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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS

DRAINAGE : ARKANSAS

STATISTICS FOR THE STATE AND ITS COUNTIES

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INTRODUCTION.

This bulletin presents the statistics of drainage for Arkansas collected at the census of 1920. The figures relate to conditions on January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises include considerable areas of timbered and other unimproved land not yet in farms.

The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner installs upon his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are presented separately.

TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	232,604	100.0
Farms reporting land having drainage	13,426	5.8
Farms reporting land needing drainage	33,437	14.4
All land in farms ... acres	17,456,750	100.0
Improved land in farms ... acres	9,210,556	52.8
Farm land reported as provided with drainage ... acres	497,489	2.8
Farm land reported as needing drainage ... acres	1,642,403	9.4
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	33,616,000	100.0
All land in operating drainage enterprises ... acres	3,479,591	10.4
Improved land ... acres	1,491,777	4.4
Timber and cut-over land ... acres	1,923,382	5.7
Other unimproved land ... acres	64,432	0.2
Capital invested in and required for completion of operating enterprises	$25,888,599	100.0
Capital invested in these enterprises to Dec. 31, 1919	$14,147,174	54.6
Additional capital required to complete these enterprises	$11,741,425	45.4

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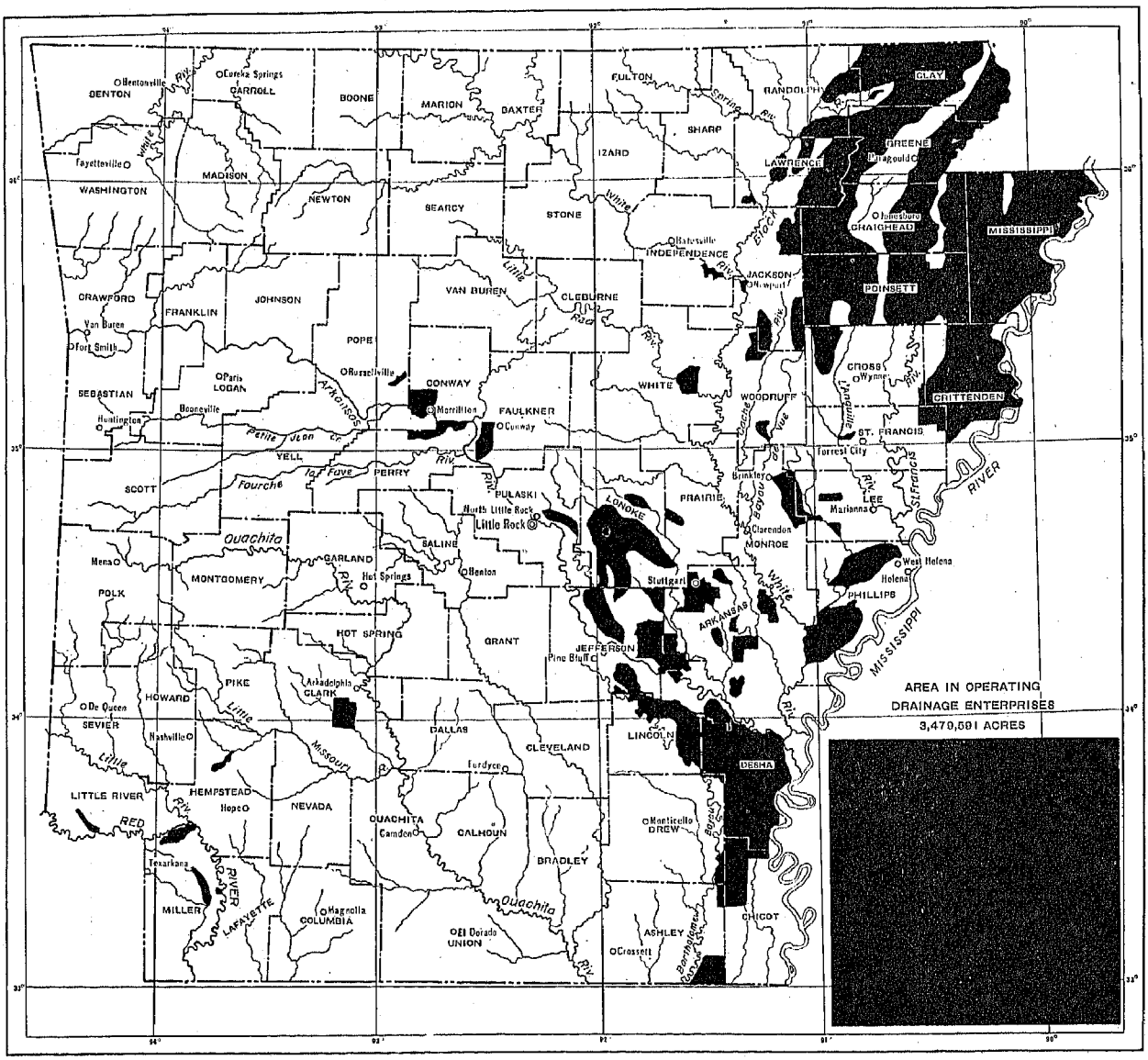
ARKANSAS

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which are substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, is the acreage actually benefited or made of more value for agricultural purposes, by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators have answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual." Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises, below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those that had completed the ainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops, which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removd from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter may be some that had completed the original plan of reclamation several years ago but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include districts that on the census date had completed their plans, sold bonds to cover the cost of the undertakings, and let contracts for the construction work, and also districts for which the orders of establishment had just been issued and which were still subject to considerable change in area, plan of drainage works, and cost.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.[1]		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	4,151,834	100.0	$14,217,155	100.0	$18,637,337
Operating enterprises	3,479,591	83.8	14,147,174	99.5	11,741,425
With works completed	2,124,446	51.2	9,385,025	66.0	.....
With works under construction	1,355,145	32.6	4,762,149	33.5	11,741,425
Nonoperating enterprises	672,243	16.2	69,981	0.5	6,895,912

[1] The inquiry asked for the "total cost of the enterprise to Dec. 31, 1919," and for an "estimate of additional investment to complete."

Location of enterprises.—Most of the drainage enterprises in Arkansas are in the eastern part of the state. Large portions of the areas of several counties in the northeast corner and in the southeastern section are embraced in drainage districts. There are a few enterprises in the central part of the state, northwest of Little Rock, and in the southwestern part, as shown by the map on page 2.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	4,151,834	100.0	$14,217,155	100.0	$18,637,337
Operating enterprises	3,479,591	83.8	14,147,174	99.5	11,741,425
St. Francis River	1,526,774	36.8	6,995,231	49.2	9,133,400
White River	886,928	21.4	3,084,530	21.7	1,032,025
Arkansas River	442,008	10.6	1,640,760	11.5	404,000
Black River (in Louisiana)[1]	220,336	5.3	689,000	4.8	142,000
Red River	33,501	0.8	168,800	1.2	.....
Mississippi River	370,344	8.9	1,568,853	11.0	1,030,000
Nonoperating enterprises	672,243	16.2	69,981	0.5	6,895,912
St. Francis River	132,000	3.2	54,500	0.4	1,598,000
White River	477,580	11.5	14,481	0.1	4,760,541
Arkansas River	23,240	0.6	1,000	(2)	106,420
Black River (in Louisiana)[1]	7,275	0.2	.....	.....	155,951
Red River	32,148	0.8	.....	.....	275,000

[1] Includes Ouachita River, Bartholomew Bayou, Boeuff River, and Mason Bayou.
[2] Less than one-tenth of 1 per cent.

Condition of land in enterprises.—Most of the drainage enterprises in this state are for the reclamation and improvement of so-called swamp land in the alluvial plain of Mississippi River. Much of the land in the enterprises receives also protection against overflow by the levees along the Mississippi and some of its principal tributaries that have been built by the Federal Government and by local levee districts which are not drainage enterprises according to the definition adopted by the Census Bureau. Originally the swamp land was generally timbered. Some of it was logged off before drainage was undertaken, but there is a considerable amount of merchantable timber still standing in operating drainage enterprises.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms, and to afford relief from overflow for the district as a unit. Therefore, the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy or subject to overflow, or land that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total.		Works completed (acres).	Works under construction (acres).	
	Acreage.	Per cent of all land.			
All land in enterprises	3,479,591	100.0	2,124,446	1,355,145	672,243
Improved land	1,491,777	42.9	1,051,442	440,335	217,491
Timber and cut-over land	1,923,382	55.3	1,016,887	906,495	414,707
Other unimproved land	64,432	1.9	56,117	8,315	40,045
Swampy or subject to overflow	897,547	25.8	330,630	566,917	496,573
Suffering a loss of crops	153,957	4.4	89,188	64,769	20,774

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided, and the part in each county be considered a separate enterprise. In this way 174 operating drainage enterprises are counted in Arkansas, with an average area of 22,085 acres assessed. There are 20 of these enterprises embracing 50,000 acres or more each, 68 others of 10,000 acres or more, and only 8 enterprises of less than 1,000 acres each.

The assessed acreage exceeds the land in enterprises by 363,221 acres, which is the amount of overlapping. The land in enterprises and the assessed acreage on each line of Table 5 refer to the same enterprises. From the total area of each enterprise, designated as the assessed area, deduction was made for the amount of overlapping with enterprises organized previously, to determine the acreage to be tabulated as land in enterprises.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	3,479,591	3,842,812	100.0
200 to 499 acres	240	1,140	(1)
500 to 999 acres	1,949	3,669	0.1
1,000 to 4,999 acres	80,780	103,001	2.7
5,000 to 9,999 acres	246,647	274,227	7.1
10,000 to 49,999 acres	1,369,711	1,473,391	38.3
50,000 to 99,999 acres	964,000	1,162,120	30.2
100,000 to 499,999 acres	825,264	825,264	21.5

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

Character of enterprises.—The drainage enterprises in Arkansas are county drains or drainage districts organized under general, special, or local laws of the state, and a few undertakings by individual farm owners. A distinction between county drains and drainage districts is not universally recognized, and is not made in this bulletin.

The statute of April 23, 1891 (act 161), was the first general drainage law of the state. It provided for the establishment of ditches by the county courts, upon petition from one or more landowners affected. Three viewers appointed by the court made report regarding the location of the proposed ditch, the probable benefits to be secured from it, and the apportionment of the work of construction to the landowners in proportion to the benefits they would receive. Order of establishment was issued only after public hearing upon the viewers' report and, if any remonstrance was filed, upon further report from reviewers appointed by the court. For work not performed by the landowners, contracts were let by the county court and the cost collected from the owners. For a ditch in more than one county, viewers were appointed by each county court, to act jointly with the viewers from the other counties affected.

The law of April 23, 1903 (act 159), supersedes that of 1891, to which it is generally similar. For an improvement to be more than 5 miles long, at least five landowners must sign the petition. If the petition is denied, the cost of the proceedings is charged to the petitioners. After the viewers have submitted a preliminary report and the order of establishment has been issued by the county court, the complete plan of drainage is prepared and the viewers assess the benefits and the damages that will accrue to the land, and apportion the work of construction to the owners in proportion to the benefits. After public hearing, the final report of the viewers is confirmed with such modifications as the court finds equitable. Appeals may be taken to the district court. Contracts for construction not performed by the landowners are let by the engineer whom the court appoints to superintend the construction. The cost of the enterprise is paid by the landowners in proportion to the benefits, and is collected like taxes. Bonds may be issued, to run from 10 to 30 years. For a district in more than one county, each county court appoints one viewer for making the preliminary report, and two additional for preparing the plan of drainage and assessment of damages and benefits.

The drainage district law of May 27, 1909 (act 279), does not repeal the law of 1903, but has virtually superseded it in practice. As amended, the 1909 law authorizes the county courts to establish drainage districts upon petition from three or more owners of real property within the proposed district. The circuit courts have jurisdiction over districts embracing land in more than one county, the petition being filed with that court for any county in which a part of the district is located. After a plan of drainage is formulated and the district boundaries are defined by an engineer appointed by the court, public hearing is held and the district is established if the court finds the project will be of benefit to the property owners; the district must be established if petition for it is made at the hearing, by a majority of the landowners in number, acreage, or value. The officers of the district are three commissioners appointed by the court; the selection may be determined by petition from a majority in value of the landowners. The final plan of improvement works, estimate of cost, and assessments of damages and benefits are made by the commissioners, subject to review by the court at public hearing. Awards of damages may be appealed by any aggrieved owner for jury trial. The cost of the enterprise is apportioned according to the benefits, and collected like taxes. Supplemental levies for cost may be made, but the total cost must not exceed the confirmed benefits. Bonds may be issued by the district, to mature within 30 years. Subdistricts within a drainage district may be established by the same method as main districts, the commissioners of the main district serving also for the subdistricts.

Local drainage laws have been enacted by the legislature, each applying in only one or a few counties. Also, many special acts have been passed, each creating one drainage district, defining its boundaries, naming the initial members of its board of commissioners, and prescribing its powers and method of procedure. The cost of these special districts generally has been apportioned according to the anticipated benefits, and the issuance of bonds nearly always has been authorized.

A law effective February 24, 1905 (act 53), provides for condemnation of right of way by drainage districts, damages to be determined by appraisers appointed by the circuit judge, the awards to be confirmed by the circuit court and subject to appeal to the supreme court of the state.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	4,151,834	100.0	$14,217,155	100.0	$18,637,337
Operating enterprises	3,479,591	83.8	14,147,174	99.5	11,741,425
Drainage districts	3,452,691	83.2	14,084,174	99.1	11,721,425
Laws of 1891, act 161	26,100	0.6	100,000	0.7	.....
Laws of 1903, act 159 [1]	339,111	8.2	981,072	6.9	.....
Laws of 1909, act 279	1,825,915	44.0	8,374,659	58.9	1,986,025
Special acts [2]	1,261,565	30.4	4,628,443	32.6	9,735,400
Individual ownerships	26,900	0.6	63,000	0.4	20,000
Nonoperating enterprises	672,243	16.2	69,981	0.5	6,895,912
Drainage districts	672,243	16.2	69,981	0.5	6,895,912
Laws of 1909, act 279	559,995	13.5	51,981	0.4	5,754,912
Special acts	112,248	2.7	18,000	0.1	1,141,000

[1] Includes 4,080 acres organized under act 27 of 1903, applicable only in Randolph, Lawrence, and Jackson Counties.
[2] Includes 5,861 acres organized under act 144 of 1909, applicable only in Little River County.

Drainage works.—The total works completed by the drainage enterprises to December 31, 1919, comprised 3,154.1 miles of open ditches, 20.4 miles of tile drains, and 119.8 miles of accessory levees; the additional lengths under construction were 974.1 miles of ditches, 2.0 miles of tile drains, and 240.8 miles of levees. These figures do not include drains or levees installed by individual farm owners supplemental to the works of the enterprises, nor the works of flood-protection or levee districts that had not undertaken the construction of ditches or tile drains. There is one pumping district for land drainage among the enterprises under construction in Arkansas, in which part of the drainage water from 90,000 acres is to be removed by pumping. The anticipated capacity of the pumps is 720,000 gallons per minute, and that of the engine 2,800 horsepower.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All kinds	3,479,591	100.0	$14,147,174	100.0	$11,741,425
Open ditches only	2,267,281	65.2	9,033,226	63.9	1,968,425
Open ditches and levees	1,171,354	33.7	4,819,948	34.1	9,736,000
Tile drains only	3,100	0.1	41,000	0.3	.....
Open ditches and tile drains	28,356	0.8	213,000	1.5	37,000
Open ditches, tile drains, and levees	9,500	0.3	40,000	0.3	.....

The average depth of the main or outlet ditch was reported for each enterprise. The maximum reported for any enterprise in the state and the maximum in each county are shown on line 15 of County Table II. The maximum length, width, and depth of outlet shown in that table for any county may not refer to the same enterprise.

In County Table II, line 16 shows the mean depth of branch ditches, which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations. Depths of 10 feet and greater were omitted, as it seemed they did not represent so well the average depths of outlet provided for all the farms in those districts; to include this group, computed as 10 feet, would change the mean depth for the state, 6.9 feet, less than 0.1 foot.

TABLE 8.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	3,479,591	100.0
3.0 to 3.9 feet	46,986	1.4
4.0 to 4.9 feet	165,213	4.7
5.0 to 5.9 feet	213,578	6.1
6.0 to 6.9 feet	517,802	14.9
7.0 to 7.9 feet	810,607	23.3
8.0 to 8.9 feet	1,138,863	32.7
9.0 to 9.9 feet	76,119	2.2
10.0 and more	41,000	1.2
Not reporting branches	469,423	13.5

Maintenance of works.—The drainage law of 1903 provides that ditches constructed under that act shall be cleaned by the road commissioners of the county. A statute of May 13, 1907, (act 314), provides that the county judge, county clerk, and county sheriff shall constitute a board to ascertain the amount of money necessary each year to clean the public ditches of the county, this amount to be certified to the quorum court of the county for the purpose of levying a tax against the property affected.

The drainage district law of 1909 provides that the district organization shall continue after completion of the drainage system, for the purpose of preserving the system, keeping the ditches clear of obstruction, and extending or enlarging the drains as may be advantageous to the district. The levy of taxes for such maintenance or extension work is determined by the county court upon petition from the district commissioners and after public hearing, the findings of the court being subject to appeal.

Most of the special acts creating individual drainage districts authorize the maintenance of the works of those districts by the district commissioners, taxes for the annual cost being levied by the commissioners in proportion to the benefits.

TABLE 9.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All operating enterprises	3,479,591	100.0	$14,147,174	100.0	$11,741,425
By district forces	580,292	16.7	2,683,513	19.0	1,440,000
By contract	643,795	18.5	3,621,997	25.6	337,000
By method not specified	16,000	0.5	129,000	0.9	.....
By landowners	92,490	2.7	11,500	0.1	.....
No maintenance provided	1,358,508	39.0	5,686,764	40.2	1,566,425
Not reporting	788,506	22.7	2,014,400	14.2	8,398,000

Date of organization.—The progress of development in drainage is shown only roughly by the dates of the organization of the enterprises, which are the dates when the districts were established by the courts, since there may be a period of a year or more between the decree of establishment and the beginning of actual construction, and since the work of construction may occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including any extensions made after the original plan of drainage was completed.

TABLE 10.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	3,479,591	100.0	3,842,812	100.0
1905 to 1909	869,641	25.0	960,641	25.0
1910 to 1914	1,563,456	44.9	1,733,237	45.1
1915 to 1919	998,494	28.7	1,100,934	28.6
Not reported	48,000	1.4	48,000	1.2

TABLE 11.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$14,147,174	100.0	$11,741,425
1905 to 1909	2,877,390	20.3	.....
1910 to 1914	7,811,962	55.2	1,425,400
1915 to 1919	3,357,822	23.7	10,216,025
Not reported	100,000	0.7	100,000

TABLE 12.—DRAINS AND LEVEES (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		TILE.		LEVEES.	
	Miles.	Per cent of total.	Miles.	Per cent of total.	Miles.	Per cent of total.
All drains and levees	4,128.2	100.0	22.4	100.0	360.6	100.0
1905 to 1909	663.2	16.1	.....	.....	65.0	18.0
1910 to 1914	2,029.4	49.2	21.7	96.9	16.1	4.5
1915 to 1919	1,377.7	33.4	0.7	3.1	279.5	77.5
Not reported	57.9	1.4	.....	.....	.....	.....

Crops.—The principal crops grown upon the drained land in the drainage enterprises are cotton and corn. Data were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

County Table I.—DRAINAGE ON FARMS: 1920.

		The State.	Arkansas.	Ashley.	Bradley.	Chicot.	Clark.	Clay.	Cleburne.
1	Number of all farms in the state or county	232,604	2,121	3,216	1,895	3,663	3,292	3,335	1,941
2	Farms reporting land having drainage	13,426	97	106	42	359	285	840	37
3	Farms reporting land needing drainage	33,437	361	575	698	208	295	1,125	576
4	Farms in drainage and levee districts	10,882	82	57	1	435	47	1,089	.....
	LAND AND FARM AREA.								
5	Approximate land area of the state or county ..... acres	33,616,000	640,000	601,600	421,760	388,480	564,480	418,560	381,440
6	All land in farms ..... acres	17,456,750	282,097	211,890	144,433	171,706	265,460	215,298	185,633
7	Improved land in farms ..... acres	9,210,556	195,910	109,700	64,788	104,472	125,816	156,989	72,083
8	Woodland in farms ..... acres	7,396,028	65,094	93,501	77,944	65,914	114,554	54,632	107,856
9	Other unimproved land in farms ..... acres	850,166	21,093	8,689	1,701	1,320	25,090	3,677	5,694
10	Farm land reported as provided with drainage ..... acres	497,489	16,771	3,534	660	14,557	6,930	38,438	757
11	Farm land reported as needing drainage ..... acres	1,642,403	19,665	46,349	34,855	27,954	16,732	34,208	23,450
12	Drainage only ..... acres	129,087	1,075	5,280	783	2,362	1,005	8,745	228
13	Drainage and clearing ..... acres	1,512,416	18,590	41,069	34,072	25,592	15,727	25,463	23,222

		Columbia.	Conway.	Craighead.	Crawford.	Crittenden.	Cross.	Desha.	Drew.	Faulkner.	Grant.
1	Number of all farms in the county	4,555	3,594	3,549	3,326	5,496	2,507	3,344	3,344	4,457	1,428
2	Farms reporting land having drainage	40	46	873	16	112	60	170	31	72	113
3	Farms reporting land needing drainage	783	251	694	272	144	263	368	610	653	994
4	Farms in drainage and levee districts	.....	27	943	23	176	77	399	4	16	18
	LAND AND FARM AREA.										
5	Approximate land area of the county ..... acres	502,400	360,320	439,680	379,520	372,480	396,160	478,080	542,080	416,640	407,680
6	All land in farms ..... acres	347,650	248,690	204,899	234,462	203,227	144,134	124,856	251,466	307,003	129,408
7	Improved land in farms ..... acres	178,341	154,625	141,459	131,636	151,215	82,529	79,215	121,476	175,466	51,668
8	Woodland in farms ..... acres	162,668	89,153	59,607	79,851	50,298	57,178	38,472	119,949	113,912	76,292
9	Other unimproved land in farms ..... acres	6,641	4,912	3,833	22,975	1,714	4,427	7,169	10,041	17,625	1,508
10	Farm land reported as provided with drainage ..... acres	916	1,202	34,255	688	8,523	7,524	4,988	728	1,724	1,629
11	Farm land reported as needing drainage ..... acres	44,712	5,964	25,132	5,126	18,881	24,666	12,760	43,615	67,649	60,390
12	Drainage only ..... acres	634	165	5,571	191	3,973	2,579	377	2,874	1,417	619
13	Drainage and clearing ..... acres	44,078	5,799	19,561	4,935	14,908	22,087	12,383	40,741	66,232	59,771

		Greene.	Hempstead.	Howard.	Independence.	Jackson.	Jefferson.	Lawrence.	Lee.	Lincoln.	Little River.
1	Number of all farms in the county	3,291	5,031	2,693	3,287	3,227	6,900	2,759	4,895	3,860	2,490
2	Farms reporting land having drainage	356	190	320	8	380	2,515	285	334	1,105	17
3	Farms reporting land needing drainage	790	417	469	204	646	575	717	852	663	484
4	Farms in drainage and levee districts	424	56	1	2	431	2,291	161	65	819	4
	LAND AND FARM AREA.										
5	Approximate land area of the county ..... acres	359,040	465,280	385,280	487,680	405,760	577,920	378,880	384,640	365,440	349,440
6	All land in farms ..... acres	211,481	334,767	184,420	278,658	221,310	290,296	220,054	213,452	223,194	178,142
7	Improved land in farms ..... acres	137,065	206,038	99,968	139,694	129,382	198,314	126,953	147,154	127,790	104,777
8	Woodland in farms ..... acres	71,765	116,532	72,990	128,024	79,035	85,203	84,738	63,167	91,034	69,371
9	Other unimproved land in farms ..... acres	2,651	12,197	11,462	10,940	12,893	6,779	8,363	3,131	4,370	3,994
10	Farm land reported as provided with drainage ..... acres	18,550	4,680	3,368	952	17,457	83,017	8,801	10,129	37,958	3,071
11	Farm land reported as needing drainage ..... acres	32,659	19,645	19,197	7,622	33,922	34,368	28,022	26,036	49,095	29,790
12	Drainage only ..... acres	4,049	1,565	263	487	2,370	6,672	3,425	2,635	7,364	1,032
13	Drainage and clearing ..... acres	28,610	18,080	18,934	7,135	31,552	27,696	24,597	23,401	41,731	28,758

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Logan.	Lonoke.	Miller.	Mississippi.	Monroe.	Montgomery.	Nevada.	Ouachita.	Perry.	Phillips.
1	Number of all farms in the county	3,911	5,596	2,618	6,511	3,305	1,742	3,682	2,326	1,265	5,774
2	Farms reporting land having drainage	137	338	23	1,498	36	54	36	35	114	146
3	Farms reporting land needing drainage	462	536	225	541	343	612	856	215	266	509
4	Farms in drainage and levee districts	15	459	16	1,664	10	.....	2	.....	3	149
	LAND AND FARM AREA.										
5	Approximate land area of the county ... acres	464,640	516,480	398,720	506,880	385,920	501,760	396,800	469,120	353,280	442,880
6	All land in farms ... acres	311,463	320,088	207,566	277,670	150,029	185,775	279,682	222,802	86,763	237,939
7	Improved land in farms ... acres	179,355	217,981	105,726	231,594	101,215	71,242	146,552	99,609	44,702	177,756
8	Woodland in farms ... acres	119,986	95,571	98,910	32,821	45,367	106,685	126,562	117,781	31,803	55,944
9	Other unimproved land in farms ... acres	12,122	6,536	2,930	13,255	3,447	7,848	6,568	5,412	10,258	4,239
10	Farm land reported as provided with drainage ... acres	2,461	14,253	3,230	65,471	1,243	648	649	654	1,870	3,744
11	Farm land reported as needing drainage ... acres	8,947	21,670	8,194	27,622	13,803	26,383	45,645	10,810	7,942	21,442
12	Drainage only ... acres	490	1,532	737	11,033	1,130	271	220	890	163	2,750
13	Drainage and clearing ... acres	8,457	20,138	7,457	16,589	12,673	26,112	45,425	9,920	7,779	18,692

		Pike.	Poinsett.	Polk.	Pope.	Prairie.	Pulaski.	Randolph.	St. Francis.	Saline.	Scott.
1	Number of all farms in the county	1,762	2,257	2,272	3,936	2,413	4,495	2,838	4,586	1,918	2,321
2	Farms reporting land having drainage	56	102	59	99	132	162	120	53	92	107
3	Farms reporting land needing drainage	520	75	277	152	544	615	375	528	715	224
4	Farms in drainage and levee districts	.....	105	.....	16	98	69	152	192	30	.....
	LAND AND FARM AREA.										
5	Approximate land area of the county ... acres	384,640	461,440	541,440	529,920	423,680	498,560	418,560	401,920	475,520	620,800
6	All land in farms ... acres	145,799	127,124	213,025	282,104	238,994	241,970	277,843	190,175	161,645	197,273
7	Improved land in farms ... acres	69,691	78,191	77,905	161,896	153,830	150,395	145,272	133,540	67,946	87,369
8	Woodland in farms ... acres	71,637	44,739	122,489	114,927	72,803	86,535	95,551	45,635	80,284	102,935
9	Other unimproved land in farms ... acres	4,471	4,194	12,631	5,281	12,361	5,040	37,020	11,000	13,415	6,969
10	Farm land reported as provided with drainage ... acres	1,055	10,997	725	2,562	3,918	5,559	6,773	5,160	2,118	2,728
11	Farm land reported as needing drainage ... acres	21,097	6,345	5,970	3,618	32,969	28,712	17,397	38,684	26,301	6,439
12	Drainage only ... acres	537	1,203	241	252	702	7,764	4,172	6,330	832	1,014
13	Drainage and clearing ... acres	20,560	5,142	5,729	3,366	32,267	20,948	13,225	32,354	25,469	5,425

		Sebastian.	Sevier.	Union.	Washington.	White.	Woodruff.	Yell.	All other counties.[1]
1	Number of all farms in the county	3,150	2,283	3,736	4,803	4,821	2,853	3,817	48,117
2	Farms reporting land having drainage	158	136	104	194	61	98	311	156
3	Farms reporting land needing drainage	520	570	785	147	818	321	416	6,583
4	Farms in drainage and levee districts	4	6	.....	9	24	142	8	61
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	339,840	366,080	670,720	611,200	663,680	369,280	611,200	8,920,320
6	All land in farms ... acres	222,567	188,122	354,437	481,183	353,062	163,305	267,014	5,043,185
7	Improved land in farms ... acres	134,459	88,148	145,075	242,456	187,064	104,386	153,885	2,138,793
8	Woodland in farms ... acres	71,912	93,966	202,472	213,021	152,163	55,279	100,304	2,549,212
9	Other unimproved land in farms ... acres	16,196	6,008	6,890	25,706	13,835	3,640	12,825	355,180
10	Farm land reported as provided with drainage ... acres	4,073	2,164	696	5,726	3,300	2,296	9,024	2,585
11	Farm land reported as needing drainage ... acres	8,950	29,078	60,751	3,511	31,723	24,272	13,945	297,719
12	Drainage only ... acres	431	7,803	362	1,234	696	938	2,320	6,200
13	Drainage and clearing ... acres	8,519	21,275	60,389	2,277	31,027	23,334	11,625	291,519

[1] No drainage on farms reported in Boone, Carroll, and Newton Counties.

County Table II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		The State.	Arkansas.	Ashley.	Chicot.	Clark.	Clay.	Conway.	Craighead.	Crittenden.
	LAND AREA.									
1	Approximate land area of the state or county ..... acres..	33,616,000	640,000	601,600	388,480	564,480	418,560	360,320	439,680	372,480
2	All land in operating drainage enterprises ..... acres..	3,479,591	91,840	38,319	68,920	25,000	278,480	31,650	265,920	261,860
3	Improved land ..... acres..	1,491,777	82,461	26,660	32,204	12,500	147,907	15,825	89,379	132,892
4	Per cent of all improved land in farms	16.2	42.1	24.3	30.8	9.9	94.2	10.2	63.2	87.9
5	Timber and cut-over land ..... acres..	1,923,382	8,653	11,659	36,716	12,500	130,573	15,825	176,541	114,296
6	Other unimproved land ..... acres..	64,432	726	.....	.....	.....	.....	.....	.....	14,672
7	Swampy or subject to overflow, in enterprises ..... acres..	897,547	.....	3,000	6,016	6,250	65	13,325	76,682	32,445
8	Suffering loss of crops from defective drainage ..... acres..	153,957	.....	.....	.....	.....	.....	.....	.....	.....
9	Assessed acreage	3,842,812	91,840	38,319	68,920	25,000	366,225	31,650	265,920	261,860
10	Excess over all land in operating enterprises ..... acres..	363,221	.....	.....	.....	.....	87,745	.....	.....	.....
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed ..... miles..	3,154.1	139.3	17.0	42.5	10.2	403.1	8.5	154.6	385.1
12	Additional under construction ..... miles..	974.1	.....	.....	1.0	5.8	12.8	0.2	76.6	92.3
13	Maximum completed in any enterprise ..... miles..	305.0	30.0	15.0	41.5	10.2	149.0	6.2	50.0	140.0
14	Maximum width at bottom of ditch [1] ..... feet..	100	24	55	88	20	80	20	50	70
15	Maximum of average depths of outlet ditches [1] ..... feet..	18.0	6.5	15.0	14.0	10.0	8.0	9.0	10.0	18.0
16	Mean depth of branch ditches [1] ..... feet..	6.9	2.7	9.0	8.9	.....	6.2	7.6	6.7	7.3
	Tile drains:									
17	Completed ..... miles..	20.4	.....	.....	.....	.....	0.2	.....	10.2	.....
18	Additional under construction ..... miles..	2.0	.....	.....	.....	.....	.....	.....	.....	.....
19	Maximum completed in any enterprise ..... miles..	10.0	.....	.....	.....	.....	0.2	.....	10.0	.....
20	Maximum size of tile [1] ..... inches..	20	.....	.....	.....	.....	6	.....	10	.....
	Accessory levees and dikes:									
21	Completed ..... miles..	119.8	.....	.....	.....	.....	60.7	.....	2.7	0.8
22	Additional under construction ..... miles..	240.8	.....	.....	.....	16.0	25.0	0.1	6.5	.....
23	Area drained by open ditches only [1] ..... acres..	2,267,281	91,840	38,319	68,920	.....	1,300	25,000	238,120	243,576
24	Length of these ditches ..... miles..	2,464.3	139.3	17.0	43.5	.....	45.1	6.2	189.2	431.5
25	Average length per acre ..... feet..	5.7	8.0	2.3	3.3	.....	183.2	1.3	4.2	9.4
26	Area having open ditches and levees [1] ..... acres..	1,171,354	.....	.....	.....	25,000	277,180	6,650	16,500	18,284
27	Length of these ditches ..... miles..	1,566.8	.....	.....	.....	16.0	356.8	2.5	27.0	45.9
28	Average length per acre ..... feet..	7.1	.....	.....	.....	3.4	6.8	2.0	8.6	13.3
29	Length of the accessory levees ..... miles..	359.6	.....	.....	.....	16.0	87.7	0.1	8.2	0.8
30	Area drained by tile only [1] ..... acres..	3,100	.....	.....	.....	.....	.....	.....	1,800	.....
31	Length of these tile ..... miles..	20.0	.....	.....	.....	.....	.....	.....	10.0	.....
32	Average length per acre ..... feet..	34.1	.....	.....	.....	.....	.....	.....	29.3	.....
33	Area drained by open ditches and tile [1] ..... acres..	28,356	.....	.....	.....	.....	(2)	.....	.....	.....
34	Length of these drains ..... miles..	84.3	.....	.....	.....	.....	14.2	.....	.....	.....
35	Average length per acre ..... feet..	15.7	.....	.....	.....	.....	.....	.....	.....	.....
36	Area having open ditches, tile drains, and levees [1] ..... acres..	9,500	.....	.....	.....	.....	.....	.....	9,500	.....
37	Length of these drains ..... miles..	15.2	.....	.....	.....	.....	.....	.....	15.2	.....
38	Average length per acre ..... feet..	8.4	.....	.....	.....	.....	.....	.....	8.4	.....
39	Length of the accessory levees ..... miles..	1.0	.....	.....	.....	.....	.....	.....	1.0	.....
	DEVELOPMENT OF LAND.									
40	Improved land in operating enterprises, 1920 ..... acres..	1,491,777	82,461	26,660	32,204	12,500	147,907	15,825	89,379	132,892
41	Improved land prior to drainage ..... acres..	887,864	37,747	20,748	9,962	6,250	48,083	5,825	55,979	88,117
42	Increase since drainage ..... acres..	603,913	44,714	5,912	22,242	6,250	99,824	10,000	33,400	44,775
43	Per cent of increase	68.0	118.5	28.5	223.3	100.0	207.6	171.7	59.7	50.8
44	Per cent increase is of all improved land in farms, 1920	6.6	22.8	5.4	21.3	5.0	63.6	6.5	23.6	20.6
45	Timber and cut-over land, 1920 ..... acres..	1,923,382	8,653	11,659	36,716	12,500	130,573	15,825	176,541	114,296
46	Timber and cut-over land prior to drainage ..... acres..	2,460,170	13,988	17,571	58,958	18,750	230,397	25,825	209,941	158,399
47	Decrease since drainage ..... acres..	536,788	5,335	5,912	22,242	6,250	99,824	10,000	33,400	44,103
48	Per cent of decrease	21.8	38.1	33.6	37.7	33.3	43.3	38.7	15.9	27.8
49	Other unimproved land, 1920 ..... acres..	64,432	726	.....	.....	.....	.....	.....	.....	14,672
50	Other unimproved land prior to drainage ..... acres..	131,557	40,105	.....	.....	.....	.....	.....	.....	15,344
51	Decrease since drainage ..... acres..	67,125	39,379	.....	.....	.....	.....	.....	.....	672
52	Per cent of decrease	51.0	98.2	.....	.....	.....	.....	.....	.....	4.4
53	Swampy or subject to overflow, 1920 ..... acres..	897,547	.....	3,000	6,016	6,250	65	13,325	76,682	32,445
54	Swampy or subject to overflow prior to drainage ..... acres..	2,065,264	38,804	16,739	52,066	12,500	159,180	22,075	228,332	104,425
55	Decrease since drainage ..... acres..	1,167,717	38,804	13,739	46,050	6,250	159,115	8,750	151,650	71,980
56	Per cent of decrease	56.5	100.0	82.1	88.4	50.0	100.0	39.6	66.4	68.9
	CAPITAL INVESTED AND COST PER ACRE.									
57	Total capital invested in and required for completion of operating enterprises ..... dollars..	25,888,599	378,988	77,000	168,182	210,000	1,772,998	65,000	1,335,000	1,696,827
58	Capital invested in these enterprises to Dec. 31, 1919 ..... dollars..	14,147,174	378,988	77,000	157,656	68,000	1,707,798	63,000	798,800	1,461,827
59	Additional capital required to complete these enterprises ..... dollars..	11,741,425	.....	.....	10,526	142,000	65,200	2,000	536,200	235,000
60	Average cost per acre when completed ..... dollars..	7.44	4.13	2.01	2.44	8.40	6.37	2.05	5.02	6.48
61	Enterprises constructing open ditches only ..... dollars..	11,001,651	378,988	77,000	168,182	.....	234,946	50,000	954,000	1,506,567
62	Average cost per acre when completed ..... dollars..	4.85	4.13	2.01	2.44	.....	.....	2.00	4.01	6.43
63	Enterprises constructing open ditches and levees ..... dollars..	14,555,948	.....	.....	.....	210,000	1,508,052	15,000	325,000	130,260
64	Average cost per acre when completed ..... dollars..	12.43	.....	.....	.....	8.40	5.44	2.26	19.70	7.12
65	Enterprises constructing tile drains only ..... dollars..	41,000	.....	.....	.....	.....	.....	.....	16,000	.....
66	Average cost per acre when completed ..... dollars..	13.23	.....	.....	.....	.....	.....	.....	8.89	.....
67	Enterprises constructing open ditches and tile drains ..... dollars..	250,000	.....	.....	.....	.....	30,000	.....	.....	.....
68	Average cost per acre when completed ..... dollars..	8.82	.....	.....	.....	.....	.....	.....	.....	.....
69	Enterprises constructing open ditches, tile drains, and levees ..... dollars..	40,000	.....	.....	.....	.....	.....	.....	40,000	.....
70	Average cost per acre when completed ..... dollars..	4.21	.....	.....	.....	.....	.....	.....	4.21	.....
	CROPS.									
	Improved land in enterprises reporting—									
71	Cotton as principal crop on drained land ..... acres..	909,973	.....	26,660	32,204	12,500	.....	15,825	33,600	108,892
72	Corn as principal crop on drained land ..... acres..	461,230	.....	.....	.....	.....	147,907	.....	55,779	24,000
73	Hay as principal crop on drained land ..... acres..	2,320	.....	.....	.....	.....	.....	.....	.....	.....
74	Other crops as principal ones on drained land ..... acres..	118,254	82,461	.....	.....	.....	.....	.....	.....	.....

[1] When works under construction have been completed.

[2] Acreage reported under open ditches and levees.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Cross.	Desha.	Drew.	Faulkner.	Greene.	Hempstead.	Independence.	Jackson.	Jefferson.
	LAND AREA.									
1	Approximate land area of the county ... acres	396,160	478,080	542,080	416,640	359,040	465,280	487,680	405,760	577,920
2	All land in operating drainage enterprises ... acres	43,364	317,264	6,400	20,000	182,180	9,400	5,520	61,083	162,660
3	Improved land ... acres	11,807	69,453	3,200	10,000	73,300	8,652	3,368	25,097	94,352
4	Per cent of all improved land in farms	14.3	87.7	2.6	5.7	53.5	4.2	2.4	19.4	47.6
5	Timber and cut-over land ... acres	29,625	247,811	3,200	10,000	105,265	700	1,891	35,986	68,308
6	Other unimproved land ... acres	1,932				3,615	48	261		
7	Swampy or subject to overflow, in enterprises ... acres	6,715	235,811			123,834	48	5,026	20,629	21,214
8	Suffering loss of crops from defective drainage ... acres					48,033		861		5,414
9	Assessed acreage	43,364	399,424	6,400	20,000	270,330	9,400	5,520	61,083	189,840
10	Excess over all land in operating enterprises ... acres		82,160			88,150				27,180
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed ... miles	28.9	138.0	3.5	10.0	151.1	14.9	10.5	75.2	150.6
12	Additional under construction ... miles	5.6	94.0			38.6			30.0	13.2
13	Maximum completed in any enterprise ... miles	22.4	94.0	3.5	10.0	48.1	11.2	5.9	13.5	24.0
14	Maximum width at bottom of ditch [1] ... feet	60	88	55	20	80	20	25	30	45
15	Maximum of average depths of outlet ditches [1] ... feet	13.0	14.0	12.0	6.0	11.0	8.0	10.0	7.0	12.0
16	Mean depth of branch ditches [1] ... feet	7.1	8.0	9.0		7.0	7.0	5.1	4.9	6.8
	Tile drains:									
17	Completed ... miles									
18	Additional under construction ... miles								0.5	
19	Maximum completed in any enterprise ... miles									
20	Maximum size of tile [1] ... inches									
	Accessory levees and dikes:									
21	Completed ... miles					4.4	5.0			
22	Additional under construction ... miles					36.7				
23	Area drained by open ditches only [1] ... acres	43,364	317,264	6,400	20,000	94,880	2,400	5,520	50,325	162,660
24	Length of these ditches ... miles	34.5	232.0	3.5	10.0	97.6	3.7	10.5	77.1	163.3
25	Average length per acre ... feet	4.2	3.9	2.9	2.6	5.4	8.1	10.0	8.1	5.3
26	Area having open ditches and levees [1] ... acres					87,300	7,000			
27	Length of these ditches ... miles					92.1	11.2			
28	Average length per acre ... feet					5.6	8.4			
29	Length of the accessory levees ... miles					41.1	5.0			
30	Area drained by tile only [1] ... acres									
31	Length of these tile ... miles									
32	Average length per acre ... feet									
33	Area drained by open ditches and tile [1] ... acres								10,758	
34	Length of these drains ... miles								28.6	
35	Average length per acre ... feet								14.0	
36	Area having open ditches, tile drains, and levees [1] ... acres									
37	Length of these drains ... miles									
38	Average length per acre ... feet									
39	Length of the accessory levees ... miles									
	DEVELOPMENT OF LAND.									
40	Improved land in operating enterprises, 1920 ... acres	11,807	69,453	3,200	10,000	73,300	8,652	3,368	25,097	94,352
41	Improved land prior to drainage ... acres	6,660	29,326	960		40,848	7,520	2,961	16,227	63,513
42	Increase since drainage ... acres	5,147	40,127	2,240	10,000	32,452	1,132	407	8,870	30,839
43	Per cent of increase	77.3	136.8	233.3		79.4	15.1	13.7	54.7	48.6
44	Per cent increase is of all improved land in farms, 1920	6.2	50.7	1.8	5.7	23.7	0.5	0.3	6.9	15.6
45	Timber and cut-over land, 1920 ... acres	29,625	247,811	3,200	10,000	105,265	700	1,891	35,986	68,308
46	Timber and cut-over land prior to drainage ... acres	31,870	287,938	5,440	20,000	135,292	1,400	2,298	44,856	99,147
47	Decrease since drainage ... acres	2,245	40,127	2,240	10,000	30,027	700	407	8,870	30,839
48	Per cent of decrease	7.0	13.9	41.2	50.0	22.2	50.0	17.7	19.8	31.1
49	Other unimproved land, 1920 ... acres	1,932				3,615	48	261		
50	Other unimproved land prior to drainage ... acres	4,834				6,040	480	261		
51	Decrease since drainage ... acres	2,902				2,425	432			
52	Per cent of decrease	60.0				40.1	90.0			
53	Swampy or subject to overflow, 1920 ... acres	6,715	235,811			123,834	48	5,026	20,629	21,214
54	Swampy or subject to overflow prior to drainage ... acres	33,575	256,811	4,800	4,000	132,286	480	5,375	50,163	72,331
55	Decrease since drainage ... acres	26,860	21,000	4,800	4,000	8,452	432	349	29,534	51,117
56	Per cent of decrease	80.0	8.2	100.0	100.0	6.4	90.0	6.5	58.9	70.7
	CAPITAL INVESTED AND COST PER ACRE.									
57	Total capital invested in and required for completion of operating enterprises ... dollars	136,000	2,463,171	8,500	30,000	2,871,418	65,000	32,500	300,000	882,318
58	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	118,000	1,463,697	8,500	30,000	1,032,418	65,000	32,500	268,000	829,318
59	Additional capital required to complete these enterprises ... dollars	18,000	999,474			1,839,000			32,000	53,000
60	Average cost per acre when completed ... dollars	3.14	7.76	1.33	1.50	15.76	6.91	5.89	4.91	5.42
61	Enterprises constructing open ditches only ... dollars	136,000	2,463,171	8,500	30,000	427,751	14,000	32,500	230,000	882,318
62	Average cost per acre when completed ... dollars	3.14	7.76	1.33	1.50	4.51	5.83	5.89	4.57	5.42
63	Enterprises constructing open ditches and levees ... dollars					2,443,667	51,000			
64	Average cost per acre when completed ... dollars					27.99	7.29			
65	Enterprises constructing tile drains only ... dollars									
66	Average cost per acre when completed ... dollars									
67	Enterprises constructing open ditches and tile drains ... dollars								70,000	
68	Average cost per acre when completed ... dollars								6.51	
69	Enterprises constructing open ditches, tile drains, and levees ... dollars									
70	Average cost per acre when completed ... dollars									
	CROPS.									
	Improved land in enterprises reporting—									
71	Cotton as principal crop on drained land ... acres	1,932	69,453	3,200	10,000	31,470	6,300	1,048	25,097	94,352
72	Corn as principal crop on drained land ... acres					41,830	2,352			
73	Hay as principal crop on drained land ... acres							2,320		
74	Other crops as principal ones on drained land ... acres	9,875								

[1] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Lawrence.	Lee.	Lincoln.	Little River.	Lonoke.	Miller.	Mississippi.	Monroe.	Perry.
	LAND AREA.									
1	Approximate land area of the county ... acres	378,880	384,640	365,440	349,440	516,480	398,720	506,880	385,920	353,280
2	All land in operating drainage enterprises ... acres	117,520	20,576	92,937	5,861	172,007	27,640	478,687	33,136	12,350
3	Improved land ... acres	37,190	12,466	47,807	5,275	91,067	14,512	207,743	14,911	6,175
4	Per cent of all improved land in farms	29.3	8.5	37.4	5.0	41.8	13.7	89.7	14.7	13.8
5	Timber and cut-over land ... acres	75,430	8,110	42,930	586	80,940	10,058	257,111	18,225	6,175
6	Other unimproved land ... acres	4,900		2,200			3,070	13,833		
7	Swampy or subject to overflow, in enterprises ... acres	39,050	4,611	6,756		56,387	795	5,319	6,627	6,175
8	Suffering loss of crops from defective drainage ... acres	209	3,662	1,760		1,688	156		298	
9	Assessed acreage	117,520	20,576	93,617	5,861	179,313	27,640	548,687	33,136	12,350
10	Excess over all land in operating enterprises ... acres			680		7,306		70,000		
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed ... miles	127.1	15.5	88.0	14.4	93.8	35.9	575.4	20.0	10.8
12	Additional under construction ... miles	11.9	6.0	7.5		72.3		282.0		1.2
13	Maximum completed in any enterprise ... miles	40.0	7.0	28.0	14.4	28.5	17.4	305.0	20.0	10.8
14	Maximum width at bottom of ditch [1] ... feet	80	16	45	17	70	20	70	16	20
15	Maximum of average depths of outlet ditches [1] ... feet	10.0	7.5	8.0	4.0	12.0	10.0	13.5	6.0	9.0
16	Mean depth of branch ditches [1] ... feet	7.5	5.6	5.2	4.0	5.8	8.0	7.5	6.0	6.0
	Tile drains:									
17	Completed ... miles									
18	Additional under construction ... miles									
19	Maximum completed in any enterprise ... miles									
20	Maximum size of tile [1] ... inches									
	Accessory levees and dikes:									
21	Completed ... miles					0.2		48.0		
22	Additional under construction ... miles					3.5		55.0		
23	Area drained by open ditches only [1] ... acres	117,520	20,576	92,937	5,861	86,567	27,640	65,687	33,136	12,350
24	Length of these ditches ... miles	139.0	21.5	95.5	14.4	82.8	35.9	204.4	20.0	12.0
25	Average length per acre ... feet	6.2	5.5	5.4	13.0	5.1	6.9	16.4	3.2	5.1
26	Area having open ditches and levees [1] ... acres					85,440		413,000		
27	Length of these ditches ... miles					33.3		653.0		
28	Average length per acre ... feet					5.1		8.3		
29	Length of the accessory levees ... miles					3.7		103.0		
30	Area drained by tile only [1] ... acres									
31	Length of these tile ... miles									
32	Average length per acre ... feet									
33	Area drained by open ditches and tile [1] ... acres									
34	Length of these drains ... miles									
35	Average length per acre ... feet									
36	Area having open ditches, tile drains, and levees [1] ... acres									
37	Length of these drains ... miles									
38	Average length per acre ... feet									
39	Length of the accessory levees ... miles									
	DEVELOPMENT OF LAND.									
40	Improved land in operating enterprises, 1920 ... acres	37,190	12,466	47,807	5,275	91,067	14,512	207,743	14,911	6,175
41	Improved land prior to drainage ... acres	25,506	10,305	33,436	2,931	62,621	7,945	140,932	11,598	6,175
42	Increase since drainage ... acres	11,684	2,161	14,371	2,344	28,446	6,567	66,811	3,313	
43	Per cent of increase	45.8	21.0	43.0	80.0	45.4	82.7	47.4	28.6	
44	Per cent increase is of all improved land in farms, 1920	9.2	1.5	11.2	2.2	13.0	6.2	28.8	3.3	
45	Timber and cut-over land, 1920 ... acres	75,430	8,110	42,930	586	80,940	10,058	257,111	18,225	6,175
46	Timber and cut-over land prior to drainage ... acres	86,614	10,271	57,301	1,465	109,386	15,490	318,405	21,538	6,175
47	Decrease since drainage ... acres	11,184	2,161	14,371	879	28,446	5,432	61,294	3,313	
48	Per cent of decrease	12.9	21.0	25.1	60.0	26.0	35.1	19.3	15.4	
49	Other unimproved land, 1920 ... acres	4,900		2,200			3,070	13,833		
50	Other unimproved land prior to drainage ... acres	5,400		2,200	1,465		4,205	19,350		
51	Decrease since drainage ... acres	500			1,465		1,135	5,517		
52	Per cent of decrease	9.3			100.0		27.0	28.5		
53	Swampy or subject to overflow, 1920 ... acres	39,050	4,611	6,756		56,387	795	5,319	6,627	6,175
54	Swampy or subject to overflow prior to drainage ... acres	99,930	6,045	46,300	5,861	107,514	16,938	199,315	8,284	6,175
55	Decrease since drainage ... acres	60,880	1,434	39,544	5,861	51,127	16,143	193,996	1,657	
56	Per cent of decrease	60.9	23.7	85.4	100.0	47.6	95.3	97.3	20.0	
	CAPITAL INVESTED AND COST PER ACRE.									
57	Total capital invested in and required for completion of operating enterprises ... dollars	369,050	118,600	319,000	52,800	730,034	116,000	4,940,636	16,900	60,000
58	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	333,025	94,600	299,000	52,800	405,034	116,000	2,090,636	16,900	52,000
59	Additional capital required to complete these enterprises ... dollars	36,025	24,000	20,000		325,000		2,850,000		8,000
60	Average cost per acre when completed ... dollars	3.14	5.76	3.43	9.01	4.24	4.20	10.32	0.51	4.86
61	Enterprises constructing open ditches only ... dollars	369,050	118,600	319,000	52,800	330,034	116,000	567,000	16,900	60,000
62	Average cost per acre when completed ... dollars	3.14	5.76	3.43	9.01	3.81	4.20	8.63	0.51	4.86
63	Enterprises constructing open ditches and levees ... dollars					400,000		4,373,636		
64	Average cost per acre when completed ... dollars					4.68		10.59		
65	Enterprises constructing tile drains only ... dollars									
66	Average cost per acre when completed ... dollars									
67	Enterprises constructing open ditches and tile drains ... dollars									
68	Average cost per acre when completed ... dollars									
69	Enterprises constructing open ditches, tile drains, and levees ... dollars									
70	Average cost per acre when completed ... dollars									
	CROPS.									
	Improved land in enterprises reporting—									
71	Cotton as principal crop on drained land ... acres	18,800	12,466	47,807	5,275	84,317	9,315	111,243	14,911	6,175
72	Corn as principal crop on drained land ... acres	15,390					5,197	96,500		
73	Hay as principal crop on drained land ... acres									
74	Other crops as principal ones on drained land ... acres	3,000				6,750				

[1] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Phillips.	Poinsett.	Pope.	Prairie.	Pulaski.	Randolph.	St. Francis.	White.	Woodruff.
	LAND AREA.									
1	Approximate land area of the county ... acres	442,880	461,440	529,920	423,680	498,560	418,560	401,920	663,680	369,280
2	All land in operating drainage enterprises ... acres	119,800	394,800	2,500	7,256	16,000	48,320	29,563	17,598	13,180
3	Improved land ... acres	59,110	71,510	1,250	6,168	16,000	31,860	13,853	5,279	10,544
4	Per cent of all improved land in farms	33.3	91.5	0.8	4.0	10.6	21.9	10.4	2.8	10.1
5	Timber and cut-over land ... acres	60,690	315,725	1,250			16,460	5,188	12,319	2,636
6	Other unimproved land ... acres		7,565		1,088			10,522		
7	Swampy or subject to overflow, in enterprises ... acres	63,036	144,540	1,000			5,010	5,245	1,936	
8	Suffering loss of crops from defective drainage ... acres		89,882				1,484	510		
9	Assessed acreage	119,800	394,800	2,500	7,256	16,000	48,320	29,563	17,598	13,180
10	Excess over all land in operating enterprises ... acres									
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed ... miles	75.0	176.0	2.2	9.0	12.0	58.2	45.4	37.4	15.0
12	Additional under construction ... miles		217.0	3.5					2.6	
13	Maximum completed in any enterprise ... miles	39.0	57.0	2.2	9.0	12.0	22.0	34.5	37.4	10.0
14	Maximum width at bottom of ditch [1] ... feet	40	100	14	40	24	20	60	20	30
15	Maximum of average depths of outlet ditches [1] ... feet	6.0	10.0	7.1	5.0		8.0	13.0	12.0	7.0
16	Mean depth of branch ditches [1] ... feet	4.0	7.1		3.0	8.0	4.3	8.0	5.0	5.0
	Tile drains:									
17	Completed ... miles		10.0							
18	Additional under construction ... miles								1.5	
19	Maximum completed in any enterprise ... miles		10.0							
20	Maximum size of tile [1] ... inches		20							
	Accessory levees and dikes:									
21	Completed ... miles									
22	Additional under construction ... miles		98.0							
23	Area drained by open ditches only [1] ... acres	119,800	208,500	2,500	7,256	16,000	48,320	29,563		13,180
24	Length of these ditches ... miles	75.0	141.0	5.7	9.0	12.0	58.2	45.4		15.0
25	Average length per acre ... feet	3.3	3.6	12.0	6.5	4.0	6.4	8.1		6.0
26	Area having open ditches and levees [1] ... acres		185,000							
27	Length of these ditches ... miles		252.0							
28	Average length per acre ... feet		7.2							
29	Length of the accessory levees ... miles		93.0							
30	Area drained by tile only [1] ... acres		1,300							
31	Length of these tile ... miles		10.0							
32	Average length per acre ... feet		40.6							
33	Area drained by open ditches and tile [1] ... acres								17,598	
34	Length of these drains ... miles								41.5	
35	Average length per acre ... feet								12.5	
36	Area having open ditches, tile drains, and levees [1] ... acres									
37	Length of these drains ... miles									
38	Average length per acre ... feet									
39	Length of the accessory levees ... miles									
	DEVELOPMENT OF LAND.									
40	Improved land in operating enterprises, 1920 ... acres	59,110	71,510	1,250	6,168	16,000	31,860	13,853	5,279	10,544
41	Improved land prior to drainage ... acres	30,820	67,817	1,250	1,088	10,667	18,348	7,129	880	7,690
42	Increase since drainage ... acres	28,290	3,693		5,080	5,333	13,512	6,724	4,399	2,854
43	Per cent of increase	91.8	5.4		466.9	50.0	73.6	94.3	499.9	37.1
44	Per cent increase is of all improved land in farms, 1920	15.9	4.7		3.3	3.5	9.3	5.0	2.4	2.7
45	Timber and cut-over land, 1920 ... acres	60,690	315,725	1,250			16,460	5,188	12,319	2,636
46	Timber and cut-over land prior to drainage ... acres	88,980	316,125	1,250	726	5,333	29,972	6,861	16,718	5,490
47	Decrease since drainage ... acres	28,290	400		726	5,333	13,512	1,673	4,399	2,854
48	Per cent of decrease	31.8	0.1		100.0	100.0	45.1	24.4	26.3	52.0
49	Other unimproved land, 1920 ... acres		7,565		1,088			10,522		
50	Other unimproved land prior to drainage ... acres		10,858		5,442			15,573		
51	Decrease since drainage ... acres		3,293		4,354			5,051		
52	Per cent of decrease		30.3		80.0			32.4		
53	Swampy or subject to overflow, 1920 ... acres	63,036	144,540	1,000			5,010	5,245	1,936	
54	Swampy or subject to overflow prior to drainage ... acres	91,170	184,233	1,000	6,168	16,000	48,320	7,951	14,078	6,040
55	Decrease since drainage ... acres	28,134	39,693		6,168	16,000	43,310	2,706	12,142	6,040
56	Per cent of decrease	30.9	21.5		100.0	100.0	89.6	34.0	86.2	100.0
	CAPITAL INVESTED AND COST PER ACRE.									
57	Total capital invested in and required for completion of operating enterprises ... dollars	230,000	5,691,125	28,000	24,000	125,000	149,925	206,627	150,000	68,000
58	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	230,000	1,191,125	12,000	24,000	125,000	149,925	206,627	120,000	68,000
59	Additional capital required to complete these enterprises ... dollars		4,500,000	16,000					30,000	
60	Average cost per acre when completed ... dollars	1.92	14.42	11.20	3.31	7.81	3.10	6.99	8.52	5.16
61	Enterprises constructing open ditches only ... dollars	230,000	666,125	28,000	24,000	125,000	149,925	206,627		68,000
62	Average cost per acre when completed ... dollars	1.92	3.19	11.20	3.31	7.81	3.10	6.99		5.16
63	Enterprises constructing open ditches and levees ... dollars		5,000,000							
64	Average cost per acre when completed ... dollars		27.03							
65	Enterprises constructing tile drains only ... dollars		25,000							
66	Average cost per acre when completed ... dollars		19.23							
67	Enterprises constructing open ditches and tile drains ... dollars								150,000	
68	Average cost per acre when completed ... dollars								8.52	
69	Enterprises constructing open ditches, tile drains, and levees ... dollars									
70	Average cost per acre when completed ... dollars									
	CROPS.									
	Improved land in enterprises reporting—									
71	Cotton as principal crop on drained land ... acres	59,110	7,235	1,250		16,000	13,860	13,853	5,279	10,544
72	Corn as principal crop on drained land ... acres		54,275				18,000			
73	Hay as principal crop on drained land ... acres									
74	Other crops as principal ones on drained land ... acres		10,000		6,168					

[1] When works under construction have been completed.

