,614	19,303	238,720
Northampton.....	189	140	8,202	3,516	1,105	77,617	46,001	26,047	152,960
Orange.....	102	142	2,133	2,643	1,192	154,760	43,375	60,604	229,760
Powhatan.....	10	39	905	1,330	768	103,092	28,280	64,892	174,720
Prince William.....	28	67	623	1,405	818	125,417	37,603	41,428	220,800
Princess Anne.....	498	540	21,262	20,192	1,180	60,660	53,604	23,455	182,400
Rappahannock.....	35	(²)	804	(²)	893	140,561	28,825	36,900	175,860
Rockingham.....	53	(²)	610	(²)	3,434	338,064	135,150	86,714	550,960
Southampton.....	159	841	2,113	13,580	3,212	206,672	103,873	140,315	385,560
Spotsylvania.....	48	121	1,100	1,605	1,464	164,661	41,370	35,380	203,680
Stafford.....	57	(²)	875	(²)	628	103,471	49,410	65,211	177,920
Surry.....	20	(²)	1,212	(²)	638	92,658	32,182	53,211	177,920
Sussex.....	80	108	1,083	3,092	1,285	172,031	57,047	87,426	320,000
Warwick.....	32	(²)	600	(²)	243	12,860	4,540	6,577	41,000
York.....	101	135	2,057	2,927	650	33,638	10,674	18,420	87,940
All other counties.....	523	3,556	6,245	63,722	114,033	10,608,217	3,075,118	4,361,140	15,003,360

¹ No drainage on farms reported in Buchanan, Charles City, Clarke, Giles, Greensville, Highland, Middlesex, and Northumberland Counties, nor in Alexandria, Bristol, Buena Vista, Charlottesville, Clifton Forge, Danville, Fredericksburg, Harrisonburg, Hopewell, Lynchburg, Newport News, Petersburg, Portsmouth, Radford, Roanoke, South Norfolk, Staunton, and Suffolk cities in 1930; nor in Pulaski County, and Alexandria, Buena Vista, Clifton Forge, Danville, Fredericksburg, Hopewell, Lynchburg, Radford, and Suffolk cities for 1920.

² Included in "All other counties."

³ Farrar Island annexed from Henrico County in 1922.

⁴ Part annexed to Petersburg city in 1921.

⁵ Includes Hampton city in 1920. Part of Elizabeth City County annexed to Newport News city in 1926.

⁶ Part annexed to Alexandria city in 1928.

⁷ Includes Williamsburg city in 1920.

⁸ Part annexed to Suffolk city in 1928.

⁹ Part annexed to Princess Anne County in 1921; and part annexed to Norfolk city in 1923. South Norfolk city incorporated and made an independent city from county in 1921.

¹⁰ Part of Norfolk County annexed in 1921.

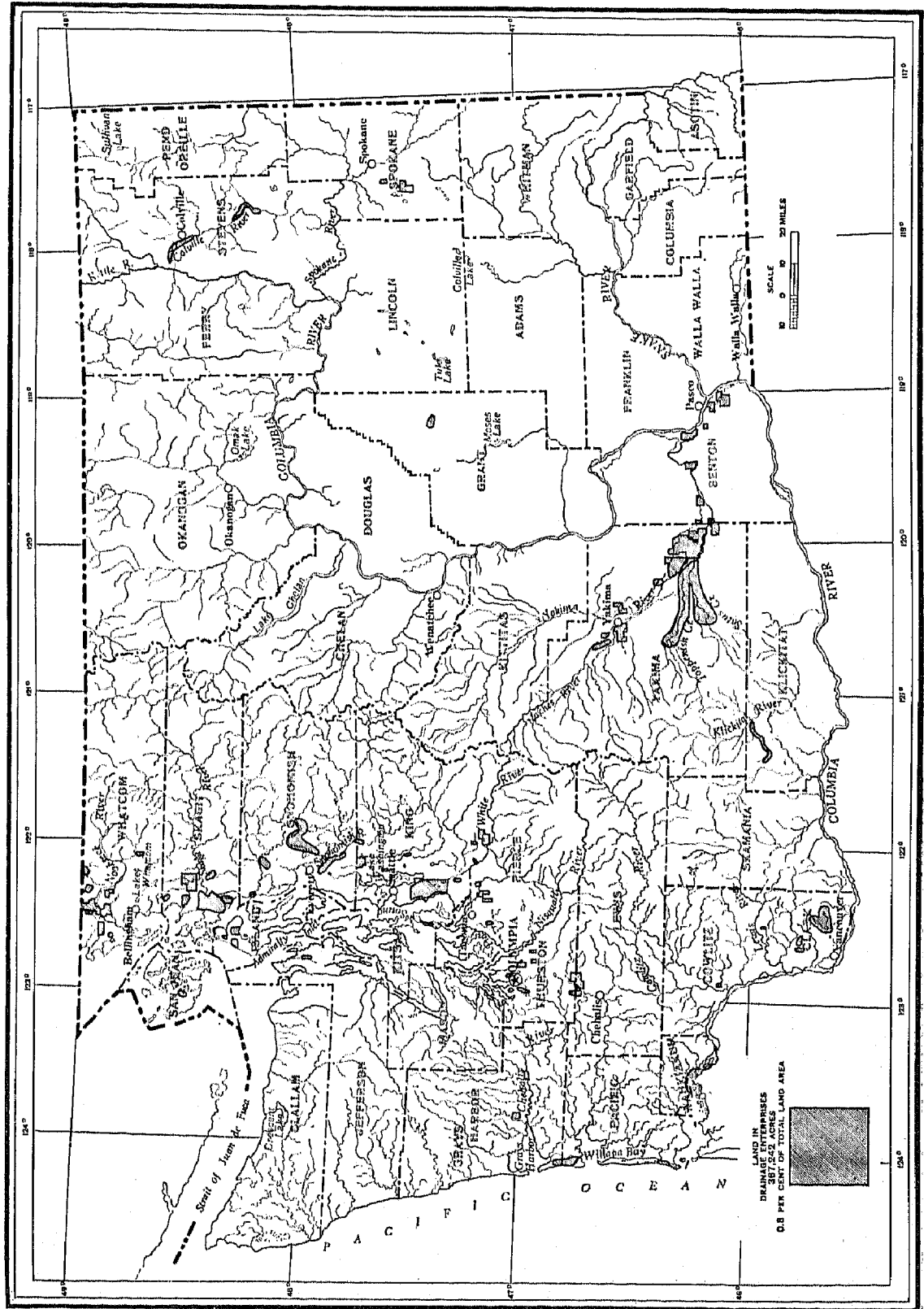
COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CONDITION AND USE OF LAND, DRAINAGE WORKS, AND CAPITAL INVESTED AND COST PER ACRE, 1930¹

ITEM (See definitions in Introduction)	THE STATE		Norfolk		ITEM (See definitions in Introduction)	THE STATE		Norfolk	
	Acres	Acres	Acres	Acres		Acres	Acres	Acres	Acres
LAND AREA					CONDITION AND USE OF LAND—Continued				
1	Approximate land area.....	25,707,680	238,720		14	Land in occupied farms.....	5,704	5,704	
2	Land in enterprises (no overlap).....	15,042	15,042		15	Land in planted crops.....	4,748	4,748	
CONDITION AND USE OF LAND					16	Woodland cleared and cultivated since drainage.....	1,700	1,700	
3	Land unfit to raise any crop prior to drainage.....	11,270	11,270		17	Land idle.....	9,500	9,500	
4	Decrease since drainage.....	100.0	100.0		18	Land available for settlement.....	9,000	9,000	
5	Land fit to raise a normal crop.....	13,138	13,138		DRAINAGE WORKS²				
6	Land fit to raise a normal crop prior to drainage.....	2,008	2,008		10	Ditches—			
7	Increase since drainage.....	554.3	554.3		Completed.....	40.0	40.0		
8	Land fit to raise a partial crop.....	1,904	1,904		20	Land drained by ditches only.....	15,042	15,042	
9	Land fit to raise a partial crop prior to drainage.....	1,764	1,764		CAPITAL INVESTED AND COST PER ACRE				
10	Decrease since drainage.....	+7.9	+7.9		21	Capital invested in enterprises to Jan. 1, 1930.....	241,608	241,608	
11	Improved land.....	6,042	6,042		22	Average, per acre.....	16.06	16.06	
12	Unimproved land—								
	Woodland.....	8,500	8,500						
13	Other.....	500	500						

¹ No drainage enterprises reported in 1920. ² A plus sign (+) denotes increase. ³ No additional works authorized.

WASHINGTON

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



WASHINGTON

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—The Cascade Range divides the State of Washington into a humid and an arid or semiarid section. Nearly half of the land in drainage enterprises is located in the western or humid section of the State and by far the greater part of this acreage is along the eastern side of Puget Sound.

About 90 per cent of the drained lands east of the Cascade Range are in the irrigated portion of the Yakima Valley where the purpose of drainage is mainly the removal of alkali or seepage from irrigation. Enterprises in the northeastern section of the State along the Colville and Spokane Rivers were organized to protect lands from overflow or to improve marsh or swampy land.

The normal annual rainfall for the State is about 36 inches. The year 1929 was the driest on record, the rainfall having been only about two-thirds of normal.

Where the drainage work is done directly by an irrigation enterprise, the drainage enterprise has been considered as identical with the irrigation enterprise, as all irrigable lands are usually assessed for the necessary drainage work. Of the 90,000 acres located in such enterprises, practically all is now served by drainage works.

The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief from overflow for the district as a unit. The fact that an enterprise which has completed its works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number.....	70,004	60,288	4,616	7.0
Farms reporting drainage.....number.....	7,812	10,020	-2,208	-22.0
All land in farms.....acres.....	13,533,778	13,244,720	289,058	2.2
Farm land provided with drainage.....acres.....	232,471	274,006	-42,225	-15.4
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres.....	42,775,040	42,775,040		
Land in drainage enterprises.....acres.....	367,242	94,024	272,318	286.9
Improved land.....acres.....	332,205	81,886	250,370	305.8
Unimproved land:				
Woodland.....acres.....	18,531	850	17,681	
Other.....acres.....	16,446	12,188	4,258	34.0
Land unfit to raise any crop for lack of drainage.....acres.....	0,870	² 10,873	-10,004	-1,136.3
Land drained, fit to raise normal crop.....acres.....	329,166	(3)		
Land partly drained, fit for partial crop.....acres.....	28,197	⁴ 8,000	10,201	213.4
Land in occupied farms.....acres.....	351,898	(5)		
Land in planted crops.....acres.....	309,818	(5)		
Land idle.....acres.....	33,764	(5)		
Ditches, completed.....miles.....	746.7	102.4	644.3	359.8
Tile drains, completed.....miles.....	199.2	83.0	116.2	140.0
Capital invested in enterprises.....dollars.....	4,637,576	1,397,410	3,240,167	231.9
Average, per acre.....dollars.....	12.63	14.72	-2.09	-14.2

¹ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.
² "Swampy, subject to overflow, seeped, or alkali."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 172 drainage enterprises, with an average area of 2,296 acres, are shown for Washington. There are 13 such enterprises of 5,000 acres or more, 119 of between 500 and 5,000 acres, and 40 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 27,609 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930
	1930		1920		
	Acres	Per cent	Acres	Per cent	
All enterprises.....	394,861	100.0	105,477	100.0	367,242
Less than 100 acres.....	156	(¹)	322	0.3	990
100 to 199 acres.....	1,756	0.4			990
200 to 499 acres.....	9,314	2.4	1,625	1.5	8,897
500 to 999 acres.....	32,331	8.2	9,161	8.7	28,825
1,000 to 4,999 acres.....	139,169	35.2	52,820	50.1	125,980
5,000 to 9,999 acres.....	74,317	18.8	19,640	18.6	66,730
10,000 to 49,999 acres.....	47,808	12.1	21,900	20.8	47,808
50,000 to 99,999 acres.....	90,000	22.8			90,000

¹ The sum of the areas of individual enterprises, including overlap.
² Less than one-tenth of 1 per cent.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects, county drains, or township drains*, according to the public officials in control.

Drainage projects under the control of the officers of an irrigation organization are classed as *irrigation enterprises*. In such cases the drainage is incidental to land reclamation by irrigation, and both the drainage and irrigation operations are functions of the one enterprise.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	367,242	100.0	4,637,570	100.0
Drainage districts.....	177,489	48.4	2,039,808	44.0
County drains.....	98,153	26.7	1,978,739	42.7
Irrigation enterprises.....	90,000	24.5	609,000	13.0
Individually owned projects.....	1,200	0.3	18,000	0.4
Other.....	400	0.1	1,529	(¹)

¹ Less than one-tenth of 1 per cent.

Type of drainage.—There were 169 enterprises, covering 273,287 acres of land and with an invested capital of \$4,029,444, which reported their works as completed; while 3 enterprises, covering 93,955 acres of land and

with an invested capital of \$608,132, estimated that \$17,500 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 747 miles of ditches, 199 miles of tile drains, and 79 miles of levees. These figures do not include drains or levees, installed by individual farmers, supplemental to the works of an enterprise. There were 11 enterprises that reported land served by pumps.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	367,242	100.0	4,637,570	100.0
Gravity drainage only.....	330,030	92.6	4,160,242	89.7
Ditches and levees.....	252,338	68.7	2,223,000	47.9
Tile drains.....	26,414	7.2	505,223	12.8
Ditches, tile drains, and levees.....	61,178	16.7	1,341,953	29.0
Drainage, all or part by pumping.....	27,312	7.4	477,334	10.3
All drainage by pumping.....	9,420	2.5	192,470	4.2
Part gravity and part pumping.....	17,892	4.9	284,855	6.1

Pumping plants.—There were 11 enterprises that reported 19,857 acres served by pumps with a total capacity of 184,500 gallons per minute. About 98 per cent of this acreage is located in the counties along the east side of Puget Sound. The remaining area is located in Cowlitz and Benton Counties. About 94 per cent of the power used was furnished by electric motors.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER, 1930

KIND OF POWER	Enterprises	Engine or motor capacity		Pump capacity	Land served
		H. p.	Per cent		
All enterprises ¹	11	982	100.0	G. p. m. 184,500	Acres 19,857
Electric.....	9	925	94.2	174,500	18,236
Internal combustion.....	2	57	5.8	10,000	1,621

¹ No pumping plants reported in 1920.

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Engine or motor capacity	Land served
		G. p. m.	Per cent		
All enterprises, centrifugal only.....	18	G. p. m. 184,500	Per cent 100.0	H. p. 982	Acres 19,857

Arrears and delinquency.—There were 48 enterprises, with approximately 29 per cent of the invested capital and covering about 16 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 124 enterprises reported no arrearage. Reports of 89 enterprises, covering 102,271 acres, show a total of 16,280 acres delinquent in drainage taxes; 58 enterprises, covering 231,838 acres, reported no delinquency; while 25 enterprises failed to report.

DRAINAGE—WASHINGTON

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres	Per cent 100.0	Dollars	Per cent 100.0	
All enterprises.....	367,242	100.0	4,637,576	100.0	16,280
Enterprises in arrears.....	59,616	16.2	1,358,221	29.3	7,673
With some delinquent land.....	46,428	12.6	1,185,448	25.6	7,073
With no delinquent land.....	9,390	2.6	153,017	3.3	—
With no report on delinquency.....	3,800	1.0	19,166	0.4	—
Enterprises not in arrears.....	307,626	83.8	3,279,355	70.7	8,607
With some delinquent land.....	55,845	15.2	1,138,264	24.6	8,607
With no delinquent land.....	222,448	60.6	1,652,197	35.6	—
With no report on delinquency.....	29,333	8.0	488,894	10.5	—

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, land damaged by alkali or seepage from irrigation, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported.

In that portion of the State west of the Cascade Range, reclamation of swamp land and improvement of land in farms were the primary purposes of drainage; while in the arid section of the State, east of the Cascade Range, removal of alkali or seepage from irrigation was more commonly the object in drainage.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	367,242	100.0	4,637,576	100.0
Reclamation of swamp land not previously in farms.....	44,154	12.0	873,312	18.8
Improvement of land already in farms.....	123,230	33.6	1,240,936	26.8
Removal of alkali or seepage from irrigation.....	168,392	45.8	3,324,162	60.1
Protection against overflow.....	31,457	8.6	199,166	4.3

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. Where the drainage work was done directly by an irrigation enterprise, the year in which drainage was undertaken is used instead of the year of organization of the irrigation project.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Acres	Over-lapped acres	Dollars	Per cent 100.0
All enterprises.....	367,242	100.0	304,861	27,000	4,637,576	100.0
1890-1899.....	2,940	0.8	2,040	—	6,909	0.1
1900-1904.....	38,938	10.6	38,938	—	133,413	2.9
1905-1909.....	30,354	8.3	30,354	—	203,703	4.4
1910-1914.....	176,732	48.1	189,436	12,704	2,015,574	43.5
1915-1919.....	39,635	10.8	45,571	5,936	1,103,197	23.8
1920-1924.....	38,022	10.3	45,273	7,251	1,054,271	22.7
1925-1929.....	40,621	11.1	42,339	1,718	120,599	2.6

¹ Includes overlap.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement Acres
	Total	Condition of land			Land available for settlement Acres	
		Improved land	Wood-land	Other unimproved land		
All enterprises.....	Acres 367,242	Acres 332,265	Per cent 90.5	Acres 18,531	Acres 16,446	Acres 4,633
1890-1899.....	2,940	2,940	100.0	—	—	—
1900-1904.....	38,938	36,800	94.5	828	1,310	848
1905-1909.....	30,354	29,507	97.2	424	423	—
1910-1914.....	176,732	158,906	89.9	8,653	8,673	984
1915-1919.....	39,635	33,667	84.7	2,185	3,793	2,304
1920-1924.....	38,022	33,605	88.4	2,900	1,451	517
1925-1929.....	40,621	36,850	90.7	3,175	506	—

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 150 enterprises, covering 302,631 acres of land and having an invested capital of \$3,985,795. There were 22 enterprises, with an invested capital of \$651,781 and covering 64,611 acres of land, which did not have systematic maintenance.