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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS

DRAINAGE : CALIFORNIA

STATISTICS FOR THE STATE AND ITS COUNTIES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

This bulletin presents the statistics of drainage for California collected at the census of 1920. The figures relate to conditions on January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises may include areas of timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner installs upon his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are presented separately.

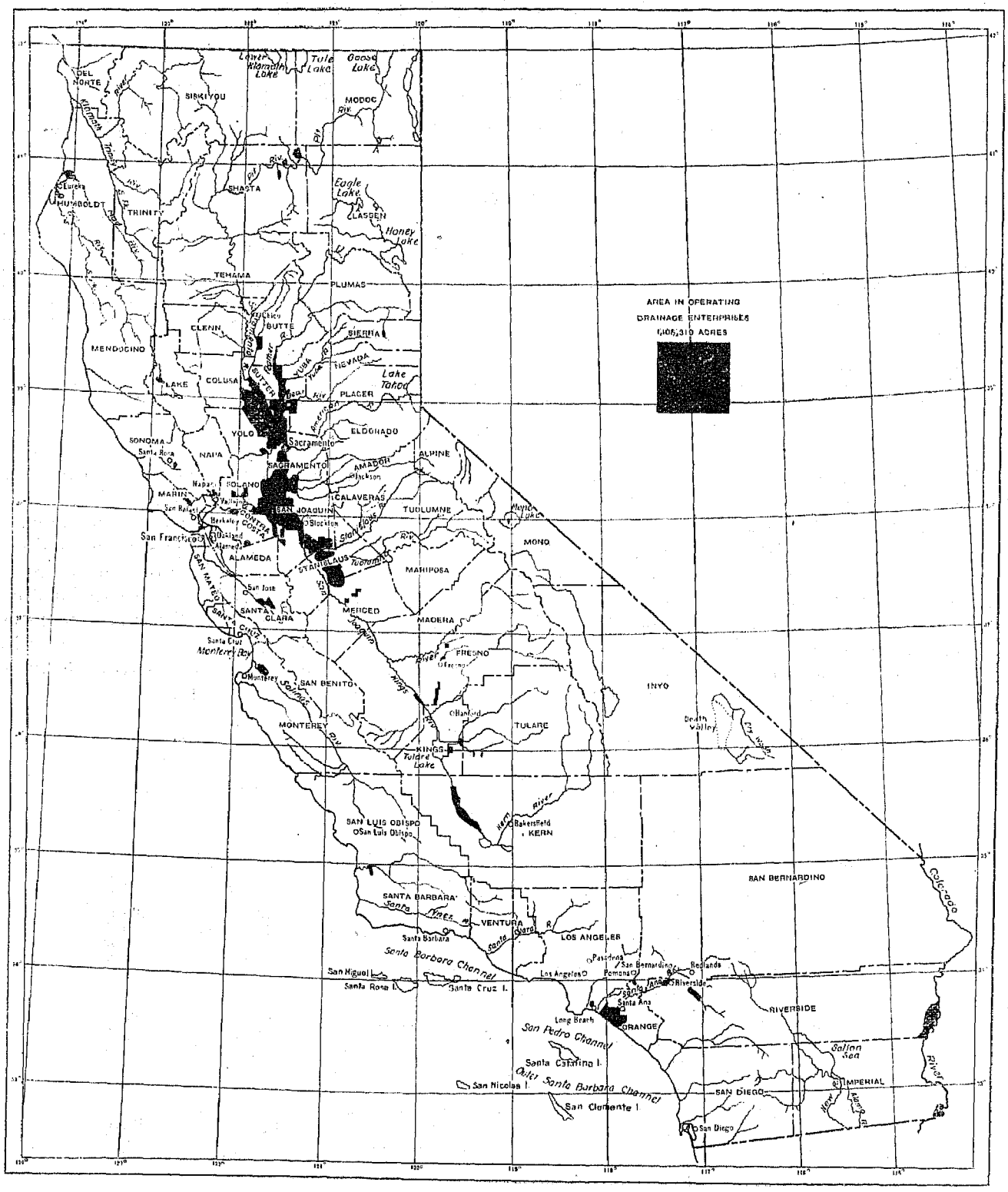
TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	117,670	100.0
Farms reporting land having drainage	5,078	4.3
Farms reporting land needing drainage	3,187	2.7
All land in farms ... acres	29,365,667	100.0
Improved land in farms ... acres	11,878,339	40.4
Farm land reported as provided with drainage ... acres	813,960	2.8
Farm land reported as needing drainage ... acres	286,320	1.0
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	99,617,280	100.0
All land in operating drainage enterprises ... acres	1,108,319	1.1
Improved land ... acres	1,038,835	1.0
Timber and cut-over land ... acres	12,263	(1)
Other unimproved land ... acres	57,221	0.1
Total capital invested in and required for completion of operating enterprises	$54,021,627	100.0
Capital invested in these enterprises to Dec. 31, 1919	$47,687,153	88.3
Additional capital required to complete these enterprises	$6,334,474	11.7

1 Less than one-tenth of 1 per cent.

CALIFORNIA.

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which are substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, is the acreage actually benefited or made of more value for agricultural purposes by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators have answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual." Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises, below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter might be any that had completed the original plan of reclamation some years ago but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include districts that on the census date had completed their plans, sold bonds to cover the cost of the undertakings, and let contracts for the construction work, and also districts that had just been established by order of the county supervisors and were still subject to considerable change in area, plan of drainage works, and cost.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.[1]		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All organized enterprises	1,121,219	100.0	$47,688,153	100.0	$6,734,474
Operating enterprises	1,108,319	98.8	47,687,153	100.0	6,334,474
With works completed	652,931	58.2	30,776,550	64.5	.....
With works under construction	455,388	40.6	16,910,603	35.5	6,334,474
Nonoperating enterprises	12,900	1.2	1,000	(2)	400,000

[1] The inquiry asked for the "total cost of the enterprise to Dec. 31, 1919," and for an "estimate of additional investment to complete."
[2] Less than one-tenth of 1 per cent.

Location of enterprises.—Most of the land in drainage enterprises in California lies in the valleys of the lower San Joaquin and Sacramento Rivers, within 75 miles of their confluence. There are several small tracts in drainage enterprises between this large area and the coast, a few areas in the north end of the state, and several, including some of considerable size, in the extreme southern and southeastern parts of the state.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All organized enterprises	1,121,219	100.0	$47,688,153	100.0	$6,734,474
Operating enterprises	1,108,319	98.8	47,687,153	100.0	6,334,474
Colorado River	46,000	4.1	175,634	0.4	1,000,000
Sacramento River	641,836	57.2	34,659,856	72.7	3,206,645
San Joaquin River	344,282	30.7	11,524,721	24.2	1,987,829
Pacific Ocean	76,201	6.8	1,326,942	2.8	140,000
Nonoperating enterprises	12,900	1.2	1,000	(1)	400,000
Pacific Ocean	12,900	1.2	1,000	(1)	400,000

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

Condition of land in enterprises.—The drainage enterprises in California are for draining and protecting land generally swampy, subject to inundation by stream floods and tidal overflow, and injured or threatened with seepage and the concentration of salts, commonly called alkali, in the surface soil as a result of irrigation. A considerable part of the total area in enterprises is swamp land that first was protected against overflow, then was more completely drained, and later was brought also under irrigation.

In the state, 19,872 acres in drainage and reclamation districts and 223,606 acres in irrigation districts and irrigation projects of the United States Reclamation Service are reported as not having needed drainage or protection, but as having been assessed for drainage merely on account of being responsible for damage to the other land. This acreage for the irrigation districts is not included in the statistics for drainage enterprises given in this bulletin.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms and to afford relief from overflow for the district as a unit. Therefore the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy or subject to overflow, or land that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total.		Works completed (acres).	Works under construction (acres).	
	Acreage.	Per cent of all land.			
All land in enterprises	1,108,319	100.0	652,931	455,388	12,900
Improved land	1,038,835	93.7	630,912	407,923	6,000
Timber and cut-over land	12,263	1.1	11,263	1,000	.....
Other unimproved land	57,221	5.2	10,756	46,465	6,900
Swampy, subject to overflow, seeped, or alkali	45,163	4.1	3,698	41,465	12,900
Suffering a loss of crops	42,209	3.8	4,696	37,513	.....

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided, and the part in each county be considered a separate enterprise. In this way, 145 operating drainage enterprises are counted in California, with an average area of 7,644 acres. There is no overlapping of the enterprises in this state.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	1,108,319	1,108,319	100.0
Less than 200 acres	341	341	(1)
200 to 499 acres	1,336	1,336	0.1
500 to 999 acres	10,059	10,059	0.9
1,000 to 4,999 acres	155,747	155,747	14.1
5,000 to 9,999 acres	203,655	203,655	18.4
10,000 to 49,999 acres	672,181	672,181	60.6
50,000 to 99,999 acres	65,000	65,000	5.9

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

Character of enterprises.—The drainage enterprises in California comprise reclamation districts organized under the Political Code of the state and by special acts of the legislature, drainage districts established according to the general drainage laws and special acts, irrigation districts providing drainage for land within those districts, commercial companies developing land to be sold or leased for farming purposes, and drainage undertakings by individual landowners in tracts of more than 500 acres each. Many of the present reclamation districts have been organized merely for the maintenance of drainage and protection works that were constructed by commercial land-development companies.

The tabulations in this bulletin include statistics for only those reclamation districts and other projects that have undertaken the construction of open ditch or tile drains, in accordance with the census definition of drainage enterprises (see p. 3). In some reclamation districts, however, it is apparent that the greater part of the cost has been for the construction of the levees rather than of the drains, so a special tabulation has been made in County Table II, under the heading "Flood-protection enterprises," for those drainage enterprises in which the length of levees is equal to or greater than the length of drains.

The Sacramento and San Joaquin Drainage District was organized in 1911–1913 by special acts of the legislature, to carry into effect the plans of the California Débris Commission. It embraces lowland along Sacramento, Feather, and San Joaquin Rivers from Butte and Glenn Counties on the north to Fresno and Madera Counties on the south. It is governed by a board of reclamation of seven men appointed by the governor of the state. This board has large powers for the construction of levee and other flood-protection works, the cost to be apportioned according to benefits to the land, and approval of this board must be obtained by any other enterprise for the construction of any new plan of reclamation, drainage, or protection that will affect the land or works of the Sacramento and San Joaquin Drainage District.

Reclamation districts are established by the boards of county supervisors, in accordance with sections 3446 to 3493 of the Political Code of 1872 as amended, upon petition from the holders of title representing one-half or more of any body of swamp, marsh, or tidal land, or land subject to overflow. This part of the code was based on the statute of March 28, 1868 (ch. 415). The supervisors hold public hearing upon the petition before approving it, and may change the boundaries of the district as they find necessary in order that just the area benefited will be included. A district situated in more than one county is established by the supervisors of the county containing the greater part of the land. The officers of each district are three trustees, elected by the landowners voting in proportion to the value of their real estate in the district. Plans for the drainage improvement works are determined by the trustees. The improvements may include drains, levees, sluices, pumping plants, and all other works necessary for the reclamation of the land in the district. The cost of the works is apportioned against the land in proportion to the benefits that will accrue, these benefits being assessed by three disinterested commissioners specially appointed by the board of county supervisors. Public hearing upon this assessment is held by the supervisors, and from their findings appeal may be taken to the superior court. Bonds to pay the cost of reclamation may be issued by the trustees if authorized by a special election of the landowners of the district. Owners of all the area included may petition for the establishment of a reclamation district, to be managed by themselves without the intervention of trustees, and the owners then may be given all the powers ordinarily granted to trustees.

Many reclamation districts have been established by special acts of the legislature that defined the boundaries of each district, sometimes named the trustees of the district, and usually prescribed that the powers of the trustees and the method of procedure should be as provided in the Political Code.

Drainage districts for the improvement of agricultural land other than swamp and overflowed land may be formed under a law of March 20, 1903 (ch. 238). A petition for establishment must be signed by 50 or by a majority of the holders of title or evidence of title to the land that will be affected, and must be submitted to the board of supervisors of the county in which all or the greater portion of the land is situated. After public hearing upon the petition, the landowners vote upon the question of establishment and for three or five directors to be the officers of the district. Two-thirds of the votes must be favorable in order that the enterprise be organized. The plan of drainage improvements is determined by the directors. The cost of drainage is assessed against the real estate in the district in proportion to its assessed value; the money that will be needed is assessed by the supervisors each year according to estimates prepared by the directors. Bonds may be issued by the directors after approval by a two-thirds vote of the landowners.

Drainage districts for the improvement of wet, swamp, or overflowed land have been formed under a law of March 21, 1903 (ch. 258), which has been repealed by an act approved May 18, 1919 (ch. 354), prescribing a similar form of organization. The board of county supervisors is the executive authority of the district. Petition for establishing the drains must be made to the supervisors by 20 or more property owners (the earlier law required only 10 or more)

or by the owners of a major portion of the land in the proposed district. The county surveyor prepares the plan of drainage works and makes the assessments of damages and of benefits. The supervisors hold public hearings upon the petition for establishment and upon the surveyor's assessments; their determinations of damages and benefits are final. The cost is assessed against the land in proportion to the benefits. The supervisors let contracts for constructing the works, and after these are completed public hearing is held to determine whether the work is acceptable and the amount of bonds that shall be issued. The law of 1903 provided that the supervisors apportion the work of construction to the various landowners, the supervisors to perform the work not completed within the time that had been specified and to assess the cost against the delinquent owners. Districts in more than one county are under the jurisdiction of the supervisors of the county containing the greater portion of the district.

A number of drainage districts have been established by special acts of the legislature, defining each separate district and prescribing its mode of operation, which usually has been somewhat similar to that prescribed for reclamation districts by the Political Code of the state.

Drainage districts may be established by the board of county supervisors under a law of March 18, 1885, upon petition from the owners of two-thirds of any body of land susceptible to one mode of drainage. This law in amended form is still in effect, but no enterprises are reported as organized under it. By-laws must be adopted by the petitioners and signed by the owners of two-thirds of the acreage in the district. The officers are three trustees selected by the landowners. The costs are assessed in proportion to benefits determined by three commissioners appointed by the supervisors. Land for district uses is obtained by condemnation proceedings according to the civil code of the state.

The first drainage law of California was that of May 13, 1861, creating a state board of swamp-land commissioners to reclaim swamp, tidal, and overflowed land granted to the state by Congress in 1850, upon petition from holders of patents or certificates of purchase of such lands. The cost of reclamation was paid from the swamp-land funds, consisting of the proceeds of the sale of those lands, supplemented by contributions from individuals or by special tax levies upon the land benefited. By an act of April 2, 1866, the board of swamp-land commissioners was abolished and its powers were transferred to the boards of county supervisors. That act was repealed March 28, 1868 (ch. 415), by a law authorizing the formation of reclamation districts much like that provided by the Political Code of 1872, which, as amended, still is the statute most generally used in the formation of drainage enterprises.

A great many amendments have been made to the drainage laws as originally enacted, but the character of the enterprises as just described is in most instances the same as was first provided. Several drainage laws have been enacted and repealed or declared unconstitutional, including one of April 23, 1880 (ch. 117), creating a state board of drainage commissioners, and one of March 3, 1881 (ch. 21), authorizing the establishment of drains by the county supervisors.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All organized enterprises	1,121,219	100.0	$47,688,153	100.0	$6,734,474
Operating enterprises	1,108,319	98.8	47,687,153	100.0	6,334,474
Reclamation districts	619,837	55.3	40,477,951	84.9	3,400,645
Political Code, secs. 3446 to 3493	360,489	32.2	21,942,881	46.0	544,000
Special acts	259,357	23.1	18,535,070	38.9	2,856,645
Drainage districts	175,604	15.7	2,543,712	5.3	60,000
Laws of 1903, ch. 238	17,600	1.6	215,250	0.5	10,000
Laws of 1903, ch. 258	80,004	7.9	1,328,462	2.8	50,000
Laws of 1919, ch. 354	7,000	0.6	50,000	0.1	.....
Special acts	62,000	5.5	950,000	2.0	.....
U. S. Reclamation Service	8,000	0.7	146,000	0.3	.....
Irrigation districts	157,200	14.0	786,325	1.6	2,543,829
Commercial developments	17,635	1.6	854,300	1.8	.....
Individual ownership	130,043	11.6	2,878,865	6.0	330,000
Nonoperating enterprises	12,900	1.2	1,000	(1)	400,000
Drainage districts—Laws of 1903, ch. 238	12,900	1.2	1,000	(1)	400,000

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

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 3,009.8 miles of open ditches, 85.6 miles of tile drains, and 1,131.1 miles of levees; the additional lengths under construction were 204.4 miles of open ditches, 23.0 miles of tile drains, and 120.4 miles of levees. These figures do not include drains or levees installed by individual farm owners supplemental to the works of the drainage enterprises, nor the works of flood-protection or levee districts that had not undertaken the construction of ditches or tile drains. There are 96 pumping districts among the operating enterprises, equipped with 191 centrifugal pumps and 1 water wheel.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All kinds	1,108,319	100.0	$47,687,153	100.0	$6,334,474
Open ditches only	130,659	11.8	1,240,730	2.6	2,166,645
Open ditches and levees	713,421	64.4	39,752,693	83.4	2,304,000
Tile drains only	1,194	0.1	60,000	0.1	.....
Open ditches and tile drains	154,100	13.9	1,376,691	2.9	1,613,829
Open ditches, tile drains, and levees	108,945	9.8	5,257,039	11.0	250,000

TABLE 8.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY TYPE OF DRAINAGE: 1920.

TYPE OF DRAINAGE.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All operating enterprises	1,108,319	100.0	$47,687,153	100.0	$6,334,474
Gravity drainage only	400,989	36.2	5,060,751	10.6	3,716,645
All drainage by pumping	300,422	27.1	20,303,606	42.6	994,000
Part gravity and part pumping	406,908	36.7	22,322,796	46.8	1,623,829
Total area served by pumps	604,446	51.2	.....	.....	.....

TABLE 9.—PUMPING PLANTS OF OPERATING ENTERPRISES, AND ACREAGE SERVED, CLASSIFIED BY KIND OF POWER: 1920.

KIND OF POWER.	ENGINE CAPACITY.		PUMP CAPACITY.		AREA SERVED.	
	Horsepower.	Per cent of total.	Gallons per minute.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	28,526	100.0	4,699,042	100.0	604,446	100.0
Steam	161	0.6	33,000	0.7	7,840	1.3
Electric	23,547	82.5	3,790,690	80.7	490,152	81.1
Internal-combustion	793	2.8	121,852	2.6	45,937	7.6
Steam and electric	[1] 3,135	11.0	564,000	12.0	45,200	7.5
Electric and internal-combustion	[2] 890	3.1	189,500	4.0	14,723	2.4
Water wheel	.....	.....	.....	.....	594	0.1

[1] Includes 1,000 steam, 580 electric, and 1,555 not divided.
[2] Includes 230 electric, 245 internal-combustion, and 415 not divided.

The average depth of the main or outlet ditch was reported for each enterprise. The maximum reported for any enterprise in the state and the maximum in each county are shown in line 15 of County Table II. The maximum length, width, and depth of outlet shown in that table for any county may not refer to the same enterprise.

In County Table II, line 16 shows the mean depth of branch ditches (open ditches only), which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations. Depths of less than 3 feet and those of 10 feet and more were omitted, as they seemed not to represent so well the average depths of outlet provided for all the farms in the districts. To include both of these groups, computed as 3 feet and 10 feet, respectively, would make the mean depth for the state 5.2 instead of 4.5 feet.

TABLE 10.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	1,108,319	100.0
Less than 3 feet	3,110	0.3
3.0 to 3.9 feet	181,551	16.4
4.0 to 4.9 feet	337,482	30.4
5.0 to 5.9 feet	151,428	13.7
6.0 to 6.9 feet	51,247	4.6
7.0 to 7.9 feet	5,600	0.5
8.0 to 8.9 feet	61,925	5.6
9.0 to 9.9 feet	10,600	1.0
10.0 feet and more	121,500	11.0
Not reporting branches	183,876	16.6

Maintenance of works.—The trustees of each reclamation district are empowered to keep the drainage works of the district in repair. Assessments for maintenance work are made in accordance with estimates prepared by the trustees, apportioned according to the original assessment of benefits or, by an amendment approved May 26, 1917 (ch. 671), according to assessment valuations made after completion of construction. The directors of drainage districts organized under the law of 1903 (ch. 238) are required each year to make an estimate of the money that will be required for maintenance purposes, and the amount is assessed against the land according to assessed value. Drainage districts organized under the law of 1919 (ch. 354) are required to be maintained by the boards of county supervisors, who are required to levy each year an ad valorem tax upon the real estate in each district, sufficient to raise the revenue that will be needed to keep the district works in repair. The law which this law superseded (ch. 258 of 1903) required that the landowners keep the works in repair.

TABLE 11.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All operating enterprises	1,108,319	100.0	$47,687,153	100.0	$6,334,474
By district forces	741,012	66.9	33,113,046	69.4	3,547,829
By contract	213,026	19.2	10,504,961	22.0	2,376,645
By method not specified	19,887	1.8	891,000	1.9	40,000
By landowners	14,384	1.3	1,216,271	2.6	50,000
Individual ownerships	52,920	4.8	1,014,015	2.1	.....
No maintenance provided	63,796	5.8	797,860	1.7	320,000
Not reported	3,294	0.3	150,000	0.3	.....

Date of organization.—The progress in drainage is shown only roughly by the dates of the organization of the enterprises, which are the dates when the districts were established by the county supervisors, since there may be a period of a year or more between the decree of establishment and the beginning of actual construction, and since the work of construction may occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including extensions made after the original plan of reclamation was completed.

TABLE 12.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	1,108,319	100.0	1,108,319	100.0
1860 to 1869	13,200	1.2	13,200	1.2
1870 to 1879	26,100	2.4	26,100	2.4
1880 to 1889	76,737	6.9	76,737	6.9
1890 to 1899	71,699	6.5	71,699	6.5
1900 to 1904	33,695	3.0	33,695	3.0
1905 to 1909	249,965	22.6	249,965	22.6
1910 to 1914	412,351	37.2	412,351	37.2
1915 to 1919	153,763	13.9	153,763	13.9
Not reported	70,809	6.4	70,809	6.4

TABLE 13.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All operating enterprises	$47,687,153	100.0	$6,334,474
1860 to 1869	350,000	0.7	.....
1870 to 1879	2,500,000	5.2	.....
1880 to 1889	2,329,106	4.9	1,053,829
1890 to 1899	4,240,215	8.9	70,000
1900 to 1904	1,585,078	3.3	68,000
1905 to 1909	6,247,723	13.1	1,330,000
1910 to 1914	20,734,890	43.5	1,020,000
1915 to 1919	7,687,320	16.1	2,592,645
Not reported	2,012,815	4.2	200,000

TABLE 14.—DRAINS AND LEVEES (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		TILE.		LEVEES.	
	Miles.	Per cent of total.	Miles.	Per cent of total.	Miles.	Per cent of total.
All drains and levees	3,214.2	100.0	108.6	100.0	1,251.5	100.0
1860 to 1869	13.0	0.4	.....	.....	21.0	1.7
1870 to 1879	39.7	1.2	.....	.....	52.0	4.2
1880 to 1889	128.5	4.0	7.1	6.5	39.5	3.2
1890 to 1899	230.5	7.2	2.0	1.8	108.2	8.6
1900 to 1904	223.9	7.0	.....	.....	79.6	6.4
1905 to 1909	618.6	19.2	18.5	17.1	237.0	19.0
1910 to 1914	1,244.7	38.7	7.6	7.0	422.8	33.8
1915 to 1919	512.0	15.9	67.3	62.0	130.5	10.4
Not reported	203.3	6.3	6.0	5.5	160.3	12.8

Crops.—The principal crops grown upon the drained land in drainage enterprises were reported as small grains, potatoes, alfalfa, and corn. Statistics were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920.

		The State.	Alameda.	Butte.	Colusa.	Contra Costa.	Del Norte.	Fresno.	Glenn.	Humboldt.
1	Number of all farms in the state or county	117,670	2,778	2,219	816	1,675	130	8,917	1,320	1,756
2	Farms reporting land having drainage	5,078	30	280	162	78	24	326	86	193
3	Farms reporting land needing drainage	3,187	26	24	63	4	44	79	28	139
4	Farms in drainage and levee districts	3,203	15	176	126	72	4	309	81	20
	LAND AND FARM AREA.									
5	Approximate land area of the state or county ... acres	99,617,280	468,480	1,086,720	729,600	456,960	655,360	3,808,000	855,680	2,288,000
6	All land in farms ... acres	29,365,667	359,742	404,625	438,417	375,065	43,830	1,319,531	524,407	717,174
7	Improved land in farms ... acres	11,878,339	185,324	253,745	302,429	238,369	13,252	672,591	336,482	98,064
8	Woodland in farms ... acres	4,252,287	21,200	70,815	30,132	31,265	19,207	107,456	36,461	225,857
9	Other unimproved land in farms ... acres	13,235,041	153,218	140,065	105,856	105,431	11,371	539,484	151,464	393,253
10	Farm land reported as provided with drainage ... acres	813,960	3,019	18,266	59,876	18,915	758	64,297	19,770	5,082
11	Farm land reported as needing drainage ... acres	286,320	3,126	3,312	9,928	340	3,060	688	2,774	7,562
12	Drainage only ... acres	92,808	538	2,547	3,407	180	311	534	947	811
13	Drainage and clearing ... acres	193,512	2,588	765	6,521	160	2,749	154	1,827	6,751

		Imperial.	Inyo.	Kern.	Kings.	Lake.	Lassen.	Los Angeles.	Marin.	Mendocino.
1	Number of all farms in the county	2,843	521	2,020	2,171	771	606	12,444	718	1,759
2	Farms reporting land having drainage	465	15	85	26	50	31	91	21	91
3	Farms reporting land needing drainage	63	28	46	51	172	43	85	26	233
4	Farms in drainage and levee districts	440	1	23	27	18	10	32	7	1
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	2,616,960	6,394,240	5,121,920	741,760	792,320	2,899,840	2,633,600	338,560	2,264,960
6	All land in farms ... acres	347,485	140,029	1,497,045	505,553	241,899	741,220	882,333	290,148	923,087
7	Improved land in farms ... acres	310,708	39,904	390,932	259,639	45,355	140,887	483,096	87,846	101,220
8	Woodland in farms ... acres	1,365	20,158	45,877	5,870	54,781	233,724	32,070	58,876	261,196
9	Other unimproved land in farms ... acres	35,412	79,967	1,060,236	240,044	141,763	366,609	367,167	143,426	560,671
10	Farm land reported as provided with drainage ... acres	96,601	701	17,605	17,988	1,783	9,962	5,067	7,517	2,342
11	Farm land reported as needing drainage ... acres	2,597	3,299	3,057	2,448	8,254	10,043	5,072	2,898	14,157
12	Drainage only ... acres	1,169	1,976	1,565	1,641	904	5,245	1,318	2,796	1,857
13	Drainage and clearing ... acres	1,428	1,323	1,492	807	7,350	4,798	3,754	102	12,300

		Merced.	Modoc.	Monterey.	Napa.	Orange.	Plumas.	Riverside.	Sacramento.	San Benito.
1	Number of all farms in the county	2,846	743	1,712	1,428	4,188	150	3,949	2,975	945
2	Farms reporting land having drainage	105	27	31	53	182	14	46	479	4
3	Farms reporting land needing drainage	118	50	32	42	41	20	63	38	2
4	Farms in drainage and levee districts	31	6	6	11	152	.....	21	424	.....
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	1,276,800	2,446,720	2,131,200	501,120	508,800	1,659,520	4,622,720	629,120	890,880
6	All land in farms ... acres	1,122,550	596,757	1,104,048	293,925	325,703	101,653	676,293	555,503	539,378
7	Improved land in farms ... acres	506,582	168,251	398,320	116,723	200,945	34,223	348,538	399,024	122,606
8	Woodland in farms ... acres	38,873	129,819	201,891	40,321	2,453	14,864	26,027	63,155	13,577
9	Other unimproved land in farms ... acres	577,095	298,687	503,837	136,881	122,305	52,566	301,728	93,324	403,195
10	Farm land reported as provided with drainage ... acres	32,008	6,983	1,237	2,100	14,240	1,138	1,884	92,053	1,025
11	Farm land reported as needing drainage ... acres	43,101	6,691	1,610	3,242	1,996	1,613	3,493	4,328	73
12	Drainage only ... acres	24,664	1,345	577	1,069	1,392	1,348	1,118	2,984	70
13	Drainage and clearing ... acres	18,437	5,346	1,033	2,173	604	265	2,375	1,344	3

		San Bernardino.	San Diego.	San Joaquin.	San Mateo.	Santa Barbara.	Santa Clara.	Santa Cruz.	Shasta.	Sierra.
1	Number of all farms in the county	4,023	3,200	4,500	624	1,485	5,016	1,759	949	77
2	Farms reporting land having drainage	101	26	352	11	29	200	62	22	2
3	Farms reporting land needing drainage	87	66	28	11	30	82	52	75	6
4	Farms in drainage and levee districts	55	3	275	2	21	14	3	9	.....
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	12,912,000	2,701,440	926,720	286,080	1,753,600	849,920	278,400	2,469,120	590,720
6	All land in farms ... acres	415,738	925,192	706,308	117,109	869,781	576,812	144,751	565,235	60,667
7	Improved land in farms ... acres	175,272	262,646	599,403	77,736	210,353	206,890	67,838	103,470	21,607
8	Woodland in farms ... acres	35,843	60,320	18,471	10,291	88,244	70,668	46,618	276,284	14,152
9	Other unimproved land in farms ... acres	204,623	602,226	88,434	29,082	571,184	299,254	30,295	185,481	24,908
10	Farm land reported as provided with drainage ... acres	3,850	1,448	117,262	1,242	865	8,453	1,007	13,299	740
11	Farm land reported as needing drainage ... acres	3,917	11,886	2,039	959	2,486	3,164	4,978	6,157	201
12	Drainage only ... acres	1,143	1,168	734	261	1,007	1,417	619	348	20
13	Drainage and clearing ... acres	2,774	10,718	1,305	698	1,479	1,747	4,359	5,809	181

		Siskiyou.	Solano.	Sonoma.	Stanislaus.	Sutter.	Tehama.	Trinity.	Ventura.	Yolo.	All other counties.[1]
1	Number of all farms in the county	1,052	1,358	5,739	4,566	1,437	1,414	377	1,543	1,613	14,538
2	Farms reporting land having drainage	17	56	110	286	330	3	31	47	128	270
3	Farms reporting land needing drainage	36	19	108	128	115	13	67	31	20	653
4	Farms in drainage and levee districts	7	47	23	223	335	.....	5	24	112	32
	LAND AND FARM AREA.										
5	Approximate land area of the county ... acres	4,003,840	526,080	1,012,480	928,000	389,120	1,872,000	1,081,440	1,189,120	648,960	15,478,400
6	All land in farms ... acres	537,396	408,288	748,147	748,678	288,940	1,124,502	130,290	384,865	398,165	5,087,403
7	Improved land in farms ... acres	166,621	299,264	251,730	477,871	232,070	232,722	15,078	189,924	300,094	1,732,695
8	Woodland in farms ... acres	71,912	17,142	204,763	98,320	9,367	324,240	40,246	15,049	29,805	1,033,202
9	Other unimproved land in farms ... acres	298,863	91,882	291,654	172,487	47,503	567,540	74,966	179,892	68,266	2,321,446
10	Farm land reported as provided with drainage ... acres	927	32,301	6,555	18,387	69,514	1,718	529	2,920	28,246	2,480
11	Farm land reported as needing drainage ... acres	2,490	3,871	12,917	7,956	9,999	1,310	3,553	2,603	7,577	49,495
12	Drainage only ... acres	1,706	3,488	369	3,011	4,556	280	84	1,330	7,393	1,561
13	Drainage and clearing ... acres	784	383	12,548	4,945	5,443	1,030	3,469	1,273	184	47,934

[1] Drainage on farms was reported in all counties in California.

COUNTY TABLE II.—OPERATING

		THE STATE.	Butte.	Colusa.	Contra Costa.	Fresno.	Imperial.	Merced.
	LAND AREA.							
1	Approximate land area of the state or county ... acres	99,617,280	1,086,720	729,600	456,960	3,808,000	2,616,960	1,276,800
2	All land in operating drainage enterprises ... acres	1,108,319	29,175	60,200	40,236	16,979	8,000	24,247
3	Improved land ... acres	1,038,835	29,175	60,200	40,036	15,994	8,000	24,207
4	Per cent of all improved land in farms ...	8.7	11.5	19.9	16.8	2.4	2.6	4.8
5	Timber and cut-over land ... acres	12,263						
6	Other unimproved land ... acres	57,221			200	985		40
7	Swampy, subject to overflow, seeped, or alkali in enterprises ... acres	45,163				985	900	40
8	Suffering a loss of crops from defective drainage ... acres	42,209			463	15	900	4,600
9	Assessed acreage ...	1,108,319	29,175	60,200	40,236	16,979	8,000	24,247
10	Excess over all land in operating enterprises ... acres							
	DRAINAGE WORKS.							
	Open ditches:							
11	Completed ... miles	3,009.8	115.0	27.8	253.9	33.0	11.7	47.8
12	*Additional under construction* ... miles	204.4						9.4
13	Maximum completed in any enterprise ... miles	324.0	70.0	10.5	68.5	20.0	11.7	20.8
14	Maximum width at bottom of ditch [1] ... feet	400	30	400	35	24	12	12
15	Maximum of average depths of *outlet ditches* [1] ... feet	20.0	8.0	20.0	10.0	9.0	5.0	10.0
16	Mean depth of branch ditches [1] ... feet	4.5	4.2		4.1		5.0	4.0
	Tile drains:							
17	Completed ... miles	85.6	0.4			3.7	4.0	
18	Additional under construction ... miles	23.0						0.1
19	Maximum completed in any enterprise ... miles	47.0	0.4			2.0	4.0	0.1
20	Maximum size of tile [1] ... inches	36	12			36	20	36
	Accessory levees and dikes:							
21	Completed ... miles	1,131.1	2.5	22.3	125.0	12.0	17.0	
22	Additional under construction ... miles	120.4		2.4	1.5			
	Pumping plants:							
23	Engine capacity ... horsepower	28,526		60	1,800	(2)	120	21
24	Pump capacity ... gallons per minute	4,699,042		10,000	391,000	(2)	17,952	1,750
25	Area served by pumps ... acres	604,446		23,000	30,286	594	8,000	700
26	Area drained by open ditches only [1] ... acres	130,659	17,000			6,625		9,247
27	*Length of these ditches* ... miles	363.0	70.0			9.5		44.7
28	Average length per acre ... feet	14.7	21.7			7.6		25.5
29	Area having open ditches and levees [1] ... acres	713,421	6,175	60,200	40,236			
30	Length of these ditches ... miles	2,301.7	20.0	27.8	253.9			
31	Average length per acre ... feet	17.0	17.1	2.4	33.3			
32	*Length of* the accessory levees ... miles	1,127.0	2.5	24.7	126.5			
33	Area drained by open ditches and tile [1] ... acres	[3] 155,294	6,000			1,894		15,000
34	Length of these drains ... miles	312.6	25.4			7.0		12.6
35	Average length per acre ... feet	10.6	22.4			10.5		4.4
36	Area having open ditches, tile drains, and levees [1] ... acres	108,945				8,460	8,000	
37	Length of these drains ... miles	345.5				20.2	15.7	
38	Average length per acre ... feet	16.7				12.6	10.4	
39	Length of the accessory levees ... miles	124.5				12.0	17.0	
	DEVELOPMENT OF LAND.							
40	Improved land in operating enterprises, 1920 ... acres	1,038,835	29,175	60,200	40,036	15,994	8,000	24,207
41	Improved land prior to drainage ... acres	350,148	29,175	5,000	3,500	7,492	8,000	8,452
42	Increase since drainage ... acres	688,687		55,200	36,536	8,502		15,755
43	*Per cent of increase* [4] ...	196.7				113.5		186.4
44	Per cent increase is of all improved land in farms, 1920 ...	5.8		18.3	15.3	1.3		3.1
45	Timber and cut-over land, 1920 ... acres	12,263						
46	Timber and cut-over land prior to drainage ... acres	42,047						
47	Decrease since drainage ... acres	29,784						
48	*Per cent of decrease* ...	70.8						
49	Other unimproved land, 1920 ... acres	57,221			200	985		40
50	Other unimproved land prior to drainage ... acres	716,124		55,200	36,736	9,487		15,795
51	Decrease since drainage ... acres	658,903		55,200	36,536	8,502		15,755
52	Per cent of decrease ...	92.0		100.0	99.5	89.6		99.7
53	*Swampy or subject to overflow, 1920* ... acres	45,163				985	900	40
54	Swampy or subject to overflow prior to drainage ... acres	822,326	946	60,200	40,236	10,137	900	4,795
55	Decrease since drainage ... acres	777,163	946	60,200	40,236	9,152		4,755
56	Per cent of decrease ...	94.5	100.0	100.0	100.0	90.3		99.2
	CAPITAL INVESTED AND COST PER ACRE.							
57	Total capital invested in and required for completion of operating enterprises ... dollars	54,021,627	355,000	2,077,000	3,528,272	254,000	146,000	652,548
58	*Capital invested in these enterprises to Dec. 31, 1919* ... dollars	47,687,153	355,000	1,927,000	3,486,272	254,000	146,000	389,091
59	Additional capital required to complete these enterprises ... dollars	6,334,474		150,000	42,000			263,457
60	Average cost per acre when completed ... dollars	48.74	12.17	34.50	87.69	14.96	18.25	26.91
61	Enterprises constructing open ditches only ... dollars	3,407,375	180,000			49,000		301,272
62	Average cost per acre when completed ... dollars	26.08	10.59			7.40		32.58
63	*Enterprises constructing open ditches and levees* ... dollars	42,056,693	100,000	2,077,000	3,528,272			
64	Average cost per acre when completed ... dollars	58.95	16.19	34.50	87.69			
65	Enterprises constructing open ditches and tile drains ... dollars	[5] 3,050,520	75,000			32,000		351,276
66	Average cost per acre when completed ... dollars	10.64	12.50			16.90		23.42
67	Enterprises constructing open ditches, tile drains, and levees ... dollars	5,607,039				173,000	146,000	
68	*Average cost per acre when completed* ... dollars	50.55				20.45	18.25	
	CROPS.							
	Improved land in enterprises reporting—							
69	Small grains as principal crop on drained land ... acres	436,835		23,000	7,450			15,000
70	Alfalfa as principal crop on drained land ... acres	97,259	6,000			14,100		
71	White potatoes as principal crop on drained land ... acres	97,461			28,086			
72	Corn as principal crop on drained land ... acres	96,580		37,200	1,000			
73	Vegetables as *principal crop* on drained land ... acres	80,288			3,500			8,547
74	Hay (except alfalfa) as principal crop on drained land ... acres	28,875						
75	Sugar beets as principal crop on drained land ... acres	14,825						
76	Rice as principal crop on drained land ... acres	77,037	17,000					
77	Fruit as principal crop on drained land ... acres	38,173	6,175					960
78	*Cotton as principal crop on drained land* ... acres	42,200					8,000	
79	Beans as principal crop on drained land ... acres	27,197						
80	Other crops as principal ones on drained land ... acres	2,096				1,894		
	FLOOD-PROTECTION ENTERPRISES. [6]							
81	*Land in operating enterprises* ... acres	298,495		42,200	20,750			
	Open ditches:							
82	Completed ... miles	[7] 309.9		8.3	27.5			
83	Additional under construction ... miles	11.7						
	Accessory levees and dikes:							
84	*Completed* ... miles	487.6		21.0	63.0			
85	Additional under construction ... miles	43.8						
86	Total capital invested in and required for completion of operating enterprises ... dollars	13,320,563		577,000	1,545,000			
87	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	12,260,563		577,000	1,545,000			
88	Additional capital required to complete these enterprises ... dollars	1,060,000						

[1] When works under construction have been completed.
[2] Drainage by water wheel.
[3] Includes 1,194 acres having tile only.
[4] Per cent not shown when more than 1,000.
[5] Includes cost of 5.1 miles of tile only.

DRAINAGE ENTERPRISES: 1920.

		Monterey.	Orange.	Riverside.	Sacramento.	San Joaquin.	Shasta.
	LAND AREA.						
1	Approximate land area of the county ... acres	2,131,200	508,800	4,622,720	629,120	926,720	2,469,120
2	All land in operating drainage enterprises ... acres	4,700	35,600	50,600	104,779	164,410	19,000
3	Improved land ... acres	4,700	35,000	42,000	104,591	164,350	16,200
4	Per cent of all improved land in farms	1.2	17.4	12.1	26.2	27.4	15.7
5	Timber and cut-over land ... acres				80		
6	Other unimproved land ... acres		600	8,600	108	60	2,800
7	Swampy, subject to overflow, seeped, or alkali in enterprises ... acres				108		2,800
8	Suffering a loss of crops from defective drainage ... acres	4,230		1,080	1,655	3,835	1,400
9	Assessed acreage	4,700	35,600	50,600	104,779	164,410	19,000
10	Excess over all land in operating enterprises ... acres						
	DRAINAGE WORKS.						
	Open ditches:						
11	Completed ... miles	29.4	95.8	26.1	250.0	905.1	21.0
12	Additional under construction ... miles	12.6	38.5	11.7		21.8	4.5
13	Maximum completed in any enterprise ... miles	29.4	40.0	25.0	88.0	78.0	18.0
14	Maximum width at bottom of ditch [1] ... feet	20	30	12	100	26	40
15	Maximum of average depths of outlet ditches [1] ... feet	5.0	14.0	15.0	16.0	16.0	20.0
16	Mean depth of branch ditches [1] ... feet	3.0	5.1	8.0	4.9	4.5	3.8
	Tile drains:						
17	Completed ... miles		10.3	1.5	1.6		
18	Additional under construction ... miles			1.6		1.5	
19	Maximum completed in any enterprise ... miles		5.0	1.5	1.0		
20	Maximum size of tile [1] ... inches		24	24	16		
	Accessory levees and dikes:						
21	Completed ... miles		2.0	20.0	168.1	306.4	34.8
22	Additional under construction ... miles			25.0	2.8	22.5	13.2
	Pumping plants:						
23	Engine capacity ... horsepower				5,740	4,930	
24	Pump capacity ... gallons per minute				857,600	1,013,600	
25	Area served by pumps ... acres				96,346	126,281	
26	Area drained by open ditches only [1] ... acres	4,700	11,000		467	4,280	5,000
27	Length of these ditches ... miles	42.0	39.0		2.0	17.0	7.5
28	Average length per acre ... feet	47.2	18.7		22.6	21.0	7.9
29	Area having open ditches and levees [1] ... acres			50,000	67,504	130,130	14,000
30	Length of these ditches ... miles			37.8	157.0	849.9	18.0
31	Average length per acre ... feet			4.0	12.3	34.5	6.8
32	Length of the accessory levees ... miles			45.0	147.4	328.9	48.0
33	Area drained by open ditches and tile [1] ... acres		16,600	600		30,000	
34	Length of these drains ... miles		63.1	3.1		61.5	
35	Average length per acre ... feet		20.1	27.3		10.8	
36	Area having open ditches, tile drains, and levees [1] ... acres		8,000		36,808		
37	Length of these drains ... miles		42.5		92.6		
38	Average length per acre ... feet		28.1		13.3		
39	Length of the accessory levees ... miles		2.0		23.5		
	DEVELOPMENT OF LAND.						
40	Improved land in operating enterprises, 1920 ... acres	4,700	35,000	42,000	104,591	164,350	16,200
41	Improved land prior to drainage ... acres		21,800	41,500	15,783	18,216	
42	Increase since drainage ... acres	4,700	13,200	500	88,808	146,134	16,200
43	Per cent of increase		60.6	1.2	562.7	802.2	
44	Per cent increase is of all improved land in farms, 1920	1.2	6.6	0.1	22.3	24.4	15.7
45	Timber and cut-over land, 1920 ... acres				80		
46	Timber and cut-over land prior to drainage ... acres				1,599	180	
47	Decrease since drainage ... acres				1,519	180	
48	Per cent of decrease				95.0	100.0	
49	Other unimproved land, 1920 ... acres		600	8,600	108	60	2,800
50	Other unimproved land prior to drainage ... acres	4,700	13,800	9,100	87,397	146,014	19,000
51	Decrease since drainage ... acres	4,700	13,200	500	87,289	145,954	16,200
52	Per cent of decrease	100.0	95.7	5.5	99.9	100.0	85.3
53	Swampy or subject to overflow, 1920 ... acres				108		2,800
54	Swampy or subject to overflow prior to drainage ... acres	4,700	16,700	16,400	101,720	162,704	19,000
55	Decrease since drainage ... acres	4,700	16,700	16,400	101,612	162,704	16,200
56	Per cent of decrease	100.0	100.0	100.0	99.9	100.0	85.3
	CAPITAL INVESTED AND COST PER ACRE.						
57	Total capital invested in and required for completion of operating enterprises ... dollars	190,000	295,000	1,149,384	8,452,309	8,161,563	540,600
58	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	140,000	295,000	149,384	8,402,309	7,659,563	510,600
59	Additional capital required to complete these enterprises ... dollars	50,000		1,000,000	50,000	502,000	30,000
60	Average cost per acre when completed ... dollars	40.43	8.29	22.72	80.67	49.64	28.45
61	Enterprises constructing open ditches only ... dollars	190,000	40,000		5,000	207,520	40,600
62	Average cost per acre when completed ... dollars	40.43	3.64		10.71	48.49	8.12
63	Enterprises constructing open ditches and levees ... dollars			1,114,384	6,421,218	7,468,628	500,000
64	Average cost per acre when completed ... dollars			22.29	95.12	57.39	35.71
65	Enterprises constructing open ditches and tile drains ... dollars		140,000	35,000		485,415	
66	Average cost per acre when completed ... dollars		8.43	58.33		16.18	
67	Enterprises constructing open ditches, tile drains, and levees ... dollars		115,000		2,026,091		
68	Average cost per acre when completed ... dollars		14.38		55.04		
	CROPS.						
	Improved land in enterprises reporting—						
69	Small grains as principal crop on drained land ... acres			7,200	53,400	66,212	
70	Alfalfa as principal crop on drained land ... acres		5,400		11,530	8,590	
71	White potatoes as principal crop on drained land ... acres	4,700				63,775	
72	Corn as principal crop on drained land ... acres					21,550	
73	Vegetables as principal crop on drained land ... acres		18,600		18,940	3,323	
74	Hay (except alfalfa) as principal crop on drained land ... acres				461		16,200
75	Sugar beets as principal crop on drained land ... acres		11,000			900	
76	Rice as principal crop on drained land ... acres						
77	Fruit as principal crop on drained land ... acres			600	7,063		
78	Cotton as principal crop on drained land ... acres			34,200			
79	Beans as principal crop on drained land ... acres				13,197		
80	Other crops as principal ones on drained land ... acres						
	FLOOD-PROTECTION ENTERPRISES. [6]						
81	Land in operating enterprises ... acres			38,000	38,681	28,670	14,000
	Open ditches:						
82	Completed ... miles			1.1	67.2	45.0	18.0
83	Additional under construction ... miles			11.7			
	Accessory levees and dikes:						
84	Completed ... miles				100.2	86.7	34.8
85	Additional under construction ... miles			25.0	2.8		13.2
86	Total capital invested in and required for completion of operating enterprises ... dollars			1,029,634	3,994,988	1,028,000	500,000
87	Capital invested in these enterprises to Dec. 31, 1919 ... dollars			29,634	3,944,988	1,028,000	500,000
88	Additional capital required to complete these enterprises ... dollars			1,000,000	50,000		

[6] These are enterprises in which the total length of levees, completed and under construction, is equal to or greater than the total length of drains (open ditches and tile); the statistics for the enterprises are included in the figures for drainage enterprises, given above.