There were 4 enterprises, with an invested capital of \$753,669 and covering 97,920 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 168 enterprises, with an invested capital of \$3,883,907 and covering 269,322 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	367,242	100.0	4,637,576	100.0
By district forces.....	199,980	54.5	3,194,254	68.9
By contract.....	99,540	27.1	748,460	16.1
By work apportioned to landowners.....	16,308	4.4	183,821	4.0
Other, none, and not reported.....	60,414	16.5	611,041	13.0

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported no cost as well as those that reported some cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 80 per cent of the land reporting showed some cost, and 20 per cent showed no cost in 1929. The average cost was 24 cents per acre. Expenditures for operation and maintenance vary greatly from year to year. Had the rainfall in 1929 been normal it is probable that the cost for "drainage, all or part by pumping" would have been somewhat higher than the figures shown.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost Acres	COST REPORTED	
		Total Dollars	Per acre Dollars
All enterprises reporting.....	367,242	89,864	0.24
Gravity drainage only.....	339,930	59,850	0.18
Ditches and levees.....	252,338	36,768	0.15
Tile drains.....	20,414	4,429	0.17
Ditches, tile drains, and levees.....	61,178	18,653	0.30
Drainage, all or part by pumping.....	27,312	30,014	1.10

DRAINAGE—WASHINGTON

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COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 7,812	Number 10,020	Acres 232,471	Acres 274,600		Number 70,904	Acres 13,533,778	Acres 6,275,350		Acres 1,874,240	Acres 42,775,040
The State.....									
Benton.....	95	(?)	2,650	(?)	1,065	320,805	111,403	65	1,069,440
Cjallam.....	63	167	2,008	3,593	720	57,820	13,680	31,037	1,104,640
Clark.....	341	275	6,217	5,035	3,503	104,482	69,163	54,826	406,760
Cowlitz.....	100	89	5,373	5,170	1,147	63,589	17,530	46,808	737,920
Grant.....	14	6	1,321	815	787	704,407	327,681	2,185	1,740,800
Grays Harbor.....	135	93	2,785	1,578	1,151	89,473	18,224	37,001	1,196,160
Island.....	212	271	6,320	6,791	877	48,877	14,412	25,770	133,120
Jefferson.....	77	92	2,692	3,218	272	25,046	4,030	13,006	1,155,200
King.....	608	1,048	13,603	20,177	4,056	137,313	40,677	42,704	1,351,040
Kitsap.....	187	541	1,312	3,259	1,557	38,367	9,085	18,623	237,440
Kittitas.....	151	129	4,477	4,027	888	359,003	70,177	72,567	1,490,560
Klickitat.....	27	45	3,273	3,059	1,074	651,395	179,000	95,432	1,168,000
Lewis.....	445	653	10,668	16,838	3,380	237,420	67,204	117,115	1,516,160
Lincoln.....	9	33	779	1,805	1,497	1,356,440	709,072	54,022	1,473,280
Mason.....	73	115	1,251	1,805	452	38,552	7,233	23,314	505,200
Okanogan.....	12	43	1,187	907	2,326	691,558	136,315	88,600	3,341,440
Pacific.....	124	131	3,834	3,186	570	59,430	8,267	26,572	572,800
Pend Oreille.....	52	75	3,700	2,551	613	114,031	27,882	66,451	871,040
Pierce.....	611	948	7,881	13,323	4,090	139,078	35,861	64,426	1,088,040
San Juan.....	122	209	2,922	5,915	472	63,795	10,862	26,638	113,920
Skagit.....	650	849	44,699	37,694	2,721	139,028	59,033	45,395	1,135,360
Snohomish.....	670	945	16,116	18,539	4,262	160,310	42,331	71,929	1,320,000
Spokane.....	144	265	8,917	16,375	4,268	763,772	466,747	213,460	1,123,840
Stevens.....	91	194	6,311	7,685	2,633	467,414	119,080	218,663	1,003,200
Thurston.....	133	194	3,130	4,852	2,082	143,378	33,076	64,196	453,760
Wahkiakum.....	130	128	3,022	3,044	388	31,713	4,034	15,918	170,880
Whatcom.....	897	990	21,027	23,310	4,282	183,447	61,808	71,302	1,332,480
Whitman.....	25	(?)	899	(?)	2,631	1,303,748	681,036	15,752	1,340,120
Yakima.....	1,158	1,330	42,307	54,558	6,806	598,366	240,001	26,025	3,237,760
All other counties.....	51	132	1,760	4,711	8,516	4,261,166	2,347,997	194,300	6,085,120

¹ No drainage on farms reported in Asotin, Franklin, and Garfield Counties in 1930; nor in Asotin, Douglas, Franklin, Garfield, and Skamania Counties for 1920.
² Included in "All other counties."

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Benton	Clark	King	Lewis	Pacific
LAND AREA							
1	Approximate land area..... 1930..... acres.....	42, 775, 040	1, 069, 440	405, 700	1, 351, 040	1, 510, 100	572, 800
2	Land in enterprises..... 1930..... acres.....	367, 242	17, 892	10, 559	34, 494	4, 075	4, 017
3	..... 1920..... acres.....	94, 924	10, 340				4, 200
4	Increase, ¹ 1920-1930..... per cent.....	286.9	73.0				-4.4
5	Area of all enterprises (overlapping areas included)..... 1930..... acres.....	394, 851	17, 892	10, 559	34, 494	4, 075	4, 017
6	Excess over land in enterprises (total areas overlapping)..... acres.....	27, 009					
CONDITION AND USE OF LAND							
7	Land unfit to raise any crop..... 1930..... acres.....	9, 879	150	200	305		
8	Land unfit to raise any crop prior to drainage..... acres.....	133, 588	16, 743	1, 854	11, 809	3, 766	4, 017
9	Decrease since drainage..... per cent.....	92.6	99.1	89.2	95.6	100.0	100.0
10	Land fit to raise a normal crop..... 1930..... acres.....	329, 166	17, 736	10, 359	32, 201	4, 075	4, 017
11	Land fit to raise a normal crop prior to drainage..... acres.....	161, 840	1, 050	4, 976	19, 965		
12	Increase since drainage ¹ per cent.....	103.4		108.2	61.3		
13	Land fit to raise a partial crop..... 1930..... acres.....	28, 197			1, 898		
14	Land fit to raise a partial crop prior to drainage..... acres.....	71, 814	60	3, 720	2, 720	300	
15	Decrease since drainage..... per cent.....	60.7	100.0	100.0	30.2	100.0	
16	Improved land..... 1930..... acres.....	332, 265	17, 736	8, 129	31, 133	2, 975	3, 272
17	..... 1920..... acres.....	81, 886	9, 715				2, 660
18	Increase, ¹ 1920-1930..... per cent.....	305.8	82.6				10.5
19	Unimproved land—						
20	Woodland..... 1930..... acres.....	18, 531		2, 430	1, 118	580	
21	Other..... 1930..... acres.....	10, 446	156		2, 243	520	745
22	Land in occupied farms..... 1930..... acres.....	351, 898	17, 777	10, 559	32, 396	4, 075	3, 916
23	Land in planted crops..... 1930..... acres.....	309, 818	17, 014	7, 774	30, 215	1, 540	3, 272
24	Woodland cleared and cultivated since drainage..... 1930..... acres.....	24, 065		1, 000	2, 720		
25	Land idle..... 1930..... acres.....	33, 764	177	920	2, 047	2, 535	745
26	Land available for settlement..... 1930..... acres.....	4, 653			1, 759		101
DRAINAGE WORKS, 1930							
26	Ditches—						
27	Completed..... miles.....	746.7	13.7	21.3	58.3	13.3	18.3
28	Additional under construction..... miles.....	6.5		3.0			
29	Tile drains—						
30	Completed..... miles.....	109.2	7.0		1.7		
31	Levees and dikes—						
32	Completed..... miles.....	78.8			42.0		
33	Additional under construction..... miles.....	3.0		3.0			
34	Pumping plants—						
35	Engine or motor capacity..... horsepower.....	982	15		97		
36	Pump capacity..... gals. per min.....	134, 500	1, 000		25, 000		
37	Land served by pumps..... acres.....	10, 857	108		1, 036		
38	Land drained by ditches only ² acres.....	244, 606	13, 152	7, 704	30, 613	4, 075	4, 017
39	Length of ditches..... miles.....	504.8	9.6	17.8	40.3	13.3	18.3
40	Land drained by tile only..... acres.....	26, 414	2, 181				
41	Length of tile..... miles.....	71.3	3.8				
42	Land drained by ditches and tile..... acres.....	54, 138	2, 361		2, 845		
43	Length of ditches..... miles.....	129.5	3.7		13.5		
44	Length of tile..... miles.....	99.1	3.2		1.7		
45	Land having ditches and levees ³ acres.....	7, 732		2, 855			
46	Length of ditches..... miles.....	20.5		6.5			
47	Length of levees..... miles.....	8.5		3.0			
48	Land having ditches, tile drains, and levees..... acres.....	7, 040					
49	Length of ditches..... miles.....	22.5					
50	Length of tile..... miles.....	25.3					
51	Length of levees..... miles.....	4.0					
52	Land drained by pumps and other drainage works ³ acres.....	27, 312	198		1, 036		
53	Length of ditches..... miles.....	75.9	0.4		4.5		
54	Length of tile..... miles.....	8.5					
55	Length of levees..... miles.....	69.3			42.0		
56	Land protected by levees of an outside agency..... acres.....	27, 012			515		
CAPITAL INVESTED AND COST PER ACRE							
56	Capital invested in enterprises to Jan. 1, 1930..... dollars.....	4, 637, 576	236, 914	42, 703	287, 398	72, 892	26, 460
57	..... 1920..... dollars.....	1, 397, 419	50, 200				37, 044
58	Increase, ¹ 1920-1930..... per cent.....	231.9	371.9				-28.6
59	Estimated cost of enterprises when completed..... 1930..... dollars.....	4, 655, 076	236, 914	40, 703	287, 398	72, 892	26, 460
60	..... 1920..... dollars.....	1, 436, 419	79, 200				47, 044
61	Average, per acre when completed..... 1930..... dollars.....	12.68	13.24	4.71	8.33	17.89	6.59
62	..... 1920..... dollars.....	15.13	7.66				11.20
63	Invested in and required for completion of—						
64	Enterprises having ditches only..... 1930..... dollars.....	2, 175, 343	74, 364	39, 703	186, 833	72, 892	26, 460
65	Average, per acre..... dollars.....	8.89	5.69	5.15	6.10	17.89	6.59
66	Enterprises having tile drains only..... 1930..... dollars.....	505, 223	62, 853				
67	Average, per acre..... dollars.....	22.63	28.82				
68	Enterprises having ditches and tile drains..... 1930..... dollars.....	1, 183, 953	19, 375		49, 393		
69	Average, per acre..... dollars.....	21.87	8.21		17.96		
70	Enterprises having ditches and levees..... 1930..... dollars.....	64, 723		10, 000			
71	Average, per acre..... dollars.....	8.87		3.50			
72	Enterprises having ditches, tile drains, and levees..... 1930..... dollars.....	158, 000					
73	Average, per acre..... dollars.....	22.44					
74	Enterprises having pumps and other drainage works..... 1930..... dollars.....	477, 834	79, 822		51, 172		
75	Average, per acre..... dollars.....	17.50	403.14		49.39		

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

² When works under construction have been completed.

³ Area of enterprises having some land served by pumps.

DRAINAGE—WASHINGTON

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Pierce	Skagit	Snoho- mish	Thurston	Whatcom	Yakima	Other counties ¹
LAND AREA								
1	Approximate land area.....1930.....acres..	1,088,040	1,135,300	1,320,000	453,700	1,332,480	3,237,760	8,072,160
2	Land in enterprises.....1930.....acres..	4,282	38,191	37,501	5,925	25,228	155,005	29,353
3	.....1920.....acres..						55,919	24,466
4	Increase, ² 1920-1930.....per cent..						178.4	20.1
5	Area of all enterprises (overlapping areas included).....1930.....acres..	4,282	38,191	37,501	5,925	27,786	180,796	29,353
6	Excess over land in enterprises (total areas overlapping).....acres..					2,508	25,101	
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop.....1930.....acres..	05	0	2,225			6,763	60
8	Land unfit to raise any crop prior to drainage.....acres..	2,060	9,930	5,250	4,699	6,297	53,441	13,722
9	Decrease since drainage.....per cent..	96.8	99.0	57.6	100.0	100.0	87.3	99.5
10	Land fit to raise a normal crop.....1930.....acres..	4,006	37,875	34,261	5,925	19,345	131,383	27,983
11	Land fit to raise a normal crop prior to drainage.....acres..	1,008	21,219	6,900		7,883	87,403	12,436
12	Increase since drainage ².....per cent..	297.4	78.5	480.7		145.4	50.3	125.0
13	Land fit to raise a partial crop.....1930.....acres..	211	310	1,015		5,853	17,549	1,331
14	Land fit to raise a partial crop prior to drainage.....acres..	1,214	7,042	20,351	1,226	11,048	14,851	3,225
15	Decrease since drainage ².....per cent..	82.6	95.6	90.1	100.0	40.8	-18.2	58.7
16	Improved land.....1930.....acres..	3,893	37,241	31,470	5,597	17,010	145,895	27,638
17	.....1920.....acres..						47,593	21,018
18	Increase, ² 1920-1930.....per cent..						206.5	29.2
Unimproved land—								
19	Woodland.....1930.....acres..	0	850	3,370	177	8,010	756	1,331
20	Other.....1930.....acres..	410	100	2,001	161	202	9,044	214
21	Land in occupied farms.....1930.....acres..	4,232	37,025	35,703	5,748	25,228	147,042	27,534
22	Land in planted crops.....1930.....acres..	3,721	31,072	28,040	3,233	16,050	143,308	23,370
23	Woodland cleared and cultivated since drainage.....1930.....acres..	30	7,507	2,580		9,170		1,058
24	Land idle.....1930.....acres..	261	820	5,373	968	8,212	8,930	2,176
25	Land available for settlement.....1930.....acres..			682			302	1,800
DRAINAGE WORKS, 1930								
Ditches—								
26	Completed.....miles..	16.0	103.0	48.8	27.3	70.5	223.3	120.0
27	Additional under construction.....miles..		0.5				3.9	
Tie drains—								
28	Completed.....miles..	4.1	37.1	3.2	2.0		143.5	
Levees and dikes—								
29	Completed.....miles..		14.8	21.0				1.0
30	Additional under construction.....miles..							
Pumping plants—								
31	Engine or motor capacity.....horsepower..		395	400				75
32	Pump capacity.....gals. per min..		92,000	55,000				11,500
33	Land served by pumps.....acres..		13,107	5,187				299
34	Land drained by ditches only ³.....acres..	297	3,290	24,001	5,398	25,228	101,687	25,114
35	Length of ditches.....miles..	2.0	12.5	1.8	24.7	70.5	172.9	115.4
36	Land drained by tie only.....acres..	725					23,508	
37	Length of tie.....miles..	2.0					65.5	
38	Land drained by ditches and tie.....acres..	3,290	10,952	3,093	557		30,500	
39	Length of ditches.....miles..	14.0	27.0	15.0	2.0		53.7	
40	Length of tie.....miles..	2.1	10.1	1.4	2.0		78.0	
41	Land having ditches and levees ⁴.....acres..			877				4,000
42	Length of ditches.....miles..			4.0				10.0
43	Length of levees.....miles..			4.5				1.0
44	Land having ditches, tie drains, and levees.....acres..		6,580	400				
45	Length of ditches.....miles..		21.0	1.5				
46	Length of tie.....miles..		24.5	0.8				
47	Length of levees.....miles..		2.0	2.0				
48	Land drained by pumps and other drainage works ⁴.....acres..		17,399	8,440				269
49	Length of ditches.....miles..		43.0	26.5				1.5
50	Length of tie.....miles..		2.5	1.0				
51	Length of levees.....miles..		12.8	14.5				
52	Land protected by levees of an outside agency.....acres..		22,599	3,127				771
CAPITAL INVESTED AND COST PER ACRE								
53	Capital invested in enterprises to Jan. 1, 1930.....dollars..	140,491	389,932	268,581	158,176	217,810	2,108,268	591,951
54	.....1920.....dollars..						1,013,675	296,500
55	Increase, ² 1920-1930.....per cent..						116.0	99.6
56	Estimated cost of enterprises when completed.....1930.....dollars..	140,491	387,432	268,581	158,176	217,810	2,208,268	591,951
57	.....1920.....dollars..						1,013,675	296,500
58	Average, per acre when completed.....1930.....dollars..	34.91	10.14	7.16	26.70	8.03	14.18	20.15
59	.....1920.....dollars..						18.13	12.12
Invested in and required for completion of—								
60	Enterprises having ditches only.....1930.....dollars..	5,767	21,800	16,000	146,176	217,810	851,440	516,508
61	Average, per acre.....dollars..	19.42	6.93	6.66	27.23	8.03	8.37	20.53
62	Enterprises having tie drains only.....1930.....dollars..	18,176					514,195	
63	Average, per acre.....dollars..	25.07					21.87	
64	Enterprises having ditches and tie drains.....1930.....dollars..	125,549	85,000	50,003	12,000		842,633	
65	Average, per acre.....dollars..	33.51	7.70	13.65	21.54		27.63	
66	Enterprises having ditches and levees.....1930.....dollars..			4,723				59,600
67	Average, per acre.....dollars..			5.38				12.50
68	Enterprises having ditches, tie drains, and levees.....1930.....dollars..		145,000	13,000				
69	Average, per acre.....dollars..		22.04	38.20				
70	Enterprises having pumps and other drainage works.....1930.....dollars..		135,632	184,855				26,353
71	Average, per acre.....dollars..		7.81	21.00				97.97

¹ Includes Cowlitz, Grant, Grays Harbor, Island, Jefferson, Klickitat, San Juan, Spokane, and Stevens Counties in 1930; and Adams, Klickitat, Spokane, and Stevens Counties for 1920.
² A plus sign (+) denotes increase. Per cent not shown when more than 1,000.
³ When works under construction have been completed.
⁴ Area of enterprises having some land served by pumps.