[7] Includes 0.5 mile of tile drains.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Solano.	Sonoma.	Stanislaus.	Sutter.	Yolo.	Yuba.	Other counties.[1]
	LAND AREA.							
1	Approximate land area of the county ... acres	526,080	1,012,480	928,000	389,120	648,960	404,480	31,873,280
2	All land in operating drainage enterprises ... acres	43,745	4,000	65,000	180,283	153,755	32,750	70,860
3	Improved land ... acres	43,490	4,000	64,000	173,561	136,630	25,375	47,326
4	Per cent of all improved land in farms ...	14.5	1.6	13.4	74.8	45.5	25.6	2.0
5	Timber and cut-over land ... acres				3,999	1,000	7,000	184
6	Other unimproved land ... acres	255		1,000	2,723	16,125	375	23,350
7	Swampy, subject to overflow, seeped, or alkali in enterprises ... acres	205			1,125	16,125	375	22,500
8	Suffering a loss of crops from defective drainage ... acres	355	1,000	5,511		1,075		16,090
9	Assessed acreage ...	43,745	4,000	65,000	180,283	153,755	32,750	70,860
10	Excess over all land in operating enterprises ... acres							
	DRAINAGE WORKS.							
	Open ditches:							
11	Completed ... miles	183.8	6.6	38.1	521.1	275.5	36.5	131.6
12	Additional under construction ... miles	1.2	3.4	29.4	24.7	8.2		39.0
13	Maximum completed in any enterprise ... miles	100.0	6.6	28.0	324.0	53.5	30.0	37.5
14	Maximum width at bottom of ditch [2] ... feet	150	18	12	110	150	15	79
15	Maximum of average depths of outlet ditches [2] ... feet	10.0	5.0	10.0	12.0	20.0	18.0	15.0
16	Mean depth of branch ditches [2] ... feet	4.0	4.0	6.0	3.7	4.7	3.0	4.2
	Tile drains:							
17	Completed ... miles	47.1			1.5	0.4		15.1
18	Additional under construction ... miles			17.0				2.8
19	Maximum completed in any enterprise ... miles	47.0			1.0	0.2		11.4
20	Maximum size of tile [2] ... inches	10			24	36		36
	Accessory levees and dikes:							
21	Completed ... miles	72.5			152.7	101.5	43.9	59.4
22	Additional under construction ... miles	6.1			16.2	27.9		2.8
	Pumping plants:							
23	Engine capacity ... horsepower	2,025		17	7,708	5,175	450	480
24	Pump capacity ... gallons per minute	311,100		3,000	1,003,540	886,500	60,000	143,000
25	Area served by pumps ... acres	39,906		600	136,085	108,948	15,000	9,700
26	Area drained by open ditches only [2] ... acres	7,500	4,000		14,000			46,840
27	Length of these ditches ... miles	8.0	10.0		25.0			38.3
28	Average length per acre ... feet	5.6	13.2		9.4			10.0
29	Area having open ditches and levees [2] ... acres	29,238			133,134	133,234	[3]32,750	16,820
30	Length of these ditches ... miles	153.5			450.8	228.7	36.5	69.8
31	Average length per acre ... feet	27.7			17.9	9.0	5.9	21.9
32	Length of the accessory levees ... miles	63.3			148.9	103.7	43.9	44.2
33	Area drained by open ditches and tile [2] ... acres			65,000	15,000			5,200
34	Length of these drains ... miles			84.5	27.0			23.4
35	Average length per acre ... feet			6.9	9.5			28.8
36	Area having open ditches, tile drains, and levees [2] ... acres	7,007			18,149	20,521		2,000
37	Length of these drains ... miles	70.6			44.5	57.4		2.0
38	Average length per acre ... feet	53.2			12.9	14.8		5.3
39	Length of the accessory levees ... miles	15.3			20.0	26.7		9.0
	DEVELOPMENT OF LAND.							
40	Improved land in operating enterprises, 1920 ... acres	43,490	4,000	64,000	173,561	136,630	25,375	47,326
41	Improved land prior to drainage ... acres	12,039	3,000	63,000	72,293	10,107	24,938	5,853
42	Increase since drainage ... acres	31,451	1,000	1,000	101,268	126,523	437	41,473
43	Per cent of increase [3] ...	261.2	33.3	1.6	140.1		1.8	708.6
44	Per cent increase is of all improved land in farms, 1920 ...	10.5	0.4	0.2	43.6	42.2	0.4	1.7
45	Timber and cut-over land, 1920 ... acres				3,999	1,000	7,000	184
46	Timber and cut-over land prior to drainage ... acres				22,509	10,300	7,000	459
47	Decrease since drainage ... acres				18,510	9,300		275
48	Per cent of decrease ...				82.2	90.3		59.9
49	Other unimproved land, 1920 ... acres	255		1,000	2,723	16,125	375	23,350
50	Other unimproved land prior to drainage ... acres	31,706	1,000	2,000	85,481	133,348	812	64,548
51	Decrease since drainage ... acres	31,451	1,000	1,000	82,758	117,223	437	41,198
52	Per cent of decrease ...	99.2	100.0	50.0	96.8	87.9	53.8	63.8
53	Swampy or subject to overflow, 1920 ... acres	205			1,125	16,125	375	22,500
54	Swampy or subject to overflow prior to drainage ... acres	43,745	1,000	4,000	112,177	134,348	20,812	67,806
55	Decrease since drainage ... acres	43,540	1,000	4,000	111,052	118,223	20,437	45,306
56	Per cent of decrease ...	99.5	100.0	100.0	99.0	88.0	98.2	66.8
	CAPITAL INVESTED AND COST PER ACRE.							
57	Total capital invested in and required for completion of operating enterprises ... dollars	1,421,992	30,000	1,413,829	13,331,045	9,526,469	1,037,500	1,459,116
58	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	1,339,492	20,000	433,457	10,974,400	8,988,969	1,037,500	1,179,116
59	Additional capital required to complete these enterprises ... dollars	82,500	10,000	980,372	2,356,645	537,500		280,000
60	Average cost per acre when completed ... dollars	32.51	7.50	21.75	73.95	61.96	31.68	20.59
61	Enterprises constructing open ditches only ... dollars	50,000	30,000		1,876,645			437,338
62	Average cost per acre when completed ... dollars	6.67	7.50		134.05			9.34
63	Enterprises constructing open ditches and levees ... dollars	884,742			10,415,144	8,062,719	1,037,500	447,086
64	Average cost per acre when completed ... dollars	30.26			78.23	60.52	31.68	26.58
65	Enterprises constructing open ditches and tile drains ... dollars			1,413,829	75,000			443,000
66	Average cost per acre when completed ... dollars			21.75	5.00			85.19
67	Enterprises constructing open ditches, tile drains, and levees ... dollars	487,250			964,256	1,463,750		131,692
68	Average cost per acre when completed ... dollars	69.54			53.13	71.33		65.85
	CROPS.							
	Improved land in enterprises reporting—							
69	Small grains as principal crop on drained land ... acres	24,355		45,000	131,724	38,182	10,500	14,812
70	Alfalfa as principal crop on drained land ... acres	139		19,000	2,625	6,000	875	23,000
71	White potatoes as principal crop on drained land ... acres							900
72	Corn as principal crop on drained land ... acres	12,039				24,800		
73	Vegetables as principal crop on drained land ... acres	6,507				20,521		350
74	Hay (except alfalfa) as principal crop on drained land ... acres	450	4,000			4,925		2,839
75	Sugar beets as principal crop on drained land ... acres							2,925
76	Rice as principal crop on drained land ... acres				4,037	42,000	14,000	
77	Fruit as principal crop on drained land ... acres				21,175			2,500
78	Cotton as principal crop on drained land ... acres							
79	Beans as principal crop on drained land ... acres				14,000			
80	Other crops as principal ones on drained land ... acres					202		
	FLOOD-PROTECTION ENTERPRISES.[4]							
81	Land in operating enterprises ... acres	2,539			35,809	39,425	31,500	6,921
	Open ditches:							
82	Completed ... miles	8.5			56.3	30.2	35.0	12.8
83	Additional under construction ... miles							
	Accessory levees and dikes:							
84	Completed ... miles	10.5			61.0	47.0	43.0	20.4
85	Additional under construction ... miles							2.8
86	Total capital invested in and required for completion of operating enterprises ... dollars	14,300			1,875,144	1,467,719	1,000,000	288,778
87	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	14,300			1,875,144	1,467,719	1,000,000	278,778
88	Additional capital required to complete these enterprises ... dollars							10,000

[1] Includes only Humboldt, Kern, Kings, Lake, Los Angeles, Marin, Modoc, Napa, Placer, San Bernardino, Santa Barbara, Santa Clara, and Sierra Counties.
[2] When works under construction have been completed.
[3] Per cent not shown when more than 1,000.
[4] See footnote 6, p. II.

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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS
SAM. L. ROGERS, DIRECTOR

DRAINAGE : COLORADO

STATISTICS FOR THE STATE AND ITS COUNTIES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

This bulletin presents the statistics of drainage for Colorado collected at the census of 1920. The figures relate to conditions on January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises may include areas of unimproved land that is not yet included in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner installs upon his farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

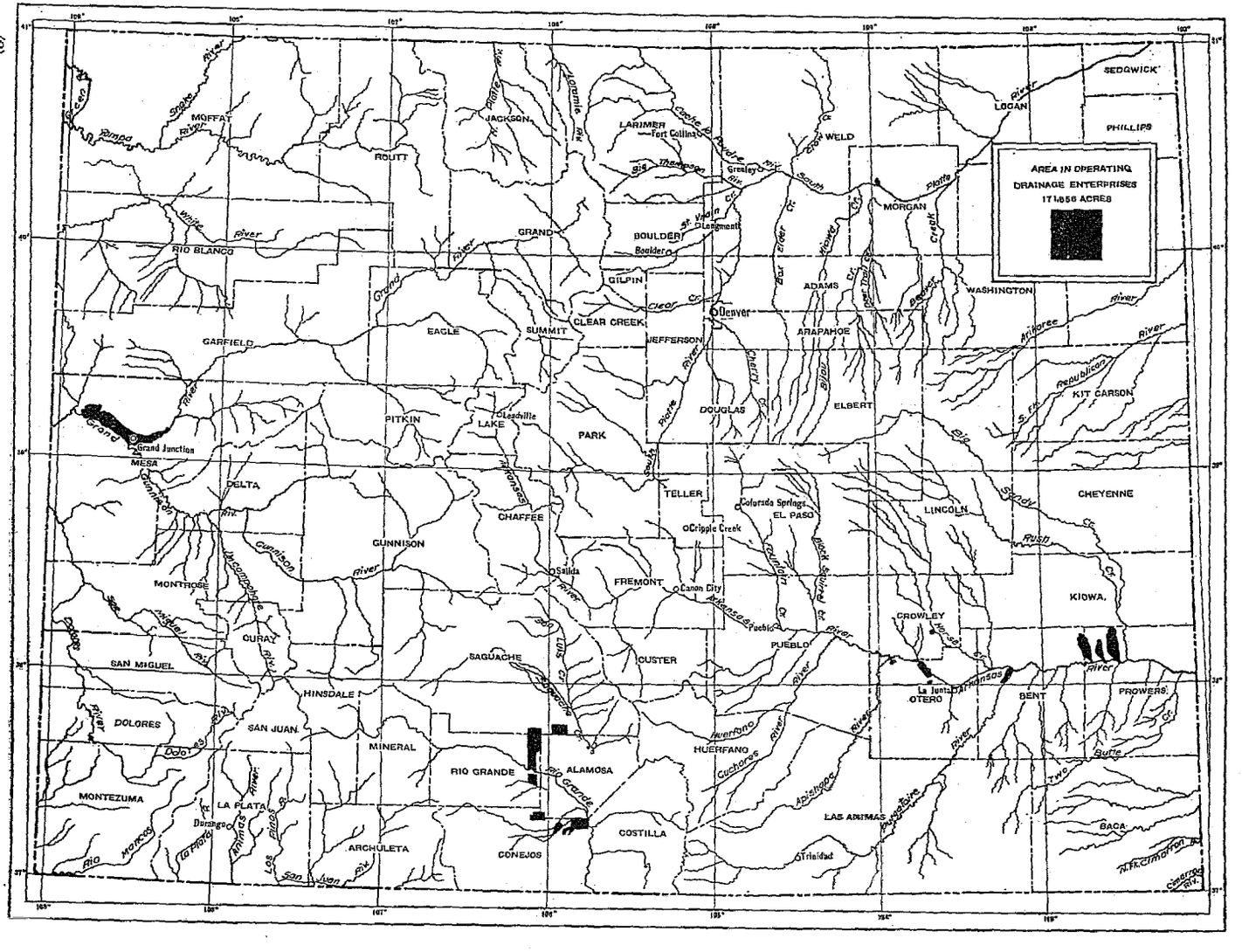
TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	59,934	100.0
Farms reporting land having drainage	2,749	4.6
Farms reporting land needing drainage	4,399	7.3
All land in farms ... acres	24,462,014	100.0
Improved land in farms ... acres	7,744,757	31.7
Farm land reported as provided with drainage ... acres	127,037	0.5
Farm land reported as needing drainage ... acres	270,997	1.1
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	66,341,120	100.0
All land in operating drainage enterprises ... acres	171,656	0.3
Improved land ... acres	123,031	0.2
Unimproved land [1] ... acres	48,625	0.1
Capital invested in and required for completion of operating enterprises	$1,285,070	100.0
Capital invested in these enterprises to Dec. 31, 1919	1,081,870	84.2
Additional capital required to complete these enterprises	203,195	15.8

[1] No timber or cut-over land reported.

COLORADO.

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which were substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, includes the acreage actually benefited or made of more value for agricultural purposes, by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual?" Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, any other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditch or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those drainage enterprises that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920. Enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops, which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow are not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In the tables that follow, statistics are given for operating enterprises only, as no nonoperating drainage enterprises were found in Colorado. The operating enterprises, as already defined, include both those that have completed their drainage works and those with such works under construction; among the latter might be any that had completed the original plan of drainage works some years ago but were constructing extensions or enlargements on January 1, 1920.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN WORKS COMPLETED AND WORKS UNDER CONSTRUCTION: 1920.

CLASS.	LAND.		CAPITAL.[1]		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	171,656	100.0	$1,081,875	100.0	$203,195
With works completed	66,816	61.1	508,663	47.0	.....
With works under construction	104,840	38.9	573,212	53.0	203,195

[1] The inquiry asked for the "total cost of the enterprise to December 31, 1919," and for an "estimate of additional investment to complete."

Location of enterprises.—The land in drainage enterprises in Colorado is about equally divided between the eastern, southern, and western parts of the state, though much the greater number of them are located along the Arkansas River and in the Rio Grande basin.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	171,656	100.0	$1,081,875	100.0	$203,195
Rio Grande	65,140	37.9	453,907	42.0	90,000
Arkansas River	55,129	32.1	391,600	36.2	26,000
Grand River[1]	51,387	30.0	236,468	21.8	87,195

[1] Includes 747 acres in Platte River basin.

Condition of land in enterprises.—With one exception, in Rio Grande County, all the drainage enterprises in this state were organized to drain and protect lands injured or threatened with waterlogging and the concentration of salts, commonly called alkali, in the surface soil as a result of irrigation.

For the state, 2,174 acres of irrigated land in drainage enterprises are reported as not having needed drainage, but as having been assessed merely for contributing to the injury of the other lands.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms and to afford relief from overflows for the district as a unit. Therefore the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy, subject to overflow, seeped, or alkali, or that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.			
	Total. Acreage.	Total. Per cent of all land.	Works completed (acres).	Works under construction (acres).
All land in enterprises	171,656	100.0	66,816	104,840
Improved land	123,031	71.7	12,536	56,121
Unimproved land[1]	48,625	28.3	54,280	48,719
Swampy, seeped, or alkali	26,446	15.4	494	25,952
Suffering a loss of crops	15,282	8.9	182	15,100

[1] No timber or cut-over land reported.

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided and the part in each county be considered a separate enterprise. In this way 24 operating drainage enterprises are counted in Colorado, with an average area of 7,152 acres. There is no overlapping of the enterprises in this state.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	171,656	171,656	100.0
500 to 999 acres	3,396	3,396	2.0
1,000 to 4,999 acres	21,260	21,260	12.4
5,000 to 9,999 acres	26,000	26,000	15.1
10,000 to 50,000 acres	121,000	121,000	70.5

Character of enterprises.—The existing drainage enterprises in Colorado are drainage districts, except those under individual ownership, although the laws of the state authorize some other forms of organized drainage undertakings.

Drainage districts are established under the drainage law of June 2, 1911 (ch. 124). This law repealed that of April 24, 1909 (ch. 161), which provided for methods of organization and control generally similar to those of the later statute. The districts are established by the county commissioners of the county in which the larger part of the proposed district is located, upon petition from a majority of the owners, who must hold a major portion of the acreage in the proposed district. The question of organization may be submitted to a vote

of the landowners, and the district is established if a majority of the votes cast are favorable. At the same time three directors are elected to be the executive officers of the enterprise. If an election would be impracticable or would cause undue expense, the district may be organized without vote of the landowners, and the county commissioners serve as the officers until the owners petition for an election of directors. Originally the law of 1911 required that all the district be assessed at uniform rate per acre to pay the cost of the drainage, but an amendment in 1913 (ch. 75) provided for assessments according to benefits, as had been provided by the law of 1909.

The boundaries of the district are determined by the county commissioners after public hearing. The plan of drainage and the classification of lands according to benefits are determined by the directors. Appeal from this classification may be made to the county court for trial by jury, and to the district court if the county judge consents. A law of 1919 (ch. 115) permits the assessment of maximum benefits against the lands, representing the increased value to result from drainage, instead of merely apportioning the benefits. The project is abandoned if the total estimated cost exceeds the total benefits assessed. An annual levy is made by the directors to provide for all expenses of the district for the following year. Bonds may be issued, to run not more than 20 years, if approved by a majority vote of the voters of the district.

Voluntary districts may be formed under this law of 1911 by agreement signed by all the landowners to be affected, and stating the name of the district, the plan of drainage, the lands owned by each person, the amount of money each will pay, and the names of the first directors. The county commissioners examine the land and, if the plan is practicable and the agreement is equitable, establish the district with all the powers of other drainage districts.

Public drains will be constructed by the county commissioners, under a law of April 11, 1903 (ch. 103), upon petition from one or more persons who own or represent the major portion of the land to be affected, if the improvements will be feasible and of benefit and are desired by the owners of a major part of the land. The cost is assessed against the lands in proportion to the benefits that will accrue. An investigation of the feasibility of the project and an estimate of the cost are made by three disinterested viewers appointed by the commissioners, who hold public hearing upon the project and report to the commissioners with assessments of benefits against the lands or with allotments of work for the landowners to construct. When the work has been completed, the commissioners apportion the total cost against the lands for collection like other taxes. For a drain in more than one county the same procedure is required in each county as though the drain were in that county only, but all the boards of viewers prepare a joint report.

An irrigation district may provide for all drainage made necessary by the irrigation provided by the district upon petition to the board of directors of the district, signed by not less than two-thirds of the legal voters each owning 5 acres or more in the district. The officers of such irrigation districts have the same powers and duties respecting such drainage as they have respecting irrigation. Whether the irrigation works have been constructed or not, the board of directors shall provide for the construction and maintenance of the drainage works that are found will be necessary by reason of the irrigation, and any lands benefited by the drainage system, not previously included in the district, shall be taxed for irrigation district and drainage purposes.

An act of March 8, 1883, was somewhat similar to that of April 11, 1903, for the benefit of persons desiring to cut a drain through lands of other owners, for agricultural or sanitary purposes, but this statute was repealed in 1885. An act of March 1, 1893 (ch. 84), grants the right of eminent domain for the drainage of wet lands.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All operating[1] enterprises	171,656	100.0	$1,081,875	100.0	$203,195
Drainage districts	138,026	80.4	674,875	62.4	188,195
Laws of 1909, ch. 161	1,850	1.1	25,000	2.3	
Laws of 1911, ch. 124	6,140	3.6	89,937	8.3	90,000
Laws of 1913, ch. 75	130,036	75.7	559,968	51.8	98,195
Individual ownership	33,630	19.6	407,000	37.6	15,000

[1] No nonoperating enterprises were found in Colorado.

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 111.6 miles of open ditches and 193.6 miles of tile drains; the additional lengths under construction were 21.9 miles of open ditches and 14.6 miles of tile drains. These figures do not include drains installed by individual farm owners supplemental to the works of the enterprises. There are no pumping districts for land drainage in the state.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All kinds	171,656	100.0	$1,081,875	100.0	$203,195
Open ditches only	41,100	23.9	119,000	11.0	5,000
Tile drains only	10,776	6.3	183,663	17.0	
Open ditches and tile drains	119,780	69.8	779,212	72.0	198,195

The average depth of the main or outlet ditch was reported for each enterprise. The maximum reported for any enterprise in the state and the maximum in each county are shown in line 14 of County Table II. The maximum length, width, and depth of outlet shown in that table for any county may not refer to the same enterprise.

In County Table II, line 15 shows the mean depth of branch ditches (open ditches only), which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations. Depths less than 3 feet were omitted; to include this group, computed as 3 feet, would show the mean depth for the state 6.8 instead of 7 feet.

TABLE 8.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	171,656	100.0
Less than 3.0 feet	9,240	5.4
3.0 to 3.9 feet	.....	.....
4.0 to 4.9 feet	22,000	12.8
5.0 to 5.9 feet	.....	.....
6.0 to 6.9 feet	1,040	0.6
7.0 to 7.9 feet	24,000	14.0
8.0 to 8.9 feet	70,500	41.1
9.0 to 9.9 feet	1,400	0.8
Not reporting branches	43,476	25.3

Maintenance of works.—The drainage district law requires that each year, before July 1, the directors determine the money that will be required during the coming year, including expenses for maintenance, and make out a tax list apportioned on the assessment of benefits. The drains provided by irrigation districts are to be maintained like a part of the irrigation works.

TABLE 9.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All operating enterprises	171,656	100.0	$1,081,875	100.0	$203,195
By district forces	133,836	78.0	608,468	56.3	94,195
By contract	4,190	2.4	66,407	6.1	94,000
By landowners	33,630	19.6	407,000	37.6	15,000

Date of organization.—The progress of development in drainage is shown only roughly by the dates of the organization of the enterprises, which are the dates when the districts were established by the county commissioners, since there may be a period of a year or more between the decree of establishment and the beginning of actual construction, and since the work of construction may occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including any extensions made after the original plan of reclamation was completed. No drainage enterprises were reported as organized in Colorado earlier than 1910.

TABLE 10.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	171,656	100.0	171,656	100.0
1910-1914	47,490	27.7	47,490	27.7
1915-1919	124,166	72.3	124,166	72.3

TABLE 11.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$1,081,875	100.0	$203,195
1910-1914	214,907	19.9	90,000
1915-1919	866,968	80.1	113,195

TABLE 12.—DRAINS (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		TILE.	
	Miles.	Per cent of total.	Miles.	Per cent of total.
All drains	146.8	100.0	208.2	100.0
1910-1914	48.5	33.0	38.5	18.5
1915-1919	98.3	67.0	169.7	81.5

Crops.—The principal crops grown upon the drained land in drainage enterprises are alfalfa, wheat, and sugar beets. Data were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified, in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920.

		The State.	Adams.	Alamosa.	Bent.	Boulder.	Conejos.	Costilla.	Delta.	El Paso.
1	Number of all farms in the state or county	59,934	1,753	302	1,056	1,420	814	443	1,707	1,571
2	Farms reporting land having drainage	2,749	40	47	69	358	24	115	122	13
3	Farms reporting land needing drainage	4,309	56	77	122	290	72	57	155	26
4	Farms in drainage and levee districts	696	7	43	26	4	39	1	65	1
	LAND AND FARM AREA.									
5	Approximate land area of the state or county ... acres	66,341,120	807,680	465,280	975,360	488,960	801,280	758,400	768,640	1,357,440
6	All land in farms ... acres	24,462,014	452,115	236,847	433,970	221,202	231,938	434,410	169,768	919,013
7	Improved land in farms ... acres	7,744,757	229,192	60,952	102,037	119,530	128,018	46,598	74,473	208,517
8	Woodland in farms ... acres	1,415,420	5,118	4,252	4,706	32,177	9,362	80,229	6,427	52,208
9	Other unimproved land in farms ... acres	15,301,837	217,805	171,643	327,227	69,495	94,558	307,583	88,868	658,288
10	Farm land reported as provided with drainage ... acres	127,037	994	8,291	4,725	11,499	14,476	6,557	2,427	514
11	Farm land reported as needing drainage ... acres	270,997	1,110	14,052	5,514	6,009	9,154	6,168	3,447	2,292
12	Drainage only ... acres	80,121	875	4,428	5,197	4,483	4,872	24	2,084	352
13	Drainage and clearing ... acres	190,876	235	9,624	317	1,526	4,282	6,144	1,363	1,940

		Garfield.	Gunnison.	Jackson.	Jefferson.	Larimer.	Logan.	Mesa.	Moffat.	Montrose.
1	Number of all farms in the county	930	376	182	1,446	1,921	1,874	2,207	1,023	1,368
2	Farms reporting land having drainage	12	19	13	160	396	16	137	3	161
3	Farms reporting land needing drainage	37	72	8	214	205	45	179	400	348
4	Farms in drainage and levee districts	4	18	.....	4	31	16	117	3	21
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	1,988,480	2,034,560	1,044,480	517,120	1,682,560	1,166,080	2,024,320	2,981,120	1,448,960
6	All land in farms ... acres	211,875	121,579	234,214	249,922	730,533	857,359	232,225	461,777	218,255
7	Improved land in farms ... acres	74,214	49,351	93,468	69,625	192,976	416,120	99,582	75,225	88,096
8	Woodland in farms ... acres	13,492	2,648	4,031	71,108	96,689	4,497	15,735	12,268	14,414
9	Other unimproved land in farms ... acres	124,169	69,580	136,715	109,189	440,868	436,742	116,908	374,284	115,745
10	Farm land reported as provided with drainage ... acres	584	539	1,165	1,516	12,711	2,393	2,407	830	3,836
11	Farm land reported as needing drainage ... acres	649	4,625	508	5,531	4,232	2,308	3,689	61,519	8,186
12	Drainage only ... acres	367	298	490	1,000	3,999	1,632	1,567	212	5,786
13	Drainage and clearing ... acres	282	4,327	18	4,531	233	676	2,122	61,307	2,400

		Morgan.	Otero.	Prowers.	Pueblo.	Rio Grande.	Saguache.	Weld.	Yuma.	All other counties.[1]
1	Number of all farms in the county	1,720	1,486	1,469	1,826	603	432	5,765	2,179	24,061
2	Farms reporting land having drainage	20	107	106	20	18	17	575	2	179
3	Farms reporting land needing drainage	52	292	120	37	64	43	437	5	986
4	Farms in drainage and levee districts	20	53	81	14	21	14	43	1	49
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	823,040	805,760	1,043,200	1,557,120	574,720	2,005,120	2,574,080	1,514,880	34,132,480
6	All land in farms ... acres	555,890	334,293	669,262	993,226	199,231	436,024	1,756,973	1,203,781	11,896,332
7	Improved land in farms ... acres	237,374	94,201	188,230	146,972	115,044	139,856	878,520	591,605	3,224,981
8	Woodland in farms ... acres	9,528	3,856	9,657	116,271	11,480	31,021	12,704	10,211	781,331
9	Other unimproved land in farms ... acres	308,988	236,236	471,375	729,983	72,707	265,147	865,749	601,965	7,890,020
10	Farm land reported as provided with drainage ... acres	844	5,144	6,442	541	6,080	7,835	19,683	680	4,324
11	Farm land reported as needing drainage ... acres	1,939	5,538	12,435	1,180	10,799	24,066	8,951	340	66,756
12	Drainage only ... acres	1,870	5,069	12,432	663	2,336	2,040	8,351	340	9,354
13	Drainage and clearing ... acres	69	469	3	517	8,463	22,026	600	.....	57,402

[1] No drainage reported in Baca, Cheyenne, Clear Creek, Dolores, Douglas, Elbert, Lincoln, Mineral, San Juan, and Sedgwick Counties.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		THE STATE.	Bent.	Conejos.	Mesa.	Otero.	Prowers.	Rio Grande.	Other counti s.[1]
	LAND AREA.								
1	Approximate land area of the state or county ... acres	66,341,120	975,360	801,280	2,024,320	805,760	1,043,200	574,720	3,810,560
2	All land in operating drainage enterprises ... acres	171,656	11,559	17,100	50,640	4,539	38,040	27,000	22,787
3	Improved land ... acres	123,031	8,736	9,163	30,640	4,196	30,359	23,650	16,287
4	Per cent of all improved land in farms ...	1.6	8.6	7.2	30.8	4.5	16.1	20.6	2.9
5	Unimproved land.[2] ... acres	48,625	2,814	7,937	20,000	343	7,681	3,350	6,500
6	Swampy, seeped, or alkali land in enterprises ... acres	26,446	974	550	20,000	211	441	3,450	820
7	Suffering a loss of crops from defective drainage ... acres	15,282	92	...	15,000	150	...	...	40
8	Assessed acreage ... acres	171,656	11,550	17,100	50,640	4,539	38,040	27,000	22,787
9	Excess over all land in enterprises ... acres	...	...	...	...	...	...	...	...
	DRAINAGE WORKS.								
	Open ditches:								
10	Completed ... miles	132.5	5.2	21.0	26.5	8.3	22.0	20.9	28.6
11	Additional under construction ... miles	14.3	...	...	13.3	0.5	...	0.5	...
12	Maximum completed in any enterprise ... miles	26.5	5.0	13.0	26.5	6.8	11.0	13.9	20.0
13	Maximum width at bottom of ditch [3] ... feet	12	4	12	12	8	5	10	6
14	Maximum of average depths of outlet ditches [3] ... feet	16.0	8.0	8.0	8.0	13.0	16.0	6.0	7.0
15	Mean depth of branch ditches [3] ... feet	7.0	8.0	7.0	8.0	9.0	8.0	6.6	8.0
	Tile drains:								
16	Completed ... miles	195.2	18.3	74.6	6.6	26.7	12.6	23.5	32.9
17	Additional under construction ... miles	13.0	1.4	6.0	...	1.5	.4	2.7	1.0
18	Maximum completed in any enterprise ... miles	59.0	11.4	59.0	5.0	22.0	12.6	10.5	16.0
19	Maximum size of tile [3] ... inches	38	24	15	15	15	15	38	21
20	Area drained by open ditches only [3] ... acres	41,100	...	...	...	600	28,500	...	12,000
21	Length of these ditches ... miles	38.0	...	...	...	2.0	16.0	...	20.0
22	Average length per acre ... feet	4.9	...	...	...	17.6	3.0	...	8.8
23	Area drained by tile only [3] ... acres	10,776	1,850	4,000	640	2,539	...	...	1,747
24	Length of these tile ... miles	70.0	6.0	9.6	5.0	26.2	...	...	23.2
25	Average length per acre ... feet	34.3	17.1	12.7	41.3	54.5	...	...	70.1
26	Area drained by open ditches and tile [3] ... acres	119,780	9,700	13,100	50,000	1,400	9,540	27,000	9,040
27	Length of these drains ... miles	247.0	18.9	92.0	41.4	8.8	19.0	47.6	19.3
28	Average length per acre ... feet	10.9	10.3	37.1	4.4	33.2	10.5	9.3	108.4
	DEVELOPMENT OF LAND.								
29	Improved land in operating enterprises, 1920 ... acres	123,031	8,736	9,163	30,640	4,196	30,359	23,650	16,287
30	Improved land prior to drainage ... acres	68,657	6,477	1,563	30,640	1,949	14,618	8,950	4,460
31	Increase since drainage ... acres	54,374	2,259	7,600	...	2,247	15,741	14,700	11,827
32	Per cent of increase ...	79.2	34.9	486.2	...	115.3	107.7	164.2	265.2
33	Per cent increase is of all improved land in farms, 1920 ...	0.7	(4)	(4)	...	(4)	0.2	0.2	2.1
34	Unimproved land, 1920 [2] ... acres	48,625	2,814	7,937	20,000	343	7,681	3,350	6,500
35	Unimproved land prior to drainage [2] ... acres	102,999	5,073	15,537	20,000	2,590	23,422	18,050	18,327
36	Decrease since drainage ... acres	54,374	2,259	7,600	...	2,247	15,741	14,700	11,827
37	Per cent of decrease ...	52.8	44.5	48.9	...	86.8	67.2	81.4	64.5
38	Swampy, seeped, or alkali land, 1920 ... acres	26,446	974	550	20,000	211	441	3,450	820
39	Swampy, seeped, or alkali land prior to drainage ... acres	98,581	3,341	15,950	20,640	1,926	20,741	21,500	14,483
40	Decrease since drainage ... acres	72,135	2,367	15,400	640	1,715	20,300	18,050	13,663
41	Per cent of decrease ...	73.2	70.8	96.6	3.1	89.0	97.9	84.0	94.3
	CAPITAL INVESTED AND AVERAGE COST PER ACRE.								
42	Total capital invested in and required for completion of operating enterprises ... dollars	1,285,070	110,500	343,907	312,000	156,000	126,000	108,200	128,463
43	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	1,081,875	99,500	253,907	224,805	141,000	126,000	108,200	128,463
44	Additional capital required to complete these enterprises ... dollars	203,195	11,000	90,000	87,195	15,000	...	...	...
45	Average cost per acre, when completed ... dollars	7.49	9.57	20.11	6.16	34.37	...	...	5.64
46	Enterprises constructing open ditches only ... dollars	124,000	...	...	...	20,000	44,000	...	60,000
47	Average cost per acre when completed ... dollars	3.02	...	...	...	33.33	1.54	...	5.00
48	Enterprises constructing tile drains only ... dollars	183,663	25,000	44,000	12,000	66,000	...	...	36,663
49	Average cost per acre when completed ... dollars	17.04	13.51	11.00	18.75	25.99	...	...	20.99
50	Enterprises constructing open ditches and tile drains ... dollars	977,407	85,500	299,907	300,000	70,000	82,000	108,200	31,800
51	Average cost per acre when completed ... dollars	8.16	8.81	22.89	6.00	50.00	8.60	4.01	3.52
	CROPS.								
	Improved land in enterprises reporting—								
52	Alfalfa as principal crop on drained land ... acres	89,838	8,116	5,163	30,000	450	11,609	20,900	13,600
53	Wheat and oats as principal crops on drained land ... acres	8,295	620	4,000	...	510	...	2,125	1,040
54	Sugar beets as principal crop on drained land ... acres	4,883	...	...	...	3,236	...	...	1,647
55	Not reporting principal crop on drained land ... acres	20,015	...	...	640	...	18,750	625	...

[1] Includes only Alamosa, Crowley, Morgan, and Saguache Counties.
[2] No timber or cut-over land reported.
[3] When works under construction have been completed
[4] Less than one-tenth of 1 per cent.

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DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS

DRAINAGE : FLORIDA

STATISTICS FOR THE STATE AND ITS COUNTIES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

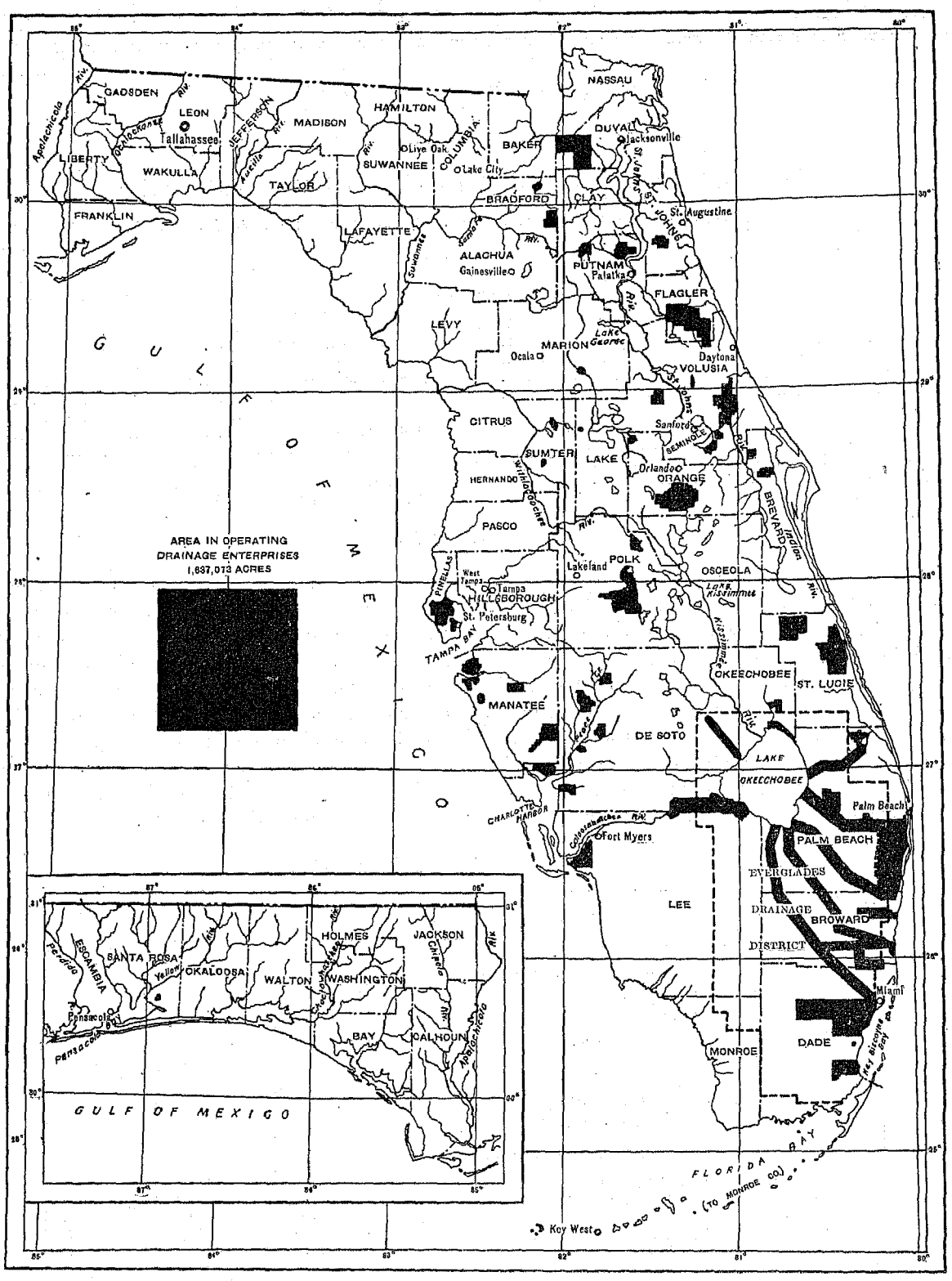
This bulletin presents the statistics of drainage for Florida collected at the census of 1920. The figures relate to conditions on January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises include considerable areas of timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner installs upon his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are presented separately.

TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	54,005	100.0
Farms reporting land having drainage	4,597	8.5
Farms reporting land needing drainage	8,486	15.7
All land in farms ... acres	6,046,691	100.0
Improved land in farms ... acres	2,297,271	38.0
Farm land reported as provided with drainage ... acres	147,940	2.4
Farm land reported as needing drainage ... acres	687,021	11.4
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	35,111,040	100.0
All land in operating drainage enterprises ... acres	1,637,073	4.7
Improved land ... acres	94,589	0.3
Timber and cut-over land ... acres	542,648	1.5
Other unimproved land ... acres	999,836	2.8
Capital invested in and required for completion of operating enterprises	$26,762,497	100.0
Capital invested in these enterprises to Dec. 31, 1919	$13,846,807	51.7
Additional capital required to complete these enterprises	$12,915,690	48.3

FLORIDA

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.[1]



[1] Boundary of Everglades Drainage District shown thus: — — —

DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which are substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, is the acreage actually benefited or made of more value for agricultural purposes by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators have answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual." Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises, below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter may be some that had completed the original plan of reclamation several years ago but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include districts that on the census date had completed their plans, sold bonds to cover the cost of the undertaking, and let contracts for the construction work, and also districts that had just been established by court decree and were still subject to considerable change in area, plan of drainage works, and cost. The Everglades Drainage District as a whole is not included in the tabulations, but those parts against which special assessments are levied for improvement works that actually have been undertaken are included as separate enterprises.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.[1]		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	2,645,816	100.0	$14,060,857	100.0	$14,933,090
Operating enterprises	1,637,073	61.9	13,846,807	98.5	12,915,690
With works completed	352,068	13.3	2,917,261	20.7	.....
With works under construction	1,285,005	48.6	10,929,546	77.7	12,915,690
Nonoperating enterprises	1,008,743	38.1	214,050	1.5	2,017,400

[1] The inquiry asked for the "total cost of the enterprise to Dec. 31, 1919," and for an "estimate of additional investment to complete."

Location of enterprises.—Practically all the organized drainage enterprises in Florida are in the southern and the extreme eastern parts of the state. Most of the drainage is eastward, either through St. Johns River or almost directly into the Atlantic Ocean.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	2,645,816	100.0	$14,060,857	100.0	$14,933,090
Operating enterprises	1,637,073	61.9	13,846,807	98.5	12,915,690
Gulf of Mexico	304,690	11.5	1,714,076	12.2	555,000
Suwannee River	23,020	0.9	42,000	0.3	1,000
Atlantic Ocean	1,067,901	40.4	11,021,371	78.4	11,941,190
St. Johns River	241,462	9.1	1,069,360	7.6	418,500
Nonoperating enterprises	1,008,743	38.1	214,050	1.5	2,017,400
Gulf of Mexico	3,000	0.1	2,500	.....	6,200
Suwannee River	1,000	.....	125	.....	920
Atlantic Ocean	559,398	21.1	46,104	0.3	1,261,000
St. Johns River	445,345	16.8	165,321	1.2	749,280

Condition of land in enterprises.—The drainage enterprises in this state are almost entirely for the reclamation of areas that naturally are too swampy or wet for agricultural uses. The extremely level ground surface has not been conducive to the formation of natural channels adequate in number or in size to drain the land, so in seasons of more than average rainfall the water stands upon the surface or moves across it slowly in a broad sheet. Particularly is this true in the Everglades, due to overflow from Lake Okeechobee. In the southern part of the peninsula and in sections along the east coast, many of the drainage enterprises have no natural boundaries, the promoters merely separating from the general body of swamp land a portion suited to their financial resources or to their judgment regarding economy of development.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms and to afford relief from overflows for the district as a unit. Therefore, the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy or subject to overflow, or land that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total. Acreage.	Total. Per cent of all land.	Works completed (acres).	Works under construction (acres).	
All land in enterprises	1,637,073	100.0	352,068	1,285,005	1,008,743
Improved land	94,589	5.8	32,511	62,078	17,925
Timber and cut-over land	542,648	33.1	100,560	442,088	303,666
Other unimproved land	999,836	61.1	218,997	780,839	687,152
Swampy or subject to overflow	731,691	44.7	75,398	656,293	692,241
Suffering a loss of crops	40,498	2.5	21,931	18,567	29,348

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided, and the part in each county be considered a separate enterprise. In this way 94 operating drainage enterprises are counted in Florida, with an average area of 18,723 acres assessed. Of the total number of enterprises, 12 comprise 50,000 acres or more each, and only 5 less than 1,000 acres each. The assessed acreage exceeds the land in enterprises by 122,868 acres, which is the amount of overlapping. The land in enterprises and the assessed acreage on each line of Table 5 refer to the same enterprises. From the total area of each enterprise, designated as the assessed area, the net amount of overlapping with enterprises organized previously was deducted, to determine the area to be tabulated as land in enterprises.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	1,637,073	1,759,941	100.0
500 to 999 acres	3,370	3,370	0.2
1,000 to 4,999 acres	60,207	63,157	3.6
5,000 to 9,999 acres	94,038	114,456	6.5
10,000 to 49,999 acres	625,245	694,045	39.4
50,000 to 99,999 acres	604,913	604,913	34.4
100,000 to 499,999 acres	249,300	280,000	15.9

Character of enterprises.—The drainage enterprises in Florida are state projects under immediate control of state officials, drainage districts established under general drainage laws and special acts of the legislature, commercial organizations developing land for sale, and private drainage undertakings by individual landowners.

The state government has undertaken to encourage and assist in the development of its great area of swamp and overflowed land. The Internal Improvement Fund was created by an act of the legislature January 6, 1855 (ch. 610), to consist of the unsold land granted to the state by Congress in 1845 for internal improvement purposes, and of the swamp and overflowed land granted to the state by Congress in 1850. The board of trustees for that fund, which consists of the governor of the state, the comptroller, the state treasurer, the attorney general, and the commissioner of agriculture, is empowered to make such arrangements for the drainage of the swamp and overflowed land as may seem most advantageous. The state board of drainage commissioners was created by act of May 27, 1905 (ch. 5377), to drain and reclaim swamp and overflowed land in certain drainage districts; the members are the trustees of the Internal Improvement Fund. The Everglades Drainage District in the southern end of the state was created by a statute of June 6, 1913 (ch. 6456), and the commissioners of that district are the state drainage commissioners. A drainage district with approximately the same boundaries had been created by the act that created the state drainage commissioners.

The Everglades Drainage District now comprises some 4,200,000 acres, located as indicated on the map on page 2. The district commissioners are empowered to plan and construct all works necessary for the reclamation of the district, and to issue bonds to finance the work. The land is divided into classes for assessment of drainage taxes. The organization of subdistricts wholly or partly within the Everglades Drainage District is provided by an act of June 7, 1919 (ch. 7866). The statistics for the Everglades district as a whole are not given in this bulletin, but statistics are included for the parts where drainage has been undertaken. Most of the state enterprises are reported as under control of the commissioners of the Everglades district, though a few are reported as under the trustees of the Internal Improvement Fund or under the state board of drainage commissioners.

Drainage districts may be established under general drainage laws by the boards of county commissioners or by the circuit courts of the counties in which the districts are situated. Districts established by the circuit courts are formed in accordance with a law of June 9, 1913 (ch. 6458), upon petition from the state board of drainage commissioners or from a majority in either number or acreage of the owners of the wet or overflowed land to be drained. After public hearings upon the petition and with the written consent of the owners of a majority of the acreage to be included, the district is decreed a public corporation for a stated term of years. The officials of the district are a board of three supervisors elected by the landowners, each of whom has one vote for each acre of his holdings. The plan of drainage works is determined by the board of supervisors, which also constructs the works. Benefits and damages are assessed by three commissioners appointed by the judge of the court, who holds hearings upon their report and confirms the assessments with any modifications deemed equitable. Appeals may be taken to the supreme court of the state. The cost of the enterprise is assessed in proportion to the benefits and not in excess of them. The supervisors may issue bonds for not exceeding 90 per cent of the tax levy, to mature in not more than 30 years.

Drainage districts have been established by the county commissioners under acts of June 1, 1899 (ch. 4807), and of May 3, 1901 (ch. 5035). The later statute supersedes the earlier one, to which it is similar, and legalizes drainage contracts and assessments made under the earlier law. The existing act, as amended June 7, 1913 (ch. 6457), requires that the petition for a drain must be made by a majority of the owners of the land that will be affected or by the owners of a majority of the acreage, and must be approved by the county commissioners. The plan of drainage and the estimate of cost are procured by a committee of three disinterested freeholders appointed by the county commissioners. The cost is assessed against the lands in proportion to the benefits as determined by the committee and approved by the county commissioners after public hearing. The commissioners let contracts for construction and the committee supervises that work. The commissioners issue bonds of the district to finance the enterprise.

Drainage of swamp and overflowed land by the board of county commissioners in any county, upon petition

of two or more owners of land that would be assessed for the cost, is authorized by a law of June 2, 1893 (ch. 4178). The general method of establishment is rather similar to that provided by the law of 1901. No enterprises were reported as organized under this statute. The only previous drainage law in Florida, except that creating the Internal Improvement Fund, was an act of 1834 providing for the establishment of drains by the county courts upon petition from one or more landowners. In each instance three commissioners were to be appointed to locate the ditch and determine what damages must be paid by the petitioners to the owners of the lands through which the drain would be constructed.

A number of drainage districts have been created by special acts of the legislature defining for each separate district its boundaries, form of organization, and powers. Some enterprises that were begun as land-development or land-sales companies have been reorganized as drainage districts.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All enterprises	2,645,816	100.0	$14,060,857	100.0	$14,933,090
Operating enterprises	1,637,073	61.9	13,846,807	98.5	12,915,690
State projects	604,900	22.9	5,742,517	40.8	6,434,440
Drainage districts	913,283	34.5	6,613,444	47.0	5,986,000
Laws of 1899, ch. 4807	17,280	0.7	28,500	0.2	.....
Laws of 1901, ch. 5035	23,840	0.9	156,576	1.1	.....
Laws of 1913, ch. 6457	59,362	2.3	455,900	3.2	20,000
Laws of 1913, ch. 6458	611,201	23.1	5,676,468	40.4	4,015,000
Special acts	201,300	7.6	297,000	2.1	1,951,000
Commercial developments	104,050	3.9	1,368,846	9.7	456,500
Individual ownerships	14,840	0.6	122,000	0.9	38,750
Nonoperating enterprises	1,008,743	38.1	214,050	1.5	2,017,400
Drainage districts [1]	1,008,743	38.1	214,050	1.5	2,017,400
Laws of 1901, ch. 5035	12,000	0.5	5,500	(2)	14,480
Laws of 1913, ch. 6457	5,250	0.2	1,900	(2)	78,000
Laws of 1913, ch. 6458	505,693	19.1	204,246	1.5	1,749,920
Special acts [1]	485,800	18.4	2,404	(2)	175,000

[1] Includes 5,000 acres under individual ownership.
[2] Less than one-tenth of 1 per cent.