WISCONSIN

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



WISCONSIN

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table

I; while those for drainage enterprises were obtained on a special drainage schedule.

Summary and condition of land in enterprises.—The usual purpose of an organized drainage enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief from overflow for the district as a unit. The fact that an enterprise which has completed its works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....	181,767	180,295	-7,528	-4.0
Farms reporting drainage.....	12,991	21,838	-8,847	-40.5
All land in farms.....	21,874,155	22,148,223	-274,068	-1.2
Farm land provided with drainage.....	423,800	658,411	-234,621	-35.6
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....	35,363,840	35,363,840		
Land in drainage enterprises.....	892,713	794,569	98,144	12.4
Improved land.....	531,909	254,504	277,405	109.0
Unimproved land:				
Woodland.....	114,273	177,744	-63,471	-35.7
Other.....	240,471	302,321	-115,850	-32.0
Land unfit to raise any crop for lack of drainage.....	157,093	² 130,111	26,982	20.7
Land drained, fit to raise normal crop.....	548,545	(3)	177,227	
Land partly drained, fit for partial crop.....	187,075	⁴ 9,848		
Land in occupied farms.....	574,892	(3)		
Land in planted crops.....	350,522	(3)		
Land idle.....	378,406	(3)		
Ditches, completed.....	1,980.4	1,601.3	208.1	17.6
Tile drains, completed.....	303.4	211.3	92.1	43.6
Capital invested in enterprises.....	6,207,278	4,163,055	2,044,223	49.1
Average, per acre.....	6.95	5.24	1.71	32.0

¹ A minus sign (-) denotes decrease. Per cent not shown when more than 1,000.
² "Swampy or subject to overflow."

³ Not called for on schedule.
⁴ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered as a separate enterprise. In this way, 373 drainage enterprises are shown for Wisconsin with an average area of 2,401 acres. There are 37 such enterprises of 5,000 acres or more, 193 of between 500 and 5,000 acres, and 143 of less than 500 acres.

The area of enterprises exceeds the land in enterprises by 2,985 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930
	1930		1920		
	Acres	Per cent	Acres	Per cent	Acres
All enterprises.....	895,698	100.0	794,569	100.0	892,713
Less than 100 acres.....	1,231	0.1	5,800	0.7	1,231
100 to 199 acres.....	4,116	0.5	26,010	3.3	4,116
200 to 499 acres.....	27,591	3.1	27,975	3.5	27,591
500 to 999 acres.....	53,853	6.0	168,061	21.1	53,853
1,000 to 4,999 acres.....	225,528	25.2	75,427	9.5	225,528
5,000 to 9,999 acres.....	124,722	13.9	228,426	28.7	124,722
10,000 to 49,999 acres.....	306,177	34.2	262,880	33.1	306,177
50,000 to 99,999 acres.....	152,480	17.0			152,480

The sum of the areas of individual enterprises, including overlap.

Character of enterprise.—Organized enterprises having executives exclusively their own, according to the State drainage laws, are classed as *drainage districts*.

Enterprises which, in common with others, are under the control of State, county, or township officials, are classed as *State projects*, *county drains*, or *township drains*, according to the public officials in control.

Enterprises without legal organization, as such, belonging to individuals, partnerships, or agricultural companies, are classed as *individually owned projects*. Projects of this type are included only when the area drained is 500 acres or more.

Some of the land in Wisconsin shown as *county drains* probably should be classed as *township drains*, but as it was difficult to determine this matter from the data on the schedules, no division is here attempted.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	892,713	100.0	6,207,278	100.0
Drainage districts.....	604,442	67.7	4,191,399	67.5
County drains.....	282,561	31.7	1,944,282	31.3
Individually owned projects.....	5,710	0.6	71,600	1.2

Type of drainage.—There were 366 enterprises, covering 854,273 acres of land, with an invested capital of \$5,866,698, that reported their works as completed.

There were 7 enterprises, covering 38,440 acres of land, with an invested capital of \$340,580, which estimated that \$13,120 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included approximately 1,989 miles of ditches, 303 miles of tile drains, and 9 miles of levees. These figures do not include drains or levees, installed by individual farmers, supplemental to the works of an enterprise. There was 1 enterprise that reported 50 acres of land served by pumps.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	892,713	100.0	6,207,278	100.0
Gravity drainage only.....	890,713	99.8	6,203,778	99.0
Ditches and levees.....	578,982	64.0	3,377,161	54.4
Tile drains.....	17,608	2.0	206,900	4.7
Ditches, tile drains, and levees.....	204,123	32.0	2,530,618	40.8
Drainage, part gravity and part by pumping.....	2,000	0.2	3,500	0.1

Pumping plants.—There was 1 enterprise that reported 50 acres served by a rotary pump with a capacity of 5,000 gallons per minute. The pump was driven by a 40-horsepower engine. The 1 plant shown in the 1920 census was reported in 1930 as abandoned.

STATE TABLE 5.—PUMPING PLANTS AND LAND SERVED, BY KIND OF POWER: 1930 AND 1920

KIND OF POWER	Enter- prises	Engine capacity		Pump capacity	Land served
		Num- ber	H. p.			Per cent 100.0
All enterprises.....	1930	1	40	100.0	50
	1920	1	150	100.0	6,507
Internal combustion.....	1930	1	40	100.0	50
	1920	1	150	100.0	6,507

¹ Not reported. This plant was reported in 1930 as abandoned.

STATE TABLE 6.—PUMPING PLANTS AND LAND SERVED, BY KIND OF PUMP, 1930

KIND OF PUMP	Pumps	Pump capacity		Engin capacity	Land served
		Num- ber	G. p. m. 5,000			Per cent 100.0
All enterprises, rotary only.....	1	1	5,000	H. p. 40	Acres 50

Arrears and delinquency.—Only 33 enterprises, with approximately 34 per cent of the invested capital, and approximately 37 per cent of the land in organized districts, were reported as in arrears in payment of principal or interest on bonds or other obligations; while 340 enterprises reported no arrearage. There were 38 enterprises, covering 339,408 acres, which reported a total of 225,893 acres delinquent in drainage taxes, and 313 enterprises, covering 494,894 acres, that reported no delinquency, while 22 failed to report.

STATE TABLE 7.—LAND, CAPITAL INVESTED, AND AREA DELIN-
QUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN
PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER
OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delin- quent
	Acres	Per cent 100.0	Dollars	Per cent 100.0	
All enterprises.....	892,713	100.0	6,207,278	100.0	225,893
Enterprises in arrears.....	327,416	36.7	2,143,452	34.5	217,305
With some delinquent land.....	284,007	31.0	1,302,546	22.0	217,305
With no delinquent land.....	12,969	1.5	145,556	2.3	—
With no report on delin- quency.....	20,450	3.3	635,351	10.2	—
Enterprises not in arrears.....	565,297	63.3	4,063,826	65.5	8,408
With some delinquent land.....	54,411	6.1	503,210	8.0	8,408
With no delinquent land.....	481,925	54.0	3,280,004	53.0	—
With no report on delin- quency.....	28,961	3.2	180,616	2.0	—

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported. Nearly two-thirds of the drained land is in enterprises organized primarily to reclaim swamp or marsh land. This land is located mainly in the central and southeastern parts of the State.

STATE TABLE 8.—LAND AND CAPITAL, BY PURPOSE OF DRAIN-
AGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	892,713	100.0	6,207,278	100.0
Reclamation of swamp land not pre- viously in farms.....	571,143	64.0	3,387,682	54.0
Improvement of land already in farms.....	317,310	35.5	2,790,824	45.0
Protection against overflow.....	4,260	0.5	22,772	0.4

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. State Table 9 shows that approximately 82 per cent of the drained land in Wisconsin is in enterprises organized between 1900 and 1920.

STATE TABLE 9.—LAND AND CAPITAL, BY DATE OF ORGANI-
ZATION, 1930

DATE OF ORGANIZA- TION	Land		Area of enter- prises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Acres	Over- lapped acres	Dollars	Per cent 100.0
All enterprises.....	892,713	100.0	895,698	2,985	6,207,278	100.0
1870-1879.....	5,247	0.0	5,247	—	7,192	0.1
1880-1889.....	13,231	1.5	13,231	—	81,588	0.5
1890-1899.....	5,468	0.0	5,468	—	11,535	0.2
1900-1904.....	239,021	26.8	239,021	—	1,469,961	23.7
1905-1909.....	167,882	18.8	168,582	700	1,168,273	18.8
1910-1914.....	113,604	12.7	113,604	—	818,828	13.2
1915-1919.....	216,468	24.2	217,833	1,365	1,453,117	23.4
1920-1924.....	117,074	13.1	117,994	920	986,930	15.9
1925-1929.....	14,728	1.7	14,728	—	269,866	4.2

¹ Includes overlap.

STATE TABLE 10.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement
	Total	Condition of land			Acres	
		Improved land	Wood-land	Other unimproved land		
	Acres	P. cent	Acres	Acres	Acres	
All enterprises.....	892,713	59.6	114,273	246,471	187,701	
1870-1879.....	5,247	80.0	1,050	1,050	—	
1880-1889.....	13,231	85.1	1,955	1,955	—	
1890-1899.....	5,458	66.0	1,858	1,858	250	
1900-1904.....	239,021	44.0	21,700	112,090	99,200	
1905-1909.....	167,882	66.8	32,031	23,773	14,179	
1910-1914.....	113,604	73.9	9,930	19,761	26,978	
1915-1919.....	216,468	50.3	42,485	65,142	37,750	
1920-1924.....	117,074	78.1	7,377	18,261	9,044	
1925-1929.....	14,728	77.5	736	2,581	330	

Method of maintenance.—In the case of drainage districts under the jurisdiction of the circuit courts, the commissioners of the district are required to report to the court in July of each year with an itemized statement showing the estimated amount which it will be necessary to raise by assessment for incidental expenses and repairs and maintenance during the ensuing year. The court hears any remonstrance that may be made against this report, confirms same as submitted or as modified, and fixes and determines the amount which will be assessed. The assessment is apportioned according to the confirmed benefits, and the fund so created is known as "assessments for repairs."

Under the Farm Drainage Law the drainage board of every county is required to make an annual report to the county court regarding each "drainage" under its control, and this report includes an estimate of the amount which it will be necessary to raise by assessment to be used for repairs and maintenance during the ensuing year. After due hearing on this report, the court confirms same as submitted or as modified and the amount so confirmed is assessed in the same proportion as assessments for construction, and immediately becomes a lien upon the property assessed.

Some enterprises reported more than one method of maintenance. The land and capital of such enterprises are classified in State Table 11 according to the principal method shown.

Systematic maintenance was reported by 211 enterprises, covering 340,277 acres of land, and having an

invested capital of \$2,902,604. There were 162 enterprises, with an invested capital of \$3,304,674 and covering 552,436 acres of land, which did not have systematic maintenance.

There were 2 enterprises, with an invested capital of \$8,500 and covering 3,300 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 371 enterprises, with an invested capital of \$6,198,778 and covering 889,413 acres of land, did not report any such equipment.

STATE TABLE 11.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	892,713	100.0	6,207,278	100.0
By district forces.....	352,749	39.5	1,934,428	31.2
By contract.....	150,983	16.9	1,703,500	28.4
By work apportioned to landowners..	99,586	11.2	453,023	7.3
Other, none, and not reported.....	289,395	32.4	2,056,327	33.1

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported *no* cost as well as those that reported *some* cost in 1929, in order to determine a fair average cost of maintenance for the State. For 1929, approximately, 54 per cent of the land reported some cost, while 46 per cent reported no cost. The average cost for all enterprises was 5 cents per acre. Expenditures for operation and maintenance of drainage works vary greatly from year to year.

STATE TABLE 12.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
	Acres	Dollars	Dollars
All enterprises reporting.....	892,713	44,950	0.05
Gravity drainage only.....	890,713	44,056	0.05
Ditches and levees.....	578,982	23,975	0.04
Tile drains.....	17,608	1,493	0.08
Ditches, tile drains, and levees.....	204,123	19,188	0.09
Drainage, part gravity and part by pumping.....	2,000	300	0.15

DRAINAGE—WISCONSIN

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COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 12, 991	Number 21, 838	Acres 423, 890	Acres 658, 411		Number 181, 767	Acres 21, 874, 155	Acres 10, 200, 455		Acres 5, 705, 302	Acres 35, 863, 840
The State.....									
Adams.....	12	87	6, 476	7, 827	1, 230	258, 005	107, 388	88, 280	437, 760
Barron.....	43	117	863	2, 477	4, 480	458, 124	109, 389	165, 263	566, 400
Brown.....	141	517	4, 050	12, 701	3, 076	205, 080	171, 682	50, 216	338, 560
Burnett.....	27	145	786	4, 035	1, 721	207, 884	69, 640	103, 708	550, 400
Calumet.....	245	255	4, 413	5, 060	2, 018	102, 538	111, 204	23, 850	207, 860
Chippewa.....	55	123	1, 366	2, 340	3, 736	407, 106	109, 888	148, 248	604, 000
Clark.....	33	188	950	4, 804	5, 068	502, 752	200, 631	150, 250	770, 520
Columbia.....	205	436	0, 308	11, 344	3, 042	445, 355	252, 533	59, 270	497, 920
Dane.....	580	721	16, 777	16, 850	5, 850	710, 214	403, 438	89, 025	769, 280
Dodge.....	814	1, 051	16, 007	22, 152	4, 586	515, 455	324, 918	34, 530	474, 080
Door.....	135	181	3, 577	2, 086	2, 060	231, 377	112, 374	64, 178	300, 160
Douglas.....	44	55	1, 136	1, 012	1, 922	100, 961	60, 570	82, 022	855, 080
Dunn.....	31	123	864	2, 085	3, 515	486, 388	227, 113	105, 201	556, 160
Fond du Lac.....	286	535	8, 725	14, 702	4, 085	432, 284	267, 455	27, 725	464, 640
Green.....	190	210	6, 835	6, 835	2, 386	350, 597	185, 070	32, 412	370, 520
Green Lake.....	58	131	2, 433	4, 422	1, 403	206, 333	117, 702	21, 940	230, 400
Iowa.....	53	67	1, 044	1, 009	2, 436	458, 034	180, 398	99, 954	499, 840
Jackson.....	57	87	1, 208	4, 621	2, 284	340, 569	141, 401	118, 910	633, 600
Jefferson.....	025	1, 022	14, 462	23, 450	3, 209	323, 653	191, 170	28, 554	353, 280
Juneau.....	250	537	17, 227	35, 027	2, 221	304, 302	132, 005	100, 702	513, 280
Kenosha.....	014	801	32, 450	30, 804	1, 220	130, 502	82, 720	12, 998	180, 480
Kewaunee.....	235	455	5, 763	14, 083	1, 972	207, 118	111, 805	36, 007	215, 680
La Crosse.....	25	576	576	576	1, 733	273, 294	113, 204	98, 039	307, 840
Lafayette.....	80	107	2, 090	2, 803	2, 254	375, 292	190, 635	33, 918	410, 880
Manitowoc.....	007	1, 404	24, 302	34, 705	3, 767	350, 069	103, 321	51, 508	385, 280
Marathon.....	30	66	1, 276	1, 688	0, 359	713, 796	202, 010	254, 514	994, 560
Marinette.....	23	181	932	5, 735	2, 307	200, 527	92, 122	97, 408	905, 600
Marquette.....	64	222	2, 254	8, 287	1, 302	251, 930	110, 078	64, 250	292, 480
Millwaukee.....	585	1, 167	13, 170	22, 542	1, 761	76, 608	54, 804	7, 031	150, 400
Monroe.....	130	181	8, 034	8, 494	3, 366	466, 234	184, 002	100, 269	599, 680
Oconto.....	132	242	3, 092	0, 531	2, 784	305, 804	132, 522	90, 800	715, 520
Outagamie.....	519	701	20, 603	20, 772	3, 460	336, 179	102, 450	50, 627	413, 440
Ozaukee.....	560	617	12, 416	13, 477	1, 571	131, 893	85, 431	15, 975	140, 120
Polk.....	55	103	884	2, 157	4, 142	444, 011	175, 470	179, 540	598, 400
Portage.....	186	312	21, 003	31, 018	3, 016	410, 614	202, 763	101, 964	519, 680
Racine.....	1, 009	1, 019	54, 229	71, 843	1, 854	175, 203	114, 222	13, 388	207, 300
Richland.....	90	116	1, 080	1, 044	2, 442	357, 898	131, 708	126, 701	377, 600
Rock.....	246	335	7, 826	11, 876	3, 361	418, 162	209, 051	30, 441	458, 240
Rusk.....	30	44	523	596	2, 058	200, 049	53, 722	77, 643	502, 000
Sauk.....	146	200	3, 867	4, 521	3, 485	490, 412	221, 353	134, 008	538, 880
Shawano.....	288	303	5, 583	0, 450	3, 737	434, 540	102, 250	138, 205	741, 120
Sheboygan.....	570	1, 292	14, 849	34, 208	3, 513	298, 064	172, 240	37, 452	333, 440
Taylor.....	110	1, 142	1, 142	1, 142	2, 464	246, 065	70, 245	107, 002	634, 240
Trempealeau.....	71	98	1, 729	1, 293	3, 051	444, 201	204, 013	116, 861	478, 720
Walworth.....	407	560	14, 160	16, 020	2, 562	313, 300	188, 555	35, 648	358, 400
Washington.....	377	623	7, 141	0, 330	2, 723	200, 921	153, 893	35, 813	275, 840
Waukesha.....	412	1, 075	8, 987	18, 202	3, 164	206, 535	179, 504	34, 978	351, 300
Waupaca.....	162	345	3, 603	7, 473	3, 487	400, 520	178, 152	100, 264	485, 760
Waushara.....	63	190	2, 810	0, 595	2, 180	337, 527	174, 050	74, 278	413, 440
Winnebago.....	530	709	16, 030	21, 408	2, 573	252, 789	153, 050	19, 048	203, 760
Wood.....	101	350	7, 321	22, 876	2, 819	306, 188	127, 229	84, 100	517, 760
All other counties.....	203	673	3, 608	14, 174	34, 970	4, 597, 640	1, 823, 132	1, 012, 078	11, 204, 080