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 1,990.8 miles of open ditches and 66.2 miles of levees; the additional lengths under construction were 694.0 miles of open ditches and 106.5 miles of levees. These figures do not include drains or levees installed by individual farm owners supplemental to the works of the enterprises, nor the works of flood-protection or levee districts that had not undertaken the construction of ditches or tile drains. The cost of nine locks and dams completed in the state canals in the Everglades Drainage District, amounting to about $278,000, and of two *others under construction* is included in the cost of the enterprises.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All kinds	1,637,073	100.0	$13,846,807	100.0	$12,915,690
Open ditches only	1,093,128	66.8	8,374,539	60.5	7,295,690
Open ditches and levees	543,945	33.2	5,472,268	39.5	5,620,000

There are two pumping districts for land drainage in the state. The pumping plants are equipped with five centrifugal pumps of 39,000 gallons per minute total capacity, and with steam engines and internal-combustion engines of 35 horsepower and 85 horsepower, respectively.

TABLE 8.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY TYPE OF DRAINAGE: 1920.

TYPE OF DRAINAGE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All operating enterprises	1,637,073	100.0	$13,846,807	100.0	$12,915,690
Gravity drainage only	1,631,073	99.6	13,763,307	99.4	12,890,690
All drainage by pumping	3,000	0.2	38,500	0.3	.....
Part gravity and part pumping	3,000	0.2	45,000	0.3	25,000
Total area served by pumps	4,500	0.3	.....	.....	.....

The average depth of the main or outlet ditch was reported for each enterprise. The maximum depth of outlet reported for any enterprise in the state and the maximum in each county are shown in line 15 of County Table II. The maximum length, width, and depth of outlet shown in that table for any county may not refer to the same enterprise.

In County Table II, line 16 shows the mean depth of branch ditches (open ditches only), which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations. Depths less than 3 feet and those 10 feet and greater were omitted because it seemed that they did not represent so well the average depths of outlet provided for all the farms in those districts. To include both these groups, computed as 3 feet and 10 feet, respectively, would make the mean depth for the state 4.4 instead of 4.3 feet.

TABLE 9.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	1,637,073	100.0
Less than 3 feet	50,100	3.1
3.0 to 3.9 feet	135,330	8.3
4.0 to 4.9 feet	355,480	21.7
5.0 to 5.9 feet	93,912	5.7
6.0 to 6.9 feet	130,000	7.9
7.0 to 7.9 feet	.....	.....
8.0 to 8.9 feet	3,186	0.2
9.0 to 9.9 feet	.....	.....
10.0 feet and more	15,645	1.0
Not reporting branches	853,420	52.1

Maintenance of works.—The state board of drainage commissioners is empowered to maintain the drainage works constructed by it. The supervisors of drainage districts organized under the circuit court are authorized to maintain and protect the drainage works of their respective districts, and for this purpose may levy taxes, not to exceed in any year 10 per cent of the net assessment of benefits for original construction and to be apportioned like those benefits. A readjustment of apportionment of maintenance costs is provided for, upon petition from the owners of 25 per cent of the acreage in the district and after public hearing. All drains constructed by districts organized under the county commissioners are under the control of those commissioners for purposes of repair and maintenance. Taxes for these purposes may be levied by the county commissioners when deemed necessary, a separate fund to be kept for each district. These taxes are levied in the same proportions as the original assessments of cost.

TABLE 10.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All operating enterprises	1,637,073	100.0	$13,846,807	100.0	$12,915,690
By district forces	312,835	19.1	2,806,008	20.3	2,331,000
By contract	418,700	25.6	3,853,915	27.8	673,000
By land owners	58,500	3.6	453,346	3.3	730,000
Method not specified	25,026	1.5	178,000	1.3	151,250
No maintenance provided	180,179	11.0	3,261,670	23.6	1,006,440
Not reporting	641,833	39.2	3,293,868	23.8	8,024,000

Date of organization.—The progress in drainage is shown only roughly by the dates of the organization of enterprises, which are the dates when the districts were established by the county courts, since there may be a period of one or more years between the decree of establishment and the beginning of actual construction, and since the work of construction will occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including extensions made after the original plan of reclamation was completed. No drainage enterprises were reported as organized in Florida earlier than 1905.

TABLE 11.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	1,637,073	100.0	1,759,941	100.0
1905-1909	6,970	0.4	15,170	0.9
1910-1914	859,617	52.5	885,617	50.3
1915-1919	770,486	47.1	859,154	48.8

TABLE 12.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$13,846,807	100.0	$12,915,690
1905-1909	125,000	0.9	.....
1910-1914	8,936,048	64.5	7,288,000
1915-1919	4,785,759	34.6	5,627,690

TABLE 13.—DITCHES AND LEVEES (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		LEVEES.	
	Miles.	Per cent of total.	Miles.	Per cent of total.
All ditches and levees	2,684.8	100.0	172.7	100.0
1905-1909	75.8	2.8	1.5	0.9
1910-1914	1,688.3	62.9	76.0	44.0
1915-1919	920.7	34.3	95.2	55.1

Crops.—The principal crops grown upon the drained land in drainage enterprises are potatoes and other vegetables. Data were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified, in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

County Table I.—DRAINAGE ON FARMS: 1920.

		The State.	Alachua.	Bay.	Bradford.	Brevard.	Broward.	Calhoun.	Clay.	Dade.
1	Number of all farms in the state or county	54,005	2,684	173	1,286	672	280	679	314	855
2	Farms reporting land having drainage	4,597	33	30	43	169	121	45	97	36
3	Farms reporting land needing drainage	8,486	509	44	158	361	5	62	191	34
4	Farms in drainage and levee districts	1,266	2	.....	2	9	16	4	1	15
	LAND AND FARM AREA.									
5	Approximate land area of the state or county ... acres	35,111,040	804,480	500,480	344,960	656,000	775,680	696,320	393,600	1,292,160
6	All land in farms ... acres	6,046,691	297,091	34,484	134,608	58,570	20,400	74,988	107,742	132,721
7	Improved land in farms ... acres	2,297,271	161,737	4,697	59,207	10,945	9,092	23,377	15,001	29,082
8	Woodland in farms ... acres	2,780,790	122,581	28,968	65,365	18,707	2,261	48,142	71,050	76,988
9	Other unimproved land in farms ... acres	968,630	12,773	819	10,036	28,918	9,047	3,469	21,691	26,651
10	Farm land reported as provided with drainage ... acres	147,940	641	901	4,929	3,428	5,849	590	6,820	3,302
11	Farm land reported as needing drainage ... acres	687,021	35,989	8,490	16,795	35,616	4,521	7,574	39,308	8,651
12	Drainage only ... acres	87,814	6,253	1,049	120	10,071	3,680	4,276	9,113	7,401
13	Drainage and clearing ... acres	599,207	29,736	7,441	16,675	25,545	841	3,298	30,195	1,250

		De Soto.	Duval.	Flagler.	Hamilton.	Hernando.	Hillsborough.	Holmes.	Jackson.	Lake.
1	Number of all farms in the county	1,719	916	187	1,102	408	1,687	1,597	4,031	876
2	Farms reporting land having drainage	259	190	63	8	7	286	122	219	60
3	Farms reporting land needing drainage	489	458	92	24	6	581	441	541	104
4	Farms in drainage and levee districts	34	35	60	.....	1	49	.....	1	15
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	2,402,560	500,480	314,240	337,920	318,080	663,040	302,720	600,960	670,080
6	All land in farms ... acres	300,209	65,165	10,617	161,907	95,618	87,483	154,110	368,117	88,339
7	Improved land in farms ... acres	43,601	13,456	4,070	82,818	15,520	33,605	64,198	212,260	32,917
8	Woodland in farms ... acres	103,294	43,527	5,832	74,833	79,542	39,452	84,155	138,914	34,474
9	Other unimproved land in farms ... acres	153,314	8,182	715	4,256	556	14,426	5,757	16,943	20,948
10	Farm land reported as provided with drainage ... acres	12,248	2,047	2,604	950	694	3,577	1,114	2,677	4,561
11	Farm land reported as needing drainage ... acres	38,139	32,944	4,660	1,476	998	20,058	26,480	30,137	9,889
12	Drainage only ... acres	1,868	2,250	456	746	266	2,738	3,972	1,131	3,647
13	Drainage and clearing ... acres	36,271	30,694	4,204	730	732	17,320	22,508	29,006	6,242

		Lee.	Liberty.	Manatee.	Marion.	Orange.	Osceola.	Palm Beach.	Pinellas.	Polk.
1	Number of all farms in the county	573	227	938	2,215	1,093	304	624	536	2,552
2	Farms reporting land having drainage	187	1	534	48	123	14	228	111	62
3	Farms reporting land needing drainage	153	1	335	157	180	28	115	81	151
4	Farms in drainage and levee districts	19	.....	386	5	11	5	117	43	27
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	2,579,840	526,720	855,680	1,054,080	594,560	867,840	1,624,320	187,520	1,220,480
6	All land in farms ... acres	43,984	36,681	40,469	225,048	242,443	66,918	37,527	31,671	299,153
7	Improved land in farms ... acres	12,917	11,039	15,273	105,471	70,572	6,304	12,055	11,273	54,675
8	Woodland in farms ... acres	21,097	18,294	21,667	107,118	158,509	39,766	16,853	17,167	139,095
9	Other unimproved land in farms ... acres	9,970	7,348	3,529	12,459	13,362	20,848	8,619	3,231	105,383
10	Farm land reported as provided with drainage ... acres	4,446	560	10,104	2,915	2,113	1,126	9,021	1,459	16,464
11	Farm land reported as needing drainage ... acres	10,364	3,345	16,229	18,586	22,868	20,384	4,927	2,649	15,946
12	Drainage only ... acres	743	.....	1,095	5,364	1,427	2,793	1,091	524	834
13	Drainage and clearing ... acres	9,621	3,345	15,134	13,222	21,441	17,591	3,836	2,125	15,112

		Putnam.	St. Johns.	St. Lucie.	Seminole.	Sumter.	Volusia.	Walton.	Washington.	All other counties.[1]
1	Number of all farms in the county	893	402	719	573	1,213	998	1,073	1,218	18,388
2	Farms reporting land having drainage	258	214	438	268	54	37	42	58	172
3	Farms reporting land needing drainage	358	234	182	112	209	88	158	401	1,443
4	Farms in drainage and levee districts	42	3	222	33	26	4	1	4	74
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	481,280	389,120	689,280	205,440	373,120	718,720	700,800	396,800	10,071,680
6	All land in farms ... acres	66,085	47,417	40,365	65,466	85,188	69,623	121,020	101,598	2,233,866
7	Improved land in farms ... acres	23,248	12,915	13,042	11,795	39,337	18,258	38,669	46,031	978,814
8	Woodland in farms ... acres	39,212	32,669	15,071	39,192	39,654	33,387	58,436	46,238	899,280
9	Other unimproved land in farms ... acres	3,625	1,833	12,252	14,479	6,197	17,978	23,915	9,329	355,772
10	Farm land reported as provided with drainage ... acres	9,317	11,216	12,334	3,358	1,799	1,120	524	1,414	1,718
11	Farm land reported as needing drainage ... acres	17,947	22,937	7,177	12,753	13,394	3,458	9,924	14,728	147,680
12	Drainage only ... acres	1,678	347	2,095	1,911	2,151	642	195	695	5,192
13	Drainage and clearing ... acres	16,269	22,590	5,082	10,842	11,243	2,816	9,729	14,033	142,488

[1] No drainage reported in Lafayette, Levy, Monroe, Okaloosa, and Suwannee Counties.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		The State.	Bradford.	Brevard.	Broward.	Dade.	De Soto.	Duval.
	LAND AREA.							
1	Approximate land area of the state or county ... acres	35,111,040	344,960	656,000	775,680	1,292,160	2,402,560	500,480
2	All land in operating drainage enterprises ... acres	1,637,073	20,780	17,000	162,250	199,300	165,640	57,600
3	Improved land ... acres	94,589	3,152	200	[1] 4,792	8,048	12,541	5,760
4	Per cent of all improved land in farms	4.1	5.3	1.8	52.7	27.7	28.8	42.8
5	Timber and cut-over land ... acres	542,648	17,488	4,000	18,810	6,000	34,146	25,920
6	Other unimproved land ... acres	999,836	140	12,800	138,648	185,252	118,953	25,920
7	Swampy or subject to overflow in enterprises ... acres	731,691	16,952	2,000	74,450	175,777	65,100	14,400
8	Suffering loss of crops from defective drainage ... acres	40,498	17,136	...	12,076	2,850	1,123	...
9	Assessed acreage	1,759,941	20,780	43,000	163,000	217,000	201,640	57,600
10	Excess over all land in operating enterprises ... acres	122,868	...	26,000	750	17,700	36,000	...
	DRAINAGE WORKS.							
	Open ditches:							
11	Completed ... miles	1,990.8	45.1	116.5	173.3	77.2	210.3	57.4
12	Additional under construction ... miles	694.0	60.0	7.5	...	113.0	106.9	22.0
13	Maximum completed in any enterprise ... miles	166.0	30.1	60.0	40.0	29.2	58.0	57.4
14	Maximum width at bottom of ditch [2] ... feet	90	50	35	80	80	50	36
15	Maximum of average depths of outlet ditches [2] ... feet	22.0	6.0	10.0	14.0	14.0	10.0	5.0
16	Mean depth of branch ditches [2] ... feet	4.3	3.1	4.2	4.2	3.0	5.0	4.0
	Accessory levees and dikes:							
17	Completed ... miles	66.2	...	...	10.5	...	1.8	...
18	Additional under construction ... miles	106.5	...	...	...	40.0	...	...
	Pumping plants:							
19	Engine capacity ... horsepower	120	...	...	...	...	...	...
20	Pump capacity ... gallons per minute	39,000	...	...	...	...	...	...
21	Area served by pumps ... acres	4,500	...	...	...	...	...	...
22	Area drained by open ditches only [2] ... acres	1,093,128	20,780	17,000	160,250	57,000	100,640	57,600
23	Length of these ditches ... miles	1,791.2	105.1	124.0	133.3	163.2	238.8	79.4
24	Average length per acre ... feet	8.7	26.7	38.5	4.4	15.1	12.5	7.3
25	Area having open ditches and levees [2] ... acres	543,945	...	...	2,000	142,300	65,000	...
26	Length of these ditches ... miles	893.6	...	...	40.0	27.0	78.4	...
27	Average length per acre ... feet	8.7	...	...	105.6	1.0	6.4	...
28	Length of accessory levees ... miles	172.7	...	...	10.5	40.0	1.8	...
	DEVELOPMENT OF LAND.							
29	Improved land in operating enterprises, 1920 ... acres	94,589	3,152	200	[1] 4,792	8,048	12,541	5,760
30	Improved land prior to drainage ... acres	30,341	1,763	...	1,488	4,070	1,663	2,880
31	Increase since drainage ... acres	64,248	1,389	200	3,304	3,978	10,878	2,880
32	Per cent of increase	211.8	78.8	...	222.0	97.7	654.1	100.0
33	Per cent increase is of all improved land in farms, 1920	2.8	2.3	1.8	36.3	13.7	24.9	21.4
34	Timber and cut-over land, 1920 ... acres	542,648	17,488	4,000	18,810	6,000	34,146	25,920
35	Timber and cut-over land prior to drainage ... acres	565,741	18,352	4,000	19,200	6,000	34,512	28,800
36	Decrease since drainage ... acres	23,093	864	...	390	...	366	2,880
37	Per cent of decrease	4.1	4.7	...	2.0	...	1.1	10.0
38	Other unimproved land, 1920 ... acres	999,836	140	12,800	138,648	185,252	118,953	25,920
39	Other unimproved land prior to drainage ... acres	1,040,991	665	13,000	141,562	189,230	129,465	25,920
40	Decrease since drainage ... acres	41,155	525	200	2,914	3,978	10,512	...
41	Per cent of decrease	4.0	78.9	1.5	2.1	2.1	8.1	...
42	Swampy or subject to overflow, 1920 ... acres	731,691	16,952	2,000	74,450	175,777	65,100	14,400
43	Swampy or subject to overflow, prior to drainage ... acres	1,328,313	18,680	16,500	159,050	193,520	128,440	46,080
44	Decrease since drainage ... acres	596,622	1,728	14,500	84,600	17,743	63,340	31,680
45	Per cent of decrease	44.9	9.3	87.9	53.2	9.2	49.3	68.8
	CAPITAL INVESTED AND COST PER ACRE.							
46	Total capital invested in and required for completion of operating enterprises ... dollars	26,762,497	35,500	585,000	3,634,992	4,060,562	1,204,550	365,000
47	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	13,846,807	35,500	585,000	1,689,945	710,894	1,030,110	260,835
48	Additional capital required to complete these enterprises ... dollars	12,915,690	...	...	1,945,047	3,349,668	174,440	104,165
49	Average cost per acre when completed ... dollars	16.35	1.71	34.41	22.40	20.37	7.27	6.34
50	Enterprises constructing open ditches only ... dollars	15,670,229	35,500	585,000	3,534,992	2,040,562	652,550	365,000
51	Average cost per acre when completed ... dollars	14.34	1.71	34.41	22.06	35.80	6.48	6.34
52	Enterprises constructing open ditches and levees ... dollars	11,092,268	...	...	100,000	2,020,000	552,000	...
53	Average cost per acre when completed ... dollars	20.39	...	...	50.00	14.20	8.49	...
	CROPS.							
	Improved land in enterprises reporting—							
54	Vegetables as principal crop on drained land ... acres	31,505	...	100	4,792	6,625	3,211	...
55	Potatoes as principal crop on drained land ... acres	18,784	...	...	...	...	1,050	...
56	Sugar cane as principal crop on drained land ... acres	17,623	...	...	...	1,423	6,500	5,760
57	Citrus fruits as principal crop on drained land ... acres	10,820	...	100	...	...	880	...
58	Other crops as principal ones on drained land ... acres	13,761	2,592	...	...	...	...	...
59	Not reporting crops ... acres	2,096	560	...	...	...	900	...

[1] Estimated total for county.

[2] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Flagler.	Lake.	Lee.	Manatee.	Nassau.	Okeechobee.	Orange.	Palm Beach.
	LAND AREA.								
1	Approximate land area of the county ... acres	314,240	670,080	2,579,840	855,680	403,200	478,080	594,560	1,624,320
2	All land in operating drainage enterprises ... acres	76,313	7,500	29,500	60,250	11,520	14,400	57,000	448,786
3	Improved land ... acres	[1] 2,026	750	1,940	10,204	1,152	350	1,080	[1] 7,658
4	Per cent of all improved land in farms	49.8	2.3	15.0	66.8	9.1	28.5	1.5	63.5
5	Timber and cut-over land ... acres	63,221	3,950	24,435	23,336	5,184	...	42,120	122,570
6	Other unimproved land ... acres	11,066	2,800	3,125	26,710	5,184	14,050	13,800	318,558
7	Swampy or subject to overflow in enterprises ... acres	25,525	4,225	26,350	33,574	2,880	4,450	10,800	195,586
8	Suffering loss of crops from defective drainage ... acres	433	60	626	...	...	50	...	[1] 5,846
9	Assessed acreage	76,313	7,500	31,700	60,250	11,520	14,400	57,000	480,004
10	Excess over all land in operating enterprises ... acres	...	...	2,200	...	...	...	...	40,218
	DRAINAGE WORKS.								
	Open ditches:								
11	Completed ... miles	62.6	27.0	15.7	55.5	10.0	25.0	66.0	266.1
12	Additional under construction ... miles	22.4	4.5	16.9	21.3	3.9	4.5	9.0	81.9
13	Maximum completed in any enterprise ... miles	31.4	25.5	9.6	10.8	10.0	18.0	36.0	48.0
14	Maximum width at bottom of ditch [2] ... feet	40	40	24	22	36	20	30	90
15	Maximum of average depths of outlet ditches [2] ... feet	10.0	7.0	6.0	10.0	5.0	4.0	7.0	22.0
16	Mean depth of branch ditches [2] ... feet	4.0	3.0	...	3.6	4.0	...	3.0	4.1
	Accessory levees and dikes:								
17	Completed ... miles	6.0	...	0.2	...	...	...	7.5	...
18	Additional under construction ... miles	...	...	3.5	...	...	...	...	42.0
	Pumping plants:								
19	Engine capacity ... horsepower	...	...	...	...	...	...	75	...
20	Pump capacity ... gallons per minute	...	...	...	...	...	...	38,000	...
21	Area served by pumps ... acres	...	...	...	...	...	...	3,000	...
22	Area drained by open ditches only [2] ... acres	51,313	7,500	5,500	60,250	11,520	14,400	54,000	329,786
23	Length of these ditches ... miles	52.0	31.5	9.5	76.8	13.9	29.5	45.0	257.2
24	Average length per acre ... feet	5.4	22.2	9.1	6.7	6.4	10.8	4.4	4.1
25	Area having open ditches and levees [2] ... acres	25,000	...	24,000	...	...	...	3,000	119,000
26	Length of these ditches ... miles	33.0	...	23.1	...	...	...	30.0	90.8
27	Average length per acre ... feet	7.0	...	5.1	...	...	...	52.8	4.0
28	Length of accessory levees ... miles	6.0	...	3.7	...	...	...	7.5	42.0
	DEVELOPMENT OF LAND.								
29	Improved land in operating enterprises, 1920 ... acres	[1] 2,026	750	1,940	10,204	1,152	350	1,080	[1] 7,658
30	Improved land prior to drainage ... acres	1,216	100	240	2,692	576	...	540	4,752
31	Increase since drainage ... acres	810	650	1,700	7,512	576	350	540	2,906
32	Per cent of increase	66.6	650.0	708.3	279.0	100.0	...	100.0	61.2
33	Per cent increase is of all improved land in farms, 1920	19.9	2.0	13.2	49.2	4.6	28.5	0.8	24.1
34	Timber and cut-over land, 1920 ... acres	63,221	3,950	24,435	23,336	5,184	...	42,120	122,570
35	Timber and cut-over land prior to drainage ... acres	64,031	3,950	26,135	28,590	5,760	...	42,120	123,810
36	Decrease since drainage ... acres	810	...	1,700	5,254	576	...	...	1,240
37	Per cent of decrease	1.3	...	6.5	18.4	10.0	...	...	1.0
38	Other unimproved land, 1920 ... acres	11,066	2,800	3,125	26,710	5,184	14,050	13,800	318,558
39	Other unimproved land prior to drainage ... acres	11,066	3,450	3,125	28,968	5,184	14,400	14,340	320,224
40	Decrease since drainage ... acres	...	650	...	2,258	...	350	540	1,666
41	Per cent of decrease	...	18.8	...	7.8	...	2.4	3.8	0.5
42	Swampy or subject to overflow, 1920 ... acres	25,525	4,225	26,350	33,574	2,880	4,450	10,800	195,586
43	Swampy or subject to overflow prior to drainage ... acres	56,313	7,175	29,250	36,764	9,216	11,200	13,800	395,286
44	Decrease since drainage ... acres	30,788	2,950	2,900	6,190	6,336	6,750	3,000	199,700
45	Per cent of decrease	54.7	41.1	9.9	15.6	68.8	60.3	21.7	50.5
	CAPITAL INVESTED AND COST PER ACRE.								
46	Total capital invested in and required for completion of operating enterprises ... dollars	382,650	97,900	389,350	412,276	75,000	74,346	183,500	9,703,753
47	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	277,590	77,900	29,350	297,276	54,165	62,846	163,500	4,778,218
48	Additional capital required to complete these enterprises ... dollars	105,060	20,000	360,000	115,000	20,835	11,500	20,000	4,925,535
49	Average cost per acre when completed ... dollars	5.01	13.05	13.20	6.84	6.51	5.16	3.22	21.62
50	Enterprises constructing open ditches only ... dollars	237,650	97,900	17,850	412,276	75,000	74,346	145,000	6,683,753
51	Average cost per acre when completed ... dollars	4.63	13.05	3.25	6.84	6.51	5.16	2.69	20.27
52	Enterprises constructing open ditches and levees ... dollars	145,000	...	371,500	...	...	...	38,500	3,020,000
53	Average cost per acre when completed ... dollars	5.80	...	15.48	...	...	...	12.83	25.38
	CROPS.								
	Improved land in enterprises reporting—								
54	Vegetables as principal crop on drained land ... acres	...	400	...	7,612	...	...	...	5,258
55	Potatoes as principal crop on drained land ... acres	2,026	...	...	...	...	...	...	80
56	Sugar cane as principal crop on drained land ... acres	...	350	...	...	1,152	350	...	1,000
57	Citrus fruits as principal crop on drained land ... acres	...	...	1,940	1,200	...	...	...	700
58	Other crops as principal ones on drained land ... acres	...	...	...	1,392	...	...	1,080	...
59	Not reporting crops ... acres	...	...	...	...	...	...	...	620

[1] Estimated total for county.

[2] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Pinellas.	Polk.	Putnam.	St. Johns.	St. Lucie.	Seminole.	Volusia.	Other counties.[1]
	LAND AREA.								
1	Approximate land area of the county ... acres	187,520	1,220,480	481,280	389,120	689,280	205,440	718,720	2,083,200
2	All land in operating drainage enterprises ... acres	32,900	56,400	34,000	7,740	115,645	6,972	48,937	6,640
3	Improved land ... acres	2,598	7,800	7,700	4,043	[2] 9,347	405	673	2,370
4	Per cent of all improved land in farms	23.0	14.2	33.1	31.3	71.7	3.4	3.7	1.4
5	Timber and cut-over land ... acres	23,450	21,700	16,600	3,697	53,540	6,511	25,230	740
6	Other unimproved land ... acres	6,852	26,900	9,700	.....	52,758	56	23,034	3,530
7	Swampy or subject to overflow in enterprises ... acres	120	.....	8,200	.....	42,911	111	24,325	3,955
8	Suffering loss of crops from defective drainage ... acres	150	48	1,956	3,868	2,739	.....	27	1,510
9	Assessed acreage	32,900	56,400	34,000	7,740	115,645	6,972	48,937	6,640
10	Excess over all land in operating enterprises ... acres	.....	.....	.....	.....	.....	.....	.....	.....
	DRAINAGE WORKS.								
	Open ditches:								
11	Completed ... miles	148.0	167.0	26.5	7.3	319.9	24.5	22.2	67.7
12	Additional under construction ... miles	.....	14.0	7.5	0.7	153.4	.....	15.8	28.8
13	Maximum completed in any enterprise ... miles	66.0	124.5	15.3	4.5	166.0	19.5	15.4	42.0
14	Maximum width at bottom of ditch [3] ... feet	50	50	30	24	65	20	40	26
15	Maximum of average depths of outlet ditches [3] ... feet	7.0	8.0	11.0	4.0	15.0	7.0	10.0	10.0
16	Mean depth of branch ditches [3] ... feet	3.0	4.1	5.0	4.0	5.5	5.0	5.8	3.0
	Accessory levees and dikes:								
17	Completed ... miles	.....	.....	.....	.....	23.5	.....	6.7	10.0
18	Additional under construction ... miles	.....	.....	.....	.....	21.0	.....	.....	.....
	Pumping plants:								
19	Engine capacity ... horsepower	.....	.....	.....	.....	.....	.....	.....	45
20	Pump capacity ... gallons per minute	.....	.....	.....	.....	.....	.....	.....	1,000
21	Area served by pumps ... acres	.....	.....	.....	.....	.....	.....	.....	1,500
22	Area drained by open ditches only [3] ... acres	32,900	56,400	34,000	7,740	.....	6,972	3,937	3,640
23	Length of these ditches ... miles	148.0	181.0	34.0	8.0	.....	24.5	10.0	26.5
24	Average length per acre ... feet	23.8	16.9	5.3	5.5	.....	18.6	13.4	38.4
25	Area having open ditches and levees [3] ... acres	.....	.....	.....	.....	115,645	.....	45,000	3,000
26	Length of these ditches ... miles	.....	.....	.....	.....	473.3	.....	28.0	70.0
27	Average length per acre ... feet	.....	.....	.....	.....	21.6	.....	3.3	123.2
28	Length of accessory levees ... miles	.....	.....	.....	.....	44.5	.....	6.7	10.0
	DEVELOPMENT OF LAND.								
29	Improved land in operating enterprises, 1920 ... acres	2,598	7,800	7,700	4,043	[2] 9,347	405	673	2,370
30	Improved land prior to drainage ... acres	614	.....	5,100	1,510	1,000	56	81	.....
31	Increase since drainage ... acres	1,984	7,800	2,600	2,533	8,347	349	592	2,370
32	Per cent of increase	323.1	.....	51.0	167.7	834.7	623.2	730.9	.....
33	Per cent increase is of all improved land in farms, 1920	17.6	14.3	11.2	19.6	64.0	3.0	3.2	1.4
34	Timber and cut-over land, 1920 ... acres	23,450	21,700	16,600	3,697	53,540	6,511	25,230	740
35	Timber and cut-over land prior to drainage ... acres	23,842	21,700	18,300	6,230	57,322	6,860	25,347	880
36	Decrease since drainage ... acres	392	.....	1,700	2,533	3,782	349	117	140
37	Per cent of decrease	1.6	.....	9.3	40.7	6.6	5.1	0.5	15.9
38	Other unimproved land, 1920 ... acres	6,852	26,900	9,700	.....	52,758	56	23,034	3,530
39	Other unimproved land prior to drainage ... acres	8,444	34,700	10,600	.....	57,323	56	23,509	5,760
40	Decrease since drainage ... acres	1,592	7,800	900	.....	4,565	.....	475	2,230
41	Per cent of decrease	18.9	22.5	8.5	.....	8.0	.....	2.0	38.7
42	Swampy or subject to overflow, 1920 ... acres	120	.....	8,200	.....	42,911	111	24,325	3,955
43	Swampy or subject to overflow, prior to drainage ... acres	30,500	53,000	23,200	7,740	50,645	6,972	26,062	5,920
44	Decrease since drainage ... acres	30,380	53,000	15,000	7,740	7,734	6,861	1,737	1,965
45	Per cent of decrease	99.6	100.0	64.7	100.0	15.3	98.4	6.7	33.2
	CAPITAL INVESTED AND COST PER ACRE.								
46	Total capital invested in and required for completion of operating enterprises ... dollars	167,000	355,000	83,000	22,500	4,261,308	52,000	536,310	81,000
47	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	167,000	325,000	67,000	20,000	2,801,308	52,000	306,370	55,000
48	Additional capital required to complete these enterprises ... dollars	.....	30,000	16,000	2,500	1,460,000	.....	229,940	26,000
49	Average cost per acre when completed ... dollars	5.08	6.29	2.44	2.91	36.85	7.46	10.96	12.20
50	Enterprises constructing open ditches only ... dollars	167,000	355,000	83,000	22,500	.....	52,000	22,350	11,000
51	Average cost per acre when completed ... dollars	5.08	6.29	2.44	2.91	.....	7.46	5.68	3.02
52	Enterprises constructing open ditches and levees ... dollars	.....	.....	.....	.....	4,261,308	.....	513,960	70,000
53	Average cost per acre when completed ... dollars	.....	.....	.....	.....	36.85	.....	11.42	23.33
	CROPS.								
	Improved land in enterprises reporting—								
54	Vegetables as principal crop on drained land ... acres	2,582	.....	.....	.....	.....	405	.....	520
55	Potatoes as principal crop on drained land ... acres	.....	7,800	3,200	4,043	.....	.....	585	.....
56	Sugar cane as principal crop on drained land ... acres	.....	.....	.....	.....	1,000	.....	88	.....
57	Citrus fruits as principal crop on drained land ... acres	.....	.....	.....	.....	6,000	.....	.....	.....
58	Other crops as principal ones on drained land ... acres	.....	.....	4,500	.....	2,347	.....	.....	1,850
59	Not reporting crops ... acres	16	.....	.....	.....	.....	.....	.....	.....

[1] Includes only Marion, Santa Rosa, and Sumter Counties.
[2] Estimated total for county.
[3] When works under construction have been completed.

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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS

DRAINAGE : GEORGIA

STATISTICS FOR THE STATE AND ITS COUNTIES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

This bulletin presents the statistics of drainage for Georgia collected at the census of 1920. The figures relate to conditions on January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises may include areas of unimproved land not yet in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner constructs on his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

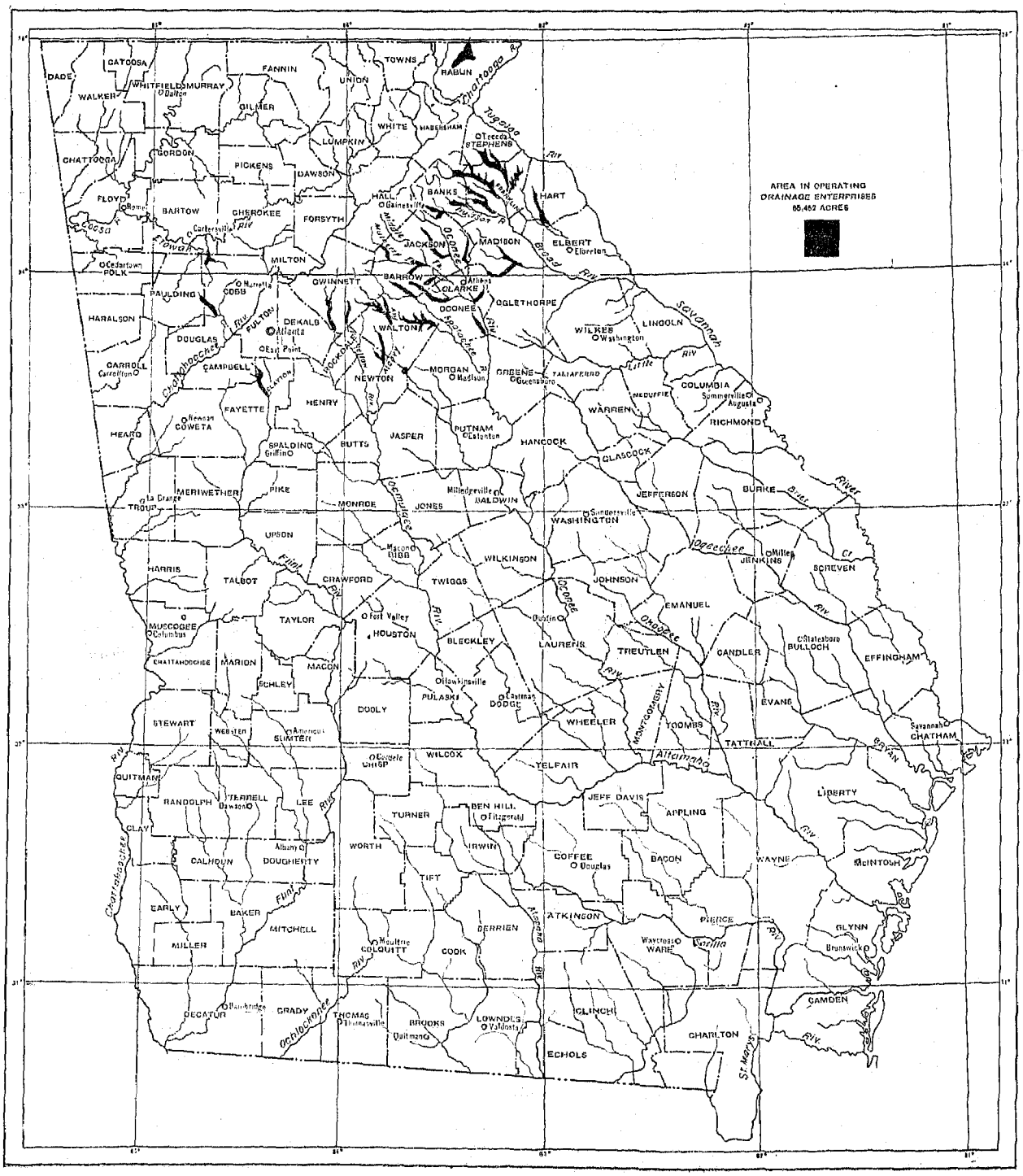
TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	310,732	100.0
Farms reporting land having drainage	15,121	4.9
Farms reporting land needing drainage	34,337	11.1
All land in farms ... acres	25,441,061	100.0
Improved land in farms ... acres	13,055,209	51.3
Farm land reported as provided with drainage ... acres	274,688	1.1
Farm land reported as needing drainage ... acres	1,819,611	7.2
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	37,584,000	100.0
All land in operating drainage enterprises ... acres	65,452	0.2
Improved land ... acres	29,753	0.1
Timber and cut-over land ... acres	10,155	(1)
Other unimproved land ... acres	25,544	0.1
Total capital invested in and required for completion of operating enterprises	$1,098,239	100.0
Capital invested in these enterprises to Dec. 31, 1919	$794,585	72.4
Additional capital required to complete these enterprises	$303,654	27.6

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

GEORGIA

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which are substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, is the acreage actually benefited or made of more value for agricultural purposes by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators have answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual?" Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises, below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter might be any that had completed the original plan of reclamation some years ago but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include districts that on the census date had completed their plans, sold bonds to cover the cost of the undertaking, and let contracts for the construction work, and also districts that had just been established by the drainage court and were still subject to considerable change in area, plan of drainage works, and cost.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.[1]		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	104,006	100.0	$828,681	100.0	$1,231,176
Operating enterprises	65,452	62.9	794,585	95.9	303,654
With works completed	43,723	42.0	614,636	74.2	.....
With works under construction	21,729	20.9	179,949	21.7	303,654
Nonoperating enterprises	38,554	37.1	34,096	4.1	927,522

[1] The inquiry asked for the "total cost of the enterprise to Dec. 31, 1919," and for an "estimate of additional investment to complete."

Location of enterprises.—All the drainage enterprises in Georgia, both operating and nonoperating, are situated in the northern part of the state. The map on page 2 shows the location of the operating enterprises; the nonoperating enterprises are in the same and adjoining counties.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	104,006	100.0	$828,681	100.0	$1,231,176
Operating enterprises	65,452	62.9	794,585	95.9	303,654
Alabama River	1,550	1.5	38,077	4.6	.....
Apalachicola River	2,338	2.2	47,986	5.8	20,000
Savannah River	43,599	41.9	376,701	45.5	156,264
Altamaha River	17,965	17.3	331,821	40.0	127,390
Nonoperating enterprises	38,554	37.1	34,096	4.1	927,522
Apalachicola River	2,582	2.5	3,700	0.4	71,524
Savannah River	6,572	6.3	13,146	1.6	148,982
Altamaha River	29,400	28.3	17,250	2.1	707,016

Condition of land in enterprises.—The drainage enterprises are in the rolling and hilly section of the state, and are for the drainage and protection of the land which is subject to overflow when floods occur in the streams. The areas to be drained usually are long and narrow, and the improvements generally are made by cleaning out or enlarging and straightening the natural watercourses.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms, and to afford relief from overflows for the district as a unit. Therefore the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy or subject to overflow, or land that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total.		Works completed (acres).	Works under construction (acres).	
	Acreage.	Per cent of all land.			
All land in enterprises	65,452	100.0	43,723	21,729	38,554
Improved land	29,753	45.5	25,699	4,054	9,622
Timber and cut-over land	10,155	15.5	3,605	6,550	9,426
Other unimproved land	25,544	39.0	14,419	11,125	19,506
Swampy or subject to overflow	21,951	33.5	3,322	18,629	23,232
Suffering a loss of crops	1,832	2.8	1,832	.....	6,862

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided and the part in each county be considered a separate enterprise. In this way, 46 operating and 27 nonoperating drainage enterprises are counted in Georgia. The average area of the operating enterprises is thus 1,423 acres. There is no overlapping of the enterprises in this state.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	65,452	65,452	100.0
Less than 200 acres	488	488	0.7
200 to 499 acres	2,764	2,764	4.2
500 to 999 acres	11,750	11,750	18.0
1,000 to 4,999 acres	25,205	25,205	38.5
5,000 to 9,999 acres	15,245	15,245	23.3
10,000 to 49,999 acres	10,000	10,000	15.3

Character of enterprises.—With one exception all the drainage enterprises found in Georgia are drainage districts organized under a law approved August 19, 1911 (ch. 265). One enterprise of 10,000 acres was formed by mutual agreement among the landowners who would receive the benefit from the work, and each performed or paid for the excavation of the ditch across his own land.

Drainage districts are established by a special court in each county, comprised of the clerk of the superior court and the board of commissioners of roads and revenues or, if there be no such board, the ordinary of the county. A petition for establishment must be signed by a majority of the landowners resident in the proposed district or by the owners of three-fifths or more of the land. A preliminary investigation as to the practicability and utility of the undertaking is made, before the district is formally established, by a board of three viewers appointed by the drainage court. After the order establishing the district is made the viewers prepare the plan of drainage improvements, assess the damages for which claims are filed, and divide the land into five classes according to the benefits each tract will receive. Public hearings are held by the court upon the viewers' preliminary report and again upon their final report presenting the plan for drainage and the assessments of damages and the classification of the land. Appeals from decisions of the drainage court may be taken to the superior court of the county. A board of three drainage commissioners, appointed by the court after election by the landowners in the district, lets contract for constructing the improvements and administers the other affairs of the district. The cost is apportioned according to the classification of the land, the assessments against the respective classes being, per acre, in the ratio 5:4:3:2:1. Bonds may be issued by the commissioners if the cost exceeds an average of 25 cents per acre on all the land in the district.

A law of August 27, 1879, authorized each county to establish and maintain a system of drainage, and other drainage laws were enacted in 1893 and 1909, but these seem to have been designed for the improvement of sanitary conditions. The drainage law of 1911 has been amended in 1913, 1917, and 1918, but without affecting the character of the enterprises as described.

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 276.8 miles of open ditches, and the additional works under construction on that date were 79.9 miles of ditches. No tile drains were included in the plans of improvement undertaken by the operating enterprises. The figures given do not include drains or levees installed by individual farm owners supplemental to the works of the enterprises nor the works of flood-protection or levee districts that had not undertaken the construction of ditches or tile drains. There are no pumping districts for land drainage in Georgia.

The average depth of the main or outlet ditch was reported for each enterprise. The maximum depth of outlet reported for any enterprise in the state and the maximum in each county are shown in line 15 of County Table II. The maximum length, width, and depth of outlet shown in that table for any county may not refer to the same enterprise.

In County Table II, line 16 shows the mean depth of branch ditches, which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises, as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations.

TABLE 6.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	65,452	100.0
4.0 to 4.9 feet	10,950	16.7
5.0 to 5.9 feet	29,689	45.4
6.0 to 6.9 feet	3,073	4.7
7.0 to 7.9 feet	2,602	4.0
8.0 to 8.9 feet	3,434	5.2
9.0 to 9.9 feet	700	1.1
Not reporting branches	15,004	22.9

Maintenance of works.—The drainage law of 1911 provides that it shall be the duty of the board of drainage commissioners of each district to keep the ditches and other drainage works in good repair, and for that purpose they may levy assessments against the land benefited by the construction of the works in the same manner and in the same proportion as the cost of original construction was apportioned. Individual landowners are liable for the cost of repair work made necessary by their negligence.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All operating enterprises	65,452	100.0	$794,585	100.0	$303,654
By district forces	2,108	3.2	52,205	6.6	.....
By contract	9,659	14.8	194,533	24.5	74,402
By method not specified	11,812	18.0	150,486	18.9	.....
No maintenance provided	18,113	27.7	306,682	38.6	94,284
Not reporting[1]	23,760	36.3	90,679	11.4	134,968

[1] Includes 1 enterprise maintained by landowners.

Date of organization.—The progress in drainage is shown only roughly by the dates of the organization of the enterprises, which are the dates when the districts were established by the drainage court, since there may be a period of a year or more between the decree of establishment and the beginning of actual construction and since the work of construction may occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, including extensions made after the original plan of reclamation was completed.

TABLE 8.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	65,452	100.0	65,452	100.0
1880 to 1889	10,000	15.3	10,000	15.3
1910 to 1914	11,326	17.3	11,326	17.3
1915 to 1919	44,126	67.4	44,126	67.4

TABLE 9.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL INVESTED.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$794,585	100.0	$303,654
1910 to 1914 [1]	140,500	17.7	.....
1915 to 1919	654,085	82.3	303,654

[1] Includes 10,000 acres under individual ownership constructed prior to 1889.

TABLE 10.—DRAINS (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.	
	Miles.	Per cent of total.
All drains	356.7	100.0
1880 to 1889	8.0	2.2
1910 to 1914	48.4	13.6
1915 to 1919	300.3	84.2

Crops.—The principal crop grown upon the drained land in drainage enterprises is corn; the crop of second importance is oats, for all enterprises reporting this item. Data were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

County Table I.—DRAINAGE ON FARMS: 1920.

		The State.	Bacon.	Baker.	Banks.	Barrow.	Bartow.	Berrien.
1	Number of all farms in the state or county	310,732	802	1,407	2,111	1,851	3,091	1,744
2	Farms reporting land having drainage	15,121	53	45	245	38	50	28
3	Farms reporting land needing drainage	34,337	229	84	254	75	288	240
4	Farms in drainage and levee districts	995	.....	.....	70	23	1	.....
	LAND AND FARM AREA.							
5	Approximate land area of the state or county ... acres	37,584,000	173,440	228,480	142,080	107,520	301,440	320,000
6	All land in farms ... acres	25,441,061	114,491	121,236	123,385	80,816	220,980	230,750
7	Improved land in farms ... acres	13,055,209	34,269	85,211	61,449	59,526	123,191	70,457
8	Woodland in farms ... acres	10,491,848	79,196	33,395	53,239	16,138	90,590	150,963
9	Other unimproved land in farms ... acres	1,894,004	1,026	2,630	8,697	5,152	7,199	9,330
10	Farm land reported as provided with drainage ... acres	274,688	2,137	522	2,438	623	956	762
11	Farm land reported as needing drainage ... acres	1,819,611	20,198	4,212	3,830	2,107	9,489	23,466
12	Drainage only ... acres	143,187	2,494	77	252	313	483	280
13	Drainage and clearing ... acres	1,676,424	17,704	4,135	3,578	1,794	9,006	23,186

		Bleckley.	Brooks.	Bryan.	Bulloch.	Burke.	Calhoun.	Camden.	Carroll.
1	Number of all farms in the county	1,255	2,726	792	3,672	4,675	1,442	334	5,436
2	Farms reporting land having drainage	60	131	157	257	84	66	106	296
3	Farms reporting land needing drainage	277	574	326	149	188	91	176	777
4	Farms in drainage and levee districts	.....	.....	1	.....	.....	.....	1	1
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	131,200	328,960	275,840	427,520	611,840	181,760	455,040	314,880
6	All land in farms ... acres	106,091	269,735	163,946	354,015	414,582	123,962	152,900	274,929
7	Improved land in farms ... acres	68,927	141,649	29,024	158,882	274,423	84,631	8,597	163,352
8	Woodland in farms ... acres	34,785	122,383	123,075	166,318	120,368	37,155	125,788	89,356
9	Other unimproved land in farms ... acres	2,379	5,703	11,847	28,815	19,791	2,176	18,515	22,221
10	Farm land reported as provided with drainage ... acres	604	1,308	6,346	2,616	3,221	1,446	3,538	2,708
11	Farm land reported as needing drainage ... acres	14,533	39,479	51,386	8,511	15,080	11,086	33,882	20,666
12	Drainage only ... acres	845	2,779	11,600	597	1,299	1,840	2,958	823
13	Drainage and clearing ... acres	13,688	36,700	39,786	7,914	13,781	9,246	30,924	19,843

		Chatham.	Chattahoochee.	Chattooga.	Cherokee.	Clinch.	Cobb.	Coffee.	Colquitt.
1	Number of all farms in the county	625	425	1,870	2,626	650	3,698	2,049	3,421
2	Farms reporting land having drainage	45	43	28	325	43	106	60	118
3	Farms reporting land needing drainage	89	98	281	258	99	206	277	414
4	Farms in drainage and levee districts	40	1	2	1	.....	53	.....	.....
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	236,800	139,520	209,920	274,560	576,000	225,920	404,480	338,560
6	All land in farms ... acres	104,493	60,742	172,018	213,152	209,317	192,078	297,215	260,496
7	Improved land in farms ... acres	15,510	24,142	92,486	81,518	23,532	110,375	108,892	145,422
8	Woodland in farms ... acres	70,688	33,175	65,376	112,233	164,922	67,838	113,674	108,206
9	Other unimproved land in farms ... acres	18,295	3,425	14,156	19,401	20,863	13,865	74,649	6,868
10	Farm land reported as provided with drainage ... acres	5,515	720	502	1,999	961	1,917	1,475	810
11	Farm land reported as needing drainage ... acres	47,301	8,525	14,022	2,902	10,398	4,211	34,597	16,869
12	Drainage only ... acres	11,594	132	1,956	786	3,010	617	2,897	895
13	Drainage and clearing ... acres	35,707	8,393	12,066	2,116	7,388	3,594	31,700	15,974

		Columbia.	Cook.	Coweta.	Crawford.	Crisp.	Dawson.	Dekalb.	Dooly.
1	Number of all farms in the county	1,914	1,223	3,374	1,369	2,052	845	2,903	2,772
2	Farms reporting land having drainage	172	43	140	162	229	66	99	396
3	Farms reporting land needing drainage	65	396	262	339	248	34	353	856
4	Farms in drainage and levee districts	.....	1	.....	1	1	.....	1	2
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	224,000	154,240	283,520	204,160	177,280	138,240	174,080	254,080
6	All land in farms ... acres	135,308	113,913	215,962	153,390	143,717	88,130	126,000	190,272
7	Improved land in farms ... acres	80,255	50,448	135,225	69,128	97,156	29,329	73,815	138,735
8	Woodland in farms ... acres	46,787	55,473	60,940	69,615	44,145	53,193	42,648	43,387
9	Other unimproved land in farms ... acres	8,266	7,992	19,797	14,647	2,416	5,608	9,537	8,150
10	Farm land reported as provided with drainage ... acres	2,958	813	1,799	4,643	2,541	729	567	5,631
11	Farm land reported as needing drainage ... acres	1,332	22,819	6,403	32,403	7,759	378	7,344	29,540
12	Drainage only ... acres	518	899	499	2,642	488	273	615	2,731
13	Drainage and clearing ... acres	814	21,920	5,904	29,761	7,271	105	6,729	26,809

		Douglas.	Early.	Effingham.	Fannin.	Fayette.	Floyd.	Forsyth.	Franklin.
1	Number of all farms in the county	1,783	3,128	1,176	1,387	2,026	3,516	2,329	3,378
2	Farms reporting land having drainage	375	135	182	246	68	196	200	374
3	Farms reporting land needing drainage	342	238	463	142	113	412	342	432
4	Farms in drainage and levee districts	2	.....	8	3	1	2	3	203
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	133,120	335,360	286,720	256,640	149,760	321,280	158,080	178,560
6	All land in farms ... acres	102,915	225,366	183,724	147,065	97,728	253,389	145,394	142,058
7	Improved land in farms ... acres	50,423	151,917	44,319	36,548	64,848	132,663	72,887	90,578
8	Woodland in farms ... acres	49,041	66,002	138,084	105,574	27,712	98,746	63,956	40,330
9	Other unimproved land in farms ... acres	3,451	7,447	1,321	4,943	5,168	21,980	8,551	11,150
10	Farm land reported as provided with drainage ... acres	9,808	1,687	5,160	2,352	852	4,231	1,117	7,869
11	Farm land reported as needing drainage ... acres	14,236	18,047	39,675	1,726	1,105	15,267	6,485	7,812
12	Drainage only ... acres	327	767	1,490	329	30	1,380	294	1,231
13	Drainage and clearing ... acres	13,909	17,280	38,185	1,397	1,075	13,887	6,191	6,581

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Gilmer.	Gordon.	Gwinnett.	Habersham.	Hall.	Hancock.	Haralson.	Heard.
1	Number of all farms in the county	1,433	2,736	4,460	1,185	2,997	2,772	2,068	2,147
2	Farms reporting land having drainage	137	351	421	106	108	55	213	159
3	Farms reporting land needing drainage	260	392	506	52	189	271	217	121
4	Farms in drainage and levee districts	3	7	115	68	.....	1	.....	12
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	281,600	240,000	281,600	185,600	279,680	339,200	181,760	182,400
6	All land in farms ... acres	180,119	196,262	241,320	109,471	210,431	208,801	141,050	154,824
7	Improved land in farms ... acres	37,240	103,199	123,668	39,265	95,850	121,643	66,009	77,713
8	Woodland in farms ... acres	137,417	81,349	89,765	67,994	97,686	65,669	61,386	66,133
9	Other unimproved land in farms ... acres	5,462	11,714	17,887	2,212	16,895	20,489	13,655	10,978
10	Farm land reported as provided with drainage ... acres	1,255	4,011	2,673	1,528	2,140	1,098	1,576	2,556
11	Farm land reported as needing drainage ... acres	9,590	6,905	7,903	680	6,189	6,275	4,591	2,939
12	Drainage only ... acres	166	1,646	704	174	619	1,151	415	297
13	Drainage and clearing ... acres	9,424	5,259	7,199	456	5,570	5,124	4,176	2,642

		Houston.	Irwin.	Jeff Davis.	Jefferson.	Jenkins.	Laurens.	Lee.	Lincoln.
1	Number of all farms in the county	2,076	1,659	908	3,258	2,119	5,337	1,691	1,668
2	Farms reporting land having drainage	101	193	46	77	188	59	156	127
3	Farms reporting land needing drainage	167	139	118	352	451	330	122	212
4	Farms in drainage and levee districts	.....	.....	23	.....	1	1	.....	.....
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	374,400	241,920	192,000	413,440	218,880	515,840	208,640	186,240
6	All land in farms ... acres	248,581	171,956	139,656	235,331	165,854	370,557	172,048	128,828
7	Improved land in farms ... acres	159,752	89,925	39,637	141,025	84,077	250,278	111,015	56,169
8	Woodland in farms ... acres	82,009	77,228	96,387	81,598	78,135	109,666	53,272	62,770
9	Other unimproved land in farms ... acres	6,820	4,803	3,632	12,708	3,642	10,613	7,761	9,889
10	Farm land reported as provided with drainage ... acres	2,648	3,359	597	1,454	1,583	855	2,320	3,395
11	Farm land reported as needing drainage ... acres	25,354	19,301	9,870	8,015	33,572	8,775	16,098	8,939
12	Drainage only ... acres	238	2,053	181	84	433	346	68	961
13	Drainage and clearing ... acres	25,116	17,248	9,689	7,931	33,139	8,429	16,030	8,038

		Lowndes.	Lumpkin.	Macon.	Marion.	Meriwether.	Milton.	Monroe.	Murray.
1	Number of all farms in the county	2,065	925	1,912	1,059	3,652	1,306	2,958	1,587
2	Farms reporting land having drainage	51	80	22	31	211	132	122	72
3	Farms reporting land needing drainage	502	262	135	87	406	203	231	142
4	Farms in drainage and levee districts	3	.....	1	1	.....	1	.....	.....
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	304,640	179,200	236,160	230,400	317,440	92,800	373,760	218,880
6	All land in farms ... acres	273,927	96,602	216,784	164,552	229,732	78,802	234,897	130,641
7	Improved land in farms ... acres	106,507	27,012	131,637	80,754	147,213	42,141	127,714	56,547
8	Woodland in farms ... acres	121,737	62,367	79,697	68,445	63,024	28,913	83,260	67,120
9	Other unimproved land in farms ... acres	45,683	7,223	5,450	15,353	19,495	7,748	23,923	6,974
10	Farm land reported as provided with drainage ... acres	1,257	1,387	771	1,576	2,194	753	996	1,776
11	Farm land reported as needing drainage ... acres	43,894	12,513	8,563	4,703	8,188	3,762	4,961	3,923
12	Drainage only ... acres	1,652	745	1,426	1,140	383	680	302	568
13	Drainage and clearing ... acres	42,242	11,768	7,137	3,563	7,805	3,082	4,659	3,355

		Newton.	Oglethorpe.	Paulding.	Pickens.	Pierce.	Polk.	Pulaski.	Rabun.
1	Number of all farms in the county	2,439	3,503	2,467	1,162	1,376	2,229	1,435	745
2	Farms reporting land having drainage	186	606	77	60	197	99	157	89
3	Farms reporting land needing drainage	292	508	133	455	236	103	461	34
4	Farms in drainage and levee districts	13	6	.....	1	9	.....	25	.....
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	167,680	322,560	207,360	147,840	330,880	202,880	165,120	241,280
6	All land in farms ... acres	144,313	202,960	166,445	119,769	189,500	145,545	127,049	72,461
7	Improved land in farms ... acres	98,597	122,698	76,340	36,248	51,006	81,679	79,345	19,514
8	Woodland in farms ... acres	31,480	60,461	76,888	79,298	106,549	54,067	41,466	50,353
9	Other unimproved land in farms ... acres	14,236	10,801	12,717	4,223	31,945	9,799	6,238	2,594
10	Farm land reported as provided with drainage ... acres	5,455	16,249	659	554	6,141	2,569	1,494	1,766
11	Farm land reported as needing drainage ... acres	4,855	15,159	1,716	23,220	14,640	3,660	14,200	279
12	Drainage only ... acres	989	1,482	112	157	1,328	628	483	159
13	Drainage and clearing ... acres	3,866	13,677	1,604	23,063	13,312	3,032	13,717	120

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Richmond.	Screven.	Stephens.	Stewart.	Sumter.	Taliaferro.	Taylor.	Telfair.
1	Number of all farms in the county	1,584	3,636	1,348	1,454	3,040	1,553	1,527	1,897
2	Farms reporting land having drainage	29	301	52	167	368	457	243	239
3	Farms reporting land needing drainage	14	407	234	273	369	291	235	324
4	Farms in drainage and levee districts	.....	3	18	.....	1	.....	1	.....
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	204,160	508,160	106,240	263,040	291,840	135,680	217,600	238,720
6	All land in farms ... acres	130,611	331,386	87,530	206,559	263,898	87,413	191,009	175,401
7	Improved land in farms ... acres	70,821	149,428	34,368	106,532	175,117	46,788	84,791	87,055
8	Woodland in farms ... acres	57,328	170,800	47,916	85,325	81,575	33,019	97,779	82,526
9	Other unimproved land in farms ... acres	2,462	11,158	5,246	14,702	7,206	7,606	8,439	5,820
10	Farm land reported as provided with drainage ... acres	756	3,333	529	11,241	6,724	11,913	10,199	10,592
11	Farm land reported as needing drainage ... acres	323	31,306	6,393	17,935	21,131	17,177	22,382	16,726
12	Drainage only ... acres	190	266	72	2,531	1,672	919	1,148	828
13	Drainage and clearing ... acres	133	31,040	6,321	15,404	19,459	16,258	21,234	15,898

		Terrell.	Towns.	Troup.	Twiggs.	Union.	Upson.	Walton.	Ware.
1	Number of all farms in the county	2,469	696	2,781	1,316	1,170	1,753	3,636	874
2	Farms reporting land having drainage	291	62	36	48	217	98	118	145
3	Farms reporting land needing drainage	142	27	117	216	240	50	148	328
4	Farms in drainage and levee districts	1	.....	.....	.....	.....	.....	66	1
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	206,080	115,840	278,400	209,960	207,360	202,880	211,840	493,440
6	All land in farms ... acres	163,088	67,412	207,850	142,619	130,429	146,536	176,011	127,863
7	Improved land in farms ... acres	120,492	22,750	121,932	80,781	35,722	75,964	121,445	31,923
8	Woodland in farms ... acres	29,836	41,707	58,441	56,219	88,480	56,942	41,406	72,641
9	Other unimproved land in farms ... acres	13,360	2,955	27,477	5,619	6,227	13,630	13,160	23,299
10	Farm land reported as provided with drainage ... acres	6,416	762	2,340	1,083	1,968	857	1,115	4,205
11	Farm land reported as needing drainage ... acres	4,159	170	4,473	15,933	2,613	821	3,656	40,731
12	Drainage only ... acres	582	55	688	232	659	368	290	471
13	Drainage and clearing ... acres	3,577	115	3,785	15,701	1,954	453	3,366	40,260

		Washington.	Wayne.	White.	Whitfield.	Wilcox.	Wilkes.	Worth.	All other counties.[1]
1	Number of all farms in the county	4,031	1,406	941	1,852	2,153	3,789	3,605	111,040
2	Farms reporting land having drainage	56	42	283	53	405	149	129	977
3	Farms reporting land needing drainage	544	422	103	74	118	551	183	10,351
4	Farms in drainage and levee districts	2	5	.....	1	1	22	.....	160
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	428,160	504,320	156,800	181,120	257,920	293,120	416,640	13,566,720
6	All land in farms ... acres	310,230	244,677	92,075	157,279	185,833	242,014	259,688	8,918,322
7	Improved land in farms ... acres	196,673	52,753	27,434	78,022	115,816	138,644	167,329	4,736,973
8	Woodland in farms ... acres	77,932	187,307	59,755	70,595	61,544	83,361	69,166	3,411,165
9	Other unimproved land in farms ... acres	35,625	4,617	4,886	8,662	8,473	20,009	23,193	770,184
10	Farm land reported as provided with drainage ... acres	511	949	3,354	915	4,868	2,598	1,225	11,706
11	Farm land reported as needing drainage ... acres	13,890	45,864	2,161	2,636	4,992	18,118	8,648	595,110
12	Drainage only ... acres	598	2,878	303	918	669	493	1,901	39,706
13	Drainage and clearing ... acres	13,292	42,986	1,858	1,718	4,323	17,625	6,747	525,404

[1] No drainage on farms reported in Campbell, Decatur, Echols, Glascock, Harris, McIntosh, Rockdale, Schley, Toombs, and Wheeler Counties.

County Table II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		The State.	Banks.	Barrow.	Cobb.	Franklin.	Gwinnett.
	LAND AREA.						
1	Approximate land area of the state or county ... acres	37,584,000	142,080	107,520	225,920	178,560	281,600
2	All land in operating drainage enterprises ... acres	65,452	5,097	3,274	2,502	21,055	2,692
3	Improved land ... acres	29,753	2,419	889	1,500	5,548	1,661
4	Per cent of all improved land in farms, 1920	0.2	3.9	1.5	1.4	6.1	1.2
5	Timber and cut-over land ... acres	10,155	1,077	433	250	3,797	113
6	Other unimproved land ... acres	25,544	1,601	1,952	752	11,710	918
7	Swampy or subject to overflow, in enterprises ... acres	21,951	2,846	1,823	1,252	9,556	18
8	Suffering loss of crops from defective drainage ... acres	1,832	772	223	.....	.....	2
9	Assessed acreage	65,452	5,097	3,274	2,502	21,055	2,692
10	Excess over all land in operating enterprises ... acres	.....	.....	.....	.....	.....	.....
	DRAINAGE WORKS.						
	Open ditches:						
11	Completed ... miles	276.8	28.5	15.9	16.3	54.5	23.1
12	Additional under construction ... miles	79.9	2.9	12.5	5.2	24.1	4.5
13	Maximum completed in any enterprise ... miles	21.5	8.0	3.5	11.0	21.5	13.5
14	Maximum width at bottom of ditch [1] ... feet	46	46	30	20	45	22
15	Maximum of average depths of outlet ditches [1] ... feet	10.0	8.0	10.0	9.0	9.0	8.0
16	Mean depth of branch ditches [1] ... feet	5.1	4.6	6.7	7.0	5.0	8.0
17	Area drained by open ditches only [1] ... acres	65,452	5,097	3,274	2,502	21,055	2,692
18	Length of these ditches ... miles	356.7	31.4	28.4	21.5	78.6	27.6
19	Average length per acre ... feet	28.8	32.5	45.8	45.4	19.7	54.1
	DEVELOPMENT OF LAND.						
20	Improved land in operating enterprises, 1920 ... acres	29,753	2,419	889	1,500	5,548	1,661
21	Improved land prior to drainage ... acres	7,229	949	238	500	3,491	200
22	Increase since drainage ... acres	22,524	1,470	651	1,000	2,057	1,461
23	Per cent of increase	311.6	154.9	273.5	200.0	58.9	730.5
24	Per cent increase is of all improved land in farms, 1920	0.2	2.4	1.1	0.9	2.3	1.1
25	Timber and cut-over land, 1920 ... acres	10,155	1,077	433	250	3,797	113
26	Timber and cut-over land prior to drainage ... acres	25,081	2,184	721	500	4,749	676
27	Decrease since drainage ... acres	14,926	1,107	288	250	952	563
28	Per cent of decrease	59.5	50.7	39.9	50.0	20.0	83.3
29	Other unimproved land, 1920 ... acres	25,544	1,601	1,952	752	11,710	918
30	Other unimproved land prior to drainage ... acres	33,142	1,964	2,315	1,502	12,815	1,816
31	Decrease since drainage ... acres	7,598	363	363	750	1,105	898
32	Per cent of decrease	22.9	18.5	15.7	49.9	8.6	49.4
33	Swampy or subject to overflow, 1920 ... acres	21,951	2,846	1,823	1,252	9,556	18
34	Swampy or subject to overflow, prior to drainage ... acres	54,092	4,650	2,793	2,502	12,655	2,132
35	Decrease since drainage ... acres	32,141	1,804	970	1,250	3,099	2,114
36	Per cent of decrease	59.4	38.8	34.7	50.0	24.5	99.2
	CAPITAL INVESTED AND COST PER ACRE.						
37	Total capital invested in and required for completion of operating enterprises ... dollars	1,098,239	100,500	94,558	73,000	308,574	53,000
38	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	794,585	100,500	52,570	53,000	182,857	42,000
39	Additional capital required to complete these enterprises ... dollars	303,654	.....	41,988	20,000	125,717	11,000
40	Average cost per acre when completed ... dollars	16.78	19.72	28.88	29.18	14.66	19.69
41	Enterprises constructing open ditches only ... dollars	1,098,239	100,500	94,558	73,000	308,574	53,000
42	Average cost per acre when completed ... dollars	16.78	19.72	28.88	29.18	14.66	19.69
	CROPS.						
43	Improved land in enterprises reporting—						
44	Corn as principal crop on drained land ... acres	29,291	2,216	889	1,500	5,548	1,661
45	Not reporting principal crop on drained land ... acres	462	203	.....	.....	.....	.....

[1] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Hart.	Jackson.	Madison.	Oconee.	Stephens.	Walton.	Other counties.[1]
	LAND AREA.							
1	Approximate land area of the county ... acres	167,040	227,200	181,760	110,080	106,240	211,840	1,553,920
2	All land in operating drainage enterprises ... acres	1,831	4,681	1,372	2,750	3,522	3,232	13,444
3	Improved land ... acres	183	1,442	61	1,385	1,012	2,305	11,348
4	Per cent of all improved land in farms	0.2	1.1	0.1	2.1	2.9	1.9	1.9
5	Timber and cut-over land ... acres	549	2,305	213	523	251	306	338
6	Other unimproved land ... acres	1,099	934	1,098	842	2,259	621	1,758
7	Swampy or subject to overflow, in enterprises ... acres	1,831	3,239	608	438	299	.....	41
8	Suffering loss of crops from defective drainage ... acres	.....	190	.....	438	.....	118	89
9	Assessed acreage	1,831	4,681	1,372	2,750	3,522	3,232	13,444
10	Excess over all land in operating enterprises ... acres	.....	.....	.....	.....	.....	.....	.....
	DRAINAGE WORKS.							
	Open ditches:							
11	Completed ... miles	6.5	19.8	11.6	20.9	7.3	34.5	37.9
12	Additional under construction ... miles	2.1	21.7	6.6	.....	0.3	.....	.....
13	Maximum completed in any enterprise ... miles	6.5	11.5	10.2	7.5	7.2	17.3	8.0
14	Maximum width at bottom of ditch [2] ... feet	16	40	26	20	9	35	26
15	Maximum of average depths of outlet ditches [2] ... feet	5.5	10.0	10.0	8.0	7.0	9.5	10.0
16	Mean depth of branch ditches [2] ... feet	.....	6.3	.....	.....	5.0	5.0	4.0
17	Area drained by open ditches only [2] ... acres	1,831	4,681	1,372	2,750	3,522	3,232	13,444
18	Length of these ditches ... miles	8.6	41.5	18.2	20.9	7.6	34.5	37.9
19	Average length per acre ... feet	24.8	46.8	70.0	40.1	11.4	56.4	14.9
	DEVELOPMENT OF LAND.							
20	Improved land in operating enterprises, 1920 ... acres	183	1,442	61	1,385	1,012	2,305	11,348
21	Improved land prior to drainage ... acres	183	123	31	272	689	124	429
22	Increase since drainage ... acres	.....	1,319	30	1,113	323	2,181	10,919
23	Per cent of increase [3]	.....	.....	.....	409.2	46.9	.....	.....
24	Per cent increase is of all improved land in farms, 1920	.....	1.1	.....	1.7	0.9	1.8	1.8
25	Timber and cut-over land, 1920 ... acres	549	2,305	213	523	251	306	338
26	Timber and cut-over land prior to drainage ... acres	549	2,428	243	1,228	413	769	10,621
27	Decrease since drainage ... acres	.....	123	30	705	162	463	10,283
28	Per cent of decrease	.....	5.1	12.3	57.4	39.2	60.2	96.8
29	Other unimproved land, 1920 ... acres	1,099	934	1,098	842	2,259	621	1,758
30	Other unimproved land prior to drainage ... acres	1,099	2,130	1,098	1,250	2,420	2,339	2,394
31	Decrease since drainage ... acres	.....	1,196	.....	408	161	1,718	636
32	Per cent of decrease	.....	56.2	.....	32.6	6.7	73.5	26.6
33	Swampy or subject to overflow, 1920 ... acres	1,831	3,239	608	438	299	.....	41
34	Swampy or subject to overflow, prior to drainage ... acres	1,831	4,481	1,372	1,770	3,522	3,232	13,152
35	Decrease since drainage ... acres	.....	1,242	764	1,332	3,223	3,232	13,111
36	Per cent of decrease	.....	27.7	55.7	75.3	91.5	100.0	99.7
	CAPITAL INVESTED AND COST PER ACRE.							
37	Total capital invested in and required for completion of operating enterprises ... dollars	37,003	152,581	45,790	48,258	26,398	68,500	90,077
38	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	27,752	78,179	24,494	48,258	26,398	68,500	90,077
39	Additional capital required to complete these enterprises ... dollars	9,251	74,402	21,296	.....	.....	.....	.....
40	Average cost per acre when completed ... dollars	20.21	32.60	33.37	17.55	7.50	21.19	6.70
41	Enterprises constructing open ditches only ... dollars	37,003	152,581	45,790	48,258	26,398	68,500	90,077
42	Average cost per acre, when completed ... dollars	20.21	32.60	33.37	17.55	7.50	21.19	6.70
	CROPS.							
	Improved land in enterprises reporting—							
43	Corn as principal crop on drained land ... acres	.....	1,442	30	1,385	967	2,305	11,348
44	Not reporting principal crop on drained land ... acres	183	.....	31	.....	45	.....	.....

[1] Includes only Bartow, Clarke, Clayton, Fayette, Newton, Oglethorpe, Paulding, and Rabun Counties.
[2] When works under construction have been completed.
[3] Per cent not shown when base is less than 100 or when per cent is more than 1,000.

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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS
SAM. L. ROGERS, DIRECTOR

DRAINAGE : IDAHO

STATISTICS FOR THE STATE AND ITS COUNTIES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

This bulletin presents the statistics of drainage for Idaho collected at the census of 1920. The figures relate to conditions as of January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises include considerable areas of unimproved land not yet in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner constructs on his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

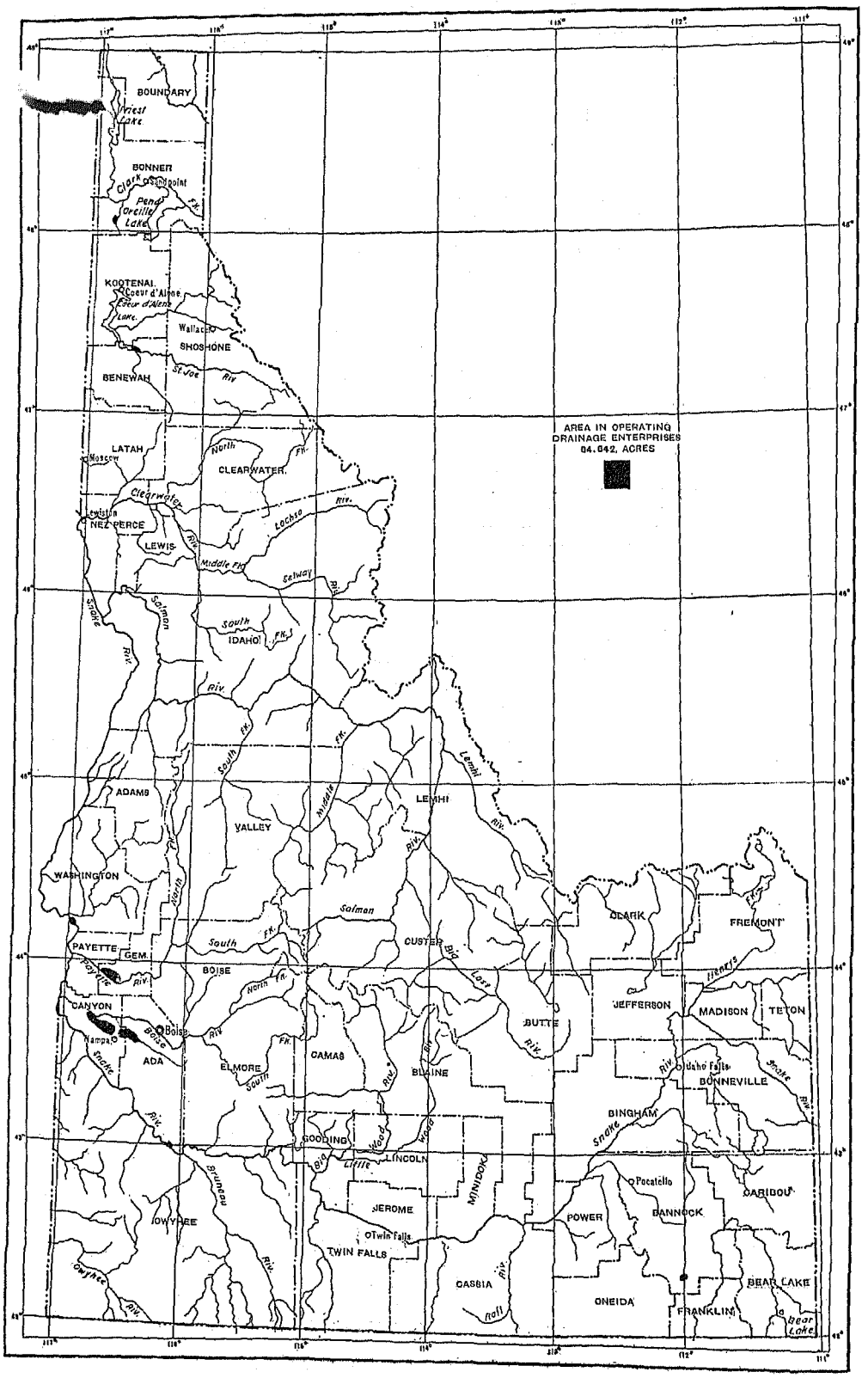
TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	42,106	100.0
Farms reporting land having drainage	1,167	2.8
Farms reporting land needing drainage	2,895	6.9
All land in farms ... acres	8,375,873	100.0
Improved land in farms ... acres	4,511,680	53.9
Farm land reported as provided with drainage ... acres	64,648	0.8
Farm land reported as needing drainage ... acres	199,874	2.4
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	53,346,560	100.0
All land in operating drainage enterprises ... acres	64,642	0.1
Improved land ... acres	52,098	0.1
Timber and cut-over land ... acres	87	(1)
Other unimproved land ... acres	12,457	(1)
Capital invested in and required for completion of operating enterprises	$1,788,569	100.0
Capital invested in these enterprises to Dec. 31, 1919	$1,668,569	93.3
Additional capital required to complete these enterprises	$120,000	6.7

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

IDAHO

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which are substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, is the acreage actually benefited or made of more value for agricultural purposes by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators have answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual." Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises, below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter might be any that had completed the original plan of reclamation some years ago but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include districts that on the census date had completed their plans, sold bonds to cover the cost of the undertaking, and let contracts for the construction work, and also districts that had just been established by court decree and were still subject to considerable change in area, plan of drainage works, and cost.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.[1]		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	78,732	100.0	$1,678,294	100.0	$250,000
Operating enterprises	64,642	82.1	1,668,569	99.4	120,000
With works completed	43,892	55.7	1,237,578	73.7	.....
With works under construction	20,750	26.4	430,991	25.7	120,000
Nonoperating enterprises	14,090	17.9	9,725	0.6	130,000

[1] The inquiry asked for the "total cost of the enterprise to December 31, 1919," and for an "estimate of additional investment to complete."

Location of enterprises.—The greater part of the drainage enterprises in Idaho is located in the southern and southwestern parts of the state, though there are a few in some of the northern counties.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	78,732	100.0	$1,678,294	100.0	$250,000
Operating enterprises	64,642	82.1	1,668,569	99.4	120,000
Snake River	61,310	77.9	1,510,269	90.0	120,000
Clark Fork and Spokane River	3,332	4.2	158,300	9.4	.....
Nonoperating enterprises	14,090	17.9	9,725	0.6	130,000
Snake River	1,090	1.4	.....	.....	30,000
Spokane River	13,000	16.5	9,725	0.6	100,000

Condition of land in enterprises.—In the basin of Clark Fork and Spokane River, the enterprises are for the drainage and protection of lands subject to overflow by streams. With the exception of one small enterprise in Bannock County, all the enterprises in the Snake River basin are to drain and protect land injured or threatened with water-logging and the concentration of salts, commonly called alkali, in the surface soil as a result of irrigation.

For the state, 1,200 acres of irrigated land in drainage districts, 93,500 acres in irrigation districts, and 35,000 acres under the United States Reclamation Service are reported as not having needed drainage, but as having been assessed merely as being responsible for damage to the other lands. These acreages, except the 1,200 acres in drainage districts, are omitted from the tables in this bulletin.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms, and to afford relief from overflows for the district as a unit. Therefore, the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy, subject to overflow, seeped, or alkali, or land that suffers damage to crops, does not show that the improvement works are inadequate. Supplemental work by individual landowners may have been contemplated when the drainage plan of the enterprise was adopted, and that work may not have been done.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total.		Works completed (acres).	Works under construction (acres).	
	Acreage.	Per cent of all land.			
All land in enterprises	64,642	100.0	48,627	16,015	14,090
Improved land	52,098	80.6	46,013	6,085	7,514
Timber and cut-over land	87	0.1	87	.....	1,950
Other unimproved land	12,457	19.3	2,527	9,930	4,626
Swampy, subject to overflow, seeped, and alkali	11,402	17.6	1,472	9,930	3,326
Suffering a loss of crops	164	0.3	64	100	3,101

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided, and the part in each county be considered a separate enterprise. In this way, 13 operating drainage enterprises are counted in Idaho, with an average area of 4,972 acres. There is no overlapping of the enterprises in this state.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	64,642	64,642	100.0
500 to 999 acres	2,472	2,472	3.8
1,000 to 4,999 acres	15,210	15,210	23.5
5,000 to 9,999 acres	6,960	6,960	10.8
10,000 to 49,999 acres	40,000	40,000	61.9

Character of enterprises.—The organized drainage enterprises of Idaho include, besides drainage districts, irrigation districts and United States Reclamation Service projects draining lands within their boundaries.

Drainage districts are established by the district court of the county in which the greater portion of the land is situated, in accordance with the law of February 21, 1913 (ch. 16), as amended in 1915 and in 1919. Petition for establishment must be signed by the owners of at least one-fifth of the acreage in the proposed district. Every district must be "conducive to the public health, convenience, or welfare, or increase the public revenue, or be of special benefit to the majority of the lands included," and the benefits must not be less than the total cost. A board of three drainage commissioners, residents of the county and appointed by the judge of the court, are the executive officers of the district and have exclusive charge of the construction and maintenance of all drainage systems in the district, that are established under this law. The total cost of the enterprise is paid by the landowners in proportion to the benefits their lands will receive, and "high lands shall be considered as being benefited to the extent and in the amount that such lands are responsible for damage to low lands from seepage and saturation by irrigation water."

The petition must state approximately the boundaries of the proposed district, the acreage, and the plan of drainage. After public hearing upon the petition, the judge of the district court may amend the boundaries and establish the district, and appoint the first drainage commissioners. Copy of the decree of establishment is filed with the secretary of state. These commissioners examine the land and report regarding the plan of drainage, area to be benefited, and cost, with award of damages and apportionment of the cost to each tract. After public hearing upon this report, the court may confirm it with any modification deemed equitable. Any person may demand a jury trial upon the damages awarded him or the assessment against his own land. Appeal in regard to benefits and damages may be made to the supreme court of the state. The commissioners may issue bonds to finance the district, not to exceed 90 per cent of the assessments against the land in the district, to run not less than 5 nor more than 20 years. A uniform tax not exceeding $1 per acre may be levied to pay such preliminary expenses as for making the survey and drainage plan and for making the assessments of damages and benefits.

The first drainage district law of this state was passed in 1903, approved March 11. It provided for petition to the board of county commissioners, their favorable finding to be followed by an election upon the question of establishing the district and for choosing the drainage commissioners. In 1912 this law was declared invalid, the requirements for voting at the election being contrary to provisions in the state constitution.

An irrigation district, by the law of February 21, 1917 (ch. 31), may construct drainage works to drain or to protect land in the district, whether the irrigation works have been actually acquired or constructed or not, and to that end has the same power as it has regarding irrigation. The United States Reclamation Service may provide drainage as needed for the reclamation or protection of the lands in its irrigation projects.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919.		Additional required to complete.
			Amount.	Per cent of total.	
All drainage enterprises	78,732	100.0	$1,678,294	100.0	$250,000
Operating enterprises	64,642	82.1	1,668,569	99.4	120,000
Drainage districts	16,082	20.4	214,300	12.8	110,000
Irrigation districts	18,000	22.9	673,389	40.1	10,000
U. S. Reclamation Service	30,000	38.1	778,000	46.3	.....
Individual ownership	560	0.7	2,880	0.2	.....
Nonoperating enterprises	14,090	17.9	9,725	0.6	130,000
Drainage districts	14,090	17.9	9,725	0.6	130,000

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 274.5 miles of open ditches, 1.8 miles of tile drains, and 9.5 miles of accessory levees; the additional lengths under construction were 14.7 miles of open ditches and 1.8 miles of tile drains. These figures do not include drains or levees installed by individual farm owners supplemental to the works of the drainage enterprises, nor the works of flood protection or levee districts that had not undertaken the construction of ditches or tile drains. There are 4 pumping districts in the state, all equipped with 6 centrifugal pumps.

TABL 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All kinds	64,642	100.0	$1,668,569	100.0	$120,000
Open ditches only	39,980	61.8	1,194,171	71.6	10,000
Open ditches and tile drains	22,750	35.2	354,398	21.2	110,000
Open ditches and levees	1,412	2.2	80,000	4.8	.....
Open ditches, tile drains, and levees	500	0.8	40,000	2.4	.....

TABLE 8.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY TYPE OF DRAINAGE: 1920.

TYPE OF DRAINAGE.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All operating enterprises	64,642	100.0	$1,668,569	100.0	$120,000
Gravity drainage only	32,730	50.6	770,569	46.2	120,000
All drainage by pumping	1,412	2.2	60,000	3.6	.....
Part gravity and part pumping	30,500	47.2	838,000	50.2	.....
Total area served by pumps	7,912	12.2	.....	.....	.....

TABLE 9.—PUMPING PLANTS OF OPERATING ENTERPRISES, AND ACREAGE SERVED, CLASSIFIED BY KIND OF POWER: 1920.

KIND OF POWER.	ENGINE CAPACITY.		PUMP CAPACITY.		AREA SERVED.	
	Horsepower.	Per cent of total.	Gallons per minute.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	285	100.0	36,200	100.0	7,912	100.0
Steam	25	8.8	3,000	8.3	900	11.4
Electric	260	91.2	33,200	91.7	7,012	88.6

The average depth of the main or outlet ditch was reported for each enterprise. The maximum reported for any enterprise in the state and the maximum in each county are shown in line 15 of County Table II. The maximum length, width, and depth of outlet shown in that table for any county may not refer to the same enterprise.

In County Table II, line 16 shows the mean depth of branch ditches (open ditches only), which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations.

TABLE 10.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	64,642	100.0
3.0 to 3.9 feet	560	0.9
4.0 to 4.9 feet	912	1.4
5.0 to 5.9 feet	500	0.8
6.0 to 6.9 feet	500	0.8
7.0 to 7.9 feet	.....	.....
8.0 to 8.9 feet	.....	.....
9.0 to 9.9 feet	1,000	1.5
10 feet	47,440	73.4
Not reporting branches	13,730	21.2

Maintenance of works.—The drainage district law requires that annually, on or before January 1, the drainage commissioners estimate the cost of maintenance and repair work for the succeeding year and apportion it against the land in the district in proportion to the maximum benefits originally assessed. These assessments are certified to the county auditor and collected with the general taxes. In irrigation enterprises the drainage works are maintained as a part of the irrigation system.

TABLE 11.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All operating enterprises	64,642	100.0	$1,668,569	100.0	$120,000
By district forces	31,920	49.4	876,300	52.5	.....
By contract	17,500	27.1	648,389	38.9	10,000
No maintenance provided	2,472	3.8	87,880	5.3	.....
Not reporting	12,750	19.7	56,000	3.3	110,000

Date of organization.—The progress in drainage is shown only roughly by the dates of the organization of the enterprises, which are the dates when the districts were established by the courts, since there may be a period of a year or more between the decree of establishment and the beginning of actual construction, and since the work of construction may occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including extensions made after the original plan of reclamation was completed. No drainage enterprises were reported as organized in Idaho earlier than 1912.

TABLE 12.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	64,642	100.0	64,642	100.0
1910–1914	47,000	72.7	47,000	72.7
1915–1919	17,642	27.3	17,642	27.3

TABLE 13.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$1,668,569	100.0	$120,000
1910–1914	1,386,389	83.1	10,000
1915–1919	282,180	16.9	110,000

TABLE 14.—DRAINS AND LEVEES (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		TILE.		LEVEES.	
	Miles.	Per cent of total.	Miles.	Per cent of total.[1]	Miles.	Per cent of total.[1]
All drains and levees	289.2	100.0	3.6	100.0	9.5	100.0
1910–1914	230.6	79.7	0.8	.....	.....	.....
1915–1919	58.6	20.3	2.8	.....	9.5	.....

[1] Per cent not shown when base is less than 100.

Crops.—The principal crops grown upon the drained land in drainage enterprises are alfalfa, grain, and hay other than alfalfa. Data were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified, in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920.

		THE STATE.	Ada.	Bannock.	Bear Lake.	Benewah.	Bonner.	Boundary.
1	Number of all farms in the state or county	42,106	2,198	1,719	825	573	1,051	373
2	Farms reporting land having drainage	1,167	90	32	6	21	127	40
3	Farms reporting land needing drainage	2,895	90	176	33	402	272	139
4	Farms in drainage and levee districts	647	44	19	5	15	20	.....
	LAND AND FARM AREA.							
5	Approximate land area of the state or county ... acres	53,346,560	738,560	1,175,680	627,200	503,040	1,118,720	816,640
6	All land in farms ... acres	8,375,873	293,651	452,710	202,890	118,649	164,366	66,962
7	Improved land in farms ... acres	4,511,680	131,464	270,179	108,466	45,079	35,389	20,311
8	Woodland in farms ... acres	820,876	2,272	6,048	3,939	64,082	103,247	34,548
9	Other unimproved land in farms ... acres	3,043,317	69,915	177,483	90,485	9,488	25,730	12,103
10	Farm land reported as provided with drainage ... acres	64,648	9,024	1,614	561	897	6,161	3,003
11	Farm land reported as needing drainage ... acres	199,874	3,271	7,984	1,102	41,446	25,845	14,812
12	Drainage only ... acres	37,566	2,335	1,824	748	2,506	802	3,595
13	Drainage and clearing ... acres	162,308	936	6,160	354	38,940	25,043	11,217

		Canyon.	Franklin.	Kootenai.	Minidoka.	Payette.	Teton.	Twin Falls.	All other counties.[1]
1	Number of all farms in the county	2,660	910	1,396	1,024	763	541	2,746	25,327
2	Farms reporting land having drainage	342	33	61	16	155	12	63	169
3	Farms reporting land needing drainage	228	90	205	19	92	41	28	1,080
4	Farms in drainage and levee districts	340	8	10	31	19	1	52	83
5	Approximate land area of the county ... acres	378,880	355,840	801,920	483,840	264,960	296,320	1,252,480	44,532,480
6	All land in farms ... acres	199,427	173,790	221,151	91,028	72,254	130,756	276,179	6,001,060
7	Improved land in farms ... acres	157,486	104,241	79,017	68,051	41,054	84,354	232,533	3,134,056
8	Woodland in farms ... acres	7,365	1,547	118,223	2,540	6,152	4,239	1,491	465,183
9	Other unimproved land in farms ... acres	34,576	68,002	23,911	20,437	25,048	42,163	42,155	24,011,821
10	Farm land reported as provided with drainage ... acres	19,249	985	3,231	580	12,219	821	1,049	5,254
11	Farm land reported as needing drainage ... acres	9,404	2,208	13,022	165	2,312	3,100	349	74,854
12	Drainage only ... acres	6,480	1,917	1,418	164	1,457	340	284	13,696
13	Drainage and clearing ... acres	2,924	291	11,604	1	855	2,760	65	61,158

[1] No drainage reported in Butte, Camas, Clark, Custer, and Lincoln Counties.

County Table II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		The State.	Ada.	Benewah.	Canyon.	Gem.	Minidoka.	Payette.	Other counties.[1]
	LAND AREA.								
1	Approximate land area of the state or county ... acres	53,340,560	738,560	503,040	378,880	362,880	483,840	264,960	2,294,400
2	All land in operating drainage enterprises ... acres	64,642	5,800	1,912	12,200	6,960	30,000	5,790	1,980
3	Improved land ... acres	52,098	5,655	1,075	12,165	2,000	29,440	1,000	763
4	Per cent of all improved land in farms ...	1.2	4.3	2.4		3.6	43.3	2.4	0.2
5	Timber and cut-over land ... acres	87		87					
6	Other unimproved land ... acres	12,457	145	750	35	4,960	560	4,790	1,217
7	Swampy, subject to overflow, seeped, and alkali land in enterprises ... acres	11,402	145	912	35	4,960	560	4,790	
8	Suffering loss of crops from defective drainage ... acres	164	100				64		
9	Assessed acreage ... acres	64,642	5,800	1,912	12,200	6,960	30,000	5,790	1,980
10	Excess over all land in enterprises ... acres								
	DRAINAGE WORKS.								
	Open ditches:								
11	Completed ... miles	274.5	41.5	6.0	91.5	4.0	108.0	3.0	20.5
12	Additional under construction ... miles	14.7	0.4		0.2	6.7		7.4	
13	Maximum completed in any enterprise ... miles	108.0	30.6	3.0	77.6	4.0	108.0	2.0	14.5
14	Maximum width at bottom of ditch[2] ... feet	14.0	8.0	6.0	8.0	14.0	10.0	14.0	7.0
15	Maximum of average depths of outlet ditches[2] ... feet	15.0	10.0	6.0	11.0	10.0	15.0	10.0	7.0
16	Mean depth of branch ditches[2] ... feet	5.7	9	4.5	9				
	Tile drains:								
17	Completed ... miles	1.8		1.0	0.8				
18	Additional under construction ... miles	1.8				0.2		1.6	
19	Maximum completed in any enterprise ... miles	1.0		1.0	0.8				
20	Maximum size of tile[2] ... inches	36		18	36			36	
	Accessory levees and dikes:								
21	Completed ... miles	9.5		9.5					
22	Additional under construction ... miles								
	Pumping plants:								
23	Engine capacity ... horsepower	285		135			150		
24	Pump capacity ... gallons per minute	36,200		13,700			22,500		
25	Area served by pumps ... acres	7,912		1,912			6,000		
26	Area drained by open ditches only[2] ... acres	[3] 41,302	5,800	[3] 1,412	2,200		30,000		1,980
27	Length of these ditches ... miles	188.5	41.9	4.0	14.1		108.0	10.4	10.1
28	Average length per acre ... feet	24.0	38.1	15.0	33.8		19.0		26.9
29	Length of the accessory levees ... miles	6.0		6.0					
30	Area drained by open ditches and tile[2] ... acres	[4] 23,250		[4] 500	10,000	6,960		5,790	
31	Length of these drains ... miles	104.3		3.0	78.4	10.9		12.0	
32	Average length per acre ... feet	23.7		31.7	41.4	8.3		10.9	
33	Length of the accessory levees ... miles	3.5		3.5					
	DEVELOPMENT OF LAND.								
34	Improved land, 1920 ... acres	52,098	5,655	1,075	12,165	2,000	29,440	1,000	763
35	Improved land prior to drainage ... acres	24,650		450		800	23,000	400	
36	Increase since drainage ... acres	27,448	5,655	625	12,165	1,200	6,440	600	763
37	Per cent of increase ...	111.4	(6)	138.9	(6)	150.0	28.0	150.0	(6)
38	Per cent increase is of all improved land in farms, 1920 ...	0.6	4.3	1.4	7.7	2.1	9.5	1.5	0.2
39	Timber and cut-over land, 1920 ... acres	87		87					
40	Timber and cut-over land prior to drainage ... acres	97		97					
41	Decrease since drainage ... acres	10		10					
42	Per cent of decrease[5] ...								
43	Other unimproved land, 1920 ... acres	12,457	145	750	35	4,960	560	4,790	1,217
44	Other unimproved land prior to drainage ... acres	39,895	5,800	1,365	12,200	6,160	7,000	5,390	1,980
45	Decrease since drainage ... acres	27,438	5,655	615	12,165	1,200	6,440	600	763
46	Per cent of decrease ...	68.8	97.5	45.1	99.7	19.5	92.0	11.1	38.5
47	Swampy, subject to overflow, seeped, and alkali land, 1920 ... acres	11,402	145	912	35	4,960	560	4,790	
48	Swampy, subject to overflow, seeped, and alkali land prior to drainage ... acres	40,442	5,800	1,912	12,200	6,160	7,000	5,390	1,980
49	Decrease since drainage ... acres	29,040	5,655	1,000	12,165	1,200	6,440	600	1,980
50	Per cent of decrease ...	71.8	97.5	52.3	99.7	19.5	92.0	11.1	100.0
	CAPITAL INVESTED AND COST PER ACRE.								
51	Total capital invested in and required for completion of operating enterprises ... dollars	1,788,569	284,423	120,000	398,966	80,000	778,000	86,000	41,180
52	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	1,668,569	277,565	120,000	395,824	33,333	778,000	22,667	41,180
53	Additional capital required to complete these enterprises ... dollars	120,000	6,858		3,142	46,667		63,333	
54	Average cost per acre when completed ... dollars	27.67	49.04	62.76	32.70	11.49	25.93	14.85	20.80
55	Enterprises constructing open ditches only ... dollars	[6] 1,284,171	284,423	[6] 80,000	100,568		778,000		41,180
56	Average cost per acre when completed ... dollars	31.02	49.04	56.66	45.71		25.93		20.80
57	Enterprises constructing open ditches and tile drains ... dollars	[7] 504,398		[7] 40,000	298,398	80,000		86,000	
58	Average cost per acre when completed ... dollars	21.69		80.00	29.84	11.49		14.85	
	CROPS.								
	Improved land in enterprises reporting—								
59	Alfalfa as principal crop on drained land ... acres	33,360	920			2,000	29,440	1,000	
60	Grain as principal crop on drained land ... acres	17,390	4,735	490	12,165				
61	Hay (except alfalfa) as principal crop on drained land ... acres	1,348		585					763

[1] Includes only Bannock and Bonner Counties.
[2] When works under construction have been completed.
[3] Includes 1,412 acres having open ditches and levees.
[4] Includes 500 acres having open ditches, tile drains, and levees.
[5] Per cent not shown when base is less than 100 or when per cent is more than 1,000.
[6] Includes cost of 6 miles of levees.
[7] Includes cost of 3.5 miles of levees.

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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS

DRAINAGE : ILLINOIS

STATISTICS FOR THE STATE AND ITS COUNTIES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

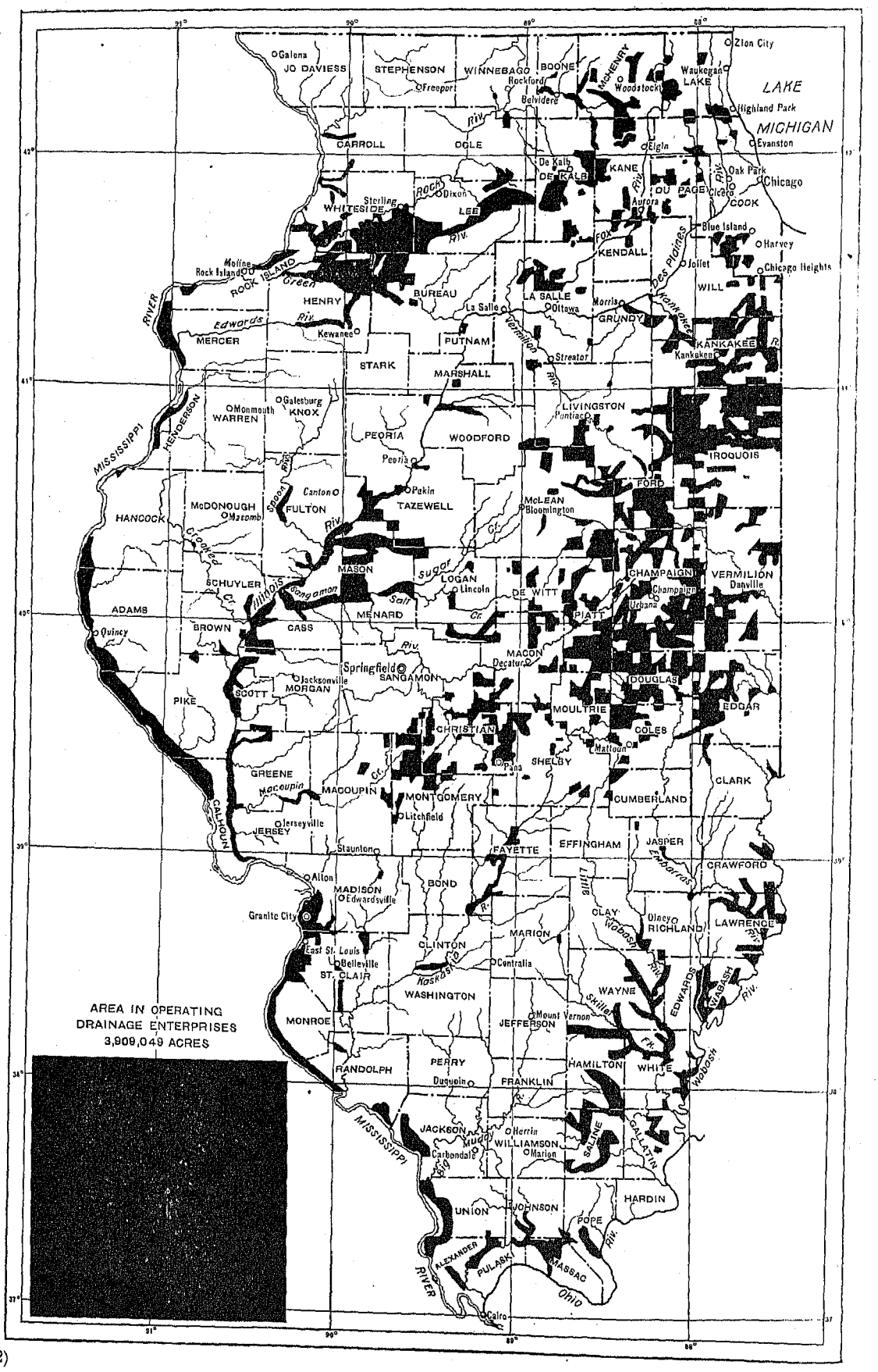
This bulletin presents the statistics of drainage for Illinois collected at the census of 1920. The figures relate to conditions on January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises may include areas of unimproved land not yet in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner installs upon his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are presented separately.

TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	237,181	100.0
Farms reporting land having drainage	99,246	41.8
Farms reporting land needing drainage	33,731	14.2
All land in farms ... acres	31,974,775	100.0
Improved land in farms ... acres	27,294,533	85.4
Farm land reported as provided with drainage ... acres	11,247,637	35.2
Farm land reported as needing drainage ... acres	1,228,739	3.8
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	35,867,520	100.0
All land in operating drainage enterprises ... acres	3,909,049	10.9
Improved land ... acres	3,532,316	9.8
Timber and cut-over land ... acres	184,573	0.5
Other unimproved land ... acres	192,160	0.5
Capital invested in and required for completion of operating enterprises	$51,393,244	100.0
Capital invested in these enterprises to Dec. 31, 1919	$43,595,069	84.8
Additional capital required to complete these enterprises	$7,798,175	15.2

ILLINOIS

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which were substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, includes the acreage actually benefited or made of more value for agricultural purposes, by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual?" Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, any other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those drainage enterprises that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops, which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter may be some that had completed the original plan of improvement several years ago, but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include districts that on the census date had completed their plans, sold bonds to cover the cost of the undertakings, and let contracts for the construction work, and also districts that had just been established and were still subject to considerable change in area, plan of drainage works, and cost.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.[1]		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	3,982,033	100.0	$43,595,069	100.0	$9,199,841
Operating enterprises	3,909,049	98.2	43,595,069	100.0	7,798,175
With works completed	3,430,474	86.1	31,424,167	72.1	.....
With works under construction	478,575	12.0	12,170,902	27.9	7,798,175
Nonoperating enterprises	72,984	1.8	.....	.....	1,401,666

[1] The inquiry asked for the "total cost of the enterprise to Dec. 31, 1919," and for an "estimate of additional investment to complete."

Location of enterprises.—The greatest portions of the land in drainage enterprises are in the eastern and northern parts of the state, though there are many enterprises in the central and southeastern parts and along the Mississippi, as shown by the map on page 2. The pumping districts are almost entirely along Illinois and Mississippi Rivers, below Peoria and from near Rock Island to the vicinity of St. Louis.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	3,982,033	100.0	$43,595,069	100.0	$9,199,841
Operating enterprises	3,909,049	98.2	43,595,069	100.0	7,798,175
Wabash River	884,974	22.2	5,739,404	13.2	303,138
Ohio River	172,367	4.3	1,547,559	3.5	56,600
Illinois River	1,537,539	38.6	16,121,388	37.0	1,162,039
Rock River	488,002	12.3	4,754,557	10.9	369,500
Mississippi River	790,198	19.8	15,107,494	34.7	5,906,898
Lake Michigan	35,969	0.9	324,667	0.7	.....
Nonoperating enterprises	72,984	1.8	.....	.....	1,401,666
Ohio River	16,214	0.4	.....	.....	78,000
Illinois River	53,490	1.3	.....	.....	1,225,676
Rock River	3,280	0.1	.....	.....	97,990

Condition of land in enterprises.—The drainage enterprises situated along and near the larger streams have been organized to secure relief for land subject to inundation by overflow waters. These comprise about 28 per cent of the land in all operating enterprises. The other enterprises are for the reclamation of swampy land or the improvement of land too generally wet for profitable cultivation. Approximately 53 per cent of the land was reported as improved land prior to the organization of the enterprises, and 12 per cent as timbered or cut-over.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms and to afford relief from overflows for the district as a unit. Therefore, the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy or subject to overflow, or land that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total.		Works completed (acres).	Works under construction (acres.)	
	Acreage.	Per cent of all land.			
All land in enterprises	3,909,049	100.0	3,430,474	478,575	72,984
Improved land	3,532,316	90.4	3,232,337	299,979	44,993
Timber and cut-over land	184,573	4.7	101,265	83,308	3,714
Other unimproved land	192,160	4.9	96,872	95,288	24,277
Swampy or subject to overflow	228,337	5.8	98,635	129,702	29,294
Suffering a loss of crops	229,065	5.9	188,167	40,898	13,507

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided, and the part in each county be considered a separate enterprise. In this way 1,365 operating drainage enterprises are counted in Illinois, with an average area of 2,997 acres assessed. Of this number, 75 comprise 10,000 acres or more each, 674 comprise 1,000 to 5,000 acres each, and 181 are smaller than 500 acres each. The assessed acreage exceeds the land in enterprises by 181,550 acres, which is the amount of overlapping.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	3,909,049	4,090,599	100.0
Less than 200 acres	2,680	3,951	0.1
200 to 499 acres	32,153	50,556	1.2
500 to 999 acres	169,207	216,371	5.1
1,000 to 4,999 acres	1,447,948	1,547,003	37.8
5,000 to 9,999 acres	955,019	979,966	23.9
10,000 to 49,999 acres	1,239,709	1,239,719	30.3
50,000 acres and over	62,333	62,333	1.5

The land in enterprises and the assessed acreage on each line of Table 5 refer to the same enterprises. From the total area of each enterprise, designated as the assessed area, the net amount of overlapping with enterprises organized previously was deducted, to determine the area to be tabulated as land in enterprises.