¹ Drainage was reported on farms in all counties in 1930. No drainage on farms reported in Crawford, Florence, Grant, Iron, La Crosse, Langlade, Lincoln, Oneida, Pierce, St. Croix, Sawyer, Taylor, Vernon, and Vilas Counties for 1920.

DRAINAGE—WISCONSIN

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)		THE STATE	Adams	Clark	Columbia	Dane	Dodge	Fond du Lac
LAND AREA								
1	Approximate land area..... 1930..... acres.....	35,303,840	437,760	770,520	497,920	769,280	574,080	464,040
2	Land in enterprises..... 1930..... acres.....	892,713	14,386	98,000	20,779	61,247	28,116	8,957
3	..... 1920..... acres.....	794,569	16,300	98,000	4,068	30,230	21,597	5,935
4	Increase, ¹ 1920-1930..... per cent.....	12.4	-12.2		345.1	56.1	30.2	50.9
5	Area of all enterprises (overlapping areas included)..... 1930..... acres.....	895,698	14,386	98,000	21,470	61,912	28,116	8,957
6	Excess over land in enterprises (total areas overlapping)..... 1930..... acres.....	2,985			700	665		
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop..... 1930..... acres.....	157,003		48,000	2,027	2,360	9,615	1,852
8	Land unfit to raise any crop prior to drainage..... acres.....	630,105	13,386	65,000	13,572	28,096	20,338	5,122
9	Decrease since drainage..... per cent.....	75.1	100.0	23.2	85.1	91.0	52.7	63.8
10	Land fit to raise a normal crop..... 1930..... acres.....	548,545	13,386	25,000	15,722	46,313	15,954	5,755
11	Land fit to raise a normal crop prior to drainage..... acres.....	134,441		10,500	5,287	15,092	2,818	2,536
12	Increase since drainage ¹ per cent.....	308.0		51.5	198.3	195.1	466.1	127.0
13	Land fit to raise a partial crop..... 1930..... acres.....	187,075	1,000	25,000	2,980	12,574	2,547	1,350
14	Land fit to raise a partial crop prior to drainage..... acres.....	128,077	1,000	10,500	1,920	17,459	4,060	1,300
15	Decrease since drainage ¹ per cent.....	+46.1		+51.5	+55.2	28.0	48.6	+3.8
16	Improved land..... 1930..... acres.....	531,969	10,000	25,000	16,929	56,303	17,854	7,046
17	..... 1920..... acres.....	254,504	9,834	9,800	2,204	6,535	4,482	1,778
18	Increase, 1920-1930..... per cent.....	109.0	1.7	155.1	668.1	761.0	298.3	296.7
Unimproved land—								
19	Woodland..... 1930..... acres.....	114,278	4,386	25,000	900		200	415
20	Other..... 1930..... acres.....	240,471		48,000	2,050	4,944	10,002	1,497
21	Land in occupied farms..... 1930..... acres.....	574,892	14,386	25,000	20,579	59,197	28,116	8,357
22	Land in planted crops..... 1930..... acres.....	360,522	1,370	15,000	12,794	47,151	12,585	6,725
23	Woodland cleared and cultivated since drainage..... 1930..... acres.....	40,850				160		1,000
24	Land idle..... 1930..... acres.....	378,406	4,386	78,000	4,560	4,092	10,782	2,002
25	Land available for settlement..... 1930..... acres.....	187,791		25,000	80	30		
DRAINAGE WORKS, 1930								
26	Ditches— Completed..... miles.....	1,980.4	56.0	14.0	53.7	223.8	110.0	30.9
27	Additional under construction..... miles.....	4.7						1.5
Tile drains—								
28	Completed..... miles.....	303.4			40.1	39.6	4.0	21.5
29	Additional under construction..... miles.....	1.0						
Levees and dikes—								
30	Completed..... miles.....	0.0						
Pumping plants—								
31	Engine capacity..... horsepower.....	40						
32	Pump capacity..... gals. per min.....	5,000						
33	Land served by pumps..... acres.....	50						
34	Land drained by ditches only ² acres.....	572,082	14,386	98,000	8,400	21,848	23,090	5,530
35	Length of ditches..... miles.....	1,345.0	56.0	14.0	31.7	82.0	111.1	25.9
36	Land drained by tile only..... acres.....	17,008			980	3,740	120	
37	Length of tile..... miles.....	77.2			4.1	13.1	1.8	
38	Land drained by ditches and tile ² acres.....	281,186			11,309	35,604	4,000	3,427
39	Length of ditches..... miles.....	545.1			22.0	140.9	5.8	6.5
40	Length of tile..... miles.....	226.2			42.0	26.5	2.8	21.5
41	Land having ditches and levees..... acres.....	6,000						
42	Length of ditches..... miles.....	12.0						
43	Length of levees..... miles.....	4.0						
44	Land having ditches, tile drains, and levees..... acres.....	12,937						
45	Length of ditches..... miles.....	80.0						
46	Length of tile..... miles.....	1.0						
47	Length of levees..... miles.....	2.0						
48	Land drained by pumps and other drainage works ³ acres.....	2,000						
49	Length of ditches..... miles.....	12.0						
50	Length of levees..... miles.....	3.0						
CAPITAL INVESTED AND COST PER ACRE								
51	Capital invested in enterprises to Jan. 1, 1930..... dollars.....	6,207,278	128,285	172,500	220,730	703,598	80,183	68,126
52	..... 1920..... dollars.....	4,163,055	98,000	44,000	41,352	326,313	95,545	72,000
53	Increase, ¹ 1920-1930..... per cent.....	49.1	30.9	292.0	433.8	143.2	-16.1	-5.5
54	Estimated cost of enterprises when completed..... 1930..... dollars.....	6,220,398	128,285	172,500	220,730	703,598	80,183	68,846
55	..... 1920..... dollars.....	4,564,025	98,000	159,000	41,352	346,313	95,545	72,000
56	Average, per acre when completed..... 1930..... dollars.....	0.97	8.92	1.76	10.82	12.90	2.86	7.69
57	..... 1920..... dollars.....	5.74	5.98	1.02	8.86	8.83	4.42	12.14
Invested in and required for completion of—								
58	Enterprises having ditches only..... 1930..... dollars.....	3,295,281	128,285	172,500	62,197	190,668	60,325	51,848
59	Average, per acre..... dollars.....	5.75	8.92	1.76	7.32	8.73	2.51	9.38
60	Enterprises having tile drains only..... 1930..... dollars.....	295,990			9,080	75,623	1,600	
61	Average, per acre..... dollars.....	10.81			9.26	20.22	13.38	
62	Enterprises having ditches and tile drains..... 1930..... dollars.....	2,400,118			149,453	527,307	18,258	10,098
63	Average, per acre..... dollars.....	8.54			13.22	14.78	4.56	4.00
64	Enterprises having ditches and levees..... 1930..... dollars.....	85,000						
65	Average, per acre..... dollars.....	14.17						
66	Enterprises having ditches, tile drains, and levees..... 1930..... dollars.....	140,500						
67	Average, per acre..... dollars.....	10.86						
68	Enterprises having pumps and other drainage works..... 1930..... dollars.....	3,500						
69	Average, per acre..... dollars.....	1.75						

¹ A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.
² When works under construction have been completed.
³ Area of enterprises having some land served by pumps.

DRAINAGE—WISCONSIN

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Green	Jackson	Jefferson	Juneau	Kenosha	Mari- nette	Millwau- kee	Monroe
LAND AREA									
1	Approximate land area..... 1930..... acres..	370,520	633,600	353,280	513,280	180,480	905,000	150,400	509,080
2	Land in enterprises..... 1930..... acres..	5,094	46,528	38,652	139,539	14,906	6,000	6,044	44,854
3	..... 1920..... acres..	(1)	46,760	17,461	133,297	11,803	(1)	8,392	41,100
4	Increase, 1920-1930..... per cent..		-0.5	121.4	4.7	27.0		-20.8	-26.6
5	Area of all enterprises (overlapping areas included)..... 1930..... acres..	5,094	46,528	38,692	139,530	14,906	6,000	6,044	44,854
6	Excess over land in enterprises (total areas overlapping)..... 1930..... acres..			40					
CONDITION AND USE OF LAND									
7	Land unfit to raise any crop..... 1930..... acres..	300	11,770	7,109	13,811			295	11,511
8	Land unfit to raise any crop prior to drainage..... 1930..... acres..	2,422	32,832	22,421	103,222	9,878	5,000	5,000	43,748
9	Decrease since drainage..... per cent..	87.0	64.2	68.3	86.6	100.0	100.0	94.1	73.7
10	Land fit to raise a normal crop..... 1930..... acres..	3,612	23,720	25,023	76,381	14,196	6,000	6,248	20,787
11	Land fit to raise a normal crop prior to drainage..... 1930..... acres..	558	5,139	9,153	19,200	2,070	1,000	367	1,021
12	Increase since drainage..... per cent..	547.3	361.6	173.4	296.6	431.7	600.0		
13	Land fit to raise a partial crop..... 1930..... acres..	1,182	11,038	6,520	49,347	2,450		101	12,556
14	Land fit to raise a partial crop prior to drainage..... 1930..... acres..	2,114	8,557	7,078	17,067	800		1,268	85
15	Decrease since drainage..... per cent..	44.1	+20.0	7.0	+186.3	67.3		92.0	
16	Improved land..... 1930..... acres..	3,894	31,393	31,793	48,776	14,490	6,000	6,360	19,312
17	..... 1920..... acres..	(1)	4,140	5,030	27,004	10,277	(1)	7,955	27,641
18	Increase, 1920-1930..... per cent..		658.3	404.7	74.8	41.0		-13.5	-30.1
Unimproved land—									
19	Woodland..... 1930..... acres..		10,846		20,209	200		151	5,624
20	Other..... 1930..... acres..	1,200	4,280	6,850	70,554	300		133	19,918
21	Land in occupied farms..... 1930..... acres..	4,194	16,924	38,522	48,050	14,900	6,000	6,830	19,606
22	Land in planted crops..... 1930..... acres..	2,487	12,545	25,050	24,600	13,986	3,600	5,955	15,159
23	Woodland cleared and cultivated since drainage..... 1930..... acres..	50	1,329	10	4,080			10	16,824
24	Land idle..... 1930..... acres..	1,200	20,097	7,360	96,916	506	3,000	607	14,985
25	Land available for settlement..... 1930..... acres..	900	13,540	120	70,563			105	14,500
DRAINAGE WORKS, 1930									
Ditches—									
26	Completed..... miles..	15.7	34.5	117.3	251.0	32.0	14.0	31.8	79.7
27	Additional under construction..... miles..				0.2				0.8
Tile drains—									
28	Completed..... miles..	16.6	7.0	8.7	19.7	5.6		6.0	2.0
29	Additional under construction..... miles..								
Levees and dikes—									
30	Completed..... miles..								
Pumping plants—									
31	Engine capacity..... horsepower..								
32	Pump capacity..... gals. per min..								
33	Land served by pumps..... acres..								
34	Land drained by ditches only..... acres..	2,364	1,540	27,868	52,565	5,000	6,000	5,717	44,500
35	Length of ditches..... miles..	7.0	8.0	93.3	114.7	16.5	14.0	28.8	73.5
36	Land drained by tile only..... acres..	340		193	936	776		100	
37	Length of tile..... miles..	1.5		1.0	3.5	1.9		1.3	
38	Land drained by ditches and tile..... acres..	2,400	44,988	10,501	86,038	8,500		821	354
39	Length of ditches..... miles..	8.7	26.5	24.0	136.5	15.5		3.0	4.0
40	Length of tile..... miles..	15.1	7.0	7.7	16.2	3.7		5.3	2.0
41	Land having ditches and levees..... acres..								
42	Length of ditches..... miles..								
43	Length of levees..... miles..								
44	Land having ditches, tile drains, and levees..... acres..								
45	Length of ditches..... miles..								
46	Length of tile..... miles..								
47	Length of levees..... miles..								
48	Land drained by pumps and other drainage works..... acres..								
49	Length of ditches..... miles..								
50	Length of levees..... miles..								
CAPITAL INVESTED AND COST PER ACRE									
51	Capital invested in enterprises to Jan. 1, 1930..... dollars..	55,710	206,940	86,658	787,000	108,959	25,000	93,887	290,872
52	..... 1920..... dollars..	(1)	101,800	47,187	739,100	100,100	(1)	110,120	165,113
53	Increase, 1920-1930..... per cent..		103.3	83.0	6.0	8.8		-14.7	76.2
54	Estimated cost of enterprises when completed..... 1930..... dollars..	55,710	206,940	86,658	788,160	108,959	25,000	93,887	291,872
55	..... 1920..... dollars..	(1)	113,570	47,187	761,004	100,100	(1)	110,120	167,039
56	Average, per acre when completed..... 1930..... dollars..	10.94	4.45	2.24	5.65	7.20	4.17	14.13	0.51
57	..... 1920..... dollars..	(1)	2.43	2.70	5.71	8.48	(1)	13.12	2.73
Invested in and required for completion of—									
58	Enterprises having ditches only..... 1930..... dollars..	10,216	20,000	28,234	204,490	78,011	25,000	54,007	237,000
59	Average, per acre..... dollars..	8.16	12.09	1.01	3.89	13.78	4.17	0.50	6.45
60	Enterprises having tile drains only..... 1930..... dollars..	4,777		10,800	11,500	12,609		3,005	
61	Average, per acre..... dollars..	14.05		65.66	12.29	16.33		28.35	
62	Enterprises having ditches and tile drains..... 1930..... dollars..	31,717	180,940	47,624	572,170	18,279		36,215	4,872
63	Average, per acre..... dollars..	13.22	4.16	4.50	0.05	2.14		44.11	13.76
64	Enterprises having ditches and levees..... 1930..... dollars..								
65	Average, per acre..... dollars..								
66	Enterprises having ditches, tile drains, and levees..... 1930..... dollars..								
67	Average, per acre..... dollars..								
68	Enterprises having pumps and other drainage works..... 1930..... dollars..								
69	Average, per acre..... dollars..								

¹ Included in "Other counties."

² A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.

³ When works under construction have been completed.

DRAINAGE—WISCONSIN

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

ITEM (See definitions in Introduction)		Outagamie	Ozaukee	Portage	Racine	Rock	Rusk	Shawano	Sheboygan
LAND AREA									
1	Approximate land area..... 1930..... acres..	418,440	149,120	519,680	207,360	458,240	592,000	741,120	333,440
2	Land in enterprises..... 1930..... acres..	24,880	6,633	61,028	54,710	11,757	6,385	23,200	10,588
3	..... 1920..... acres..	18,305	5,909	67,567	61,847	15,792	5,174	4,000	7,106
4	Increase, ¹ 1920-1930..... per cent..	35.9	11.3	-0.7	-11.5	-25.6	23.4	404.3	49.0
5	Area of all enterprises (overlapping areas included)..... 1930..... acres..	24,880	6,633	61,028	54,710	11,757	6,385	23,900	10,588
6	Excess over land in enterprises (total areas overlapping)..... 1930..... acres..							700	
CONDITION AND USE OF LAND									
7	Land unfit to raise any crop..... 1930..... acres..	550		1,500		800	1,212	5,600	
8	Land unfit to raise any crop prior to drainage..... 1930..... acres..	13,700	2,725	61,028	32,800	5,375	1,935	16,200	8,017
9	Decrease since drainage..... per cent..	96.0	100.0	97.5	100.0	85.1	37.4	63.2	100.0
10	Land fit to raise a normal crop..... 1930..... acres..	22,710	6,388	51,780	51,380	5,060	3,233	12,350	3,956
11	Land fit to raise a normal crop prior to drainage..... 1930..... acres..	7,380	3,588	17,700	17,700	2,200	88		627
12	Increase since drainage ¹ per cent..	207.7	78.0		190.3	157.3			532.5
13	Land fit to raise a partial crop..... 1930..... acres..	1,020	245	7,730	3,330	5,297	1,940	5,250	0,622
14	Land fit to raise a partial crop prior to drainage..... 1930..... acres..	3,800	320	4,210	4,210	4,182	4,362	8,000	1,944
15	Decrease since drainage ¹ per cent..	57.4	23.4		20.9	+26.7	55.5	34.4	+240.6
16	Improved land..... 1930..... acres..	20,870	6,088	51,989	52,380	10,407	3,233	12,650	3,721
17	..... 1920..... acres..	5,408	4,402	21,734	47,205	5,372	1,104	2,970	501
18	Increase, 1920-1930..... per cent..	281.7	36.4	139.2	10.8	93.7	192.8	325.9	563.3
Unimproved land—									
19	Woodland..... 1930..... acres..	2,400	485		100		1,250		0,767
20	Other..... 1930..... acres..	1,520	60	9,039	2,230	1,350	1,893	10,550	100
21	Land in occupied farms..... 1930..... acres..	23,560	6,593	35,540	51,380	11,757	6,385	12,000	4,376
22	Land in planted crops..... 1930..... acres..	20,370	5,638	14,861	30,280	6,707	2,451	9,550	2,651
23	Woodland cleared and cultivated since drainage..... 1930..... acres..	380		7,746					
24	Land idle..... 1930..... acres..	1,050	545	25,483	2,530	1,350	1,802	11,000	6,767
25	Land available for settlement..... 1930..... acres..	250		23,988	3,280			5,650	
DRAINAGE WORKS, 1930									
Ditches—									
26	Completed..... miles..	73.3	8.0	126.5	90.4	37.0	24.8	22.8	43.4
27	Additional under construction..... miles..							2.2	
Tile drains—									
28	Completed..... miles..	0.1	22.8		45.0		15.3		5.0
29	Additional under construction..... miles..								
Levees and dikes—									
30	Completed..... miles..								
Pumping plants—									
31	Engine capacity..... horsepower..								
32	Pump capacity..... gals. per min..								
33	Land served by pumps..... acres..								
34	Land drained by ditches only ¹ acres..	20,760	535	61,028	21,200	11,757	2,165	23,200	9,627
35	Length of ditches..... miles..	64.8	1.6	126.5	30.8	37.0	8.3	25.0	39.4
36	Land drained by tile only..... acres..		3,998		3,010		1,877		561
37	Length of tile..... miles..		13.8		15.0		7.3		4.4
38	Land drained by ditches and tile ² acres..	4,120	2,100		30,500		2,343		400
39	Length of ditches..... miles..	9.0	7.0		59.6		18.5		4.0
40	Length of tile..... miles..	0.1	4.0		30.6		8.0		1.5
41	Land having ditches and levees..... acres..								
42	Length of ditches..... miles..								
43	Length of levees..... miles..								
44	Land having ditches, tile drains, and levees..... acres..								
45	Length of ditches..... miles..								
46	Length of tile..... miles..								
47	Length of levees..... miles..								
48	Land drained by pumps and other drainage works..... acres..								
49	Length of ditches..... miles..								
50	Length of levees..... miles..								
CAPITAL INVESTED AND COST PER ACRE									
51	Capital invested in enterprises to Jan. 1, 1930..... dollars..	108,365	91,767	437,120	447,535	81,885	71,765	30,100	317,602
52	..... 1920..... dollars..	117,540	60,100	441,920	406,000	83,375	60,510	9,740	135,033
53	Increase, ¹ 1920-1930..... per cent..	-7.4	52.5	10.2	10.2	-7.3	8.2	200.0	135.2
54	Estimated cost of enterprises when completed..... 1930..... dollars..	108,365	91,767	437,120	447,535	81,885	71,765	31,000	317,662
55	..... 1920..... dollars..	167,540	63,160	441,920	406,000	83,375	82,510	10,490	260,033
56	Average, per acre when completed..... 1930..... dollars..	4.38	13.33	7.98	8.18	6.90	11.24	1.34	30.00
57	..... 1920..... dollars..	0.16	10.60	6.64	6.60	5.60	15.95	2.28	36.59
Invested in and required for completion of—									
58	Enterprises having ditches only..... 1930..... dollars..	80,217	6,057	437,120	102,246	81,885	14,095	31,000	206,975
59	Average, per acre..... dollars..	3.86	11.32	7.98	4.82	6.90	6.51	1.34	36.85
60	Enterprises having tile drains only..... 1930..... dollars..		30,210		88,700		17,112		11,860
61	Average, per acre..... dollars..		7.55		29.47		9.12		21.14
62	Enterprises having ditches and tile drains..... 1930..... dollars..	28,648	55,500		256,589		40,558		8,767
63	Average, per acre..... dollars..	6.95	26.43		8.41		17.31		21.92
64	Enterprises having ditches and levees..... 1930..... dollars..								
65	Average, per acre..... dollars..								
66	Enterprises having ditches, tile drains, and levees..... 1930..... dollars..								
67	Average, per acre..... dollars..								
68	Enterprises having pumps and other drainage works..... 1930..... dollars..								
69	Average, per acre..... dollars..								

¹ A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.
² When works under construction have been completed.

DRAINAGE—WISCONSIN

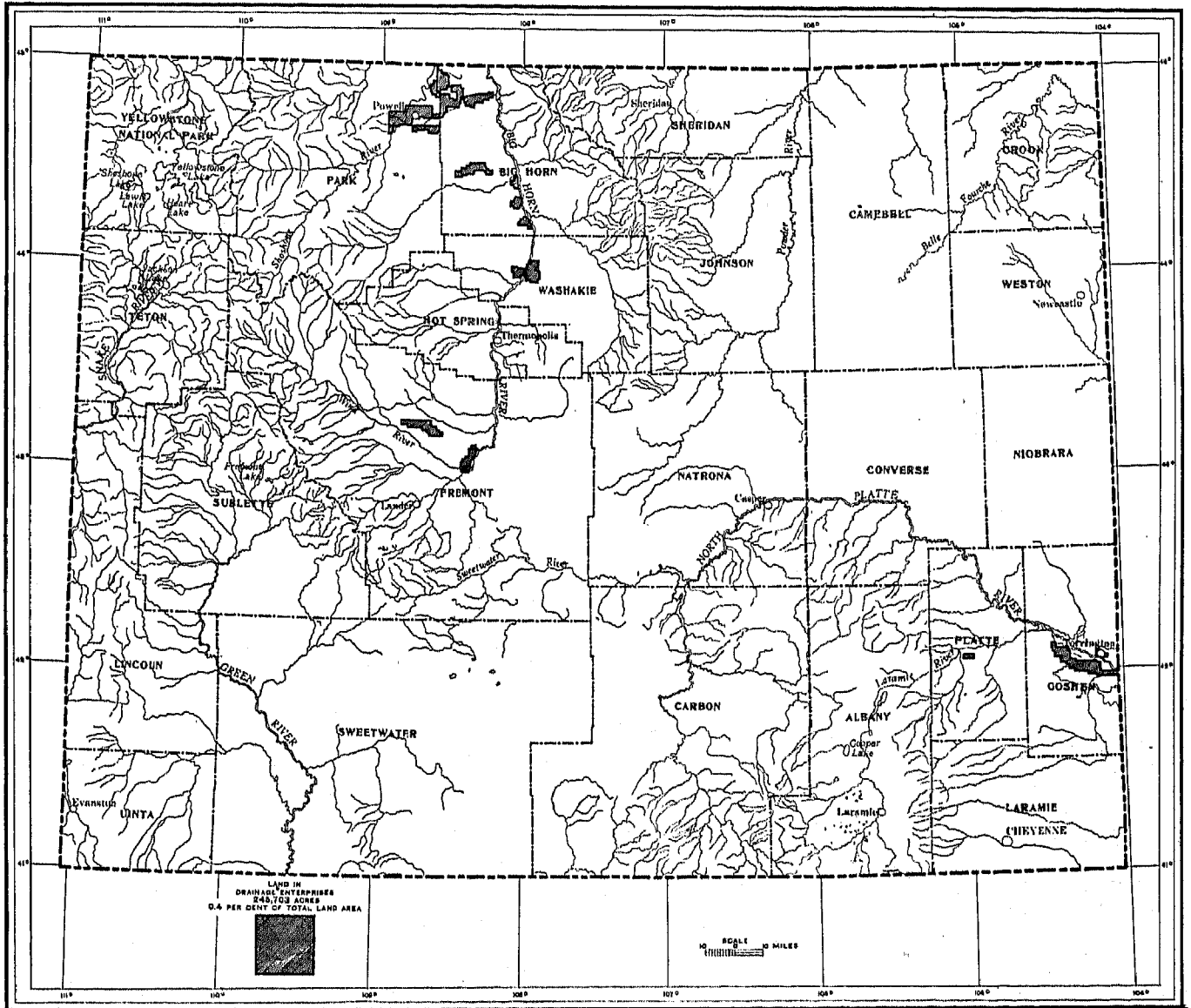
COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930—Continued

	ITEM (See definitions in Introduction)	Walworth	Waukesha	Waupaca	Waushara	Winnebago	Wood	Other counties ¹
LAND AREA								
1	Approximate land area.....1930.....acres.....	358,400	351,300	485,700	413,440	293,700	517,760	7,138,560
2	Land in enterprises.....1930.....acres.....	7,340	6,139	7,190	13,939	6,180	64,073	53,979
3	.....1920.....acres.....	8,910	7,848	(2)	7,240	6,246	64,343	48,089
4	Increase, ³ 1920-1930.....per cent.....	-17.6	-21.8		92.6	-1.0	1.0	10.2
5	Area of all enterprises (overlapping areas included).....1930.....acres.....	7,340	6,139	7,190	14,819	6,180	64,073	53,979
6	Excess over land in enterprises (total areas overlapping).....1930.....acres.....				880			
CONDITION AND USE OF LAND								
7	Land unfit to raise any crop.....1930.....acres.....	310	1,218	350	4,095	600	21,750	10,648
8	Land unfit to raise any crop prior to drainage.....acres.....	4,910	4,115	3,000	6,334	3,000	56,795	41,187
9	Decrease since drainage.....per cent.....	93.7	70.4	88.3	36.8	83.3	61.7	74.1
10	Land fit to raise a normal crop.....1930.....acres.....	6,700	4,014	5,060	7,077	4,450	30,381	28,250
11	Land fit to raise a normal crop prior to drainage.....acres.....	1,000	10	1,300	4,020	1,600	7,600	3,708
12	Increase since drainage ³.....per cent.....	324.4		358.5	43.8	178.1	374.0	649.7
13	Land fit to raise a partial crop.....1930.....acres.....	240	907	880	2,867	1,230	6,842	15,081
14	Land fit to raise a partial crop prior to drainage.....acres.....	800	2,014	2,800	2,085	1,680	518	9,024
15	Decrease since drainage ³.....per cent.....	70.0	55.0	69.6	+0.4	22.2		+67.1
16	Improved land.....1930.....acres.....	6,900	4,012	6,050	5,370	4,700	22,443	25,371
17	.....1920.....acres.....	4,018	4,767	(2)	450	3,710	18,911	10,100
18	Increase, ³ 1920-1930.....per cent.....	70.4	-15.0			26.7	18.7	57.5
Unimproved land—								
19	Woodland.....1930.....acres.....		439	190	3,045		16,000	14,067
20	Other.....1930.....acres.....	440	1,058	350	4,024	1,480	20,530	13,041
21	Land in occupied farms.....1930.....acres.....	7,340	6,110	7,070	11,860	4,650	27,108	47,710
22	Land in planted crops.....1930.....acres.....	6,340	3,468	4,300	3,500	2,050	14,094	18,875
23	Woodland cleared and cultivated since drainage.....1930.....acres.....		100		985		3,150	5,326
24	Land idle.....1930.....acres.....	460	2,481	1,320	9,360	1,480	40,685	28,087
25	Land available for settlement.....1930.....acres.....			110			17,676	3,100
DRAINAGE WORKS, 1930								
26	Ditches—Completed.....miles.....	25.3	40.7	5.5	28.4	10.5	260.0	127.0
27	Additional under construction.....miles.....							
28	Tile drains—Completed.....miles.....	8.3	0.8	2.5		2.0	2.3	19.8
29	Additional under construction.....miles.....			1.0				
30	Levees and dikes—Completed.....miles.....						2.0	7.0
Pumping plants—								
31	Engine capacity.....horsepower.....							40
32	Pump capacity.....gals. per min.....							5,000
33	Land served by pumps.....acres.....							50
34	Land drained by ditches only ⁴.....acres.....	2,040	4,211	2,610	13,939	4,180	41,836	34,545
35	Length of ditches.....miles.....	17.8	37.9	3.0	28.4	8.5	167.0	82.1
36	Land drained by tile only.....acres.....	200	71					700
37	Length of tile.....miles.....	1.5	(5)					2.0
38	Land drained by ditches and tile ⁴.....acres.....	4,200	1,857	4,580		2,000	10,200	10,734
39	Length of ditches.....miles.....	7.5	8.8	2.5		2.0	13.0	21.8
40	Length of tile.....miles.....	6.8	0.8	3.5		2.0	1.3	17.8
41	Land having ditches and levees.....acres.....							6,000
42	Length of ditches.....miles.....							12.0
43	Length of levees.....miles.....							4.0
44	Land having ditches, tile drains, and levees.....acres.....						12,937	
45	Length of ditches.....miles.....						80.0	
46	Length of tile.....miles.....						1.0	
47	Length of levees.....miles.....						2.0	
48	Land drained by pumps and other drainage works ⁵.....acres.....							2,000
49	Length of ditches.....miles.....							12.0
50	Length of levees.....miles.....							3.0
CAPITAL INVESTED AND COST PER ACRE								
51	Capital invested in enterprises to Jan. 1, 1930.....dollars.....	162,555	80,941	61,124	75,734	45,400	602,915	432,862
52	.....1920.....dollars.....	63,465	44,855	(2)	27,000	20,400	394,200	344,175
53	Increase, ³ 1920-1930.....per cent.....	140.4	80.5		180.5	122.5	52.0	25.8
54	Estimated cost of enterprises when completed.....1930.....dollars.....	162,555	80,941	71,124	75,734	45,400	602,915	432,862
55	.....1920.....dollars.....	63,465	44,835	(2)	27,000	20,400	394,200	383,305
56	Average, per acre when completed.....1930.....dollars.....	20.78	13.18	0.80	5.43	7.35	9.28	8.02
57	.....1920.....dollars.....	7.12	5.71	(2)	3.73	3.27	6.18	7.83
Invested in and required for completion of—								
58	Enterprises having ditches only.....1930.....dollars.....	57,730	40,520	18,024	75,734	12,400	394,870	213,358
59	Average, per acre.....dollars.....	19.04	0.62	7.14	5.43	2.07	9.44	6.18
60	Enterprises having tile drains only.....1920.....dollars.....	2,500	5,810					10,753
61	Average, per acre.....dollars.....	12.60	81.83					15.36
62	Enterprises having ditches and tile drains.....1930.....dollars.....	62,325	34,002	62,600		33,000	67,545	120,251
63	Average, per acre.....dollars.....	21.08	18.63	11.46		10.50	6.62	11.20
64	Enterprises having ditches and levees.....1930.....dollars.....							85,000
65	Average, per acre.....dollars.....							14.17
66	Enterprises having ditches, tile drains, and levees.....1930.....dollars.....						140,500	
67	Average, per acre.....dollars.....						10.86	
68	Enterprises having pumps and other drainage works.....1930.....dollars.....							3,500
69	Average, per acre.....dollars.....							1.76

¹ Includes Barron, Brown, Buffalo, Burnett, Calumet, Green Lake, Manitowoc, Marathon, Oconto, Polk, Price, Sauk, Trempealeau, and Washington Counties in 1930; and Barron, Brown, Buffalo, Burnett, Calumet, Door, Green, Green Lake, Manitowoc, Marathon, Marinette, Oconto, Polk, Trempealeau, Washington, and Waupaca Counties for 1920.
² Included in "Other counties."
³ A minus sign (-) denotes decrease. A plus sign (+) denotes increase. Per cent not shown when more than 1,000.
⁴ When works under construction have been completed.
⁵ Tile located in Milwaukee County.
⁶ Area of enterprises having some land served by pumps.