Character of enterprises.—Very nearly all of the drainage enterprises in Illinois are drainage districts organized under either the levee act of 1879 or the farm drainage act of 1885. There are a few other districts organized under similar statutes of earlier dates and under county ditch and sanitary district laws, and there are some drainage undertakings of more than 500 acres each by individual landowners.

The so-called levee act of May 29, 1879, as amended, provides for the formation of "drainage and levee districts" for either drainage or flood protection, or for both. Each enterprise is established by order of the county court upon petition from owners of land to be included in the district, if the improvement works are necessary or will be useful in draining the land for agricultural, sanitary, or mining purposes. Jurisdiction for a district in more than one county lies with the court of the county containing the greatest part of the district. The petition must be signed by a majority of the owners who must own at least one-third of the acreage in the district, or by one-third of the owners who own a majority of the acreage. A preliminary investigation, including surveys and the preparation of a plan of drainage and estimates of cost, is made by three commissioners appointed by the court, who become the corporate authority of the district when the order of establishment has been issued, to secure construction of the drainage works. Public hearings are held by the court to determine the sufficiency of the petition before the commissioners are appointed, and to consider the commissioners' report before the district is established. The order of establishment is appealable to the state supreme court. Benefits and damages are assessed by the commissioners against the tracts of land affected, including railroads, public highways, and municipal corporations, which are confirmed by the county court with any amendments deemed equitable after hearing before a jury impaneled as in eminent domain cases. The cost of the enterprise is apportioned according to the benefits confirmed. Bonds of the district may be issued for not exceeding 90 per cent of the assessments unpaid at the time of issue.

Under the levee act a justice of the peace has concurrent jurisdiction with the county court for districts that will not cost more than $2,000, but the hearings on objections to the assessments of benefits and damages must be held by the county court. Districts may be established by mutual agreement of the owners of all the land to be included, duly recorded in the county drainage record. The agreement may determine the location and character of the drains, the awards of damages, the apportionment of the cost, and the selection of the first commissioners. Subdistricts may be established by the county court in any district maintaining a levee as part of the improvement works, upon confirmation of a special report describing the proposed subdistrict, submitted by the commissioners upon their own initiative or upon petition from the landowners in the subdistrict.

As enacted in 1879, the levee act required that the petition for establishment be signed by a majority of the owners owning at least one-third of the acreage to be included in the district; it did not authorize appeal from the county court's order of establishment; it provided for the assessment of damages and benefits by jury; justices of the peace were given jurisdiction in cases where the cost would not exceed $5,000; and bonds might be issued for the full amount of unpaid assessments.

The act of April 24, 1871, was similar in its principal provisions to the levee act, by which it was repealed in 1879. The districts under it were established by the county court upon petition from the landowners. The court appointed three drainage commissioners to prepare the plan of drainage and estimates of cost, and to secure construction of the drainage works. Benefits and damages were assessed by the commissioner and confirmed by the court after public hearing, or the court might impanel a jury to determine benefits and damages. Small enterprises were established by justices of the peace and administered by the highway commissioners.

The farm drainage act, as it is generally termed, was approved June 27, 1885. As in force on the census date, it provides for the establishment of drainage districts by the town commissioners of highways, upon petition signed as for a district under the levee act, by a majority of the owners who own a third of the land or by a third of the owners who own a majority of the acreage. The highway commissioners secure a survey and estimates for the undertaking. After hearing upon their report, they establish the district if they find favorably or if it then is desired by two-thirds of the owners who own more than half the acreage to be included. The corporate authority after establishment is vested in three drainage commissioners elected by the landowners. These commissioners fix the boundaries of the district, determine the plan of drainage, obtain rights of way by agreement or by proceedings before a justice of the peace, and secure construction of the works. The land is classified according to benefits by the drainage commissioners, the tract to receive greatest benefit being rated 100 per cent and the others in proportion. Hearing upon this classification is held by the commissioners, and their determinations are subject to appeal to the

county court. The cost of the enterprise is apportioned according to the benefits as finally confirmed.

The farm drainage act authorizes the establishment of union drainage districts situated in two towns in one or two counties under township organization, in a manner similar to that for a district in only one town. The petition is filed in the town embracing the greater part of the district, the commissioners before establishment being appointed by the town clerk from the highway commissioners of both towns. Subdistricts may be organized by the landowners in the same manner as main districts, or by the district commissioners upon their own initiative. By petition to the county clerk, the landowners in the subdistrict embracing not less than five sections may elect their own commissioners. Subdistricts may be divided by the commissioners into minor subdistricts for assessment purposes. Districts may be formed by mutual agreement duly recorded in the town drainage record, by the same method as districts by mutual agreement under the levee act. A district may be established to maintain any drain previously constructed by voluntary agreement between two or more landowners, upon petition from any user of the drain, in a manner similar to that described for other districts under the farm drainage act.

Special drainage districts may be formed under this act, comprising land in three or more towns in one or more counties, or all or partly in a county or counties not under township organization. The petition is made to the county court of the county containing the greatest part of the proposed district. The preliminary investigation is made by three commissioners appointed by the court. After establishment the district is managed by three commissioners elected by the landowners, or appointed by the court when there are less than 15 landowners in the district. Classification of the land according to benefits is made by the commissioners, and damages are determined by jury in the county court. Special drainage districts may issue bonds for not more than 90 per cent of the unpaid assessments.

The establishment of a private drain across the land of an objecting owner, when necessary, is authorized by the farm drainage act. Petition must be made to a justice of the peace, who assesses the damages to be paid for constructing the drain or impanels a jury to assess those damages.

As enacted in 1885, the farm drainage act provided that the highway commissioners should continue to be the drainage commissioners after the districts were established, and that damages should be assessed by jury, but did not authorize the election of commissioners in subdistricts nor the formation of minor subdistricts.

The establishment of drainage districts, union districts, and special drainage districts was authorized by a statute approved May 29, 1879, and in force July 1, 1879. The method of organization in each case was very similar to that prescribed by the farm drainage act of 1885, which repealed the earlier law.

County ditches or drains are established in accordance with an act of June 23, 1883. That law provides for the maintenance and improvement of drains constructed by the counties to drain swamp and overflowed land donated to the counties by the state. Each county board is authorized to appoint three district commissioners to divide those drains into proper districts, and to assess the benefits against the land as the basis for apportioning the cost of the work. The county board may also appoint for each district one drainage commissioner to have charge of the work under direction of the board.

Sanitary districts are formed under an act of May 17, 1907. Each must comprise a contiguous area of land subject to overflow within two counties, must include two or more incorporated cities or villages, and must have a population not less than 25,000. Such districts are established by a board of commissioners consisting of the county judge of each county in which the district is located and one circuit judge, after favorable vote by the legal voters of the district. A petition for establishment must be signed by 300 voters in the district. Control of the enterprise is vested in five elected trustees, and the cost is paid by an ad valorem tax on the taxable property in the district.

Circuit courts of the state and superior courts of Cook County were given concurrent jurisdiction with the county courts in all matters relating to farm drainage and levee matters, by an act of June 5, 1909.

The issue of bonds by drainage districts established under any law of the state is authorized by an act of June 15, 1895. Issues made by authority of this act must not exceed 90 per cent of the assessment that has been levied, and petition for the issue must be made by property owners representing a majority of the land in the district.

The first drainage law of Illinois was approved June 22, 1852. It provided for the survey and sale of the swamp land of each county under control of the county court, and the drainage of that land with the proceeds of the sales. An act of February 16, 1865, provided for the establishment of drains by boards of drainage commissioners, consisting of the town commissioners of highways, upon petition from owners of land to be drained. Those commissioners assessed damages and benefits against the land through which the drain would pass, and allotted the work of construction in proportion to the assessed benefits. A large number of other laws relating to drainage have been enacted in this state. Those that affected the character of enterprises have been repealed or are embodied in the foregoing statement.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	3,982,033	100.0	$43,595,069	100.0	$9,199,841
Operating enterprises	3,909,049	98.2	43,595,069	100.0	7,798,175
Levee drainage districts	1,718,628	43.2	23,190,834	53.2	2,583,667
Act of Apr. 24, 1871	10,000	0.3	180,780	0.4	28,000
Act of May 29, 1879	1,708,628	42.9	23,010,054	52.8	2,555,667
Farm drainage districts	2,109,099	53.0	15,388,792	35.3	709,508
Act of May 29, 1879	85,724	2.2	439,632	1.0	.....
Act of June 27, 1885	2,023,375	50.8	14,949,160	34.3	709,508
Special drainage districts	837,454	21.0	7,170,069	16.4	519,500
County ditches	3,780	0.1	10,303	(1)	.....
Sanitary districts	60,000	1.5	4,500,000	10.3	4,500,000
Individual ownerships	17,542	0.4	505,140	1.2	5,000
Nonoperating enterprises	72,984	1.8	.....	.....	1,401,666
Levee drainage district	69,984	1.8	.....	.....	1,365,905
Act of May 29, 1879	69,984	1.8	.....	.....	1,365,905
Farm drainage district	3,000	0.1	.....	.....	35,761
Act of June 27, 1885	3,000	0.1	.....	.....	35,761

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

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 4,754.5 miles of open ditches, 3,507.1 miles of tile drains, and 650.2 miles of levees; the additional lengths under construction were 65.7 miles of open ditches, 127.1 miles of tile drains, and 97.1 miles of levees. These figures do not include drains or levees installed by individual farm owners supplemental to the works of the enterprises, nor the works of flood-protection or levee districts that had not undertaken the construction of ditches or tile drains. There are 49 pumping districts among the operating drainage enterprises in the state, 7 of which comprise land in more than one county. They are all equipped with 107 pumps of 2,843,066 gallons per minute total capacity. All are centrifugal pumps except 2 rotary pumps of 18,000 gallons per minute capacity and 2 of kind not reported having 25,000 gallons per minute estimated capacity.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All kinds	3,909,049	100.0	$43,595,069	100.0	$7,798,175
Open ditches only	1,508,695	38.6	11,280,916	25.9	593,742
Open ditches and levees	452,588	11.6	13,344,715	30.6	6,114,536
Tile drains only	392,738	10.0	3,086,665	7.1	94,732
Tile drains and levees	10,109	0.3	160,000	0.4	.....
Open ditches and tile drains	1,327,996	34.0	10,030,005	23.0	611,865
Open ditches, tile drains, and levees	216,923	5.5	5,692,768	13.1	383,300

The average depth of the main or outlet ditch was reported for each enterprise. The maximum depth of outlet reported for any enterprise in the state and the maximum in each county are shown in line 15 of County Table II. The maximum length, width, and depth of outlet shown in that table for any county may not refer to the same enterprise.

In County Table II, line 16 shows the mean depth of branch ditches (open ditches only), which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations. Depths less than 3 feet and those 10 feet and greater were omitted because it seemed that they did not represent so well the average depths of outlet provided for all the farms in those districts. To include both these groups, computed as 3 feet and 10 feet, respectively, would make the mean depth for the state 5.1 instead of 4.8 feet.

TABLE 8.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY TYPE OF DRAINAGE: 1920.

TYPE OF DRAINAGE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All operating enterprises	3,909,049	100.0	$43,595,069	100.0	$7,798,175
Gravity drainage only	3,583,206	91.7	31,533,478	72.3	2,508,689
All drainage by pumping	157,360	4.0	6,226,386	14.3	582,986
Part gravity and part pumping	168,483	4.3	5,835,205	13.4	4,706,500
Total area served by pumps	291,816	7.5	.....	.....	.....

TABLE 9.—PUMPING PLANTS OF OPERATING ENTERPRISES, AND ACREAGE SERVED, CLASSIFIED BY KIND OF POWER: 1920.

KIND OF POWER.	ENGINE CAPACITY.		PUMP CAPACITY.		AREA SERVED.	
	Horsepower.	Per cent of total.	Gallons per minute.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	18,225	100.0	2,843,066	100.0	291,816	100.0
Steam	5,805	31.9	1,070,900	37.7	137,291	47.0
Electric	10,445	57.3	1,529,666	53.8	134,939	46.2
Internal-combustion	325	1.8	52,500	1.8	4,242	1.5
Steam and electric	[1] 1,650	9.1	190,000	6.7	15,323	5.3

[1] Includes 1,250 steam, 250 electric, and 150 horsepower not divided.

TABLE 10.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	3,909,049	100.0
Less than 3 feet	21,657	0.6
3.0 to 3.9 feet	108,241	2.8
4.0 to 4.9 feet	368,769	9.4
5.0 to 5.9 feet	325,687	8.3
6.0 to 6.9 feet	395,989	10.1
7.0 to 7.9 feet	257,043	6.6
8.0 to 8.9 feet	391,984	10.0
9.0 to 9.9 feet	46,556	1.2
10.0 and more	132,716	3.4
Not reporting branches	1,860,407	47.6

Maintenance of works.—In districts organized under the levee act of 1879, when assessing the benefits for construction the commissioners assess also, if so directed by the court, the annual amount of benefits to each tract from maintenance of the works and from operation of the pumping plants. These assessments for maintenance and operation are reviewed and confirmed in the same manner as the assessments for construction. The annual assessments for maintenance must not exceed, except in pumping districts, an aggregate equivalent to 30 cents per acre on all land in the district. The maintenance assessments may be made or increased in the same manner as assessments for construction, upon petition from the landowners or from the district commissioners.

The drainage works of districts organized under the farm drainage act of 1885 are to be maintained by the commissioners of the respective districts or subdistricts. The commissioners of drainage districts situated in one town may use the district funds for making repairs, and when necessary may levy additional taxes for maintenance. Commissioners of special drainage districts are required to file each year an estimate of the funds required for maintenance, which are assessed in proportion to the benefits assessed for construction. Maintenance in union drainage districts, in subdistricts, and in minor subdistricts is provided as in drainage districts in one town.

The improvement works in sanitary districts under the statute of 1907 are to be maintained by the respective boards of trustees of the districts, who may levy taxes and issue bonds for this purpose.

TABLE 11.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All operating enterprises	3,909,049	100.0	$43,595,069	100.0	$7,798,175
By district forces	1,658,434	42.4	22,252,977	51.0	6,335,988
By contract	1,412,552	36.1	12,205,434	28.0	306,464
By method not specified	197,894	5.1	2,637,740	6.1	34,900
By landowners	9,808	0.3	347,306	0.8	.....
No maintenance provided	356,097	9.1	3,414,637	7.8	160,468
Not reporting	274,264	7.0	2,736,975	6.3	960,355

Date of organization.—The progress in drainage is shown only roughly by the dates of the organization of the enterprises, which are the dates when the orders of establishment were made, since there may be a period of one or more years between the order of establishment and the beginning of actual construction, and since the work of construction may occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including extensions made after the original plan of drainage was completed.

TABLE 12.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	3,909,049	100.0	4,090,599	100.0
1870 to 1879	16,960	0.4	16,960	0.4
1880 to 1889	901,087	23.1	925,911	22.6
1890 to 1899	766,891	19.6	817,588	20.0
1900 to 1904	432,203	11.1	453,287	11.1
1905 to 1909	879,892	22.3	941,796	23.0
1910 to 1914	622,095	15.9	630,756	15.4
1915 to 1919	287,898	7.4	291,958	7.1
Not reported	11,023	0.3	12,343	0.3

TABLE 13.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$43,595,069	100.0	$7,798,175
1870 to 1879	202,467	0.5	.....
1880 to 1889	9,860,927	22.6	787,000
1890 to 1899	5,315,978	12.2	324,500
1900 to 1904	4,201,068	9.6	318,722
1905 to 1909	13,817,447	31.7	5,142,762
1910 to 1914	6,569,847	15.1	199,732
1915 to 1919	3,207,754	7.4	1,025,449
Not reported	419,581	1.0	.....

TABLE 14.—DRAINS AND LEVEES (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		TILE.		LEVEES.	
	Miles.	Per cent of total.	Miles.	Per cent of total.	Miles.	Per cent of total.
All drains and levees	4,820.2	100.0	3,634.2	100.0	747.3	100.0
1870 to 1879	13.9	0.3	1.5	(1)	11.0	1.5
1880 to 1889	1,316.0	27.3	446.2	12.3	152.0	20.3
1890 to 1899	1,001.8	20.8	548.8	15.1	54.2	7.3
1900 to 1904	470.0	9.8	435.8	12.0	125.3	16.8
1905 to 1909	1,052.2	21.8	1,199.7	33.0	208.5	27.9
1910 to 1914	702.2	14.6	599.5	16.5	116.0	15.5
1915 to 1919	243.9	5.1	359.0	9.9	67.8	9.1
Not reported	20.2	0.4	43.7	1.2	12.5	1.7

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

Crops.—The principal crop grown upon the drained land in drainage enterprises is corn, and wheat also is reported as an important crop on this land. Data were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified, in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920.

		THE STATE.	Adams.	Alexander.	Bond.	Boone.	Brown.	Bureau.	Calhoun.	Carroll.
1	Number of all farms in the state or county	237,181	3,844	731	1,948	1,325	1,352	3,203	1,119	1,769
2	Farms reporting land having drainage	99,246	207	58	62	558	193	2,255	21	177
3	Farms reporting land needing drainage	33,731	197	279	62	573	52	644	78	206
4	Farms in drainage and levee districts	14,586	81	41	.....	27	35	321	20	22
	LAND AND FARM AREA.									
5	Approximate land area of the state or county ... acres	35,867,520	538,880	144,640	248,320	187,520	190,080	563,840	163,840	289,920
6	All land in farms ... acres	31,974,775	496,311	96,642	222,239	173,549	177,844	520,064	151,799	270,996
7	Improved land in farms ... acres	27,294,533	373,183	62,371	195,493	143,537	123,179	458,676	83,544	224,774
8	Woodland in farms ... acres	3,102,579	71,916	32,352	19,586	10,386	35,153	43,746	62,845	25,347
9	Other unimproved land in farms ... acres	1,577,663	51,212	1,919	7,160	19,626	19,512	17,642	5,410	20,375
10	Farm land reported as provided with drainage ... acres	11,247,637	13,540	4,668	1,914	28,685	12,549	234,991	1,194	5,339
11	Farm land reported as needing drainage ... acres	1,228,739	10,580	14,282	1,910	17,344	2,273	20,991	4,316	5,466
12	Drainage only ... acres	641,493	7,332	4,186	850	10,927	563	13,084	1,076	3,992
13	Drainage and clearing ... acres	587,246	3,248	10,096	1,060	6,417	1,710	7,907	3,240	1,474

		Cass.	Champaign.	Christian.	Clark.	Clay.	Clinton.	Coles.	Cook.	Crawford.
1	Number of all farms in the county	1,164	3,666	2,782	2,801	2,423	1,794	2,332	5,305	2,248
2	Farms reporting land having drainage	488	3,088	2,227	422	99	98	1,792	2,975	331
3	Farms reporting land needing drainage	157	94	341	401	279	191	302	1,145	413
4	Farms in drainage and levee districts	130	540	330	12	9	72	258	277	33
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	237,440	667,520	448,000	315,520	295,680	309,120	336,000	597,120	289,920
6	All land in farms ... acres	212,416	604,827	416,918	297,153	270,021	266,108	286,191	348,616	248,855
7	Improved land in farms ... acres	167,678	591,086	393,915	242,257	240,023	219,746	258,958	303,470	220,259
8	Woodland in farms ... acres	25,217	9,731	18,150	41,573	26,970	28,420	21,736	23,196	21,149
9	Other unimproved land in farms ... acres	19,521	4,010	4,853	13,323	3,028	17,942	5,497	21,950	7,447
10	Farm land reported as provided with drainage ... acres	63,544	413,233	287,765	22,840	3,447	7,277	204,282	124,653	23,191
11	Farm land reported as needing drainage ... acres	8,342	5,459	14,457	7,056	6,990	4,616	10,109	28,689	10,053
12	Drainage only ... acres	4,681	3,634	5,561	1,640	252	2,479	4,994	21,561	2,301
13	Drainage and clearing ... acres	3,661	1,825	8,896	5,416	6,738	2,137	5,115	7,128	7,752

		Cumberland.	De Kalb.	De Witt.	Douglas.	Du Page.	Edgar.	Edwards.	Effingham.	Fayette.
1	Number of all farms in the county	1,982	2,400	1,586	1,630	1,756	2,407	1,186	2,223	3,676
2	Farms reporting land having drainage	331	2,053	1,399	1,528	1,369	1,788	306	366	612
3	Farms reporting land needing drainage	178	613	189	257	838	393	435	178	358
4	Farms in drainage and levee districts	22	278	13	473	41	244	63	3	92
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	225,920	408,320	265,600	266,880	220,800	397,440	152,320	327,040	466,560
6	All land in farms ... acres	200,061	378,360	247,292	256,301	188,092	365,129	140,204	272,699	405,987
7	Improved land in farms ... acres	178,571	353,691	224,783	245,223	155,663	334,657	126,250	226,414	339,295
8	Woodland in farms ... acres	16,436	12,277	16,156	9,586	18,511	24,294	12,481	35,335	46,041
9	Other unimproved land in farms ... acres	5,054	12,392	6,353	1,492	13,918	6,178	1,473	10,950	20,651
10	Farm land reported as provided with drainage ... acres	14,501	240,170	195,088	229,111	92,500	244,846	15,352	31,284	29,366
11	Farm land reported as needing drainage ... acres	2,803	18,186	7,088	8,575	25,111	11,725	9,196	3,250	10,927
12	Drainage only ... acres	405	10,944	3,808	2,651	14,326	2,922	2,664	587	4,436
13	Drainage and clearing ... acres	2,398	7,242	3,280	5,924	10,785	8,803	6,532	2,663	6,491

		Ford.	Fulton.	Gallatin.	Greene.	Grundy.	Hamilton.	Hancock.	Henderson.	Henry.
1	Number of all farms in the county	1,655	3,532	1,387	2,143	1,506	2,633	3,463	1,204	3,161
2	Farms reporting land having drainage	1,439	1,443	582	797	1,345	148	963	574	1,976
3	Farms reporting land needing drainage	124	401	217	139	451	204	128	85	504
4	Farms in drainage and levee districts	507	118	181	36	52	4	20	50	416
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	320,000	565,760	216,320	329,600	277,120	291,200	499,200	240,640	527,360
6	All land in farms ... acres	295,972	509,953	162,157	320,929	250,993	237,087	462,214	214,206	485,150
7	Improved land in farms ... acres	291,040	364,020	135,878	258,341	224,967	210,798	366,054	172,675	427,642
8	Woodland in farms ... acres	3,971	79,918	24,018	43,027	11,880	22,242	58,987	30,424	24,157
9	Other unimproved land in farms ... acres	961	66,015	2,261	19,561	14,146	4,047	37,173	11,107	33,351
10	Farm land reported as provided with drainage ... acres	256,984	119,605	53,473	77,070	187,164	6,887	74,558	78,935	174,702
11	Farm land reported as needing drainage ... acres	4,678	14,086	9,255	10,553	23,284	7,143	3,327	3,166	17,713
12	Drainage only ... acres	3,041	5,975	5,031	5,759	18,031	1,933	2,480	1,832	13,283
13	Drainage and clearing ... acres	1,637	8,111	4,224	4,794	5,253	5,160	847	1,334	4,430

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Iroquois.	Jackson.	Jasper.	Jersey.	Jo Daviess.	Johnson.	Kane.	Kankakee.	Kendall.
1	Number of all farms in the county	3,953	2,426	2,762	1,368	2,183	1,742	2,248	2,480	1,210
2	Farms reporting land having drainage	3,609	118	340	313	194	45	1,459	2,196	981
3	Farms reporting land needing drainage	758	276	354	87	250	221	1,003	480	294
4	Farms in drainage and levee districts	1,728	126	40	39	1	29	236	546	18
	LAND AND FARM AREA.									
5	Approximate land area of the county ....acres..	717,440	376,320	325,120	234,880	398,720	222,720	337,280	427,520	207,360
6	All land in farms ....acres..	674,323	312,746	296,917	210,688	355,079	193,077	301,574	397,154	190,994
7	Improved land in farms ....acres..	641,090	220,755	268,247	152,002	236,439	138,527	254,383	366,635	173,932
8	Woodland in farms ....acres..	22,496	72,604	25,061	43,857	59,031	45,672	28,587	14,703	10,792
9	Other unimproved land in farms ....acres..	10,737	19,387	3,609	14,829	59,609	8,878	18,604	15,816	6,270
10	Farm land reported as provided with drainage ....acres..	555,813	14,194	20,877	23,387	5,816	1,895	100,126	304,499	130,061
11	Farm land reported as needing drainage ....acres..	64,296	15,676	10,693	3,319	8,644	7,930	32,162	27,866	8,977
12	Drainage only ....acres..	36,744	2,736	3,619	1,236	3,104	2,479	15,447	17,920	4,139
13	Drainage and clearing ....acres..	27,552	12,940	7,074	2,083	5,540	5,451	16,715	9,946	4,838

		Knox.	La Salle.	Lake.	Lawrence.	Lee.	Livingston.	Logan.	McDonough.	McHenry.
1	Number of all farms in the county	2,711	4,213	2,220	1,710	2,593	3,726	2,234	2,728	2,874
2	Farms reporting land having drainage	1,696	3,496	1,531	431	1,870	3,453	1,902	1,889	778
3	Farms reporting land needing drainage	409	897	1,402	444	496	576	324	183	1,399
4	Farms in drainage and levee districts	3	193	184	226	362	258	180	6	143
	LAND AND FARM AREA.									
5	Approximate land area of the county ....acres..	455,040	733,440	291,200	229,120	474,880	667,520	394,880	376,320	396,800
6	All land in farms ....acres..	414,434	668,560	234,800	204,679	432,726	636,957	373,253	355,318	368,765
7	Improved land in farms ....acres..	329,408	603,057	166,928	180,568	392,855	616,725	354,095	289,199	294,352
8	Woodland in farms ....acres..	39,353	45,197	33,475	19,156	16,639	15,206	13,463	37,452	32,982
9	Other unimproved land in farms ....acres..	45,673	20,306	34,397	4,955	23,232	5,026	4,705	28,667	71,431
10	Farm land reported as provided with drainage ....acres..	160,506	472,542	66,346	28,430	240,039	559,913	282,513	194,593	34,078
11	Farm land reported as needing drainage ....acres..	14,706	33,500	47,610	17,847	24,375	21,522	16,724	4,460	52,908
12	Drainage only ....acres..	9,622	25,957	22,206	9,007	18,879	12,872	10,507	1,633	31,620
13	Drainage and clearing ....acres..	5,084	7,543	25,404	8,840	5,496	8,650	6,217	2,827	21,288

		McLean.	Macon.	Macoupin.	Madison.	Marion.	Marshall.	Mason.	Massac.	Menard.
1	Number of all farms in the county	4,309	2,528	3,771	3,454	3,097	1,231	1,558	1,192	1,033
2	Farms reporting land having drainage	3,620	2,120	840	461	66	917	512	39	688
3	Farms reporting land needing drainage	476	247	150	270	388	244	222	266	175
4	Farms in drainage and levee districts	320	144	28	97	1	10	472	66	28
	LAND AND FARM AREA.									
5	Approximate land area of the county ....acres..	762,240	374,400	550,400	471,680	364,160	253,440	355,200	153,600	202,880
6	All land in farms ....acres..	714,400	350,154	509,046	399,140	330,720	225,635	311,412	121,135	186,514
7	Improved land in farms ....acres..	683,847	333,126	397,029	343,720	280,047	185,195	269,064	94,147	165,937
8	Woodland in farms ....acres..	23,340	12,978	69,361	36,321	38,085	29,068	26,264	23,615	13,750
9	Other unimproved land in farms ....acres..	7,213	4,050	42,656	19,099	11,688	11,372	16,084	3,373	6,821
10	Farm land reported as provided with drainage ....acres..	586,887	285,995	64,322	24,770	1,765	108,722	70,927	1,148	86,335
11	Farm land reported as needing drainage ....acres..	17,406	7,645	4,050	7,776	9,090	10,404	20,025	10,667	4,676
12	Drainage only ....acres..	7,616	2,658	1,851	4,785	705	6,780	12,623	4,033	1,483
13	Drainage and clearing ....acres..	9,790	4,987	2,199	2,991	8,385	3,624	7,402	6,634	3,193

		Mercer.	Monroe.	Montgomery.	Morgan.	Moultrie.	Ogle.	Peoria.	Platt.	Pike.
1	Number of all farms in the county	2,022	1,498	3,037	2,420	1,501	2,784	2,499	1,386	3,381
2	Farms reporting land having drainage	1,161	99	646	1,457	1,335	660	1,171	1,310	515
3	Farms reporting land needing drainage	440	52	140	189	228	290	296	104	350
4	Farms in drainage and levee districts	50	90	171	12	29	21	43	391	224
	LAND AND FARM AREA.									
5	Approximate land area of the county ....acres..	345,600	248,960	440,960	368,640	216,320	483,840	407,040	288,640	503,040
6	All land in farms ....acres..	324,787	215,592	408,165	337,657	206,781	450,722	348,711	262,071	475,116
7	Improved land in farms ....acres..	262,227	164,080	357,691	207,178	190,031	382,446	263,761	252,929	375,036
8	Woodland in farms ....acres..	31,156	43,265	44,323	23,293	12,978	32,053	48,925	7,534	63,638
9	Other unimproved land in farms ....acres..	31,404	8,247	6,151	17,186	3,772	36,223	36,025	1,608	36,442
10	Farm land reported as provided with drainage ....acres..	87,401	5,627	54,535	158,123	167,194	51,452	121,737	243,716	32,335
11	Farm land reported as needing drainage ....acres..	11,737	785	6,502	7,997	6,859	10,089	10,902	3,334	10,914
12	Drainage only ....acres..	5,745	437	4,540	5,675	2,022	4,903	5,027	1,352	5,663
13	Drainage and clearing ....acres..	5,992	348	1,962	2,322	4,837	5,126	5,875	1,982	5,251

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Pope.	Pulaski.	Putnam.	Randolph.	Richland.	Rock Island.	St. Clair.	Saline.	Sangamon.
1	Number of all farms in the county	1,587	1,015	533	2,324	1,930	2,045	3,112	2,105	3,425
2	Farms reporting land having drainage	31	191	328	66	128	533	386	453	2,340
3	Farms reporting land needing drainage	34	263	90	200	290	221	501	246	521
4	Farms in drainage and levee districts	9	123	18	56	44	42	81	346	19
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	246,400	121,600	110,720	375,680	228,480	271,360	424,320	255,360	560,640
6	All land in farms ... acres	192,894	99,787	91,262	323,081	205,939	243,773	356,423	204,193	496,782
7	Improved land in farms ... acres	130,447	78,806	67,623	247,433	186,161	178,591	304,430	177,288	461,346
8	Woodland in farms ... acres	52,698	18,588	17,232	58,542	16,961	35,807	39,137	22,420	24,363
9	Other unimproved land in farms ... acres	9,749	2,393	6,407	17,106	2,817	29,375	12,856	4,485	11,073
10	Farm land reported as provided with drainage ... acres	977	11,682	35,991	2,448	3,185	29,432	12,144	33,774	314,126
11	Farm land reported as needing drainage ... acres	749	11,886	3,805	6,045	5,576	6,750	7,593	7,887	26,646
12	Drainage only ... acres	378	1,789	2,418	876	999	3,731	2,050	3,603	19,205
13	Drainage and clearing ... acres	371	10,097	1,387	5,169	4,577	3,019	5,543	4,284	7,441

		Schuyler.	Scott.	Shelby.	Stark.	Stephenson.	Tazewell.	Union.	Vermilion.	Wabash.
1	Number of all farms in the county	1,778	1,089	3,860	1,077	2,794	2,536	2,006	3,587	1,053
2	Farms reporting land having drainage	554	298	1,649	751	466	1,448	160	2,959	466
3	Farms reporting land needing drainage	256	108	210	115	416	344	127	716	214
4	Farms in drainage and levee districts	104	114	83	1	27	184	140	695	185
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	276,480	159,360	494,080	185,600	357,760	414,080	257,920	589,440	140,800
6	All land in farms ... acres	256,633	150,543	452,369	178,399	337,442	383,512	217,765	519,338	128,184
7	Improved land in farms ... acres	177,569	123,690	405,582	157,447	291,795	333,857	150,018	479,152	115,378
8	Woodland in farms ... acres	60,622	16,023	34,978	11,399	20,544	29,976	58,223	31,269	10,896
9	Other unimproved land in farms ... acres	18,442	10,830	11,809	9,553	25,103	19,679	9,524	8,917	1,910
10	Farm land reported as provided with drainage ... acres	53,332	31,153	101,443	79,328	16,354	196,825	14,341	417,698	32,570
11	Farm land reported as needing drainage ... acres	6,260	4,044	6,821	2,895	7,991	10,983	12,824	28,832	4,642
12	Drainage only ... acres	1,603	2,014	4,289	1,572	4,929	2,794	3,363	19,595	1,369
13	Drainage and clearing ... acres	4,657	2,030	2,532	1,323	3,062	8,189	9,461	9,237	3,273

		Warren.	Washington.	Wayne.	White.	Whiteside.	Will.	Winnebago.	Woodford.	All other counties.[1]
1	Number of all farms in the county	1,899	2,357	3,769	2,419	2,789	3,385	2,185	1,903	11,201
2	Farms reporting land having drainage	1,561	18	261	865	879	2,719	299	1,421	28
3	Farms reporting land needing drainage	268	48	336	466	336	972	321	221	306
4	Farms in drainage and levee districts	2	1	113	263	370	209	14	4	3
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	349,440	359,040	469,120	324,480	434,560	540,160	338,560	337,920	1,365,120
6	All land in farms ... acres	318,984	330,136	390,343	283,849	415,559	488,230	292,325	292,978	1,070,915
7	Improved land in farms ... acres	270,602	268,233	349,079	260,061	369,529	431,039	248,081	252,716	891,981
8	Woodland in farms ... acres	30,826	48,060	38,026	17,390	17,829	25,608	28,973	26,391	146,405
9	Other unimproved land in farms ... acres	17,556	13,843	3,238	6,398	28,201	31,583	15,271	13,871	32,529
10	Farm land reported as provided with drainage ... acres	195,371	568	18,408	75,905	73,498	305,211	11,693	196,052	851
11	Farm land reported as needing drainage ... acres	9,720	1,398	29,817	14,711	11,598	34,578	10,215	6,383	11,018
12	Drainage only ... acres	6,771	244	12,561	7,954	8,659	22,194	5,127	1,981	2,469
13	Drainage and clearing ... acres	2,949	1,154	17,256	6,757	2,939	12,384	5,088	4,402	8,549

[1] No drainage on farms reported in Jefferson and Perry Counties.

County Table II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		The State.	Adams.	Alexander.	Boone.	Brown.	Bureau.	Calhoun.	Carroll.	Cass.
	LAND AREA.									
1	Approximate land area of the state or county ... acres..	35,867,520	538,880	144,640	187,520	190,080	563,840	163,840	280,920	237,440
2	All land in operating drainage enterprises ... acres..	3,909,049	56,843	18,875	4,052	7,890	64,788	33,000	4,690	35,109
3	Improved land ... acres..	3,532,316	39,831	13,319	3,955	6,122	63,360	29,700	3,646	26,022
4	Per cent of all improved land in farms ...	12.9	10.7	21.4	2.8	5.0	13.8	35.6	1.6	15.5
5	Timber and cut-over land ... acres..	184,573	15,269	3,886	.....	965	693	1,650	170	1,292
6	Other unimproved land ... acres..	192,160	1,743	1,670	97	803	735	1,650	874	7,795
7	Swampy or subject to overflow, in enterprises ... acres..	228,337	16,028	2,330	194	1,070	2,046	3,300	469	7,219
8	Suffering a loss of crops from defective drainage ... acres..	229,065	3,456	2,330	194	1,070	2,046	3,300	469	939
9	Assessed acreage ...	4,090,599	56,853	18,885	4,052	7,890	64,788	33,000	4,690	35,109
10	Excess over all land in operating enterprises ... acres..	181,550	10	10	.....	.....	.....	.....	.....	.....
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed ... miles..	4,754.5	71.5	32.6	11.0	16.0	105.4	18.0	10.0	52.6
12	Additional under construction ... miles..	65.7	6.5	.....	.....	.....	4.0	.....	.....	1.0
13	Maximum completed in any enterprise ... miles..	80.0	47.0	12.0	8.0	9.0	15.0	18.0	6.0	14.0
14	Maximum width at bottom of ditch [1] ... feet..	100	80	50	25	70	80	80	30	80
15	Maximum of average depths of outlet ditches [1] ... feet..	42.0	30.0	10.0	10.0	12.0	12.0	12.0	12.0	13.0
16	Mean depth of branch ditches [1] ... feet..	4.8	7.0	7.2	6.0	4.9	5.0	8.0	4.3	5.6
	Tile drains:									
17	Completed ... miles..	3,507.1	2.5	.....	5.0	33.3	16.5	.....	.....	2.1
18	Additional under construction ... miles..	127.1	.....	.....	.....	9.6	2.0	.....	.....	.....
19	Maximum completed in any enterprise ... miles..	200.0	2.5	.....	3.0	23.3	2.7	.....	.....	1.0
20	Maximum size of tile [1] ... inches..	48	16	.....	22	24	24	.....	.....	18
	Accessory levees and dikes:									
21	Completed ... miles..	650.2	22.6	19.1	.....	14.3	.....	.....	12.9	0.4
22	Additional under construction ... miles..	97.1	23.4	.....	.....	.....	.....	.....	2.1	.....
	Pumping plants:									
23	Engine capacity ... horsepower..	18,225	1,450	50	.....	225	.....	.....	150	475
24	Pump capacity ... gallons per minute..	2,843,066	141,000	5,500	.....	36,000	.....	.....	31,000	136,000
25	Area served by pumps ... acres..	291,816	38,476	200	.....	7,750	.....	.....	2,800	13,480
26	Area drained by open ditches only [1] ... acres..	1,508,695	14,667	.....	1,940	.....	27,185	33,000	.....	22,476
27	Length of these ditches ... miles..	2,406.7	8.0	.....	8.0	.....	38.8	18.0	.....	20.9
28	Average length per acre ... feet..	8.4	2.9	.....	21.8	.....	7.5	2.9	.....	7.0
29	Area having open ditches and levees [1] ... acres..	452,588	21,976	18,875	.....	1,900	.....	.....	4,690	3,040
30	Length of these ditches ... miles..	559.7	23.0	32.6	.....	5.0	.....	.....	10.0	7.2
31	Average length per acre ... feet..	6.5	5.5	9.1	.....	13.9	.....	.....	11.3	10.4
32	Length of the accessory levees ... miles..	469.1	23.0	19.1	.....	5.0	.....	.....	15.0	5.0
33	Area drained by tile only [1] ... acres..	392,738	.....	.....	712	.....	815	.....	.....	.....
34	Length of these tile ... miles..	1,206.9	.....	.....	3.0	.....	2.7	.....	.....	.....
35	Average length per acre ... feet..	16.2	.....	.....	22.2	.....	17.5	.....	.....	.....
36	Area having tile drains and levees [1] ... acres..	10,109	.....	.....	.....	.....	.....	.....	.....	.....
37	Length of these tile ... miles..	2.0	.....	.....	.....	.....	.....	.....	.....	.....
38	Average length per acre ... feet..	1.0	.....	.....	.....	.....	.....	.....	.....	.....
39	Length of the accessory levees ... miles..	16.0	.....	.....	.....	.....	.....	.....	.....	.....
40	Area drained by open ditches and tile [1] ... acres..	1,327,996	.....	.....	1,400	.....	36,788	.....	.....	3,000
41	Length of these drains ... miles..	3,012.4	.....	.....	5.0	.....	86.4	.....	.....	6.5
42	Average length per acre ... feet..	12.0	.....	.....	18.9	.....	12.4	.....	.....	11.4
43	Area having open ditches, tile drains, and levees [1] ... acres..	216,923	20,200	.....	.....	5,900	.....	.....	.....	5,003
44	Length of these drains ... miles..	1,266.7	49.5	.....	.....	53.9	.....	.....	.....	12.1
45	Average length per acre ... feet..	30.8	12.9	.....	.....	47.5	.....	.....	.....	10.7
46	Length of the accessory levees ... miles..	262.2	23.0	.....	.....	9.3	.....	.....	.....	3.5
	DEVELOPMENT OF LAND.									
47	Improved land in operating enterprises, 1920 ... acres..	3,532,316	39,831	13,319	3,955	6,122	63,360	29,700	3,646	26,022
48	Improved land prior to drainage ... acres..	2,062,521	12,433	10,193	528	3,052	25,586	1,650	985	11,812
49	Increase since drainage ... acres..	1,469,795	27,398	3,126	3,427	3,070	37,774	28,050	2,661	14,210
50	Per cent of increase [2] ...	71.3	220.4	30.7	649.1	100.6	147.6	.....	270.2	120.3
51	Per cent increase is of all improved land in farms, 1920 ...	5.4	7.3	5.0	2.4	2.5	8.2	33.6	1.2	8.5
52	Timber and cut-over land, 1920 ... acres..	184,573	15,269	3,886	.....	965	693	1,650	170	1,292
53	Timber and cut-over land prior to drainage ... acres..	479,498	23,580	5,228	.....	2,036	948	11,550	170	4,082
54	Decrease since drainage ... acres..	294,925	14,311	1,342	.....	1,071	255	9,900	.....	2,790
55	Per cent of decrease ...	61.5	48.4	25.7	.....	52.6	26.9	85.7	.....	68.3
56	Other unimproved land, 1920 ... acres..	192,160	1,743	1,670	97	803	735	1,650	874	7,795
57	Other unimproved land prior to drainage ... acres..	1,367,030	14,830	3,454	3,524	2,802	38,254	19,800	3,535	19,215
58	Decrease since drainage ... acres..	1,174,870	13,087	1,784	3,427	1,999	37,519	18,150	2,661	11,420
59	Per cent of decrease ...	85.9	88.2	51.7	97.2	71.3	98.1	91.7	75.3	59.4
60	Swampy or subject to overflow, 1920 ... acres..	228,337	16,028	2,330	194	1,070	2,046	3,300	469	7,219
61	Swampy or subject to overflow prior to drainage ... acres..	1,864,138	23,740	9,913	3,275	7,378	30,307	16,500	3,535	24,591
62	Decrease since drainage ... acres..	1,635,801	7,712	7,583	3,081	6,308	28,261	13,200	3,066	17,372
63	Per cent of decrease ...	87.8	32.5	76.5	94.1	85.5	93.2	80.0	86.7	70.6
	CAPITAL INVESTED AND COST PER ACRE.									
64	Total capital invested in and required for completion of operating enterprises ... dollars..	51,393,244	2,133,995	371,484	40,500	301,150	883,120	733,488	133,000	859,068
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars..	43,595,069	1,436,995	371,484	40,500	284,250	787,120	733,488	114,000	845,068
66	Additional capital required to complete these enterprises ... dollars..	7,798,175	697,000	.....	.....	16,900	96,000	.....	19,000	5,000
67	Average cost per acre when completed ... dollars..	13.15	37.54	19.68	10.00	38.17	13.63	22.23	28.36	24.21
68	Enterprises constructing open ditches only ... dollars..	11,874,658	325,995	.....	20,000	.....	468,194	733,488	.....	643,036
69	Average cost per acre when completed ... dollars..	7.87	22.23	.....	10.31	.....	17.22	22.23	.....	28.61
70	Enterprises constructing open ditches and levees ... dollars..	19,459,251	1,141,000	371,484	.....	130,000	.....	.....	133,000	86,059
71	Average cost per acre when completed ... dollars..	43.00	51.92	19.68	.....	68.42	.....	.....	28.36	23.64
72	Enterprises constructing tile drains only ... dollars..	3,181,397	.....	.....	5,500	.....	10,758	.....	.....	.....
73	Average cost per acre when completed ... dollars..	8.10	.....	.....	7.72	.....	13.20	.....	.....	.....
74	Enterprises constructing tile drains and levees ... dollars..	160,000	.....	.....	.....	.....	.....	.....	.....	.....
75	Average cost per acre when completed ... dollars..	15.83	.....	.....	.....	.....	.....	.....	.....	.....
76	Enterprises constructing open ditches and tile drains ... dollars..	10,641,870	.....	.....	15,000	.....	404,168	.....	.....	35,249
77	Average cost per acre when completed ... dollars..	8.01	.....	.....	10.71	.....	10.99	.....	.....	11.75
78	Enterprises constructing open ditches, tile drains, and levees ... dollars..	6,076,068	667,000	.....	.....	171,150	.....	.....	.....	85,724
79	Average cost per acre when completed ... dollars..	28.01	33.02	.....	.....	28.57	.....	.....	.....	14.30
	CROPS.									
	Improved land in enterprises reporting—									
80	Corn as principal crop on drained land ... acres..	3,404,489	39,831	13,319	3,955	6,122	63,360	29,700	3,646	18,268
81	Wheat as principal crop on drained land ... acres..	88,520	.....	.....	.....	.....	.....	.....	.....	7,754
82	Potatoes as principal crop on drained land ... acres..	28,723	.....	.....	.....	.....	.....	.....	.....	.....
83	Vegetables as principal crop on drained land ... acres..	5,380	.....	.....	.....	.....	.....	.....	.....	.....
84	Not reporting principal crop on drained land ... acres..	5,204	.....	.....	.....	.....	.....	.....	.....	.....

[1] When works under construction have been completed.