WYOMING

APPROXIMATE LOCATION OF LAND IN DRAINAGE ENTERPRISES



WYOMING

Introduction.—Statistics concerning the drainage of lands for agricultural purposes are presented in the following pages. The data relate to drainage conditions as of January 1, 1930, and the crop year 1929. The first drainage census for the United States was that of 1920 and statistics from that census are shown for purposes of comparison.

An organized drainage enterprise may include timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in 1930 on the general farm schedule and are shown in the first section of State Table 1 and in County Table I; while those for drainage enterprises were obtained on a special drainage schedule.

Since farm lands provided with drains may be either within or without an organized enterprise, and since these drains may be either supplemental to or independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

Summary and condition of land in enterprises.—Approximately 77 per cent of the land in drainage enterprises in Wyoming is located in the Big Horn Basin, in the northwestern quarter of the State, and the remaining 23 per cent lies in the Platte Basin in the southeastern portion. More than 50 per cent of the land in

enterprises lies in Park and Big Horn Counties. About 58 per cent of land in enterprises is in irrigation projects constructed by the United States Bureau of Reclamation. Approximately 74 per cent of the land was reported as improved, and less than 4 per cent was unfit to raise any crop for lack of drainage.

When the drainage work is done directly by an irrigation enterprise, the drainage enterprise has been considered as identical with the irrigation enterprise, as all irrigable lands are usually assessed for the necessary drainage work. However, in the 1920 census only the portion then served by drainage works was used as the area of such an enterprise. Of the 155,795 acres located in such enterprises in 1930, 99,000 acres are served by drainage works, and 7,200 acres are reported as in need of drainage.

The usual purpose of an organized enterprise is to provide adequate outlets into which the farms of the district may be drained, and to afford relief from overflow for the district as a unit. Therefore, the fact that an enterprise which has completed its drainage works contains land still unfit to raise any crop, or land fit only for a partial crop, does not necessarily show that the works are inadequate. State Table 1 includes a summary of the condition of lands in drainage enterprises.

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

ITEM (See definitions in Introduction)	CENSUS OF—		INCREASE ¹	
	1930	1920	Amount	Per cent
FARMS AND DRAINAGE ON FARMS				
All farms.....number.....	16,011	15,748	263	1.7
Farms reporting drainage.....number.....	926	433	493	113.0
All land in farms.....acres.....	23,525,234	11,800,351	11,715,883	99.2
Farm land provided with drainage.....acres.....	97,834	35,654	62,180	174.4
AREA, DRAINS, AND INVESTMENT IN ENTERPRISES				
Approximate land area of State.....acres.....	62,430,720	62,430,720		
Land in drainage enterprises.....acres.....	245,703	² 95,474	150,229	157.4
Improved land.....acres.....	181,828	84,840	96,982	114.3
Unimproved land:				
Woodland.....acres.....	1,100	(3)		
Other.....acres.....	62,775	10,628	52,147	490.6
Land unfit to raise any crop for lack of drainage.....acres.....	0,021	⁴ 20,785	-11,764	-50.6
Land drained, fit to raise normal crop.....acres.....	210,762	(5)		
Land partly drained, fit for partial crop.....acres.....	16,920	⁶ 6,595	10,325	156.6
Land in occupied farms.....acres.....	188,327	(5)		
Land in planted crops.....acres.....	163,015	(5)		
Land idle.....acres.....	64,478	(5)		
Ditches, completed.....miles.....	521.0	25.1	495.9	
Tile drains, completed.....miles.....	237.6	114.2	123.4	103.0
Capital invested in enterprises.....dollars.....	5,250,573	1,175,962	4,074,611	346.5
Average, per acre.....dollars.....	21.37	12.32	9.05	73.5

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

² See text, "Summary and condition of land."

³ Not reported.

⁴ "Seeped or alkali."

⁵ Not called for on schedule.

⁶ "Suffering a loss of crops from defective drainage."

AREA AND CAPITAL

Area of enterprises.—Statistics by counties require that an enterprise located in more than one county be divided, and the part in each county be considered

as a separate enterprise. In this way, there are 26 drainage enterprises in Wyoming with an average area of 9,551 acres. There are 15 such enterprises of 5,000 acres or more, and 11 of between 1,000 and 5,000 acres.

The area of enterprises exceeds the land in enterprises by 2,613 acres, which is the amount of overlap.

STATE TABLE 2.—AREA OF ENTERPRISES, BY SIZE: 1930 AND 1920

SIZE GROUP	AREA OF ENTERPRISES ¹				Land in enterprises, 1930 Acres
	1930		1920		
	Acres	Per cent 100.0	Acres	Per cent 100.0	
All enterprises.....	248,316		65,474		245,703
100 to 199 acres.....			140	0.2	
500 to 999 acres.....			500	0.6	
1,000 to 4,999 acres.....	33,438	13.5	21,514	22.6	30,825
5,000 to 9,999 acres.....	93,007	25.4	27,460	28.7	63,007
10,000 to 49,999 acres.....	100,376	40.4	46,920	48.1	100,376
50,000 to 99,999 acres.....	51,436	20.7			51,436

¹ The sum of the areas of individual enterprises, including overlap.

Character of enterprise.—Organized drainage enterprises having executive officers exclusively their own, chosen according to the State drainage laws, are classed as *drainage districts*.

Drainage projects under the control of the officers of an irrigation organization are classed as *irrigation enterprises*. In such cases the drainage is incidental to land reclamation by irrigation, and both the drainage and irrigation operations are functions of the one enterprise.

STATE TABLE 3.—LAND AND CAPITAL, BY CHARACTER OF ENTERPRISE, 1930

CHARACTER OF ENTERPRISE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	245,703		5,250,573	
Drainage districts.....	89,908	36.6	2,189,424	41.7
Irrigation enterprises.....	155,795	63.4	3,061,149	58.3

Type of drainage.—There were 18 enterprises, covering 112,286 acres of land and with an invested capital of \$2,131,843, that reported their works as completed; while 8 enterprises, covering 133,417 acres of land and with an invested capital of \$3,118,730, estimated that \$348,459 would be required to complete the drainage works under construction.

The works completed to January 1, 1930, included 521 miles of ditches and approximately 238 miles of tile drains. These figures do not include drains or levees, installed by individual farmers, supplemental to the works of an enterprise. No pumping plants were reported.

STATE TABLE 4.—LAND AND CAPITAL, BY TYPE OF DRAINAGE, 1930

TYPE OF DRAINAGE (See definitions in Introduction)	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	245,703		5,250,573	
Gravity drainage only.....	245,703	100.0	5,250,573	100.0
Ditches.....	125,043	50.9	1,407,828	26.8
Tile drains.....	14,740	6.0	320,000	6.1
Ditches and tile drains.....	105,920	43.1	3,522,745	67.1

Arrears and delinquency.—There were 6 enterprises, with approximately 15 per cent of the invested capital and covering 13 per cent of the land in organized districts, reported as in arrears in payment of principal or interest on bonds or other obligations; while the remaining 20 enterprises were reported as not in arrears. Reports of 16 enterprises, covering 125,428 acres, show a total of 18,686 acres delinquent in drainage taxes; 6 enterprises, covering 92,115 acres, reported no delinquency; while 4 enterprises failed to report.

STATE TABLE 5.—LAND, CAPITAL INVESTED, AND AREA DELINQUENT IN DRAINAGE TAXES, ACCORDING TO ARREARAGE IN PAYMENT OF PRINCIPAL OR INTEREST ON BONDS OR OTHER OBLIGATIONS, 1930

FINANCIAL STATUS	Land		Capital invested to Jan. 1, 1930		Area delinquent Acres
	Acres	Per cent 100.0	Dollars	Per cent 100.0	
All enterprises.....	245,703		5,250,573		18,080
Enterprises in arrears.....	32,021	13.0	707,824	15.2	10,250
With some delinquent land.....	24,021	9.8	617,824	11.8	10,250
With no report on delinquency.....	8,000	3.2	180,000	3.4	
Enterprises not in arrears.....	213,682	87.0	4,452,749	84.8	8,430
With some delinquent land.....	101,407	41.3	3,200,828	60.8	8,430
With no delinquent land.....	92,115	37.5	831,121	15.8	
With no report on delinquency.....	20,160	8.2	324,800	6.2	

Purpose of drainage.—In some cases the drainage development accomplished two or more purposes, as an enterprise may contain swamp land, land in farms, land damaged by alkali and seepage from irrigation, and land subject to overflow, all of which are benefited. However, the land is classified according to the principal purpose reported.

All the drainage enterprises in Wyoming are located on irrigated land and the principal purpose of drainage is the prevention or removal of damage due to alkali and seepage resulting from irrigation.

STATE TABLE 6.—LAND AND CAPITAL, BY PURPOSE OF DRAINAGE, 1930

PURPOSE OF DRAINAGE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent 100.0	Dollars	Per cent 100.0
All enterprises.....	245,703		5,250,573	
Improvement of land already in farms. Removal of alkali and seepage from irrigation.....	1,840	0.7	48,000	0.9
	243,863	99.3	5,202,573	99.1

Date of organization.—A period of one or more years may elapse between the date of organization and the beginning of actual construction, and in large enterprises the work may extend over a period of several years. For these reasons the original drainage was accomplished somewhat later than the dates shown. It was not feasible to secure dates of beginning and ending of construction work, so the date of establishment of each enterprise was used. Where the drainage work was done directly by an irrigation enterprise, the year in which drainage was undertaken is used instead of the year of organization of the irrigation project.

DRAINAGE—WYOMING

STATE TABLE 7.—LAND AND CAPITAL, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	Land		Area of enterprises ¹		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Acres	Over-lapped acres	Dollars	Per cent
All enterprises.....	245,703	100.0	248,316	2,613	5,250,573	100.0
1900-1904.....	9,724	4.0	9,724	-----	32,533	0.6
1910-1914.....	57,782	23.5	57,782	-----	2,061,946	39.3
1915-1919.....	69,648	28.3	69,648	-----	1,390,210	26.5
1920-1924.....	94,009	38.3	94,009	-----	1,567,876	29.8
1925-1929.....	14,540	5.9	17,153	2,613	198,000	3.8

¹ Includes overlap.

STATE TABLE 8.—CONDITION OF LAND AND LAND AVAILABLE FOR SETTLEMENT, BY DATE OF ORGANIZATION, 1930

DATE OF ORGANIZATION	LAND IN ENTERPRISES					Land available for settlement
	Total	Condition of land			Acres	
		Improved land	Wood-land	Other unimproved land		
All enterprises.....	Acres 245,703	Acres 181,828	Per cent 74.0	Acres 1,100	Acres 62,775	Acres 39,505
1900-1904.....	9,724	2,200	22.6	-----	7,524	0,404
1910-1914.....	57,782	47,000	81.3	-----	10,782	4,240
1915-1919.....	69,648	39,766	57.1	1,100	28,782	23,350
1920-1924.....	94,009	78,322	83.3	-----	15,687	5,511
1925-1929.....	14,540	14,540	100.0	-----	-----	-----

Method of maintenance.—Some enterprises reported more than one method of maintenance, but in such cases the principal method is shown.

Systematic maintenance was reported by 22 enterprises, covering 217,221 acres of land and having an invested capital of \$4,684,749. There were 4 enterprises, with an invested capital of \$565,824 and covering 28,482 acres of land, that did not have systematic maintenance.

There were 10 enterprises, with an invested capital of \$3,194,847 and covering 141,323 acres of land, that reported ownership of excavators or other power equipment used principally for maintenance; while 16 enterprises, with an invested capital of \$2,055,726 and covering 104,380 acres of land, reported no such equipment.

STATE TABLE 9.—LAND AND CAPITAL, BY METHOD OF MAINTENANCE, 1930

METHOD OF MAINTENANCE	Land		Capital invested to Jan. 1, 1930	
	Acres	Per cent	Dollars	Per cent
All enterprises.....	245,703	100.0	5,250,573	100.0
By district forces.....	219,720	89.4	4,882,040	93.0
By contract.....	13,474	5.5	64,533	1.2
Other, none, and not reported.....	12,500	5.1	304,000	5.8

Cost of operation and maintenance.—Since many enterprises do not have annual maintenance, it is necessary to include those that reported *no* cost as well as those that reported *some* cost for 1929, in order to determine a fair average cost of maintenance for the State. Approximately 88 per cent of the land reporting showed some cost, and 12 per cent showed no cost in 1929. The average cost was 15 cents per acre. Expenditures for operation and maintenance vary greatly from year to year.

STATE TABLE 10.—LAND AND COST OF OPERATION AND MAINTENANCE, 1929, BY TYPE OF DRAINAGE.

TYPE OF DRAINAGE (See definitions in Introduction)	Land reporting on cost	COST REPORTED	
		Total	Per acre
All enterprises reporting.....	Acres 233,003	Dollars 35,366	Dollars 0.15
Gravity drainage only.....	233,003	35,366	0.15
Ditches.....	112,343	10,423	0.09
Tile drains.....	14,740	700	0.05
Ditches and tile drains.....	105,920	24,243	0.23

COUNTY TABLE I.—FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

STATE AND COUNTY	FARMS REPORTING DRAINAGE ¹		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
The State.....	926	433	97,834	35,654	16,011	23,525,234	2,202,608	515,043	62,430,720
Albany.....	17	(²)	1,023	(³)	548	1,302,481	100,084	11,361	2,815,300
Big Horn.....	304	108	32,052	7,505	948	187,860	74,620	4,088	1,990,400
Carbon.....	7	7	590	625	500	2,048,810	132,307	26,446	5,124,480
Converse.....	3	-----	184	-----	811	1,753,207	95,555	14,800	2,645,120
Fremont ⁴	72	20	9,090	743	942	1,088,284	65,785	26,259	5,004,000
Goshen.....	78	(²)	5,273	(⁴)	1,487	1,082,004	271,030	17,620	1,390,040
Johnson.....	10	8	1,304	900	536	1,220,248	70,618	18,133	2,604,960
Park ⁵	295	204	31,794	16,155	688	471,906	77,570	2,314	3,316,480
Sublette ⁶	8	(²)	638	(⁷)	292	418,826	101,500	1,364	3,173,760
Washakie.....	97	34	14,197	4,818	326	250,285	35,401	1,551	1,434,240
All other counties.....	35	52	1,040	5,002	8,933	13,086,317	1,278,105	301,638	31,002,880

¹ No drainage on farms reported in Crook, Laramie, Niobrara, Sweetwater, Teton, and Weston Counties in 1930; nor in Campbell, Converse, Crook, Hot Springs, Natrona, Niobrara, and Weston Counties for 1920.

² Includes 1,002,720 acres in Yellowstone National Park (part of) not shown in detail.

³ Included in "All other counties."

⁴ Part taken to form part of Sublette in 1923.

⁵ Part annexed to Yellowstone National Park, and part of Yellowstone National Park annexed in 1920.

⁶ Organized from parts of Fremont and Lincoln in 1923.