[2] Per cent not shown when more than 1,000.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Champaign.	Christian.	Clark.	Clay.	Clinton.	Coles.	Cook.	Crawford.	Cumberland.	De Kalb.
	LAND AREA.										
1	Approximate land area of the county ... acres	667,520	448,000	315,520	295,680	309,120	336,000	597,120	289,920	225,920	408,320
2	All land in operating drainage enterprises ... acres	331,646	110,129	5,344	6,080	8,303	65,595	37,532	17,589	7,207	46,900
3	Improved land ... acres	327,787	108,690	4,810	5,350	7,955	65,132	35,373	15,604	6,494	38,100
4	Per cent of all improved land in farms	55.5	27.6	2.0	2.2	3.6	25.2	11.7	7.1	3.6	10.8
5	Timber and cut-over land ... acres	1,899	.....	174	730	348	450	531	1,985	43	.....
6	Other unimproved land ... acres	1,960	1,439	360	.....	.....	13	1,628	.....	670	8,800
7	Swampy or subject to overflow, in enterprises ... acres	2,527	2,503	736	3,648	1,060	695	2,340	6,055	10	1,222
8	Suffering a loss of crops from defective drainage ... acres	1,678	2,503	736	3,648	1,060	695	2,340	6,055	10	563
9	Assessed acreage	441,367	110,129	5,344	6,080	8,303	66,145	37,532	17,589	7,207	46,900
10	Excess over all land in operating enterprises ... acres	109,721	.....	.....	.....	.....	550	.....	.....	.....	.....
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	408.7	112.8	6.3	8.1	29.5	24.9	65.4	23.8	11.7	72.9
12	Additional under construction ... miles	6.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
13	Maximum completed in any enterprise ... miles	27.5	16.0	2.5	8.1	16.0	4.5	9.0	9.5	3.0	10.0
14	Maximum width at bottom of ditch [1] ... feet	50	100	16	16	16	12	20	30	10	40
15	Maximum of average depths of outlet ditches [1] ... feet	12.0	12.0	9.0	12.0	6.0	10.0	11.0	15.0	6.0	8.0
16	Mean depth of branch ditches [1] ... feet	6.0	3.9	4.4	.....	3.0	4.0	4.7	7.0	4.3	6.0
	Tile drains:										
17	Completed ... miles	386.1	243.8	7.4	.....	.....	36.5	44.4	13.5	2.7	45.8
18	Additional under construction ... miles	11.1	.....	.....	.....	.....	2.1	.....	.....	.....	.....
19	Maximum completed in any enterprise ... miles	41.0	9.8	7.1	.....	.....	6.6	9.0	10.1	1.7	6.0
20	Maximum size of tile [1] ... inches	32	30	12	.....	.....	36	32	24	16	30
	Accessory levees and dikes:										
21	Completed ... miles	.....	3.5	0.8	.....	11.5	.....	.....	.....	.....	.....
22	Additional under construction ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:										
23	Engine capacity ... horsepower	.....	.....	.....	.....	50	.....	.....	.....	.....	.....
24	Pump capacity ... gallons per minute	.....	.....	.....	.....	10,000	.....	.....	.....	.....	.....
25	Area served by pumps ... acres	.....	.....	.....	.....	600	.....	.....	.....	.....	.....
26	Area drained by open ditches only [1] ... acres	130,190	11,438	1,820	6,080	.....	46,056	13,282	6,850	3,236	35,833
27	Length of these ditches ... miles	233.8	32.0	2.1	8.1	.....	12.6	24.9	10.8	5.1	54.8
28	Average length per acre ... feet	9.5	14.8	6.1	7.0	.....	1.4	9.9	8.3	8.3	8.1
29	Area having open ditches and levees [1] ... acres	.....	.....	.....	.....	8,303	.....	.....	.....	.....	.....
30	Length of these ditches ... miles	.....	.....	.....	.....	29.5	.....	.....	.....	.....	.....
31	Average length per acre ... feet	.....	.....	.....	.....	18.8	.....	.....	.....	.....	.....
32	Length of the accessory levees ... miles	.....	.....	.....	.....	11.5	.....	.....	.....	.....	.....
33	Area drained by tile only [1] ... acres	30,167	42,225	.....	.....	.....	2,928	3,645	.....	.....	3,300
34	Length of these tile ... miles	212.4	139.4	.....	.....	.....	11.6	30.8	.....	.....	27.0
35	Average length per acre ... feet	37.2	17.4	.....	.....	.....	20.9	44.6	.....	.....	43.2
36	Area having tile drains and levees [1] ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
37	Length of these tile ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
38	Average length per acre ... feet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
39	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
40	Area drained by open ditches and tile [1] ... acres	171,289	55,966	1,624	.....	.....	16,611	20,605	10,739	3,971	7,767
41	Length of these drains ... miles	365.7	181.5	2.0	.....	.....	39.3	54.1	26.5	9.3	36.9
42	Average length per acre ... feet	11.3	17.1	6.5	.....	.....	12.5	13.9	13.0	12.4	25.1
43	Area having open ditches, tile drains, and levees [1] ... acres	.....	500	1,900	.....	.....	.....	.....	.....	.....	.....
44	Length of these drains ... miles	.....	3.7	9.6	.....	.....	.....	.....	.....	.....	.....
45	Average length per acre ... feet	.....	39.1	26.7	.....	.....	.....	.....	.....	.....	.....
46	Length of the accessory levees ... miles	.....	3.5	0.8	.....	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.										
47	Improved land in operating enterprises, 1920 ... acres	327,787	108,690	4,810	5,350	7,955	65,132	35,373	15,604	6,494	38,100
48	Improved land prior to drainage ... acres	250,271	66,603	2,341	4,864	3,947	64,045	18,884	10,247	5,489	22,099
49	Increase since drainage ... acres	77,516	42,087	2,469	486	4,008	1,087	16,489	5,357	1,005	16,001
50	Per cent of increase	31.0	63.2	105.5	10.0	101.5	1.7	87.3	52.3	18.3	72.4
51	Per cent increase is of all improved land in farms, 1920	13.1	10.7	1.0	0.2	1.8	0.4	5.4	2.4	0.6	4.5
52	Timber and cut-over land, 1920 ... acres	1,899	.....	174	730	348	450	531	1,985	43	.....
53	Timber and cut-over land prior to drainage ... acres	11,626	.....	407	1,216	1,150	1,420	705	5,906	133	.....
54	Decrease since drainage ... acres	9,727	.....	233	486	802	970	174	3,921	90	.....
55	Per cent of decrease	83.7	.....	57.2	40.0	69.7	68.3	24.7	66.4	67.7	.....
56	Other unimproved land, 1920 ... acres	1,960	1,439	360	.....	.....	13	1,628	.....	670	8,800
57	Other unimproved land prior to drainage ... acres	69,749	43,526	2,596	.....	3,206	130	17,943	1,436	1,585	24,801
58	Decrease since drainage ... acres	67,789	42,087	2,236	.....	3,206	117	16,315	1,436	915	16,001
59	Per cent of decrease	97.2	96.7	86.1	.....	100.0	90.0	90.9	100.0	57.7	64.5
60	Swampy or subject to overflow, 1920 ... acres	2,527	2,503	736	3,648	1,060	695	2,340	6,055	10	1,222
61	Swampy or subject to overflow prior to drainage ... acres	111,804	44,906	4,125	4,864	5,239	26,495	16,223	9,637	3,114	20,496
62	Decrease since drainage ... acres	109,277	42,403	3,389	1,216	4,179	25,800	13,883	3,582	3,104	19,274
63	Per cent of decrease	97.7	94.4	82.2	25.0	79.8	97.4	85.6	37.2	99.7	94.0
	CAPITAL INVESTED AND COST PER ACRE.										
64	Total capital invested in and required for completion of operating enterprises ... dollars	2,151,932	601,798	57,562	38,677	158,894	371,410	366,169	139,909	45,161	385,667
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	2,057,536	601,798	57,562	38,677	158,894	332,512	366,169	139,909	45,161	385,667
66	Additional capital required to complete these enterprises ... dollars	94,396	.....	.....	.....	.....	38,898	.....	.....	.....	.....
67	Average cost per acre when completed ... dollars	6.49	5.46	10.77	6.36	19.14	5.66	9.76	7.95	6.27	8.22
68	Enterprises constructing open ditches only ... dollars	634,785	46,200	10,180	38,677	.....	102,712	115,500	41,000	19,527	236,667
69	Average cost per acre when completed ... dollars	4.88	4.04	5.59	6.36	.....	2.23	8.70	5.99	6.03	6.60
70	Enterprises constructing open ditches and levees ... dollars	.....	.....	.....	.....	158,894	.....	.....	.....	.....	.....
71	Average cost per acre when completed ... dollars	.....	.....	.....	.....	19.14	.....	.....	.....	.....	.....
72	Enterprises constructing tile drains only ... dollars	481,472	241,890	.....	.....	.....	48,900	63,920	.....	.....	56,000
73	Average cost per acre when completed ... dollars	15.96	5.73	.....	.....	.....	16.70	17.54	.....	.....	16.97
74	Enterprises constructing tile drains and levees ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
75	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
76	Enterprises constructing open ditches and tile drains ... dollars	1,035,675	293,708	7,382	.....	.....	219,789	186,749	98,909	25,634	93,000
77	Average cost per acre when completed ... dollars	6.05	5.25	4.55	.....	.....	13.23	9.06	9.21	6.46	11.97
78	Enterprises constructing open ditches, tile drains, and levees ... dollars	.....	20,000	40,000	.....	.....	.....	.....	.....	.....	.....
79	Average cost per acre when completed ... dollars	.....	40.00	21.05	.....	.....	.....	.....	.....	.....	.....
	CROPS.										
	Improved land in enterprises reporting—										
80	Corn as principal crop on drained land ... acres	284,212	108,690	4,810	.....	4,863	65,132	32,993	9,192	6,494	38,100
81	Wheat as principal crop on drained land ... acres	14,852	.....	.....	5,350	3,092	.....	.....	6,412	.....	.....
82	Potatoes as principal crop on drained land ... acres	28,723	.....	.....	.....	.....	.....	.....	.....	.....	.....
83	Vegetables as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	2,380	.....	.....	.....
84	Not reporting principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		De Witt.	Douglas.	Du Page.	Edgar.	Edwards.	Fayette.	Ford.	Fulton.	Gallatin.	Greene.
	LAND AREA.										
1	Approximate land area of the county ... acres	265,600	266,880	220,800	397,440	152,320	466,560	320,000	565,760	216,320	329,600
2	All land in operating drainage enterprises ... acres	36,200	155,823	15,019	63,442	9,011	40,562	136,175	27,194	22,176	36,548
3	Improved land ... acres	36,184	155,525	13,915	60,531	7,752	28,543	113,953	17,354	19,947	28,699
4	Per cent of all improved land in farms	16.1	63.4	8.9	18.1	6.1	8.4	39.2	4.8	14.7	11.1
5	Timber and cut-over land ... acres	16	.....	.....	525	1,259	11,885	722	3,290	2,229	2,409
6	Other unimproved land ... acres	.....	298	1,104	2,386	.....	134	21,500	6,550	.....	5,440
7	Swampy or subject to overflow, in enterprises ... acres	466	236	1,157	.....	7,752	7,363	2,111	8,444	1,715	525
8	Suffering a loss of crops from defective drainage ... acres	466	236	1,150	.....	7,752	5,341	2,111	1,014	1,715	525
9	Assessed acreage	36,200	164,823	15,019	63,442	9,011	40,562	137,095	27,194	22,176	36,548
10	Excess over all land in operating enterprises ... acres	.....	9,000	.....	.....	.....	.....	920	.....	.....	.....
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	10.4	127.1	13.2	44.9	18.9	50.9	117.7	42.7	32.5	54.5
12	Additional under construction ... miles	.....	.....	.....	.....	.....	.....	.....	3.8	.....	.....
13	Maximum completed in any enterprise ... miles	5.5	12.5	6.0	7.6	12.6	11.0	24.0	7.0	14.0	19.0
14	Maximum width at bottom of ditch[1] ... feet	20	24	20	6	35	30	50	40	25	60
15	Maximum of average depths of outlet ditches[1] ... feet	8.0	10.0	7.0	9.0	12.0	10.0	11.0	12.0	20.0	12.0
16	Mean depth of branch ditches[1] ... feet	.....	6.3	.....	3.7	5.8	7.1	5.6	7.1	5.9	7.3
	Tile drains:										
17	Completed ... miles	44.9	107.4	28.6	92.5	.....	22.3	64.1	108.8	2.1	335.0
18	Additional under construction ... miles	.....	.....	4.9	.....	.....	.....	.....	1.5	.....	.....
19	Maximum completed in any enterprise ... miles	9.5	9.2	5.6	11.2	.....	10.0	13.0	75.0	2.1	200.0
20	Maximum size of tile[1] ... inches	40	30	30	30	.....	24	48	32	14	18
	Accessory levees and dikes:										
21	Completed ... miles	.....	.....	.....	.....	.....	19.0	5.0	35.3	.....	57.4
22	Additional under construction ... miles	.....	.....	.....	.....	.....	.....	.....	17.8	.....	1.2
	Pumping plants:										
23	Engine capacity ... horsepower	.....	.....	.....	.....	.....	.....	.....	1,175	.....	3,140
24	Pump capacity ... gallons per minute	.....	.....	.....	.....	.....	.....	.....	204,500	.....	424,000
25	Area served by pumps ... acres	.....	.....	.....	.....	.....	.....	.....	22,885	.....	35,723
26	Area drained by open ditches only[1] ... acres	1,600	29,160	3,300	6,139	9,011	9,623	26,405	.....	21,359	1,260
27	Length of these ditches ... miles	2.6	60.2	11.0	9.3	18.9	14.3	36.7	.....	32.5	1.5
28	Average length per acre ... feet	8.6	10.9	17.6	8.0	11.1	7.8	7.3	.....	8.0	6.3
29	Area having open ditches and levees[1] ... acres	.....	.....	.....	.....	.....	15,000	9,900	7,500	.....	20,325
30	Length of these ditches ... miles	.....	.....	.....	.....	.....	11.0	9.5	13.5	.....	26.0
31	Average length per acre ... feet	.....	.....	.....	.....	.....	3.9	5.1	9.5	.....	6.8
32	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	15.0	5.0	16.2	.....	35.0
33	Area drained by tile only[1] ... acres	23,093	44,563	8,603	12,411	.....	.....	7,330	.....	817	.....
34	Length of these tile ... miles	36.6	104.8	25.9	29.0	.....	.....	13.5	.....	2.1	.....
35	Average length per acre ... feet	8.4	12.4	15.9	12.3	.....	.....	9.7	.....	13.6	.....
36	Area having tile drains and levees[1] ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
37	Length of these tile ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
38	Average length per acre ... feet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
39	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
40	Area drained by open ditches and tile drains[1] ... acres	11,507	82,100	3,116	44,892	.....	11,200	92,540	3,600	.....	.....
41	Length of these drains ... miles	16.1	159.5	9.8	99.1	.....	32.9	122.1	3.9	.....	.....
42	Average length per acre ... feet	7.4	10.3	16.6	11.7	.....	15.5	7.0	5.7	.....	.....
43	Area having open ditches, tile drains, and levees[1] ... acres	.....	.....	.....	.....	.....	4,739	.....	16,094	.....	14,963
44	Length of these drains ... miles	.....	.....	.....	.....	.....	15.0	.....	130.4	.....	362.0
45	Average length per acre ... feet	.....	.....	.....	.....	.....	16.7	.....	45.7	.....	127.7
46	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	4.0	.....	36.9	.....	23.6
	DEVELOPMENT OF LAND.										
47	Improved land in operating enterprises, 1920 ... acres	36,184	155,525	13,015	60,531	7,752	28,543	113,953	17,354	19,947	28,699
48	Improved land prior to drainage ... acres	34,375	116,393	7,139	50,324	3,662	11,868	86,463	1,036	13,234	9,472
49	Increase since drainage ... acres	1,809	39,132	6,776	10,207	4,090	16,675	27,490	13,318	6,713	19,227
50	Per cent of increase	5.3	33.6	94.9	20.3	111.7	140.5	31.8	330.0	50.7	203.0
51	Per cent increase is of all improved land in farms, 1920	0.8	16.0	4.4	3.0	3.2	4.9	9.4	3.7	4.0	7.4
52	Timber and cut-over land, 1920 ... acres	16	.....	.....	525	1,259	11,885	722	3,290	2,229	2,409
53	Timber and cut-over land prior to drainage ... acres	160	884	.....	1,041	5,349	25,958	848	8,934	8,942	11,019
54	Decrease since drainage ... acres	144	884	.....	1,416	4,090	14,073	126	5,644	6,713	8,610
55	Per cent of decrease	90.0	100.0	.....	73.0	76.5	54.2	14.9	63.2	75.1	78.1
56	Other unimproved land, 1920 ... acres	.....	298	1,104	2,386	.....	134	21,500	6,550	.....	5,440
57	Other unimproved land prior to drainage ... acres	1,065	38,546	7,880	11,177	.....	2,736	48,864	14,224	.....	16,057
58	Decrease since drainage ... acres	1,065	38,248	6,776	8,791	.....	2,602	27,364	7,674	.....	10,617
59	Per cent of decrease	100.0	99.2	86.0	78.7	.....	95.1	56.0	54.0	.....	66.1
60	Swampy or subject to overflow, 1920 ... acres	466	236	1,157	.....	7,752	7,363	2,111	8,444	1,715	525
61	Swampy or subject to overflow prior to drainage ... acres	8,585	78,492	5,532	29,135	9,011	25,394	66,205	18,808	9,823	18,604
62	Decrease since drainage ... acres	8,119	78,256	4,375	29,135	1,259	18,031	64,094	10,364	8,108	18,079
63	Per cent of decrease	94.6	99.7	79.1	100.0	14.0	71.0	96.8	55.1	82.5	97.2
	CAPITAL INVESTED AND COST PER ACRE.										
64	Total capital invested in and required for completion of operating enterprises ... dollars	240,839	732,899	188,192	439,310	83,542	525,994	780,272	1,601,950	92,503	1,087,926
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	240,839	732,899	120,192	439,310	83,542	525,994	780,272	1,178,450	92,503	1,059,926
66	Additional capital required to complete these enterprises ... dollars	.....	.....	68,000	.....	.....	.....	.....	423,500	.....	28,000
67	Average cost per acre when completed ... dollars	6.65	4.70	12.53	6.92	9.27	12.97	5.73	58.91	4.17	29.77
68	Enterprises constructing open ditches only ... dollars	10,000	132,502	22,000	23,977	83,542	77,213	131,151	.....	89,803	40,834
69	Average cost per acre when completed ... dollars	6.25	4.54	6.67	3.91	9.27	8.02	4.97	.....	4.20	32.41
70	Enterprises constructing open ditches and levees ... dollars	.....	.....	.....	.....	.....	325,845	18,050	545,500	.....	612,092
71	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	21.72	1.82	72.73	.....	30.12
72	Enterprises constructing tile drains only ... dollars	180,885	225,468	69,949	83,449	.....	.....	49,019	.....	2,700	.....
73	Average cost per acre when completed ... dollars	7.83	5.06	8.13	6.72	.....	.....	6.69	.....	3.30	.....
74	Enterprises constructing tile drains and levees ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
75	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
76	Enterprises constructing open ditches and tile drains ... dollars	49,954	374,929	96,243	331,884	.....	77,959	582,052	23,500	.....	.....
77	Average cost per acre when completed ... dollars	4.34	4.57	30.89	7.39	.....	6.96	6.29	6.53	.....	.....
78	Enterprises constructing open ditches, tile drains, and levees ... dollars	.....	.....	.....	.....	.....	44,977	.....	1,032,950	.....	435,000
79	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	9.40	.....	64.18	.....	29.07
	CROPS.										
	Improved land in enterprises reporting—										
80	Corn as principal crop on drained land ... acres	36,184	155,525	13,915	60,531	7,752	28,200	113,953	15,224	19,947	20,392
81	Wheat as principal crop on drained land ... acres	.....	.....	.....	.....	.....	343	.....	1,800	.....	8,307
82	Potatoes as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
83	Vegetables as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
84	Not reporting principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	330	.....	.....

[1] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Grundy.	Hamilton.	Hancock.	Henderson.	Henry.	Iroquois.	Jackson.	Jersey.	Johnson.	Kane.
	LAND AREA.										
1	Approximate land area of the county ... acres	277,120	291,200	499,200	240,640	527,360	717,440	376,320	234,880	222,720	337,280
2	All land in operating drainage enterprises ... acres	11,360	50,470	17,100	17,500	84,560	283,159	19,078	12,412	15,896	48,626
3	Improved land ... acres	3,296	24,240	15,550	15,773	78,135	278,159	16,083	10,842	7,663	46,829
4	Per cent of all improved land in farms	1.5	11.5	4.2	9.1	18.3	43.4	7.3	7.1	5.5	18.4
5	Timber and cut-over land ... acres		26,230	1,550	967	1,105	950		1,570	5,283	51
6	Other unimproved land ... acres	8,064			760	5,320	4,050	2,995		2,950	1,746
7	Swampy or subject to overflow, in enterprises ... acres	8,064	5,958	1,550	967	1,313	4,082	2,995		3,940	1,465
8	Suffering a loss of crops from defective drainage ... acres		11,206	3,875	944	1,320	4,217			6,268	716
9	Assessed acreage	11,360	50,470	17,100	17,500	84,560	283,159	19,078	12,412	15,896	48,626
10	Excess over all land in operating enterprises ... acres										
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	4.3	65.8	14.0	35.0	155.8	337.4	53.0	16.5	18.1	60.7
12	Additional under construction ... miles		9.9			2.4					
13	Maximum completed in any enterprise ... miles	4.3	33.0	12.0	30.0	32.0	35.0	35.0	10.5	7.0	8.0
14	Maximum width at bottom of ditch[1] ... feet	13	80	35	40	80	30	23	30	50	40
15	Maximum of average depths of outlet ditches[1] ... feet	8.0	14.0	10.0	12.0	12.0	10.0	10.0	11.0	42.0	11.0
16	Mean depth of branch ditches[1] ... feet		7.8	6.0	4.9	4.2	4.9	6.8	5.0	4.2	5.9
	Tile drains:										
17	Completed ... miles	5.8			31.0	42.4	172.5		0.6		26.1
18	Additional under construction ... miles	15.2		0.3	0.2						
19	Maximum completed in any enterprise ... miles	5.0			31.0	20.0	20.0		0.5		8.5
20	Maximum size of tile[1] ... inches	26		42	14	18	36		14		32
	Accessory levees and dikes:										
21	Completed ... miles			11.5	27.0	5.8			2.8	5.0	
22	Additional under construction ... miles				1.0	5.5					
	Pumping plants:										
23	Engine capacity ... horsepower			70	800				(2)		
24	Pump capacity ... gallons per minute			6,000	153,500				(2)		
25	Area served by pumps ... acres			2,500	17,500				9,540		
26	Area drained by open ditches only[1] ... acres		50,470			26,410	65,190	19,078	2,322	9,993	36,781
27	Length of these ditches ... miles		75.7			62.0	128.0	53.0	3.3	12.1	51.8
28	Average length per acre ... feet		7.9			12.4	10.4	14.7	7.5	6.4	7.4
29	Area having open ditches and levees[1] ... acres			15,500		3,750				5,903	
30	Length of these ditches ... miles			12.0		5.5				6.0	
31	Average length per acre ... feet			4.1		7.7				5.4	
32	Length of the accessory levees ... miles			11.0		11.0				5.0	
33	Area drained by tile only[1] ... acres	2,400					17,820				3,445
34	Length of these tile ... miles	5.0					34.9				11.0
35	Average length per acre ... feet	11.0					10.3				16.9
36	Area having tile drains and levees[1] ... acres										
37	Length of these tile ... miles										
38	Average length per acre ... feet										
39	Length of the accessory levees ... miles										
40	Area drained by open ditches and tile drains[1] ... acres	8,960				50,800	200,149		9,540		8,400
41	Length of these drains ... miles	20.3				119.1	347.0		11.0		24.0
42	Average length per acre ... feet	12.0				12.4	9.2		6.1		15.1
43	Area having open ditches, tile drains, and levees[1] ... acres			1,600	17,500	3,600			550		
44	Length of these drains ... miles			2.3	66.2	14.0			2.8		
45	Average length per acre ... feet			7.6	20.0	20.5			26.9		
46	Length of the accessory levees ... miles			0.5	28.0	0.3			2.8		
	DEVELOPMENT OF LAND.										
47	Improved land in operating enterprises, 1920 ... acres	3,296	24,240	15,550	15,773	78,135	278,159	16,083	10,842	7,663	46,829
48	Improved land prior to drainage ... acres	896	14,292	2,055	1,520	33,551	181,480	3,760	3,044	5,388	5,006
49	Increase since drainage ... acres	2,400	9,948	13,495	14,253	44,584	96,679	12,323	7,798	2,275	41,823
50	Per cent of increase	267.9	69.6	656.7	937.7	132.9	53.3	327.7	256.2	42.2	835.5
51	Per cent increase is of all improved land in farms, 1920	1.1	4.7	3.7	8.3	10.4	15.1	5.6	5.1	1.6	16.4
52	Timber and cut-over land, 1920 ... acres		26,230	1,550	967	1,105	950		1,570	5,283	51
53	Timber and cut-over land prior to drainage ... acres		36,178	11,625	4,790	2,205	2,662	5,646	8,818	7,558	251
54	Decrease since drainage ... acres		9,948	10,075	3,823	1,100	1,712	5,646	7,248	2,275	200
55	Per cent of decrease		27.5	86.7	79.8	49.9	64.3	100.0	82.2	30.1	79.7
56	Other unimproved land, 1920 ... acres	8,064			760	5,320	4,050	2,995		2,950	1,746
57	Other unimproved land prior to drainage ... acres	10,464		3,420	11,190	48,804	99,017	9,672	550	2,950	43,369
58	Decrease since drainage ... acres	2,400		3,420	10,430	43,484	94,967	6,677	550		41,623
59	Per cent of decrease	22.9		100.0	93.2	89.1	95.9	69.0	100.0		96.0
60	Swampy or subject to overflow, 1920 ... acres	8,064	5,958	1,550	967	1,313	4,082	2,995		3,940	1,465
61	Swampy or subject to overflow prior to drainage ... acres	9,984	16,487	4,700	11,420	25,535	111,258	9,672	10,297	7,649	30,283
62	Decrease since drainage ... acres	1,920	10,529	3,150	10,453	24,222	107,176	6,677	10,297	3,709	28,818
63	Per cent of decrease	19.2	63.9	67.0	91.5	94.9	96.3	69.0	100.0	48.5	95.2
	CAPITAL INVESTED AND COST PER ACRE.										
64	Total capital invested in and required for completion of operating enterprises ... dollars	198,612	623,901	250,000	650,000	1,099,750	1,629,378	253,000	344,166	107,448	291,671
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	122,444	433,901	245,000	600,000	965,750	1,629,378	253,000	344,166	107,448	291,671
66	Additional capital required to complete these enterprises ... dollars	76,168	190,000	5,000	50,000	44,000					
67	Average cost per acre when completed ... dollars	17.48	12.36	14.62	37.14	11.94	5.75	13.26	27.73	6.76	6.00
68	Enterprises constructing open ditches only ... dollars		623,901			225,750	351,178	253,000	15,000	68,550	148,075
69	Average cost per acre when completed ... dollars		12.36			8.55	5.39	13.26	6.46	6.86	4.03
70	Enterprises constructing open ditches and levees ... dollars			200,000		118,000				38,898	
71	Average cost per acre when completed ... dollars			12.90		31.47				6.59	
72	Enterprises constructing tile drains only ... dollars	16,000					123,576				39,096
73	Average cost per acre when completed ... dollars	6.67					6.93				11.35
74	Enterprises constructing tile drains and levees ... dollars										
75	Average cost per acre when completed ... dollars										
76	Enterprises constructing open ditches and tile drains ... dollars	182,612				621,000	1,154,624		309,166		104,500
77	Average cost per acre when completed ... dollars	20.38				12.22	5.77		32.41		12.44
78	Enterprises constructing open ditches, tile drains, and levees ... dollars			50,000	650,000	45,000			20,000		
79	Average cost per acre when completed ... dollars			31.25	37.14	12.50			36.36		
	CROPS.										
	Improved land in enterprises reporting—										
80	Corn as principal crop on drained land ... acres	3,296	24,240	15,550	15,773	78,135	278,159	16,083	10,842	7,663	42,829
81	Wheat as principal crop on drained land ... acres										4,000
82	Potatoes as principal crop on drained land ... acres										
83	Vegetables as principal crop on drained land ... acres										
84	Not reporting principal crop on drained land ... acres										

[1] When works under construction have been completed.

[2] Pumping plant located in Greene County.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Kankakee.	Kendall.	La Salle.	Lake.	Lawrence.	Lee.	Livingston.	Logan.	McHenry.
	LAND AREA.									
1	Approximate land area of the county ... acres	427,520	207,360	733,440	291,200	229,120	474,880	667,520	394,880	396,800
2	All land in operating drainage enterprises ... acres	125,344	7,414	41,861	14,520	61,592	85,460	47,379	22,030	48,325
3	Improved land ... acres	115,704	7,264	40,812	14,430	48,838	84,026	46,314	21,850	45,650
4	Per cent of all improved land in farms	31.6	4.2	6.8	8.6	27.0	21.4	7.5	6.2	17.3
5	Timber and cut-over land ... acres				90	5,812	263		180	
6	Other unimproved land ... acres	9,640	150	1,049		6,942	1,171	1,065		2,675
7	Swampy or subject to overflow, in enterprises ... acres	8,991	150	1,049		5,902	2,886	6,747		1,075
8	Suffering a loss of crops from defective drainage ... acres	15,411	150	19	1,915	9,085	9,181	1,484	666	204
9	Assessed acreage ... acres	125,344	7,414	41,861	14,520	61,592	97,635	47,379	25,260	48,325
10	Excess over all land in operating enterprises ... acres						12,175		3,230	
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed ... miles	125.3	15.6	35.4	23.4	85.3	130.4	24.2	25.8	39.6
12	Additional under construction ... miles					1.5	0.8	4.0		
13	Maximum completed in any enterprise ... miles	12.0	5.5	8.0	4.5	13.5	43.8	7.5	13.0	12.0
14	Maximum width at bottom of ditch [1] ... feet	50	16	16	12	30	70	30	25	30
15	Maximum average depths of outlet ditches [1] ... feet	10.0	11.0	8.0	10.0	15.0	12.0	8.0	30.0	9.0
16	Mean depth of branch ditches [1] ... feet	6.0		4.7	5.0	6.3	6.9	6.0	7.0	6.3
	Tile drains:									
17	Completed ... miles	141.6	7.6	42.0	15.6		22.0	42.2	19.3	98.6
18	Additional under construction ... miles			2.3			3.1	11.1		10.9
19	Maximum completed in any enterprise ... miles	11.0	4.0	7.0	4.7		13.0	5.3	7.5	22.4
20	Maximum size of tile [1] ... inches	40	24	36	30		30	36	24	32
	Accessory levees and dikes:									
21	Completed ... miles	5.5					7.0			
22	Additional under construction ... miles									
	Pumping plants:									
23	Engine capacity ... horsepower									
24	Pump capacity ... gallons per minute									
25	Area served by pumps ... acres									
26	Area drained by open ditches only [1] ... acres	30,980	5,431	13,481	6,730	61,592	30,230	8,050	16,406	
27	Length of these ditches ... miles	33.8	14.8	23.0	17.0	86.8	57.1	14.0	22.8	
28	Average length per acre ... feet	5.8	14.4	9.0	13.3	7.4	10.6	9.2	7.3	
29										
30	Area having open ditches and levees [1] ... acres	11,511					(2)			
31	Length of these ditches ... miles	12.0					1.0			
32	Average length per acre ... feet	5.5								
	Length of the accessory levees ... miles	5.0					1.0			
33										
34	Area drained by tile only [2] ... acres	20,635	1,900	8,490	3,000		1,100	24,200	3,044	2,980
35	Length of these tile ... miles	71.6	7.0	19.1	7.7		2.5	43.5	15.4	10.1
	Average length per acre ... feet	18.3	19.5	11.9	13.6		12.0	9.5	26.7	17.9
36										
37	Area having tile drains and levees [1] ... acres									
38	Length of these tile ... miles									
39	Average length per acre ... feet									
	Length of the accessory levees ... miles									
40										
41	Area drained by open ditches and tile [1] ... acres	50,298	83	19,890	4,790		19,380	15,120	2,520	45,345
42	Length of these drains ... miles	128.2	1.4	37.6	14.3		39.8	24.0	6.9	139.0
	Average length per acre ... feet	13.5	89.1	10.0	15.8		10.8	8.4	14.5	16.2
43										
44	Area having open ditches, tile drains, and levees [1] ... acres	11,920					34,750			
45	Length of these drains ... miles	21.3					56.8			
46	Average length per acre ... feet	9.4					8.6			
	Length of the accessory levees ... miles	0.5					6.0			
	DEVELOPMENT OF LAND.									
47										
48	Improved land in operating enterprises, 1920 ... acres	115,704	7,264	40,812	14,430	48,838	84,026	46,314	21,850	45,650
49	Improved land prior to drainage ... acres	67,794	1,416	34,441	4,667	15,290	30,376	43,290	1,868	11,434
50	Increase since drainage ... acres	47,910	5,848	6,371	9,763	33,548	53,650	3,024	19,982	34,216
51	Per cent of increase [3]	70.7	413.0	18.5	209.2	219.4	176.6	7.0		299.2
	Per cent increase is of all improved land in farms, 1920	13.1	3.4	1.1	5.8	18.6	13.7	0.5	5.6	12.9
52										
53	Timber and cut-over land, 1920 ... acres				90	5,812	263		180	
54	Timber and cut-over land prior to drainage ... acres	5,471			674	28,266	263		1,380	300
55	Decrease since drainage ... acres	5,471			584	22,454			1,200	300
	Per cent of decrease	100.0			86.6	79.4			87.0	100.0
56										
57	Other unimproved land, 1920 ... acres	9,640	150	1,049		6,942	1,171	1,065		2,675
58	Other unimproved land prior to drainage ... acres	52,079	5,998	7,420	9,179	18,036	54,821	4,089	18,782	36,591
59	Decrease since drainage ... acres	42,439	5,848	6,371	9,179	11,094	53,650	3,024	18,782	33,916
	Per cent of decrease	81.5	97.5	85.9	100.0	61.5	97.9	74.0	100.0	92.7
60										
61	Swampy or subject to overflow, 1920 ... acres	8,991	150	1,049		5,902	2,886	6,747		1,075
62	Swampy or subject to overflow prior to drainage ... acres	55,154	6,047	8,225	6,400	32,120	59,357	17,826	18,782	26,191
63	Decrease since drainage ... acres	46,163	5,897	7,176	6,400	26,218	56,471	11,079	18,782	25,116
	Per cent of decrease	83.7	97.5	87.2	100.0	81.6	95.1	62.2	100.0	95.9
	CAPITAL INVESTED AND COST PER ACRE.									
64	Total capital invested in and required for completion of operating enterprises ... dollars	932,234	80,392	312,436	140,650	304,734	1,339,563	426,762	193,905	530,670
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	932,234	80,392	294,936	140,650	304,734	1,284,563	312,304	193,905	479,570
66	Additional capital required to complete these enterprises ... dollars			17,500			55,000	114,458		50,500
67	Average cost per acre when completed ... dollars	7.44	10.84	7.46	9.69	4.95	15.67	9.01	8.80	10.97
68	Enterprises constructing open ditches only ... dollars	156,019	49,362	65,800	62,300	304,734	463,333	28,700	139,478	
69	Average cost per acre when completed ... dollars	5.04	9.09	4.88	9.26	4.95	15.33	3.57	8.47	
70	Enterprises constructing open ditches and levees ... dollars	19,500					1,422			
71	Average cost per acre when completed ... dollars	1.69								
72	Enterprises constructing tile drains only ... dollars	126,115	24,780	51,110	26,350		7,000	196,062	48,420	32,000
73	Average cost per acre when completed ... dollars	6.11	13.04	5.02	8.78		6.36	8.10	15.91	10.74
74	Enterprises constructing tile drains and levees ... dollars									
75	Average cost per acre when completed ... dollars									
76	Enterprises constructing open ditches and tile drains ... dollars	524,600	6,250	195,526	52,000		103,508	202,000	6,007	498,070
77	Average cost per acre when completed ... dollars	10.43	75.30	9.83	10.86		5.34	13.36	2.38	10.98
78	Enterprises constructing open ditches, tile drains, and levees ... dollars	106,000					764,300			
79	Average cost per acre when completed ... dollars	8.89					21.99			
	CROPS.									
	Improved land in enterprises reporting—									
80	Corn as principal crop on drained land ... acres	111,784	7,264	40,812	14,430	38,606	84,026	46,314	13,030	45,650
81	Wheat as principal crop on drained land ... acres					10,232			8,820	
82	Potatoes as principal crop on drained land ... acres									
83	Vegetables as principal crop on drained land ... acres									
84	Not reporting principal crop on drained land ... acres	3,000 920								

[1] When works under construction have been completed. [2] Area included in "open ditches, tile drains, and levees." [3] Per cent not shown when more than 1,000.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		McLean.	Macon.	Macoupin.	Madison.	Mason.	Massac.	Menard.	Mercer.	Monroe.
	LAND AREA.									
1	Approximate land area of the county ... acres	762,240	374,400	550,400	471,680	355,200	153,600	202,880	345,600	248,960
2	All land in operating drainage enterprises ... acres	116,861	52,026	7,575	28,119	118,620	28,800	16,788	22,320	24,860
3	Improved land ... acres	113,161	51,688	7,500	16,335	108,762	7,200	14,988	19,369	22,726
4	Per cent of all improved land in farms	16.5	15.5	1.9	4.8	40.4	7.6	9.0	7.4	13.9
5	Timber and cut-over land ... acres	...	160	...	2,400	1,989	21,600	600	1,040	...
6	Other unimproved land ... acres	3,700	178	75	9,384	7,869	...	1,200	1,911	2,134
7	Swampy or subject to overflow, in enterprises ... acres	4,460	289	...	7,956	7,365	8,640	650	1,965	2,404
8	Suffering a loss of crops from defective drainage ... acres	...	289	38	6,950	6,537	3,600	2,423	1,040	820
9	Assessed acreage	132,703	61,666	7,575	28,119	118,620	28,800	16,788	23,840	24,860
10	Excess over all land in operating enterprises ... acres	15,842	9,640	...	...	...	...	...	1,520	...
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed ... miles	87.2	43.0	3.2	22.3	154.9	54.6	27.5	24.0	45.9
12	Additional under construction ... miles	...	...	...	...	3.9	...	...	...	...
13	Maximum completed in any enterprise ... miles	15.5	15.2	2.8	12.0	32.0	54.6	9.0	15.0	18.0
14	Maximum width at bottom of ditch [1] ... feet	35	20	10	80	75	50	40	30	22
15	Maximum of average depths of outlet ditches [1] ... feet	9.5	8.0	11.0	9.0	40.0	42.0	40.0	5.5	7.0
16	Mean depth of branch ditches [1] ... feet	7.7	4.6	...	3.3	4.6	...	7.0	3.9	3.7
	Tile drains:									
17	Completed ... miles	34.3	71.3	15.4	...	5.3	...	2.5	...	...
18	Additional under construction ... miles	5.5	...	...	...	1.2	...	...	...	...
19	Maximum completed in any enterprise ... miles	6.8	6.3	8.2	...	2.8	...	2.5	...	...
20	Maximum size of tile [1] ... inches	36	40	30	...	30	...	12	...	...
	Accessory levees and dikes:									
21	Completed ... miles	...	...	2.7	2.3	12.2	7.7	17.5	15.4	26.3
22	Additional under construction ... miles	...	...	...	7.7	...	1.9	...	7.6	...
	Pumping plants:									
23	Engine capacity ... horsepower	...	...	...	(2)	60	...	50	1,150	...
24	Pump capacity ... gallons per minute	...	...	...	(2)	16,000	...	8,400	225,000	...
25	Area served by pumps ... acres	...	...	...	20,000	1,320	...	2,000	20,230	...
26	Area drained by open ditches only [1] ... acres	59,861	25,068	...	8,119	110,233	...	11,000	1,520	8,700
27	Length of these ditches ... miles	44.0	33.2	...	10.3	147.3	...	15.0	(3)	21.0
28	Average length per acre ... feet	3.9	7.0	...	6.7	7.1	...	7.2	...	12.7
29	Area having open ditches and levees [1] ... acres	...	...	...	20,000	1,800	28,800	2,288	20,800	16,160
30	Length of these ditches ... miles	...	...	...	12.0	4.0	54.6	7.0	24.0	24.9
31	Average length per acre ... feet	...	...	...	3.2	11.7	10.0	16.2	6.1	8.1
32	Length of the accessory levees ... miles	...	...	...	10.0	3.7	9.6	9.0	23.0	26.3
33	Area drained by tile only [1] ... acres	11,360	26,958	3,020	...	...	...	...	...	...
34	Length of these tile ... miles	16.1	62.9	3.1	...	...	...	...	...	...
35	Average length per acre ... feet	7.5	12.3	5.4	...	...	...	...	...	...
36	Area having tile drains and levees [1] ... acres	...	...	...	...	...	...	...	...	...
37	Length of these tile ... miles	...	...	...	...	...	...	...	...	...
38	Average length per acre ... feet	...	...	...	...	...	...	...	...	...
39	Length of the accessory levees ... miles	...	...	...	...	...	...	...	...	...
40	Area drained by open ditches and tile [1] ... acres	45,640	(4)	4,005	...	3,087	...	...	...	...
41	Length of these drains ... miles	66.9	18.2	12.6	...	6.0	...	...	...	...
42	Average length per acre ... feet	7.7	...	16.6	...	10.3	...	...	...	...
43	Area having open ditches, tile drains, and levees [1] ... acres	...	...	550	...	3,500	...	3,500	...	...
44	Length of these drains ... miles	...	...	2.9	...	8.0	...	8.0	...	...
45	Average length per acre ... feet	...	...	27.8	...	12.1	...	12.1	...	...
46	Length of the accessory levees ... miles	...	...	2.7	...	8.5	...	8.5	...	...
	DEVELOPMENT OF LAND.									
47	Improved land in operating enterprises, 1920 ... acres	113,161	51,688	7,500	16,335	108,762	7,200	14,988	19,369	22,726
48	Improved land prior to drainage ... acres	103,811	38,645	35	14,643	24,990	2,880	4,500	337	12,388
49	Increase since drainage ... acres	9,350	13,043	7,465	1,692	83,772	4,320	10,488	19,032	10,338
50	Per cent of increase [5]	9.0	33.8	...	11.6	335.2	150.0	233.1	...	83.5
51	Per cent increase is of all improved land in farms, 1920	1.4	3.9	1.9	0.5	31.1	4.6	6.3	7.3	6.3
52	Timber and cut-over land, 1920 ... acres	...	160	...	2,400	1,989	21,600	600	1,040	...
53	Timber and cut-over land prior to drainage ... acres	...	296	...	2,972	11,697	25,920	1,200	11,090	2,246
54	Decrease since drainage ... acres	...	136	...	572	9,708	4,320	600	10,050	2,246
55	Per cent of decrease	...	45.9	...	19.2	83.0	16.7	50.0	90.6	100.0
56	*Other unimproved land, 1920* ... *acres*	3,700	178	75	9,384	7,869	...	1,200	1,911	2,134
57	Other unimproved land prior to drainage ... acres	13,050	13,085	7,540	10,504	81,933	...	11,088	10,893	10,226
58	Decrease since drainage ... acres	9,350	12,907	7,465	1,120	74,064	...	9,888	8,982	8,092
59	Per cent of decrease	71.6	98.6	99.0	10.7	90.4	...	89.2	82.5	79.1
60	Swampy or subject to overflow, 1920 ... acres	4,460	289	...	7,956	7,365	8,640	650	1,965	2,404
61	Swampy or subject to overflow prior to drainage ... acres	40,496	20,374	7,540	13,067	107,566	14,400	16,788	14,312	11,036
62	Decrease since drainage ... acres	36,036	20,085	7,540	5,111	100,201	5,760	16,138	12,347	8,632
63	Per cent of decrease	89.0	98.6	100.0	39.1	93.2	40.0	96.1	86.3	78.2
	CAPITAL INVESTED AND COST PER ACRE.									
64	Total capital invested in and required for completion of operating enterprises ... dollars	633,994	238,151	64,483	3,048,500	1,353,190	621,600	176,500	975,400	738,446
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	573,761	238,151	64,483	2,048,500	1,153,190	609,600	176,500	558,600	738,446
66	Additional capital required to complete these enterprises ... dollars	60,233	...	...	1,000,000	200,000	12,000	...	416,800	...
67	Average cost per acre when completed ... dollars	5.43	4.58	8.51	[6]108.41	11.41	21.58	10.51	43.70	29.70
68	Enterprises constructing open ditches only ... dollars	145,719	72,427	...	48,500	1,236,882	...	98,000	14,000	245,000
69	Average cost per acre when completed ... dollars	2.43	2.89	...	5.97	11.22	...	8.91	9.21	28.16
70	Enterprises constructing open ditches and levees ... dollars	...	...	...	3,000,000	41,808	621,600	51,000	961,400	493,446
71	Average cost per acre when completed ... dollars	...	...	...	[6]150.00	23.23	21.58	22.20	46.22	30.51
72	Enterprises constructing tile drains only ... dollars	134,119	151,326	19,630	...	...	...	...	...	...
73	Average cost per acre when completed ... dollars	11.81	5.61	6.50	...	...	...	...	...	...
74	Enterprises constructing tile drains and levees ... dollars	...	...	...	...	...	...	...	...	...
75	Average cost per acre when completed ... dollars	...	...	...	...	...	...	...	...	...
76	Enterprises constructing open ditches and tile drains ... dollars	354,165	14,398	24,853	...	47,000	...	...	...	...
77	Average cost per acre when completed ... dollars	7.76	...	5.21	...	15.23	...	...	...	...
78	Enterprises constructing open ditches, tile drains, and levees ... dollars	...	...	20,000	...	27,500	...	27,500	...	...
79	Average cost per acre when completed ... dollars	...	...	36.36	...	7.86	...	7.86	...	...
	CROPS.									
	Improved land in enterprises reporting—									
80	Corn as principal crop on drained land ... acres	113,161	51,688	7,275	11,760	102,376	7,200	14,988	19,369	22,726
81	Wheat as principal crop on drained land ... acres	...	...	225	4,575	6,386	...	...	...	...
82	Potatoes as principal crop on drained land ... acres	...	...	...	...	...	...	...	...	...
83	Vegetables as principal crop on drained land ... acres	...	...	...	...	...	...	...	...	...
84	Not reporting principal crop on drained land ... acres	...	...	...	...	...	...	...	...	...

[1] When works under construction have been completed.
[2] Pumping plant located in St. Clair County.
[3] Ditches reported in Rock Island County.
[4] Area included in "open ditches only."
[5] Per cent not shown when more than 1,000.
[6] Not for drainage of agricultural land only.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Montgomery.	Morgan.	Moultrie.	Ogle.	Peoria.	Piatt.	Pike.	Pope.	Pulaski.
	LAND AREA.									
1	Approximate land area of the county ... acres	440,960	368,640	216,320	483,840	407,040	288,640	503,040	246,400	121,600
2	All land in operating drainage enterprises ... acres	48,521	10,013	20,250	12,820	6,100	122,384	67,683	12,500	19,298
3	Improved land ... acres	48,135	8,946	19,966	12,738	5,465	121,934	60,379	9,835	13,829
4	Per cent of all improved land in farms	13.5	3.0	10.5	3.3	2.1	48.2	16.1	7.5	17.5
5	Timber and cut-over land ... acres	...	49	284	38	210	...	3,385	2,665	5,469
6	Other unimproved land ... acres	386	1,018	...	44	425	450	3,919	...	...
7	Swampy or subject to overflow, in enterprises ... acres	800	1,664	375	...	850	450	1,070	700	90
8	Suffering a loss of crops from defective drainage ... acres	790	1,724	1,494	2,270	850	450	7,303	2,966	7,660
9	Assessed acreage ... acres	48,521	10,013	20,250	12,820	6,100	122,969	67,683	12,500	19,298
10	Excess over all land in operating enterprises ... acres	...	...	...	...	...	585	...	...	...
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed ... miles	62.1	14.8	22.7	18.3	9.5	117.2	43.0	14.9	26.6
12	Additional under construction ... miles	...	...	...	1.7	...	...	...	0.7	...
13	Maximum completed in any enterprise ... miles	9.5	6.0	7.0	9.0	5.0	14.0	34.0	14.3	10.0
14	Maximum width at bottom of ditch [1] ... feet	30	18	20	40	20	40	80	50	50
15	Maximum of average depths of outlet ditches [1] ... feet	12.0	8.0	9.0	7.0	12.0	17.0	12.0	42.0	42.0
16	Mean depth of branch ditches [1] ... feet	4.1	4.0	6.0	6.7	8.0	5.0	7.8	5.0	4.0
	Tile drains:									
17	Completed ... miles	144.4	2.4	32.8	7.8	45.9	142.6	34.3	...	...
18	Additional under construction ... miles	2.0	...	...	...	...	...	10.8	7.0	...
19	Maximum completed in any enterprise ... miles	16.5	1.5	9.5	6.0	40.0	10.0	34.3	...	...
20	Maximum size of tile [1] ... inches	33	20	30	20	30	33	24	16	...
	Accessory levees and dikes:									
21	Completed ... miles	...	20.6	...	...	9.3	...	59.2	...	2.8
22	Additional under construction ... miles	...	...	...	...	...	...	...	0.1	0.1
	Pumping plants:									
23	Engine capacity ... horsepower	...	325	...	...	515	...	450	...	...
24	Pump capacity ... gallons per minute	...	54,000	...	...	62,666	...	97,000	...	...
25	Area served by pumps ... acres	...	2,482	...	...	4,400	...	5,350	...	...
26	Area drained by open ditches only [1] ... acres	1,957	...	7,626	7,500	...	40,864	...	...	7,481
27	Length of these ditches ... miles	9.5	...	10.5	13.0	...	57.4	...	...	12.0
28	Average length per acre ... feet	25.6	...	7.3	9.2	...	7.4	...	...	8.5
29	Area having open ditches and levees [1] ... acres	...	6,859	...	...	2,100	...	62,333	300	11,817
30	Length of these ditches ... miles	...	10.8	...	...	4.5	...	34.0	0.6	14.6
31	Average length per acre ... feet	...	8.3	...	...	11.3	...	2.9	10.6	6.5
32	Length of the accessory levees ... miles	...	4.6	...	...	4.3	...	53.0	0.1	2.9
33	Area drained by tile only [1] ... acres	12,091	500	4,527	920	1,700	30,270	...	...	...
34	Length of these tile ... miles	44.5	1.5	17.4	1.8	5.9	66.4	...	...	...
35	Average length per acre ... feet	19.4	15.8	20.3	10.3	18.3	11.6	...	...	...
36	Area having tile drains and levees [1] ... acres	...	...	...	...	...	...	...	...	...
37	Length of these tile ... miles	...	...	...	...	...	...	...	...	...
38	Average length per acre ... feet	...	...	...	...	...	...	...	...	...
39	Length of the accessory levees ... miles	...	...	...	...	...	...	...	...	...
40	Area drained by open ditches and tile [1] ... acres	34,473	...	8,097	4,400	...	51,250	...	12,200	...
41	Length of these drains ... miles	154.5	...	27.6	13.0	...	136.0	...	22.0	...
42	Average length per acre ... feet	23.7	...	18.0	15.6	...	14.0	...	9.5	...
43	Area having open ditches, tile drains, and levees [1] ... acres	...	2,654	...	...	2,300	...	5,350	...	...
44	Length of these drains ... miles	...	4.9	...	...	45.0	...	54.1	...	...
45	Average length per acre ... feet	...	9.7	...	...	103.3	...	53.4	...	...
46	Length of the accessory levees ... miles	...	16.0	...	...	5.0	...	6.2	...	...
	DEVELOPMENT OF LAND.									
47	Improved land in operating enterprises, 1920 ... acres	48,135	8,946	19,966	12,738	5,465	121,934	60,379	9,835	13,829
48	Improved land prior to drainage ... acres	26,486	7,243	16,182	5,353	1,275	63,102	4,455	9,180	8,351
49	Increase since drainage ... acres	21,649	1,703	3,784	7,385	4,190	58,832	55,924	655	5,478
50	Per cent of increase [2]	81.7	23.5	23.4	138.0	328.6	93.2	...	7.1	65.6
51	Per cent increase is of all improved land in farms, 1920	6.1	0.6	2.0	1.9	1.6	23.3	14.9	0.5	7.0
52	Timber and cut-over land, 1920 ... acres	...	49	284	38	210	...	3,385	2,665	5,469
53	Timber and cut-over land prior to drainage ... acres	...	133	618	38	3,075	4,651	23,153	3,320	10,947
54	Decrease since drainage ... acres	...	84	334	...	2,865	4,651	19,768	655	5,478
55	Per cent of decrease	...	63.2	54.0	...	93.2	100.0	85.4	19.7	50.0
56	Other unimproved land, 1920 ... acres	386	1,018	...	44	425	450	3,919	...	...
57	Other unimproved land prior to drainage ... acres	22,035	2,637	3,450	7,429	1,750	54,631	40,075	...	...
58	Decrease since drainage ... acres	21,649	1,619	3,450	7,385	1,325	54,181	36,156	...	...
59	Per cent of decrease	98.2	61.4	100.0	99.4	75.7	99.2	90.2	...	...
60	Swampy or subject to overflow, 1920 ... acres	800	1,664	375	...	850	450	1,070	700	90
61	Swampy or subject to overflow prior to drainage ... acres	22,035	5,516	4,349	12,038	2,175	61,560	30,283	1,370	8,382
62	Decrease since drainage ... acres	21,235	3,852	3,974	12,038	1,325	61,110	29,213	670	8,292
63	Per cent of decrease	96.4	69.8	91.4	100.0	60.9	99.3	96.5	48.9	98.9
	CAPITAL INVESTED AND COST PER ACRE.									
64	Total capital invested in and required for completion of operating enterprises ... dollars	386,965	156,932	159,901	141,900	246,760	865,364	1,549,627	101,550	218,595
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	383,853	156,932	159,901	113,900	246,760	865,364	1,532,727	66,350	218,395
66	Additional capital required to complete these enterprises ... dollars	3,112	...	...	28,000	...	...	16,900	35,200	200
67	Average cost per acre when completed ... dollars	7.98	15.67	7.90	11.07	40.45	7.07	22.90	8.12	11.33
68	Enterprises constructing open ditches only ... dollars	12,000	...	44,275	72,000	...	205,701	...	...	47,045
69	Average cost per acre when completed ... dollars	6.13	...	5.81	9.60	...	6.50	...	...	6.29
70	Enterprises constructing open ditches and levees ... dollars	...	128,500	...	...	147,000	...	1,393,477	6,550	171,550
71	Average cost per acre when completed ... dollars	...	18.73	...	...	70.00	...	22.36	21.83	14.52
72	Enterprises constructing tile drains only ... dollars	85,738	6,000	82,886	6,000	32,760	173,110	...	...	...
73	Average cost per acre when completed ... dollars	7.09	12.00	18.31	6.52	19.27	5.72	...	...	...
74	Enterprises constructing tile drains and levees ... dollars	...	...	...	...	...	...	...	...	...
75	Average cost per acre when completed ... dollars	...	...	...	...	...	...	...	...	...
76	Enterprises constructing open ditches and tile drains ... dollars	289,227	...	32,740	63,900	...	426,553	...	95,000	...
77	Average cost per acre when completed ... dollars	8.39	...	4.04	14.52	...	8.32	...	7.79	...
78	Enterprises constructing open ditches, tile drains, and levees ... dollars	...	22,432	...	...	67,000	...	156,150	...	...
79	Average cost per acre when completed ... dollars	...	8.45	...	...	29.13	...	29.19	...	...
	CROPS.									
	Improved land in enterprises reporting—									
80	Corn as principal crop on drained land ... acres	48,135	2,574	19,966	12,738	5,465	120,649	60,379	9,835	11,160
81	Wheat as principal crop on drained land ... acres	...	6,372	...	...	...	...	...	...	...
82	Potatoes as principal crop on drained land ... acres	...	...	...	...	...	...	...	...	...
83	Vegetables as principal crop on drained land ... acres	...	...	...	...	...	...	...	...	...
84	Not reporting principal crop on drained land ... acres	...	...	...	...	...	1,285	...	...	2,669

[1] When works under construction have been completed.