DRAINAGE—WYOMING

COUNTY TABLE II.—LAND IN DRAINAGE ENTERPRISES, CAPITAL INVESTED AND COST PER ACRE, AND CONDITION AND USE OF LAND, 1930 AND 1920; AND DRAINAGE WORKS, 1930

ITEM (See definitions in Introduction)	THE STATE	Big Horn	Fremont ¹	Goshen	Park ²	Platte	Washakie
LAND AREA							
1 Approximate land area..... 1930..... acres..	62,430,720	1,990,400	5,904,000	1,309,040	3,316,480	1,360,000	1,434,240
2 Land in enterprises..... 1930..... acres..	245,703	75,034	33,000	55,180	61,061	1,840	18,982
3 Land fit to raise a normal crop prior to drainage..... 1920..... acres..	45,474	41,750	140	2,704	20,920	600	20,400
4 Increase, ³ 1920-1930..... per cent..	157.4	70.7	-----	-----	104.1	268.0	-7.0
5 Area of all enterprises (overlapping areas included)..... 1930..... acres..	248,316	77,047	33,000	55,186	61,061	1,840	18,982
6 Excess over land in enterprises (total areas overlapping)..... acres..	2,013	2,013	-----	-----	-----	-----	-----
CONDITION AND USE OF LAND							
7 Land unfit to raise any crop..... 1930..... acres..	0,021	4,840	620	1,040	1,087	-----	225
8 Land unfit to raise any crop prior to drainage..... 1920..... acres..	90,917	29,737	8,000	10,500	44,850	100	5,800
9 Decrease since drainage..... per cent..	91.0	83.7	93.0	84.3	96.2	100.0	96.1
10 Land fit to raise a normal crop..... 1930..... acres..	219,762	57,114	32,980	53,337	55,999	1,800	18,532
11 Land fit to raise a normal crop prior to drainage..... 1920..... acres..	115,263	25,091	24,500	41,430	13,090	1,040	8,900
12 Increase since drainage..... per cent..	90.7	122.3	34.6	28.7	327.6	0.8	108.2
13 Land fit to raise a partial crop..... 1930..... acres..	16,920	13,080	-----	200	3,375	40	225
14 Land fit to raise a partial crop prior to drainage..... 1920..... acres..	30,493	19,608	200	3,250	3,115	40	4,282
15 Decrease since drainage..... per cent..	44.5	33.3	100.0	93.8	-8.3	-----	94.7
16 Improved land..... 1930..... acres..	181,828	54,555	13,400	51,897	44,636	1,840	15,500
17 Improved land..... 1920..... acres..	84,840	33,922	140	2,704	20,920	600	17,000
18 Increase, ³ 1920-1930..... per cent..	114.3	60.8	-----	-----	40.2	268.0	-11.9
19 Unimproved land—							
20 Woodland..... 1930..... acres..	1,100	1,100	-----	-----	-----	-----	-----
21 Other..... 1930..... acres..	62,775	10,370	20,200	3,280	16,425	-----	3,482
22 Land in occupied farms..... 1930..... acres..	188,327	59,757	11,350	53,440	44,434	1,840	17,500
23 Land in planted crops..... 1930..... acres..	163,015	51,835	9,673	43,480	46,727	1,800	15,500
24 Land idle..... 1930..... acres..	64,478	19,085	23,927	9,000	8,400	-----	3,400
25 Land available for settlement..... 1930..... acres..	30,505	9,331	22,050	-----	6,724	-----	1,400
DRAINAGE WORKS, 1930							
26 Ditches—							
27 Completed..... miles..	521.0	108.3	22.7	108.0	178.0	-----	14.0
28 Additional under construction..... miles..	33.0	9.0	-----	4.0	26.0	-----	-----
29 Tile drains—							
30 Completed..... miles..	237.6	68.2	13.0	-----	135.7	3.7	17.0
31 Additional under construction..... miles..	6.5	-----	-----	-----	4.0	2.5	-----
32 Land drained by ditches only ⁴ acres..	125,043	27,873	26,000	55,180	15,984	-----	-----
33 Length of ditches..... miles..	341.1	167.1	14.0	112.0	48.0	-----	-----
34 Land drained by tile only ⁴ acres..	14,740	12,000	-----	-----	-----	1,840	-----
35 Length of tile..... miles..	17.2	11.0	-----	-----	-----	6.2	-----
36 Land drained by ditches and tile ⁴ acres..	105,920	34,201	7,000	-----	45,077	-----	18,982
37 Length of ditches..... miles..	212.9	40.2	8.7	-----	150.0	-----	14.0
38 Length of tile..... miles..	226.0	57.2	13.0	-----	139.7	-----	17.0
CAPITAL INVESTED AND COST PER ACRE							
39 Capital invested in enterprises to Jan. 1, 1930..... dollars..	5,259,573	1,818,024	309,419	473,369	2,075,161	20,000	554,009
40 Capital invested in enterprises..... 1920..... dollars..	1,175,962	550,927	6,231	16,896	442,808	2,000	158,000
41 Increase, ³ 1920-1930..... per cent..	346.5	230.6	-----	-----	368.6	900.0	250.6
42 Estimated cost of enterprises when completed..... 1930..... dollars..	5,599,032	1,849,024	309,419	498,369	2,349,120	37,000	555,500
43 Estimated cost of enterprises when completed..... 1920..... dollars..	1,697,367	727,433	6,231	21,120	632,583	2,000	278,000
44 Average, per acre when completed..... 1930..... dollars..	22.79	24.65	9.21	9.03	38.47	20.11	29.26
45 Average, per acre when completed..... 1920..... dollars..	17.46	17.42	44.51	7.04	21.14	4.00	13.63
46 Invested in and required for completion of—							
47 Enterprises having ditches only..... 1930..... dollars..	1,051,787	615,800	91,419	498,369	443,199	-----	-----
48 Average, per acre..... dollars..	13.21	22.09	3.03	9.03	27.73	-----	-----
49 Enterprises having tile drains only..... 1930..... dollars..	337,000	300,000	-----	-----	-----	37,000	-----
50 Average, per acre..... dollars..	22.86	23.26	-----	-----	-----	20.11	-----
51 Enterprises having ditches and tile drains..... 1930..... dollars..	3,010,245	633,824	216,000	-----	1,005,921	-----	555,500
52 Average, per acre..... dollars..	34.08	27.26	28.29	-----	42.28	-----	29.26

¹ Part taken to form part of Sublette in 1923.
² Part annexed to Yellowstone National Park, and part of Yellowstone National Park annexed in 1920.
³ Includes 1,902,720 acres in Yellowstone National Park (part of) not shown in detail.
⁴ See text, "Summary and condition of land."
⁵ Per cent not shown when more than 1,000. A minus sign (-) denotes decrease. A plus sign (+) denotes increase.
⁶ When works under construction have been completed.

DRAINAGE—OTHER STATES

In the following pages are presented statistics by counties for drainage on farms collected, on the general farm schedule, by census enumerators in the 13 States which reported no organized drainage enterprises. These States are as follows: Alabama, Con-

necticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia. Statistics for the District of Columbia are included in State Table XI on page 46.

FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930

ALABAMA

STATE AND COUNTY	FARMS REPORTING DRAINAGE		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Number	Acres	Acres	
The State 1	7,515	10,067	416,230	416,293	267,395	17,654,635	8,106,030	6,485,981	32,818,500
Autauga	14	218	2,938	6,651	2,081	215,477	103,323	84,008	373,700
Bibb	160	225	3,785	2,325	1,050	141,775	48,456	71,384	405,700
Blount	63	410	700	3,938	4,373	283,493	123,208	131,047	415,369
Bullock	73	90	2,673	1,541	2,021	220,009	126,587	36,527	300,400
Butler	42	89	1,309	803	3,001	260,579	120,400	108,669	488,320
Calhoun 2	70	190	704	2,779	3,070	214,724	100,715	81,240	393,600
Chambers	33	900	1,286	30,359	4,123	276,402	145,043	75,501	391,680
Cherokee	47	404	809	4,760	3,513	251,618	122,105	94,799	360,280
Chilton	127	166	1,102	2,244	3,020	237,603	104,152	112,521	456,320
Choctaw	97	69	1,539	737	2,743	216,489	67,704	138,899	596,480
Clay	317	1,048	2,176	8,677	3,632	213,971	84,640	95,201	392,960
Cleburne	272	149	2,418	1,728	2,630	175,903	54,008	102,088	364,160
Coffee	56	(3)	1,354	(3)	4,174	335,129	106,780	109,932	433,920
Colbert	238	69	5,187	778	2,694	181,362	104,874	53,653	395,820
Coosa	265	475	1,934	4,259	1,876	201,724	57,631	114,403	419,200
Covington	34	69	633	935	4,426	315,813	170,240	120,513	600,880
Dallas	44	507	1,873	21,103	7,000	343,730	196,909	62,616	612,480
Elmore 4	18	351	1,253	6,013	4,250	262,214	130,022	81,260	405,700
Escambia	17	88	511	956	2,103	140,634	71,058	61,648	612,480
Etowah 5	149	304	2,310	3,477	3,773	243,602	115,709	67,230	345,600
Fayette	369	634	4,927	10,216	2,780	286,027	77,760	154,978	411,520
Geneva	42	172	770	1,212	3,048	202,074	166,346	78,087	309,920
Greene	155	80	6,482	6,628	3,553	188,848	65,813	54,031	406,400
Hale	444	642	20,008	17,929	4,583	249,320	127,906	65,280	413,440
Houston	83	263	1,248	3,061	4,720	276,430	108,597	52,420	370,560
Jackson	180	284	4,117	6,041	5,337	381,060	177,904	104,721	729,000
Lamar	963	1,259	10,719	28,208	3,075	273,523	86,066	151,405	384,640
Lawrence	280	227	6,536	4,144	6,119	274,879	102,730	72,603	448,000
Lee	85	(3)	1,093	(3)	2,970	270,065	126,087	89,365	380,120
Limestone	12	(3)	808	(3)	6,349	295,021	103,437	61,756	381,440
Lowndes	11	1,046	1,562	31,695	3,093	275,437	121,451	63,010	472,060
Macon	23	848	1,579	25,814	3,714	217,028	134,665	44,090	392,960
Madison	100	308	1,858	7,546	7,178	387,270	254,973	82,125	519,040
Marengo	82	743	1,448	20,365	6,503	387,095	153,330	131,161	618,240
Marion	205	687	1,837	8,336	3,746	300,974	101,020	165,847	475,520
Mobile	19	51	788	2,298	1,557	118,010	49,305	46,068	784,040
Montgomery 6	84	121	2,048	7,302	4,069	324,071	151,293	54,938	515,200
Morgan	294	414	4,625	7,799	5,079	270,771	153,718	87,472	375,680
Perry	531	146	17,540	5,501	4,347	265,614	130,507	76,958	471,680
Pickens	213	730	3,068	10,283	4,127	318,635	118,178	126,323	560,000
Pike	13	138	602	2,556	3,669	299,668	180,694	73,057	429,440
Randolph	66	829	1,120	12,082	4,069	285,321	115,800	126,942	377,000
Russell	59	403	2,081	7,650	2,657	268,269	128,040	85,998	419,200
St. Clair	203	57	4,000	610	2,424	204,873	75,084	109,729	414,720
Talladega	205	85	4,328	1,982	4,003	265,205	148,307	82,338	483,200
Tallapoosa	135	1,219	1,666	15,346	3,340	279,104	107,597	123,042	488,320
Tuscaloosa	151	426	2,833	5,520	4,752	345,735	123,070	158,063	861,440
Walker	41	192	548	2,289	3,635	200,945	78,165	106,346	506,880
Wilcox	12	157	525	4,580	4,344	314,732	101,004	114,358	573,440
All other counties	323	1,841	5,754	50,294	68,885	4,693,391	2,111,942	1,804,231	9,843,840

1 Drainage on farms was reported in all counties in Alabama in 1930 and 1920.

2 Part annexed to Etowah and part of Etowah annexed in 1923.

3 Included in "All other counties."

4 Part annexed to Montgomery in 1923.

5 Part annexed to Calhoun and part of Calhoun annexed in 1923.

6 Part of Elmore annexed in 1923.

DRAINAGE—OTHER STATES

FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930—Continued

CONNECTICUT

STATE AND COUNTY	FARMS REPORTING DRAINAGE		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 605	Number 1, 203	Acres 17, 037	Acres 14, 646		Number 17, 195	Acres 1, 502, 279	Acres 430, 588		Acres 599, 405	Acres 3, 084, 800
The State ¹									
Fairfield.....	76	212	1, 429	2, 740	2, 081	142, 404	48, 590	37, 005	403, 840
Hartford.....	260	408	3, 185	5, 553	3, 743	249, 615	91, 631	87, 180	466, 560
Litchfield.....	70	146	7, 370	1, 057	2, 174	270, 582	70, 942	101, 482	502, 000
New Haven.....	84	151	903	1, 469	2, 155	149, 951	52, 052	50, 334	385, 020
Windham.....	42	83	3, 180	705	1, 900	188, 270	45, 976	81, 808	320, 000
All other counties.....	73	143	970	2, 423	5, 142	402, 457	112, 397	240, 090	916, 480

¹ Drainage on farms was reported in all counties in Connecticut in 1930 and 1920.

DELAWARE

The State ¹	900	4, 246	40, 076	185, 831	9, 707	900, 815	504, 259	203, 698	1, 267, 600
Kent.....	251	1, 540	10, 886	71, 080	2, 874	302, 000	165, 267	64, 471	394, 880
New Castle.....	103	573	3, 643	18, 003	1, 830	207, 323	111, 734	25, 024	278, 400
Sussex.....	555	2, 133	25, 547	96, 742	4, 994	391, 480	227, 258	114, 203	584, 320

¹ Drainage on farms was reported in all counties in Delaware in 1930 and 1920.

MAINE

The State ¹	752	2, 068	10, 008	26, 302	39, 006	4, 630, 038	1, 401, 765	2, 240, 910	10, 132, 800
Androscoggin.....	57	144	1, 407	2, 189	2, 322	215, 710	66, 991	97, 781	293, 769
Aroostook.....	136	87	1, 244	667	6, 459	808, 400	400, 443	321, 028	4, 120, 922
Cumberland.....	100	312	1, 624	4, 291	2, 233	211, 867	93, 877	95, 561	545, 920
Kennebec.....	75	145	986	1, 884	3, 592	365, 873	114, 037	140, 615	562, 560
Oxford.....	41	203	564	2, 000	2, 806	393, 107	80, 339	241, 913	1, 207, 200
Penobscot.....	75	182	1, 004	2, 364	4, 060	504, 380	155, 698	232, 587	2, 085, 120
Somerset.....	46	102	561	1, 793	2, 696	407, 853	115, 900	191, 318	2, 325, 120
York.....	88	152	1, 310	2, 001	2, 158	218, 340	58, 115	110, 893	632, 960
All other counties.....	108	742	1, 308	0, 113	12, 380	1, 454, 408	345, 865	800, 214	7, 200, 240

¹ Drainage on farms was reported in all counties in Maine in 1930 and 1920.

MARYLAND

The State ¹	2, 087	6, 911	86, 307	240, 799	43, 203	4, 374, 398	2, 120, 204	1, 213, 103	6, 302, 240
Anne Arundel.....	41	92	949	2, 497	1, 555	138, 315	59, 752	37, 149	272, 040
Baltimore.....	88	108	884	1, 748	3, 413	249, 744	138, 450	55, 287	388, 480
Caroline.....	465	812	17, 730	32, 087	1, 922	107, 521	91, 137	47, 960	204, 160
Carroll.....	92	395	2, 635	2, 240	3, 140	250, 360	109, 701	37, 382	280, 080
Cecil.....	43	153	909	4, 092	1, 424	175, 229	86, 840	38, 730	241, 280
Dorchester.....	78	880	3, 458	48, 450	1, 598	172, 249	87, 359	53, 769	308, 040
Frederick.....	123	483	966	5, 808	3, 434	350, 343	210, 029	40, 043	424, 320
Garrett.....	140	198	2, 991	2, 900	1, 830	241, 248	62, 988	110, 224	438, 400
Harford.....	96	133	720	1, 097	2, 260	212, 363	94, 025	50, 807	282, 880
Howard.....	152	105	1, 086	1, 650	1, 093	128, 837	66, 050	25, 932	160, 000
Kent.....	25	32	1, 210	869	971	150, 460	90, 586	22, 832	180, 480
Montgomery.....	117	182	1, 405	3, 889	1, 071	238, 728	109, 223	45, 878	333, 440
Prince Georges.....	68	150	1, 778	3, 301	2, 291	207, 459	87, 803	62, 009	308, 480
Queen Annes.....	100	438	6, 265	30, 475	1, 404	209, 415	110, 345	42, 620	233, 000
Somerset.....	429	652	26, 841	30, 461	1, 561	117, 573	57, 739	41, 140	211, 840
Talbot.....	20	106	1, 435	5, 013	1, 113	152, 574	85, 991	34, 317	171, 520
Wicomico.....	109	809	3, 195	31, 124	2, 193	147, 783	83, 860	51, 167	237, 440
Worcester.....	328	551	11, 050	26, 987	2, 190	188, 422	90, 150	76, 371	316, 800
All other counties.....	71	533	930	13, 752	7, 757	857, 775	339, 361	330, 477	1, 301, 760

¹ Drainage on farms was reported in all counties in Maryland in 1930 and 1920.

MASSACHUSETTS

The State ¹	1, 554	2, 955	20, 741	30, 022	25, 598	2, 005, 401	564, 054	802, 509	5, 144, 960
Berkshire.....	82	86	1, 232	1, 746	1, 604	251, 151	65, 745	108, 022	618, 240
Bristol.....	67	163	910	2, 828	3, 042	145, 172	40, 640	60, 820	362, 880
Essex.....	185	309	2, 894	3, 346	2, 024	117, 113	39, 819	37, 355	318, 080
Franklin.....	153	241	1, 497	2, 237	2, 095	260, 326	63, 801	126, 179	446, 030
Hampshire.....	143	87	1, 036	1, 510	2, 588	220, 708	63, 394	105, 739	374, 400
Middlesex.....	328	718	3, 808	8, 280	3, 453	201, 029	75, 652	73, 675	532, 480
Norfolk.....	56	92	554	1, 121	1, 128	54, 940	16, 274	22, 302	259, 840
Plymouth.....	223	349	5, 081	6, 674	1, 734	100, 414	24, 582	48, 880	432, 000
Worcester.....	220	597	2, 118	8, 054	4, 943	437, 173	120, 269	188, 553	905, 840
All other counties.....	97	313	1, 005	3, 217	2, 387	208, 435	53, 881	90, 435	805, 120

¹ Drainage on farms was reported in all counties in Massachusetts in 1930 and 1920.

DRAINAGE—OTHER STATES

FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930—Continued

NEW HAMPSHIRE

STATE AND COUNTY	FARMS REPORTING DRAINAGE		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Number	Acres	Acres	
The State ¹	304	1,013	5,412	11,777	14,006	1,060,061	422,182	1,071,097	5,770,840
Hillsborough.....	101	205	981	2,180	2,080	238,240	60,222	132,000	572,800
Merrimack.....	43	161	600	1,556	1,007	270,409	53,552	155,613	500,480
Rockingham.....	93	236	1,601	3,335	2,458	202,432	53,736	103,632	442,240
Strafford.....	36	89	716	1,375	951	100,621	25,765	48,470	242,500
All other counties.....	121	322	1,424	3,325	7,470	1,148,260	238,907	632,192	3,025,700

¹ Drainage on farms was reported in all counties in New Hampshire in 1930 and 1920.

NEW JERSEY

The State ¹	2,610	4,003	89,890	174,290	25,378	1,758,027	987,315	278,892	4,808,900
Burlington.....	601	1,081	30,028	54,063	1,948	182,740	115,038	19,390	521,600
Camden ²	37	188	1,800	4,527	882	33,504	22,543	5,412	142,720
Capo May.....	20	31	1,197	7,775	383	20,807	11,803	6,725	160,000
Cumberland.....	49	152	3,638	7,410	2,587	127,826	71,120	23,252	320,000
Essex.....	19	(³)	1,350	(³)	247	7,723	3,313	2,106	81,280
Gloucester ²	102	404	3,462	8,304	2,347	121,360	70,795	17,040	211,840
Hunterdon.....	94	(³)	2,026	(³)	2,405	200,644	125,127	24,010	270,680
Mercer.....	231	100	7,808	7,817	1,131	93,051	62,147	10,056	144,040
Middlesex.....	107	380	3,741	12,615	1,006	71,207	46,332	10,021	190,680
Monmouth ⁴	445	963	13,322	30,700	2,228	154,430	95,100	23,831	304,000
Morris.....	65	176	1,761	3,951	1,128	98,581	39,140	30,080	304,000
Ocean ⁴	42	64	2,143	3,502	630	30,288	12,221	8,040	410,240
Salem.....	209	710	8,283	24,010	1,426	128,000	72,202	13,713	210,520
Somerset.....	205	208	5,850	7,465	1,258	90,137	63,421	10,160	195,200
Sussex.....	85	96	1,722	1,570	1,155	165,030	65,169	30,591	338,560
Union.....	29	(³)	678	(³)	285	6,530	3,712	668	65,920
Warren.....	38	108	598	3,640	1,311	131,008	65,010	10,635	231,680
All other counties.....	61	196	470	2,825	2,871	76,258	36,156	20,766	608,800

¹ Drainage on farms was reported in all counties in New Jersey in 1930 and 1920.

² Part of Gloucester annexed to Camden in 1923.

³ Included in "All other counties."

⁴ Part of Monmouth annexed to Ocean in 1928.

NEW YORK

The State ¹	20,540	33,890	743,823	1,180,423	150,800	17,070,633	8,154,315	3,034,239	30,498,500
Albany.....	215	375	4,513	8,240	1,927	202,518	108,880	31,280	337,280
Allegany.....	143	216	2,295	2,700	3,375	480,715	204,020	108,750	670,080
Broome.....	57	134	1,682	3,234	3,104	336,035	126,470	74,046	451,200
Cattaraugus.....	234	585	4,569	10,115	3,999	544,704	188,908	127,875	850,520
Cayuga.....	1,862	2,939	90,002	143,423	3,805	372,800	231,823	42,060	449,020
Chautauque.....	678	960	12,029	15,262	6,410	538,635	280,843	108,025	684,160
Chemung.....	50	117	1,212	1,489	1,595	180,186	84,062	30,000	260,480
Chemung.....	113	185	1,403	2,244	3,333	465,060	162,363	90,800	572,160
Clinton.....	130	241	7,083	9,715	2,852	420,008	148,559	144,103	671,300
Columbia.....	150	225	3,469	3,387	2,144	276,420	128,540	50,340	412,100
Cortland.....	79	127	1,081	1,430	1,908	200,387	104,302	45,528	321,020
Delaware.....	102	195	1,213	2,824	3,950	478,333	191,084	204,075	927,300
Dutchess.....	224	327	5,253	7,850	2,190	337,001	140,204	63,284	515,840
Erie.....	728	1,201	21,164	36,015	6,942	433,712	249,632	62,761	661,700
Essex.....	34	72	1,600	1,331	1,757	264,044	68,002	138,238	1,175,040
Franklin.....	46	220	1,984	8,617	2,925	356,541	135,604	84,504	1,073,020
Fulton.....	35	112	608	2,146	1,167	121,767	61,885	35,440	330,240
Genesee.....	609	511	10,070	10,095	2,555	250,191	166,035	28,003	317,440
Greene.....	48	164	2,770	2,615	1,787	227,312	81,320	64,198	411,520
Herkimer.....	244	267	6,054	6,514	2,400	300,638	120,135	47,930	933,700
Jefferson.....	128	368	5,201	23,964	4,699	673,211	341,021	98,280	815,360
Lewis.....	188	287	6,159	7,076	2,558	401,363	137,041	94,325	812,800
Livingston.....	709	1,109	33,807	48,784	2,322	332,762	170,978	46,781	403,840
Madison.....	306	550	6,827	13,446	3,176	337,272	151,034	48,825	416,000
Monroe.....	731	1,594	22,178	45,279	4,165	312,580	220,820	22,495	424,320
Montgomery.....	354	886	10,918	25,721	1,753	212,331	120,160	22,828	254,720
Niagara.....	640	1,150	36,181	73,337	4,018	282,499	217,097	15,854	334,080
Oneida.....	750	1,174	19,625	24,904	4,699	515,700	206,276	83,603	800,000
Onondaga.....	936	1,627	31,856	52,230	4,520	373,716	210,025	40,377	499,840
Ontario.....	1,534	2,412	76,956	104,332	3,322	343,863	207,065	42,980	415,360
Orange.....	303	856	6,764	18,401	3,115	301,363	149,101	43,621	533,700
Orleans.....	328	622	10,581	19,337	2,392	213,408	116,284	16,842	253,440
Oswego.....	557	1,015	11,208	18,211	4,726	388,861	158,927	75,798	618,240
Otsego.....	153	278	2,222	3,378	3,080	513,337	199,223	105,406	645,700
Rensselaer.....	198	408	3,339	7,174	2,533	288,552	124,000	61,255	424,320
St. Lawrence.....	721	888	30,068	44,252	6,970	1,001,280	369,756	202,412	1,728,040
Saratoga.....	170	555	5,788	16,070	2,417	250,324	110,503	60,315	520,720
Schenectady.....	70	149	1,135	4,230	736	71,837	41,791	11,176	131,840
Schoharie.....	142	150	2,821	2,004	2,272	304,574	132,511	67,550	410,880
Schuyler.....	354	524	14,530	21,557	1,361	156,974	84,430	28,052	215,040
Seneca.....	1,014	1,473	67,120	104,395	1,666	172,700	113,021	14,000	215,040
Steuben.....	204	330	4,564	6,241	5,143	706,800	347,730	153,123	894,720
Tioga.....	64	119	1,247	1,247	2,273	202,300	111,068	55,700	352,800
Tompkins.....	575	989	27,094	40,170	2,358	240,632	120,110	41,474	304,640
Ulster.....	200	400	6,576	6,576	3,630	314,705	114,615	114,091	727,680
Washington.....	218	342	5,524	7,946	2,880	417,432	177,060	91,012	535,680
Wayne.....	1,458	1,824	35,706	48,570	4,408	325,462	212,364	32,008	385,360
Westchester.....	51	200	1,055	4,631	428	41,033	14,686	8,522	280,720
Wyoming.....	631	855	23,821	29,067	2,830	333,115	101,142	59,173	394,040
Yates.....	901	1,308	45,240	57,538	1,730	185,990	109,086	27,702	210,520
All other counties.....	105	215	1,613	3,509	7,310	648,016	225,044	245,695	3,511,680

¹ No drainage on farms reported in Bronx, Kings, and New York Counties in 1930; nor in New York County for 1920.

DRAINAGE—OTHER STATES

FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930—Continued

PENNSYLVANIA

STATE AND COUNTY	FARMS REPORTING DRAINAGE		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number 11,068	Number 22,750	Acres 170,410	Acres 318,956		Number 172,410	Acres 15,300,485	Acres 7,813,820		Acres 3,303,315	Acres 28,692,480
The State ¹									
Adams.....	190	711	1,861	8,048	3,333	264,145	173,050	40,551	337,920
Allegheny.....	179	224	2,682	4,257	2,935	180,888	102,235	26,207	404,000
Armstrong.....	240	106	3,108	1,157	2,663	242,288	137,258	42,251	417,920
Beaver.....	73	54	945	700	1,973	161,900	80,873	30,272	274,560
Bedford.....	193	430	2,130	4,729	3,184	425,343	158,097	101,011	656,781
Berks.....	87	196	801	1,471	5,350	391,508	282,986	44,031	553,710
Blair.....	65	(²)	670	(²)	1,008	145,447	81,521	35,234	341,700
Bradford.....	146	565	1,073	6,940	4,667	551,417	240,989	109,734	732,058
Bucks.....	144	373	2,008	4,313	4,360	260,072	175,833	28,547	389,120
Butler.....	487	1,000	6,282	12,844	3,090	293,403	153,193	51,119	505,700
Cambria.....	88	304	893	3,134	2,183	178,594	80,019	49,901	458,880
Centre.....	96	281	1,717	3,376	1,876	247,950	127,117	71,476	733,598
Chester.....	153	483	1,560	3,076	4,550	375,221	210,075	45,234	407,280
Clarion.....	491	737	7,270	12,225	2,164	210,356	112,338	52,895	384,640
Clearfield.....	153	61	1,416	544	2,762	208,102	101,549	69,114	731,037
Clinton.....	92	115	1,031	1,288	913	63,754	45,054	31,482	502,041
Columbia.....	343	507	4,342	6,080	2,270	194,755	121,562	43,170	300,560
Crawford.....	480	1,263	8,343	18,042	5,518	490,405	221,076	102,175	664,463
Elk.....	44	59	527	580	789	66,911	24,043	23,174	515,051
Erie.....	617	1,253	12,348	26,741	4,885	387,130	189,244	70,818	490,840
Fayette.....	257	378	3,389	5,845	3,364	247,806	100,591	62,008	508,010
Franklin.....	132	314	1,815	2,942	3,530	338,229	238,009	42,803	480,640
Greene.....	62	90	550	1,444	2,741	324,082	90,034	33,670	367,360
Huntingdon.....	137	251	1,399	2,825	1,771	276,700	100,985	110,043	587,647
Indiana.....	418	806	7,122	12,855	3,058	312,979	160,947	67,229	530,674
Jefferson.....	330	499	3,881	5,937	2,450	204,200	112,843	47,253	420,240
Lancaster.....	116	175	790	1,072	9,705	517,373	380,536	41,410	602,370
Lawrence.....	637	803	14,063	19,490	2,236	163,388	87,314	22,866	230,400
Lebanon.....	135	211	1,350	1,980	2,203	161,861	117,660	13,293	230,400
Luzerne.....	137	304	2,050	3,089	2,385	174,297	79,590	51,399	571,003
Lycoming.....	178	552	1,764	5,146	2,710	293,468	144,002	90,319	780,968
Mercer.....	1,035	2,277	23,180	45,719	3,067	334,737	154,812	55,355	448,000
Mifflin.....	69	176	820	1,713	1,107	122,009	63,953	30,036	254,720
Montgomery.....	76	210	1,384	2,407	3,360	171,744	124,478	12,603	309,760
Montour.....	157	288	4,009	7,901	995	67,820	46,352	10,660	83,200
Northumberland.....	300	621	3,724	7,027	2,143	185,880	122,338	31,058	290,560
Perry.....	52	308	532	2,816	1,861	207,655	105,432	71,440	300,960
Schuylkill.....	82	229	674	1,700	2,502	182,808	113,600	44,450	497,280
Snyder.....	210	450	2,343	5,023	1,596	130,442	84,908	29,308	199,040
Somerset.....	562	1,056	9,009	16,783	3,400	410,705	104,242	154,357	601,003
Tioga.....	86	193	1,075	2,321	3,168	424,118	188,202	98,401	781,038
Union.....	83	334	1,000	4,427	1,154	64,800	70,893	11,214	195,200
Venango.....	178	455	3,383	7,050	1,776	161,984	69,063	43,104	423,040
Warren.....	96	164	1,375	2,131	1,959	202,563	61,256	77,070	877,404
Washington.....	151	276	2,105	2,808	4,274	437,135	174,903	41,904	551,800
Westmoreland.....	472	483	8,078	6,400	4,712	382,678	105,536	60,770	665,103
All other counties.....	551	2,000	5,839	17,489	30,857	3,374,355	1,034,040	865,029	7,008,123

¹ Drainage on farms was reported in all counties in 1930 and 1920.

² Included in "All other counties."

RHODE ISLAND

The State ¹	83	116	1,043	2,403	3,322	279,361	68,256	121,580	682,880
Newport.....	17	28	360	607	625	37,280	14,964	6,850	72,960
Providence.....	38	52	457	1,233	1,340	101,173	26,468	47,701	275,200
All other counties.....	28	36	226	563	1,357	140,902	26,824	67,029	334,720

¹ Drainage on farms was reported in all counties in Rhode Island in 1930 and 1920.

VERMONT

The State ¹	784	1,728	20,530	35,640	24,898	3,896,097	1,128,017	1,503,681	5,830,360
Addison.....	90	124	3,900	5,377	2,023	354,792	138,964	95,191	483,840
Bennington.....	15	03	609	2,309	950	161,973	45,213	70,853	423,040
Caledonia.....	54	89	542	1,122	2,085	300,927	78,800	115,543	395,520
Chittenden.....	56	104	1,844	1,943	1,842	277,498	98,300	88,298	347,520
Franklin.....	93	201	2,902	6,221	2,303	361,109	125,931	100,512	417,280
Grand Isle.....	151	160	0,888	6,696	434	45,704	22,034	7,840	53,120
Orleans.....	42	166	606	2,080	2,337	359,561	101,697	122,712	440,320
Rutland.....	55	212	1,193	3,661	2,151	382,442	114,662	139,372	583,040
Windsor.....	112	182	952	1,936	2,036	400,207	95,816	177,499	606,720
All other counties.....	110	307	1,004	4,304	8,137	1,251,884	305,940	585,861	2,088,960

¹ Drainage on farms was reported in all counties in Vermont in 1930 and 1920.

DRAINAGE—OTHER STATES

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FARMS REPORTING DRAINAGE AND FARM LAND DRAINED, 1930 AND 1920; FARMS, ALL LAND IN FARMS, AND APPROXIMATE LAND AREA, 1930—Continued

WEST VIRGINIA

STATE AND COUNTY	FARMS REPORTING DRAINAGE		FARM LAND PROVIDED WITH DRAINAGE		All farms, 1930	FARM LAND, 1930			Approximate land area, 1930
	1930	1920	1930	1920		All land in farms	Crop land	Woodland	
	Number	Number	Acres	Acres		Acres	Acres	Acres	
The State ¹	1,126	1,049	23,276	38,464	82,641	8,802,348	1,907,204	3,129,350	15,374,080
Berkeley.....	5	(²)	715	(²)	1,201	150,167	71,412	32,901	208,000
Hardy.....	17	84	601	2,225	1,098	222,970	31,986	112,685	367,300
Lewis.....	75	121	642	1,214	1,755	225,303	33,464	46,411	251,520
Mason.....	60	121	5,855	9,147	2,294	246,991	63,190	69,207	304,000
Mineral.....	51	78	1,204	2,481	754	163,667	28,164	70,797	223,300
Monroe.....	27	63	579	873	1,826	222,846	42,082	68,930	292,480
Ohio.....	25	26	655	676	513	46,989	18,600	4,366	69,480
Pondleton.....	82	(²)	980	(²)	1,272	272,805	34,704	166,857	447,360
Pocahontas.....	34	65	631	817	1,201	230,824	34,892	117,120	578,500
Preston.....	40	90	542	926	2,162	251,140	65,092	86,359	416,000
Putnam.....	16	34	590	989	1,851	170,590	48,661	67,936	215,640
Randolph.....	85	132	1,478	2,487	1,765	275,140	39,928	145,241	603,640
Upshur.....	130	190	1,379	1,964	1,955	168,878	34,171	45,613	224,640
Wood.....	32	54	523	593	1,828	150,870	45,617	30,422	232,060
All other counties.....	438	882	6,842	14,072	61,170	6,004,166	1,314,341	2,063,776	10,881,280

¹ No drainage on farms reported in Boone, Calhoun, Clay, McDowell, and Wyoming Counties in 1930; and Logan, McDowell, and Wyoming Counties for 1920.
² Included in "All other counties."