[2] Per cent not shown when more than 1,000.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Randolph.	Rock Island.	St. Clair.	Saline.	Sangamon.	Schuyler.	Scott.	Shelby.	Tazewell.
	LAND AREA.									
1	Approximate land area of the county ... acres	375,680	271,360	424,320	255,360	560,640	276,480	159,360	494,080	414,080
2	All land in operating drainage enterprises ... acres	18,949	23,906	55,242	66,251	7,097	16,080	32,393	31,834	34,240
3	Improved land ... acres	16,418	23,221	33,337	57,640	7,097	15,899	30,740	31,834	34,167
4	Per cent of all improved land in farms	6.6	13.0	11.0	32.5	1.5	9.0	24.9	7.8	10.2
5	Timber and cut-over land ... acres	1,510	282	5,575	8,321	...	79	301	...	...
6	Other unimproved land ... acres	1,021	403	16,330	290	...	102	1,352	...	73
7	Swampy or subject to overflow, in enterprises ... acres	1,526	1,608	13,107	5,425	...	...	1,537	400	...
8	Suffering a loss of crops from defective drainage ... acres	1,205	479	10,209	21,758	...	204	1,135	400	1,147
9	Assessed acreage ...	18,949	27,186	55,242	67,251	7,097	16,080	32,393	31,834	34,240
	Excess over all land in operating enterprises ... acres	...	3,280	...	1,000	...	...	...	...	...
	DRAINAGE WORKS.									
10	Open ditches:									
11	Completed ... miles	12.6	27.0	33.4	109.3	...	30.3	44.2	17.1	83.0
12	Additional under construction ... miles	0.5	0.4	4.0	2.3	...	...	...	...	...
13	Maximum completed in any enterprise ... miles	6.0	7.5	14.0	20.0	...	11.5	17.2	9.0	10.0
14	Maximum width at bottom of ditch [1] ... feet	15	4.0	80	80	...	28	60	35	75
15	Maximum of average depths of outlet ditches [1] ... feet	6.0	8.0	35.0	14.0	...	12.0	15.0	16.0	12.5
16	Mean depth of branch ditches [1] ... feet	3.5	4.7	7.0	5.7	...	7.3	5.0	...	7.0
	Tile drains:									
17	Completed ... miles	2.0	1.8	...	...	6.3	18.0	202.9	71.7	15.2
18	Additional under construction ... miles	...	...	...	...	...	...	...	...	2.6
19	Maximum completed in any enterprise ... miles	2.0	1.8	...	...	6.2	15.0	200.0	35.0	14.6
20	Maximum size of tile [1] ... inches	8	15	...	...	20	30	18	40	15
	Accessory levees and dikes:									
21	Completed ... miles	17.7	10.2	1.5	...	...	26.6	50.2	...	22.9
22	Additional under construction ... miles	1.0	5.0	10.0	...	...	2.4	...	...	...
	Pumping plants:									
23	Engine capacity ... horsepower	...	495	3,900	...	...	850	980	...	1,715
24	Pump capacity ... gallons per minute	...	75,000	675,000	...	...	114,500	137,000	...	201,000
25	Area served by pumps ... acres	...	9,168	10,000	...	...	16,380	27,352	...	13,861
26	Area drained by open ditches only [1] ... acres	4,700	13,718	13,042	66,251	...	...	...	17,710	19,419
27	Length of these ditches ... miles	8.2	13.1	18.9	111.6	...	...	...	14.6	37.5
28	Average length per acre ... feet	9.2	5.0	7.7	8.9	...	...	...	4.4	10.2
29	Area having open ditches and levees [1] ... acres	4,140	9,168	42,200	...	...	4,186	1,854	...	12,843
30	Length of these ditches ... miles	4.9	14.9	18.5	...	...	8.8	5.0	...	37.5
31	Average length per acre ... feet	6.2	8.6	2.3	...	...	11.1	14.2	...	15.4
32	Length of the accessory levees ... miles	2.7	15.2	11.5	...	...	9.5	3.0	...	17.7
33	Area drained by tile only [1] ... acres	...	1,020	...	...	7,097	...	...	8,739	...
34	Length of these tile ... miles	...	1.8	...	...	6.3	...	...	62.2	...
35	Average length per acre ... feet	...	9.3	...	...	4.7	...	...	37.6	...
36	Area having tile drains and levees [1] ... acres	10,109	...	...	...	...	...	...	...	...
37	Length of these tile ... miles	2.0	...	...	...	...	...	...	...	...
38	Average length per acre ... feet	1.0	...	...	...	...	...	...	...	...
39	Length of the accessory levees ... miles	16.0	...	...	...	...	...	...	...	...
40	Area drained by open ditches and tile [1] ... acres	...	...	...	...	...	...	...	5,385	960
41	Length of these drains ... miles	...	...	...	...	...	...	...	12.0	4.6
42	Average length per acre ... feet	...	...	...	...	...	...	...	11.8	25.3
43	Area having open ditches, tile drains, and levees [1] ... acres	...	...	...	...	...	11,894	30,539	...	1,018
44	Length of these drains ... miles	...	...	...	...	...	39.5	242.1	...	21.2
45	Average length per acre ... feet	...	...	...	...	...	17.5	41.9	...	110.0
46	Length of the accessory levees ... miles	...	...	...	...	...	19.5	47.2	...	5.2
	DEVELOPMENT OF LAND.									
47	Improved land in operating enterprises, 1920 ... acres	16,418	23,221	33,337	57,640	7,097	15,899	30,740	31,834	34,167
48	Improved land prior to drainage ... acres	13,476	801	26,000	45,070	43	3,282	14,563	21,954	5,547
49	Increase since drainage ... acres	2,942	22,420	7,337	12,570	7,054	12,617	16,177	9,880	28,620
50	Per cent of increase [2]	21.8	...	28.2	27.9	...	384.4	111.1	45.0	516.0
51	Per cent increase is of all improved land in farms, 1920	1.2	12.6	2.4	7.1	1.5	7.1	13.1	2.4	8.6
52	Timber and cut-over land, 1920 ... acres	1,510	282	5,575	8,321	...	79	301	...	...
53	Timber and cut-over land prior to drainage ... acres	1,724	1,072	7,636	20,601	...	6,035	3,608	...	9,331
54	Decrease since drainage ... acres	214	790	2,061	12,280	...	5,956	3,307	...	9,331
55	Per cent of decrease	12.4	73.7	27.0	59.6	...	98.7	91.7	...	100.0
56	Other unimproved land, 1920 ... acres	1,021	403	16,330	290	...	102	1,352	...	73
57	Other unimproved land prior to drainage ... acres	3,749	22,033	21,606	580	7,054	6,763	14,222	9,879	19,362
58	Decrease since drainage ... acres	2,728	21,630	5,276	290	7,054	6,661	12,870	9,879	19,289
59	Per cent of decrease	72.8	98.2	24.4	50.0	100.0	98.5	90.5	100.0	99.6
60	Swampy or subject to overflow, 1920 ... acres	1,526	1,608	13,107	5,425	...	...	1,537	400	...
61	Swampy or subject to overflow prior to drainage ... acres	14,408	17,636	17,606	40,519	7,054	14,416	22,547	11,091	21,147
62	Decrease since drainage ... acres	12,882	16,028	4,499	35,094	7,054	14,416	21,010	10,691	21,147
63	Per cent of decrease	89.4	90.9	25.6	86.6	100.0	100.0	93.2	96.4	100.0
	CAPITAL INVESTED AND COST PER ACRE.									
64	Total capital invested in and required for completion of operating enterprises ... dollars	293,554	526,700	6,201,572	405,835	8,100	678,980	893,545	114,187	1,023,963
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	283,554	411,500	2,701,572	396,835	8,100	658,794	893,545	114,187	1,016,463
66	Additional capital required to complete these enterprises ... dollars	10,000	115,200	3,500,000	9,000	...	20,186	...	...	7,500
67	Average cost per acre when completed ... dollars	15.49	22.03	[3] 112.26	6.13	1.14	42.23	27.58	3.59	29.91
68	Enterprises constructing open ditches only ... dollars	55,000	96,400	166,572	405,835	...	...	...	19,169	224,963
69	Average cost per acre when completed ... dollars	11.70	7.03	12.77	6.13	...	...	...	1.08	11.58
70	Enterprises constructing open ditches and levees ... dollars	78,554	423,600	6,035,000	...	...	271,140	26,000	...	616,500
71	Average cost per acre when completed ... dollars	18.97	46.20	[3] 143.01	...	...	64.77	14.02	...	48.00
72	Enterprises constructing tile drains only ... dollars	...	6,700	...	...	8,100	...	...	75,107	...
73	Average cost per acre when completed ... dollars	...	6.57	...	...	1.14	...	...	8.59	...
74	Enterprises constructing tile drains and levees ... dollars	160,000	...	...	...	...	...	...	...	...
75	Average cost per acre when completed ... dollars	15.83	...	...	...	...	...	...	...	...
76	Enterprises constructing open ditches and tile drains ... dollars	...	...	...	...	...	...	...	19,911	15,000
77	Average cost per acre when completed ... dollars	...	...	...	...	...	...	...	3.70	15.63
78	Enterprises constructing open ditches, tile drains, and levees ... dollars	...	...	...	...	...	407,840	867,545	...	167,500
79	Average cost per acre when completed ... dollars	...	...	...	...	...	34.29	28.41	...	164.54
	CROPS.									
	Improved land in enterprises reporting—									
80	Corn as principal crop on drained land ... acres	16,418	23,221	33,337	57,640	7,097	15,899	30,740	31,834	34,167
81	Wheat as principal crop on drained land ... acres	...	...	...	...	...	...	...	...	...
82	Potatoes as principal crop on drained land ... acres	...	...	...	...	...	...	...	...	...
83	Vegetables as principal crop on drained land ... acres	...	...	...	...	...	...	...	...	...
84	Not reporting principal crop on drained land ... acres	...	...	...	...	...	...	...	...	...

[1] When works under construction have been completed. [2] Per cent not shown when more than 1,000. [3] Not for drainage of agricultural land only.

County Table II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Union.	Vermilion.	Wabash.	Wayne.	White.	Whiteside.	Will.	Woodford.	Other counties.[1]
	LAND AREA.									
1	Approximate land area of the county ... acres	257,920	589,440	140,800	469,120	324,480	434,560	540,160	337,920	2,245,120
2	All land in operating drainage enterprises ... acres	34,713	121,075	26,661	42,930	33,724	138,170	46,042	8,500	17,896
3	Improved land ... acres	21,369	112,843	23,751	35,195	28,762	130,909	40,526	6,400	14,141
4	Per cent of all improved land in farms	14.2	23.6	20.6	10.1	11.1	35.4	9.4	2.5	0.8
5	Timber and cut-over land ... acres	13,124	3,996	2,750	6,288	4,225	391	.....	.....	1,371
6	Other unimproved land ... acres	220	4,236	160	1,447	737	6,870	5,516	2,100	2,384
7	Swampy or subject to overflow, in enterprises ... acres	1,229	706	2,206	2,278	1,029	3,698	5,184	5,300	3,021
8	Suffering a loss of crops from defective drainage ... acres	208	406	1,957	10,961	4,692	3,943	225	.....	2,869
9	Assessed acreage	34,713	124,110	27,896	42,930	34,507	147,184	46,042	8,500	17,896
10	Excess over all land in operating enterprises ... acres	.....	3,035	1,235	.....	783	9,014	.....	.....	.....
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed ... miles	49.1	104.7	83.1	89.7	65.3	236.8	58.1	13.2	45.7
12	Additional under construction ... miles	.....	.....	.....	1.1	1.8	6.3	.....	2.8	0.3
13	Maximum completed in any enterprise ... miles	15.0	13.0	9.5	19.9	8.0	80.0	9.0	10.0	8.0
14	Maximum width at bottom of ditch [2] ... feet	50	28	35	50	50	80	40	22	60
15	Maximum of average depths of outlet ditches [2] ... feet	42.0	12.0	12.0	15.0	8.0	12.0	11.0	9.0	10.0
16	Mean depth of branch ditches [2] ... feet	7.5	6.0	6.5	7.3	6.3	4.5	4.6	7.5	6.7
	Tile drains:									
17	Completed ... miles	.....	182.2	6.7	.....	1.8	4.9	43.4	.....	7.7
18	Additional under construction ... miles	.....	7.0	.....	.....	.....	1.0	10.2	3.5	2.0
19	Maximum completed in any enterprise ... miles	.....	12.2	3.0	.....	1.7	1.7	10.0	.....	4.5
20	Maximum size of tile [2] ... inches	.....	42	30	.....	24	16	30	30	30
	Accessory levees and dikes:									
21	Completed ... miles	29.7	.....	.....	.....	.....	31.0	.....	2.0	7.0
22	Additional under construction ... miles	2.9	.....	.....	.....	.....	2.9	.....	4.0	0.5
	Pumping plants:									
23	Engine capacity ... horsepower	(3)	.....	.....	.....	.....	(4)	.....	.....	150
24	Pump capacity ... gallons per minute	(3)	.....	.....	.....	.....	(4)	.....	.....	30,000
25	Area served by pumps ... acres	500	.....	.....	.....	.....	4,319	.....	.....	3,000
26	Area drained by open ditches only [2] ... acres	4,967	14,152	23,501	42,930	31,133	91,215	20,310	.....	10,604
27	Length of these ditches ... miles	21.0	26.7	70.1	90.8	62.7	171.0	28.1	.....	30.1
28	Average length per acre ... feet	22.3	10.0	15.7	11.2	10.6	9.9	7.3	.....	15.0
29	Area having open ditches and levees [2] ... acres	29,746	.....	.....	.....	.....	20,521	.....	2,100	3,800
30	Length of these ditches ... miles	28.1	.....	.....	.....	.....	28.2	.....	10.0	9.0
31	Average length per acre ... feet	5.0	.....	.....	.....	.....	7.3	.....	25.1	12.5
32	Length of the accessory levees ... miles	32.6	.....	.....	.....	.....	33.7	.....	6.0	7.0
33	Area drained by tile only [2] ... acres	.....	8,101	872	.....	659	.....	5,272	.....	.....
34	Length of these tile ... miles	.....	32.6	2.7	.....	1.7	.....	13.4	.....	.....
35	Average length per acre ... feet	.....	21.2	16.3	.....	13.6	.....	13.4	.....	.....
36	Area having tile drains and levees [2] ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....
37	Length of these tile ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....
38	Average length per acre ... feet	.....	.....	.....	.....	.....	.....	.....	.....	.....
39	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....
40	Area drained by open ditches and tile [2] ... acres	.....	98,822	2,288	.....	1,932	11,640	20,460	6,400	2,967
41	Length of these drains ... miles	.....	234.6	17.0	.....	4.5	22.9	70.2	9.5	11.1
42	Average length per acre ... feet	.....	12.5	39.2	.....	12.3	10.4	18.1	7.8	19.8
43	Area having open ditches, tile drains, and levees [2] ... acres	.....	.....	.....	.....	.....	14,704	.....	.....	525
44	Length of these drains ... miles	.....	.....	.....	.....	.....	26.9	.....	.....	5.5
45	Average length per acre ... feet	.....	.....	.....	.....	.....	9.6	.....	.....	55.3
46	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	0.2	.....	.....	0.5
	DEVELOPMENT OF LAND.									
47	Improved land in operating enterprises, 1920 ... acres	21,369	112,843	23,751	35,195	28,762	130,909	40,526	6,400	14,141
48	Improved land prior to drainage ... acres	13,954	100,760	9,508	23,862	21,052	68,609	23,070	6,400	7,150
49	Increase since drainage ... acres	7,415	12,083	14,243	11,333	7,710	62,300	17,456	.....	6,991
50	Per cent of increase	53.1	12.0	149.8	47.5	36.6	90.8	75.7	.....	97.8
51	Per cent increase is of all improved land in farms, 1920	4.9	2.5	12.3	3.2	3.0	16.9	4.0	.....	0.4
52	Timber and cut-over land, 1920 ... acres	13,124	3,996	2,750	6,288	4,225	391	.....	.....	1,371
53	Timber and cut-over land prior to drainage ... acres	16,661	5,943	15,379	17,605	11,018	401	635	.....	4,214
54	Decrease since drainage ... acres	3,537	1,947	12,629	11,317	6,793	10	635	.....	2,843
55	Per cent of decrease	21.2	32.8	82.1	64.3	61.7	2.5	100.0	.....	67.5
56	Other unimproved land, 1920 ... acres	220	4,236	160	1,447	737	6,870	5,516	2,100	2,384
57	Other unimproved land prior to drainage ... acres	4,098	14,372	1,774	1,463	1,654	69,160	22,337	2,100	6,532
58	Decrease since drainage ... acres	3,878	10,136	1,614	16	917	62,290	16,821	.....	4,148
59	Per cent of decrease	94.6	70.5	91.0	1.1	55.4	90.1	75.3	.....	63.5
60	Swampy or subject to overflow, 1920 ... acres	1,229	706	2,206	2,278	1,029	3,698	5,184	5,300	3,021
61	Swampy or subject to overflow prior to drainage ... acres	10,672	57,701	14,324	16,660	15,142	52,730	19,626	5,300	9,154
62	Decrease since drainage ... acres	9,443	56,995	12,118	14,382	14,113	49,032	14,442	.....	6,133
63	Per cent of decrease	88.5	98.8	84.6	86.3	93.2	93.0	73.6	.....	67.0
	CAPITAL INVESTED AND COST PER ACRE.									
64	Total capital invested in and required for completion of operating enterprises ... dollars	522,550	1,011,498	296,945	282,959	240,644	993,704	388,681	171,000	504,886
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	497,850	973,498	296,945	282,959	233,402	883,204	334,849	147,750	487,886
66	Additional capital required to complete these enterprises ... dollars	24,700	38,000	.....	.....	7,242	110,500	53,832	23,250	17,000
67	Average cost per acre when completed ... dollars	15.05	8.35	11.14	6.59	7.14	7.19	8.44	20.12	28.21
68	Enterprises constructing open ditches only ... dollars	101,500	80,659	235,495	282,959	221,778	532,052	81,774	.....	66,799
69	Average cost per acre when completed ... dollars	20.43	5.70	10.02	6.59	7.12	5.83	4.03	.....	6.30
70	Enterprises constructing open ditches and levees ... dollars	421,050	.....	.....	.....	.....	212,092	.....	93,000	366,240
71	Average cost per acre when completed ... dollars	14.15	.....	.....	.....	.....	10.34	.....	44.20	96.38
72	Enterprises constructing tile drains only ... dollars	.....	97,718	6,613	.....	6,338	.....	78,824	.....	.....
73	Average cost per acre when completed ... dollars	.....	12.06	7.58	.....	9.62	.....	14.95	.....	.....
74	Enterprises constructing tile drains and levees ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....
75	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....
76	Enterprises constructing open ditches and tile drains ... dollars	.....	833,121	54,837	.....	12,528	72,560	228,083	78,000	68,347
77	Average cost per acre when completed ... dollars	.....	8.43	23.97	.....	6.48	6.23	11.15	12.19	25.04
78	Enterprises constructing open ditches, tile drains, and levees ... dollars	.....	.....	.....	.....	.....	177,000	.....	.....	3,500
79	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	11.96	.....	.....	6.67
	CROPS.									
	Improved land in enterprises reporting—									
80	Corn as principal crop on drained land ... acres	21,369	112,843	23,751	35,195	28,762	130,909	40,526	6,400	14,141
81	Wheat as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....
82	Potatoes as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....
83	Vegetables as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....
84	Not reporting principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Includes only Bond, Jasper, McDonough, Marion, Marshall, Putnam, Richland, and Winnebago Counties.
[2] When works under construction have been completed.
[3] Pumping plant located in Alexander County.
[4] Pumping plant located in Rock Island County.

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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS

DRAINAGE : INDIANA

STATISTICS FOR THE STATE AND ITS COUNTIES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

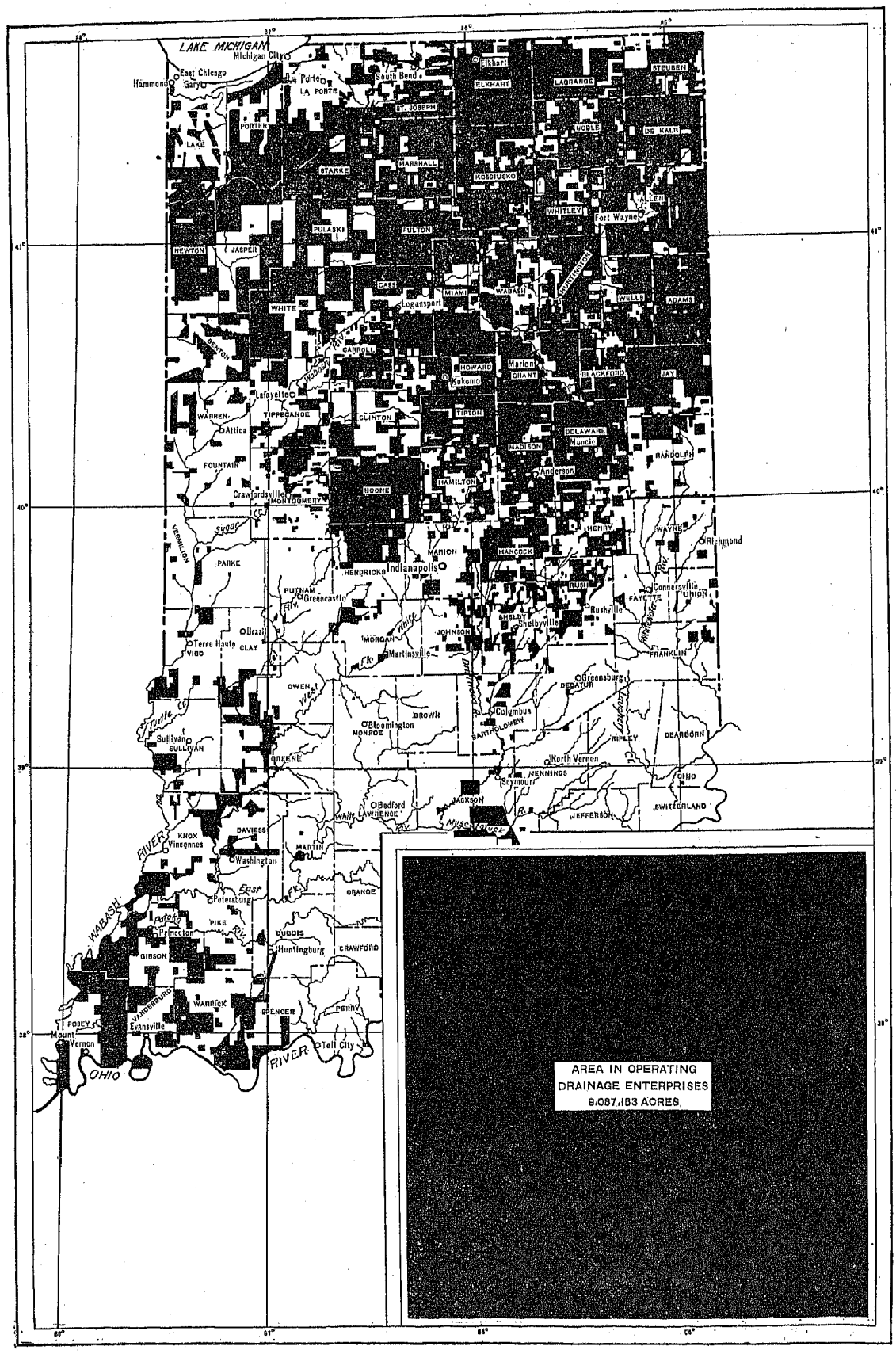
This bulletin presents the statistics of drainage for Indiana collected at the census of 1920. The figures relate to conditions on January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises might include areas of unimproved land not yet in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner installs upon his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are presented separately.

TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	205, 126	100.0
Farms reporting land having drainage	111, 435	54.3
Farms reporting land needing drainage	66, 413	32.4
All land in farms ... acres	21, 063, 332	100.0
Improved land in farms ... acres	16, 680, 212	79.2
Farm land reported as provided with drainage ... acres	8, 308, 844	39.4
Farm land reported as needing drainage ... acres	1, 717, 068	8.2
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	23, 068, 800	100.0
All land in operating drainage enterprises ... acres	9, 087, 183	39.4
Improved land ... acres	7, 605, 565	33.0
Timber and cut-over land ... acres	942, 378	4.1
Other unimproved land ... acres	539, 240	2.3
Total capital invested in and required for completion of operating enterprises	$31, 943, 858	100.0
Capital invested in these enterprises to Dec. 31, 1919	$31, 147, 682	97.5
Additional capital required to complete these enterprises	$796, 176	2.5

INDIANA

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which are substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, is the acreage actually benefited or made of more value for agricultural purposes by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators have answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual." Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises, below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter might be any that had completed the original plan of reclamation some years ago but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include enterprises that on the census date had completed their plans, sold bonds to cover the cost of the undertakings, and let contracts for the construction work, and also others for which the order of establishment had just been issued and which were still subject to considerable change in area, plan of drainage works, and cost.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.[1]		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	9,375,907	100.0	$31,201,517	100.0	$2,729,055
Operating enterprises	9,087,183	96.9	31,147,682	99.8	796,176
With works completed	8,867,674	94.6	30,154,296	96.6	.....
With works under construction	219,509	2.3	993,386	3.2	796,176
Nonoperating enterprises	288,724	3.1	53,835	0.2	1,932,879

[1] The inquiry asked for the "total cost of the enterprise to Dec. 31, 1919," and for an "estimate of additional investment to complete."

Location of enterprises.—A large portion of the central and northern parts of Indiana has been included in drainage enterprises, and there is a considerable area in such enterprises in the southwest corner.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	9,375,907	100.0	$31,201,517	100.0	$2,729,055
Operating enterprises	9,087,183	96.9	31,147,682	99.8	796,176
Miami River	28,238	0.3	113,256	0.4	1,125
Wabash River	5,978,848	63.8	20,081,675	64.4	574,533
Ohio River	230,317	2.5	804,875	2.6	.....
Illinois River	1,273,240	13.6	5,325,712	17.1	107,021
Lake Michigan	877,831	9.4	2,356,527	7.6	23,941
Lake Erie	698,709	7.5	2,465,637	7.9	89,556
Nonoperating enterprises	288,724	3.1	53,835	0.2	1,932,879
Wabash River	41,531	0.4	12,066	0.1	431,727
Illinois River	217,572	2.3	41,769	(1)	1,271,555
Lake Michigan	27,824	0.3	.....	.....	60,699
Lake Erie	1,797	0.1	.....	.....	168,898

[1] Less then one tenth of 1 per cent.

In the southern and southeastern parts of the state, however, are groups of counties in which there has been very little or no drainage except that done by individual farm owners.

Condition of land in enterprises.—Three-fourths of the drainage enterprises in this state, in number and in area of land included, are reported as having been organized for the purpose of draining land that was swampy or so generally wet as to interfere with profitable cultivation. A comparatively few were organized to secure protection against stream overflow, but for nearly a fourth of the enterprises the condition that necessitated drainage was not reported. The statistics show approximately 60 per cent of the land in operating enterprises to have been improved before the drainage enterprises were organized, and 25 per cent to have been timber and cut-over land.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms and to afford relief from overflows for the district as a unit. Therefore, the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy or subject to overflow, or land that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total. Acreage.	Total. Per cent of all land.	Works completed (acres).	Works under construction (acres).	
All land in enterprises	9,087,183	100.0	8,867,674	219,509	288,724
Improved land	7,605,565	83.7	7,442,870	162,695	192,190
Timber and cut-over land	942,378	10.4	900,167	42,211	51,212
Other unimproved land	539,240	5.9	524,637	14,603	45,322
Swampy or subject to overflow	386,320	4.3	362,159	24,161	64,677
Suffering a loss of crops	210,678	2.3	188,007	22,671	38,456

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided, and the part in each county be considered a separate enterprise. In this way 12,004 operating drainage enterprises are counted in Indiana, with an average area of 1,251 acres assessed. Of this number, 174 comprise 10,000 acres or more each, 2,611 comprise 1,000 to 5,000 acres, and 2,345 are smaller than 200 acres each. The assessed acreage exceeds the land in enterprises by 5,928,038 acres, which is the amount of overlapping. The land in enterprises and the assessed acreage on each line of Table 5 refer to the same enterprises. From the total area of each enterprise, designated as the assessed area, the net amount of overlapping with enterprises organized previously was deducted, to determine the area to be tabulated as land in enterprises. The amount of overlapping could be only estimated, however, in a great many cases, so for several counties the figures for land in enterprises are only rough approximations.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

SIZE GROUP.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	9,087,183	15,015,221	100.0
Less than 200 acres	194,640	255,985	1.7
200 to 499 acres	878,821	1,218,792	8.1
500 to 999 acres	1,526,423	2,098,534	14.0
1,000 to 4,999 acres	3,528,421	5,017,315	33.4
5,000 to 9,999 acres	1,059,216	1,718,075	11.4
10,000 to 49,999 acres	1,486,965	2,917,817	19.4
50,000 to 99,999 acres	391,248	1,032,904	6.9
100,000 to 499,999 acres	21,449	755,799	5.0

Character of enterprises.—The drainage enterprises in Indiana have been classified as incorporated associations, county commissioners' drains, circuit court drains, and drainage districts. The information secured concerning a considerable part of the enterprises, however, was not sufficiently definite to permit classification with reasonable certainty. The statistics include also a very few commercial developments and private undertakings.

Incorporated associations for the construction of levees and drains and the reclamation of wet and overflowed land have been organized under statutes of 1852 (ch. 29), 1869 (ch. 38), 1873 (ch. 68), 1889 (ch. 67), and 1913 (ch. 165); only the last two are still in effect. Each of these laws has required that the owners of the land to be drained or protected sign articles of association and file them with the county recorder. The minimum number of incorporators required has varied from 15 under the first law to 3 and 5, respectively, under the laws of 1889 and 1913. The associations are governed by directors elected by the members. Assessments of damages and of benefits to accrue from construction are assessed by appraisers, who were selected by the directors under the 1852 law but now are appointed by the county commissioners upon petition signed by a majority of the landowners or by the owners of two-thirds of the land that will be affected. After public hearing by the appraisers to equalize the assessments, as provided by the statutes still in force, the cost of the enterprise is apportioned against all the land in proportion to the benefits confirmed. Appeals regarding assessments may be taken to the circuit court or the court of common pleas. The county commissioners may issue bonds to finance the construction of drainage works undertaken by associations formed under the act of 1913 and, since 1905, under the act of 1889.

County commissioners' drains, to enable owners of wet land to drain and reclaim it when that could not be done without affecting the land of others, have been established under acts of 1867 (ch. 99), 1875 (approved Mar. 9), 1879 (ch. 121), 1881 (ch. 44), and 1891 (ch. 196), all of which have been repealed. The act of 1867, like one of 1863 which it repealed, required that application for the proposed drain be made to the county board, who would appoint appraisers to assess both damages and benefits against all land that would be affected. The applicant must pay the damages assessed before construction of the drain was begun, and might demand payment of the benefits assessed when construction had been completed. The act of 1875 provided for reviewers to review the work of the first viewers or appraisers of damages and benefits, if remonstrance was made by landowners affected, and for control of construction by the county board. Each landowner might construct the portion of ditch allotted to him, or the county auditor would let the work by contract and charge the cost to the landowners in proportion to the benefits assessed. The act of 1879 related only to drains not exceeding 3 miles in length. It provided that appeal might be taken to the circuit court regarding assessments of damages and benefits confirmed by the county commissioners. Construction was secured by the petitioners, who were authorized to collect the benefits assessed by suit at law. The statute of 1881 was similar to that of 1875, but provided that appeal from decisions of the county commissioners might be taken to the circuit court, and that the county auditor should let contracts for construction, collect the assessments, and pay the accounts rendered against the enterprise. The act of 1891 related to drains not less than 5 miles in length, and required that the petition for establishment be signed by 10 or more owners of land to be benefited. It authorized the county commissioners also to issue bonds for drainage. The statutes of 1875, 1881, and 1891 provided for drains to be located in more than one county, to be established by joint action of the county commissioners of the counties affected.

The circuit court drains are those that have been established under laws of 1881 (ch. 43), 1885 (ch. 40), 1905 (ch. 157), and 1907 (ch. 252). Each of these acts repealed the preceding one, and only that of 1907 is now in effect. The act of 1881 (ch. 43) provided for a board of drainage commissioners for each enterprise established under the law, to consist of the county surveyor and two other persons appointed by the court. The later acts have provided that each board of county commissioners shall appoint a county drainage commissioner, and that the drainage commissioners for each drain established under these acts shall consist of the county drainage commissioner, the county surveyor, and a third commissioner specially appointed by the court. The following provisions are alike in all of the circuit court drain acts: A petition for establishment must be submitted to the circuit or superior court, signed by one or more owners of land to be benefited by the proposed work. After public hearing, the court refers the petition to the board of drainage commissioners, who investigate the utility and practices

bility of the project, plan the drainage improvements, estimate the cost of the undertaking, and assess the damages and the benefits that will accrue if the enterprise is carried out. Public hearing upon the drainage commissioners' report is held by the court, and the assessments are equalized and confirmed. Decisions of this court are subject to appeal to the supreme court of the state. Construction of the drainage works is secured by a commissioner appointed by the court. This commissioner also assesses the cost according to the confirmed benefits, collects the assessments, and disburses the funds. The laws of 1905 and 1907 provide that for a drain to be located in more than one county, proceedings shall be before the court of that county having the greatest length of the drain, and for an enterprise in only one county proceedings may be before the county commissioners instead of the circuit or superior court. These two acts also authorize the issue of county bonds for drainage, to be paid from the assessments against the land in the drainage enterprises.

Drainage districts were authorized by acts of 1893 (ch. 146) and 1915 (ch. 88); the former was repealed in 1905 and the latter in 1917. The earlier act provided for establishment by proceedings before the county commissioners' court. A petition for the district must be signed by a majority of the landowners who must own at least one-third of the acreage in the proposed district, or by one-third of the owners owning a major part of the acreage. After ordering the district established, the court appointed three drainage commissioners to administer the affairs of the district until other commissioners should be elected. The commissioners determined the plan of drainage, classified the land according to benefits, assessed the damages that should be paid, and let contracts for construction of the works. Classification of the land and assessments of damages were subject to confirmation by the commissioners' court and appeal to the circuit court. The cost of the enterprise was apportioned by the county auditor according to the confirmed benefits, and collected like general county taxes. No provision was made for issuing bonds. For a district to be situated in more than one county, proceedings were in the county embracing the greater part of the district. The same statute authorized the formation of subdistricts within an original district, by similar proceedings, to be administered by the commissioners of the original district. Drainage districts might also be formed by mutual agreement of two-thirds of the landowners owning two-thirds of the acreage. Classification of the land in a mutual agreement district was made by the county surveyor, and confirmed by the commissioners' court.

The act of 1915 (ch. 88) provided for the establishment of drainage, sanitary, and reclamation districts by the circuit or superior courts, after filing of articles of association signed by a majority of the resident landowners to be affected, in number or in acreage. Three or five supervisors were elected by the landowners, or appointed by the court upon petition, to be the executive board of the district. They adopted a plan of reclamation and secured construction of the work. Hearing upon the plan of reclamation was required if the proposed work would affect land of owners that had not signed the articles of association. Damages and benefits were assessed by three commissioners appointed by the judge of the court upon petition from the district supervisors, and confirmed by the court after public hearing. Appeal might be taken to the state supreme court. The drainage taxes were apportioned like the confirmed benefits, or the supervisors might levy a uniform acreage tax of not exceeding 50 cents per acre per year. Bonds of the district might be issued by the supervisors.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	9,375,907	100.0	$31,201,517	100.0	$2,729,055
Operating enterprises	9,087,183	96.9	31,147,682	99.8	796,176
Incorporated associations	722,942	7.7	2,175,073	7.0	21,000
Laws of 1852, ch. 29	29,358	0.3	55,704	0.2	.....
Laws of 1869, ch. 38	38,592	0.4	61,551	0.2	.....
Laws of 1873, ch. 68	40,847	0.4	89,839	0.3	.....
Laws of 1889, ch. 67	490,399	5.2	1,376,969	4.4	.....
Laws of 1913, ch. 165	123,746	1.3	591,010	1.9	21,000
County commissioners' drains	2,096,992	22.4	5,148,191	16.5	.....
Laws of 1867, ch. 99	85,500	0.9	226,173	0.7	.....
Laws of 1875 (Mar. 9)	840,592	9.0	1,495,706	4.8	.....
Laws of 1879, ch. 121	49,241	0.5	99,428	0.3	.....
Laws of 1881, ch. 44	962,911	10.3	2,875,084	9.2	.....
Laws of 1891, ch. 196	158,748	1.7	451,800	1.4	.....
Circuit court drains	3,264,920	34.8	14,502,720	46.5	753,421
Laws of 1881, ch. 43	332,810	3.5	682,524	2.2	.....
Laws of 1885, ch. 40	*306,258*	*3.3*	*809,131*	*2.6*	.....
Laws of 1905, ch. 157	435,381	4.6	1,744,802	5.6	.....
Laws of 1907, ch. 252	2,190,471	23.4	11,266,263	36.1	753,421
Drainage districts	170,657	1.8	963,016	3.1	12,150
Laws of 1893, ch. 146	74,461	0.8	325,683	1.0	.....
Laws of 1915, ch. 88	96,196	1.0	637,333	2.0	12,150
Not identified	2,793,682	29.8	7,775,994	24.9	9,605
Laws of 1881	2,541,239	27.1	6,776,281	21.7	445
Laws of 1901	124,861	1.3	347,495	1.1	.....
Laws of 1911	127,582	1.4	652,218	2.1	9,160
Commercial and individual	5,623	0.1	398,519	1.3	.....
Not reported	32,367	0.3	184,169	0.6	.....
Nonoperating enterprises [1]	288,724	3.1	53,835	0.2	1,032,879

[1] All are circuit court drains under Laws of 1907 (ch. 252), except 600 acres under individual ownership.

The first drainage law of Indiana was approved May 29, 1852, providing for the sale of swamp land by the county auditors and treasurers, and the appointment by the governor of a drainage commissioner for each county. That commissioner was authorized to plan the drainage of the land and let contracts for construction, the cost to be paid from the proceeds of the sale of the land. This act was repealed in 1869 (ch. 38). A great many other laws

relating to drainage and flood protection have been enacted, several of them being still operative. Most of these relate only to construction of levees and the protection of land in cities, or to the maintenance and repair of works constructed under earlier laws. Only those already mentioned affect the character of the enterprises reported.

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 17,470.7 miles of open ditches, 8,227.6 miles of tile drains, and 165.8 miles of accessory levees; the additional lengths under construction were 123.4 miles of open ditches, 185.7 miles of tile drains, and 9.2 miles of levees. These figures do not include drains or levees installed by individual farm owners supplemental to the works of the enterprises, nor the works of flood-protection or levee districts that had not undertaken the construction of ditches or tile drains. There are four pumping districts among the operating drainage enterprises in the state, equipped with 5 centrifugal pumps and 1 rotary pump, and all operated by steam power. The pumps have a total capacity of 55,348 gallons per minute, and the engines 625 horsepower.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All kinds	9,087,183	100.0	$31,147,682	100.0	$796,176
Open ditches only	5,133,620	56.5	14,405,334	46.2	160,656
Open ditches and levees	270,784	3.0	895,236	2.9	25,740
Tile drains only	1,234,320	13.6	6,171,216	19.8	103,952
Open ditches and tile drains	2,423,949	26.7	9,336,171	30.0	475,828
Open ditches, tile drains, and levees	24,510	0.3	339,725	1.1	30,000

TABLE 8.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY TYPE OF DRAINAGE: 1920.

TYPE OF DRAINAGE.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All operating enterprises	9,087,183	100.0	$31,147,682	100.0	$796,176
Gravity drainage only	9,078,072	99.9	30,964,618	99.4	750,176
All drainage by pumping	311	(1)	6,289	(1)	.....
Part gravity and part pumping	8,800	0.1	176,775	0.6	46,000
Total area served by pumps	5,611	0.1	.....	.....	.....

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

The average depth of the main or outlet ditch was reported for each enterprise. The maximum depth of outlet reported for any enterprise in the state and the maximum in each county are shown in line 15 of County Table II. The maximum length, width, and depth of outlet shown in that table for any county may not refer to the same enterprise.

In County Table II, line 16 shows the mean depth of branch ditches (open ditches only), which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations. Depths less than 3 feet and those 10 feet and greater were omitted because it seemed that they did not represent so well the average depths of outlet provided for all the farms in those districts. To include these groups, computed as 3 feet and 10 feet, respectively, would show the mean depth for the state 5.2 instead of 5.1 feet.

TABLE 9.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	9,087,183	100.0
Less than 3 feet	162,513	1.8
3.0 to 3.9 feet	428,560	4.7
4.0 to 4.9 feet	929,258	10.2
5.0 to 5.9 feet	587,320	6.5
6.0 to 6.9 feet	692,507	7.6
7.0 to 7.9 feet	320,915	3.5
8.0 to 8.9 feet	237,242	2.6
9.0 to 9.9 feet	33,471	0.4
10 feet and more	143,084	1.6
Not reporting branches	5,552,313	61.1

Maintenance of works.—The township trustees are required, by an act passed in 1915 (ch. 100), to clean and repair biennially all ditches or drains, except dredged ditches, constructed in their respective townships under any law of the state. The trustees employ engineers to make necessary surveys and let contracts for the work, but landowners may pay their assessments in labor. For cleaning an open ditch, the cost is paid from a tax levied at a uniform rate per acre upon all land benefited, but each town lot is assessed as one acre. The cost of repairing a tile drain is paid by the land benefited in the same proportion as the cost of original construction.

Open ditches other than dredged ditches may be repaired by petition to the county commissioners, in accordance with an act of 1917 (ch. 82). The petition must be signed by owners of 20 per cent of the acreage to be affected, and must be dismissed if remonstrance is made by owners of a major part of the acreage.

The work is allotted to the individual landowners by the county surveyor, or apportioned according to the allotments made for original construction, and is performed under the supervision of the township trustees.

Ditches constructed wholly or partly with a dredge are to be repaired by proceedings somewhat similar to those for establishing a new drain. A petition from five or more owners of real estate that was assessed for the original construction of the drain must be submitted to the court or county commissioners who established the original enterprise. After public hearing and favorable finding, the petition is referred to the drainage commissioner of the county, who makes the survey, assesses damages and benefits, and apportions the cost according to the benefits. His findings are subject to review by the court or county commissioners before contracts are let for construction. Bonds may be issued if the contracts exceed $5,000.

Drains established under the act of 1889 (ch. 67) are to be kept in repair by the directors of the respective enterprises, the cost to be borne by the land in the same proportion as the cost of original construction, according to an act of 1911 (ch. 127).

A number of laws relating to the repair of ditches have been enacted, which have been repealed or superseded by those mentioned.

TABLE 10.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All operating enterprises	9,087,183	100.0	$31,147,682	100.0	$796,176
By district forces	1,767,614	19.5	4,942,336	15.9	51,203
By contract	1,734,516	19.1	6,608,791	21.2	96,107
By method not specified	31,056	0.3	154,958	0.5	.....
By landowners	2,780,623	30.6	8,657,234	27.8	174,753
No maintenance provided	2,690,086	29.6	10,496,412	33.7	457,536
Not reported	83,288	0.9	293,951	0.9	16,577

Date of organization.—The progress in drainage is shown only roughly by the dates of the organization of the enterprises, which are the dates when they were established by orders of the courts or county commissioners or otherwise as provided by law, since there may be a period of one or more years between the decree of establishment and the beginning of actual construction, and since the work of construction may occupy several years in a large enterprise. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including extensions made after the original plan of reclamation was completed.

TABLE 11.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	9,087,183	100.0	15,015,221	100.0
Before 1860	6,466	0.1	6,466	(1)
1860 to 1869	49,025	0.5	54,486	0.4
1870 to 1879	618,718	6.8	700,290	4.7
1880 to 1889	2,148,153	23.6	2,753,722	18.3
1890 to 1899	1,662,573	18.3	2,531,548	16.9
1900 to 1904	1,378,712	15.2	2,301,705	15.3
1905 to 1909	997,537	11.0	2,191,494	14.6
1910 to 1914	1,419,381	15.6	2,493,866	16.6
1915 to 1919	800,709	8.8	1,966,739	13.1
Not reported	5,909	0.1	14,905	0.1

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

TABLE 12.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$31,147,682	100.0	$796,176
Before 1860	18,014	0.1	.....
1860 to 1869	63,460	0.2	.....
1870 to 1879	1,165,221	3.7	.....
1880 to 1889	4,877,163	15.7	.....
1890 to 1899	5,015,664	16.1	.....
1900 to 1904	3,993,652	12.8	281
1905 to 1909	4,358,197	14.0	.....
1910 to 1914	6,248,435	20.1	256,438
1915 to 1919	5,325,766	17.1	539,457
Not reported	82,110	0.3	.....

TABLE 13.—DRAINS AND LEVEES (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		TILE.		LEVEES.	
	Miles.	Per cent of total.	Miles.	Per cent of total.	Miles.	Per cent of total.
All drains and levees	17,594.1	100.0	8,413.3	100.0	175.0	100.0
Before 1860	7.5	(1)	.....	.....	.....	.....
1860 to 1869	79.8	0.5	1.0	(1)	.....	.....
1870 to 1879	1,822.7	10.4	54.6	0.6	.....	.....
1880 to 1889	5,960.8	33.9	827.3	9.8	25.2	14.4
1890 to 1899	3,580.4	20.4	1,543.6	18.3	9.8	5.6
1900 to 1904	1,893.1	10.8	1,394.6	16.6	21.5	12.3
1905 to 1909	1,580.3	9.0	1,420.7	16.9	17.5	10.0
1910 to 1914	1,623.9	9.2	1,842.5	21.9	70.2	40.1
1915 to 1919	1,013.5	5.8	1,317.9	15.7	30.8	17.6
Not reported	32.1	0.2	11.1	0.1	.....	.....

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

Crops.—The principal crops grown upon the drained land in drainage enterprises are corn, wheat, and hay. Data were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified, in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920.

		The State.	Adams.	Allen.	Bartholomew.	Benton.	Blackford.	Boone.	Brown.
1	Number of all farms in the state or county	205,126	2,328	4,221	2,043	1,255	1,126	3,011	1,458
2	Farms reporting land having drainage	111,435	2,197	3,877	1,037	1,174	1,061	2,886	52
3	Farms reporting land needing drainage	66,413	1,423	2,644	815	202	752	1,224	89
4	Farms in drainage and levee districts	14,839	17	360	72	59	404	50	.....
	LAND AND FARM AREA.								
5	Approximate land area of the state or county ... acres	23,068,800	215,680	423,040	260,480	261,120	107,520	273,280	207,360
6	All land in farms ... acres	21,063,332	206,981	391,772	242,768	253,194	101,469	255,620	159,867
7	Improved land in farms ... acres	16,680,212	181,678	321,262	196,389	239,857	87,604	223,674	81,389
8	Woodland in farms ... acres	3,141,042	21,574	53,767	33,719	5,529	12,640	29,793	57,412
9	Other unimproved land in farms ... acres	1,242,078	3,729	16,743	12,660	7,808	1,225	2,153	21,066
10	Farm land reported as provided with drainage ... acres	8,308,844	155,678	257,396	80,447	223,867	75,702	214,310	964
11	Farm land reported as needing drainage ... acres	1,717,068	26,668	66,689	23,135	12,976	19,076	24,021	1,803
12	Drainage only ... acres	673,952	9,224	22,305	6,778	10,362	7,950	4,701	428
13	Drainage and clearing ... acres	1,043,116	17,444	44,384	16,357	2,614	11,126	19,320	1,375

		Carroll.	Cass.	Clark.	Clay.	Clinton.	Daviess.	Decatur.	De Kalb.	Delaware.
1	Number of all farms in the county	2,075	2,395	2,002	2,414	2,389	2,602	1,910	2,461	2,803
2	Farms reporting land having drainage	1,610	1,965	128	545	2,029	599	1,305	2,358	2,447
3	Farms reporting land needing drainage	787	998	216	411	747	513	664	1,767	1,196
4	Farms in drainage and levee districts	385	503	2	117	29	164	12	228	147
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	241,280	266,240	240,000	231,040	261,120	277,120	241,920	236,800	250,880
6	All land in farms ... acres	226,389	250,078	212,414	204,441	248,433	256,892	231,113	220,815	237,295
7	Improved land in farms ... acres	195,457	207,684	141,149	161,703	226,600	223,446	188,384	181,510	205,652
8	Woodland in farms ... acres	23,597	33,742	51,052	30,666	20,027	21,829	28,616	29,378	24,729
9	Other unimproved land in farms ... acres	7,335	8,652	20,213	12,072	1,806	8,617	14,113	9,927	6,914
10	Farm land reported as provided with drainage ... acres	138,092	154,443	3,030	16,442	189,214	26,502	126,886	148,022	175,208
11	Farm land reported as needing drainage ... acres	15,807	23,624	6,867	7,670	12,094	13,445	21,749	35,723	23,585
12	Drainage only ... acres	5,604	7,783	1,952	1,810	1,997	7,566	12,321	11,398	7,757
13	Drainage and clearing ... acres	10,203	15,841	4,915	5,860	10,097	5,879	9,428	24,325	15,828

		Dubois.	Elkhart.	Fayette.	Floyd.	Fountain.	Franklin.	Fulton.	Gibson.	Grant.
1	Number of all farms in the county	2,261	3,131	1,081	1,252	1,915	2,067	2,241	2,563	2,950
2	Farms reporting land having drainage	176	1,410	711	43	1,310	563	1,955	1,117	2,707
3	Farms reporting land needing drainage	136	1,166	548	142	791	425	1,387	356	1,478
4	Farms in drainage and levee districts	9	492	6	1	21	76	402	203	169
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	273,280	295,680	138,240	94,720	252,800	252,160	234,880	311,040	270,720
6	All land in farms ... acres	258,735	262,300	133,437	82,574	236,904	248,193	222,778	260,532	251,655
7	Improved land in farms ... acres	178,056	220,203	104,587	52,2 0	194,071	158,093	187,339	236,709	219,414
8	Woodland in farms ... acres	64,920	31,820	19,017	23,497	30,556	50,172	20,365	16,845	26,505
9	Other unimproved land in farms ... acres	15,759	10,187	9,833	6,817	12,277	39,928	15,074	6,978	5,736
10	Farm land reported as provided with drainage ... acres	5,789	68,519	43,922	682	105,805	31,137	136,424	72,566	198,700
11	Farm land reported as needing drainage ... acres	4,642	21,546	10,802	2,093	26,980	8,116	30,316	10,337	30,575
12	Drainage only ... acres	1,482	9,712	2,795	128	14,654	1,314	12,227	5,862	9,974
13	Drainage and clearing ... acres	3,160	11,834	8,007	1,965	12,326	6,802	18,089	4,475	20,601

		Greene.	Hamilton.	Hancock.	Harrison.	Hendricks.	Henry.	Howard.	Huntington.	Jackson.
1	Number of all farms in the county	3,441	2,868	2,038	3,048	2,526	2,540	2,164	2,637	2,617
2	Farms reporting land having drainage	417	2,260	1,966	174	2,190	2,334	2,040	2,354	540
3	Farms reporting land needing drainage	270	1,066	1,024	252	1,305	1,414	1,164	1,521	184
4	Farms in drainage and levee districts	104	64	190	4	80	253	141	332	32
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	347,520	255,360	196,480	311,040	261,120	254,080	190,080	247,040	331,520
6	All land in farms ... acres	309,198	242,165	187,218	287,333	242,235	239,709	182,150	234,105	294,173
7	Improved land in farms ... acres	237,795	209,869	166,994	183,033	197,844	211,054	162,102	196,094	206,826
8	Woodland in farms ... acres	53,681	27,864	17,089	78,331	33,895	24,337	16,247	29,579	73,372
9	Other unimproved land in farms ... acres	17,722	4,432	3,135	25,969	10,496	4,318	3,801	8,432	13,975
10	Farm land reported as provided with drainage ... acres	27,605	149,612	153,842	12,113	163,420	179,265	145,473	162,122	20,475
11	Farm land reported as needing drainage ... acres	8,746	19,187	17,157	4,867	35,900	26,260	17,527	27,250	5,157
12	Drainage only ... acres	5,104	6,721	3,048	413	12,225	6,085	4,042	6,351	2,477
13	Drainage and clearing ... acres	3,642	12,466	14,109	4,454	23,675	20,175	13,485	20,899	2,680

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Jasper.	Jay.	Jennings.	Johnson.	Knox.	Kosciusko.	Lagrange.	Lake.	LaPorte.
1	Number of all farms in the county	1,736	2,532	2,023	2,051	2,458	3,355	2,044	1,718	2,431
2	Farms reporting land having drainage	1,389	2,166	255	1,789	900	2,522	908	1,114	560
3	Farms reporting land needing drainage	856	1,248	471	889	515	1,851	624	876	290
4	Farms in drainage and levee districts	111	268	2	178	316	461	253	298	318
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	359,680	240,000	245,120	206,080	326,400	346,240	247,680	314,880	380,800
6	All land in farms ... acres	322,369	238,534	221,145	196,932	299,751	313,245	221,305	225,415	338,998
7	Improved land in farms ... acres	249,596	201,452	159,415	164,550	261,428	249,460	177,332	181,713	280,328
8	Woodland in farms ... acres	42,320	27,927	49,875	24,395	27,573	35,189	23,884	25,116	27,523
9	Other unimproved land in farms ... acres	30,453	4,155	11,855	7,987	10,750	28,596	20,089	18,586	31,147
10	Farm land reported as provided with drainage ... acres	198,318	161,422	6,863	134,434	57,789	137,099	31,389	87,141	71,070
11	Farm land reported as needing drainage ... acres	85,778	31,104	13,291	16,908	15,523	42,346	12,062	36,585	15,667
12	Drainage only ... acres	49,595	11,777	5,361	4,993	10,084	17,675	6,176	20,996	11,057
13	Drainage and clearing ... acres	36,183	19,327	7,930	11,915	5,439	24,671	5,886	15,589	4,610

		Lawrence.	Madison.	Marion.	Marshall.	Martin.	Miami.	Monroe.	Montgomery.	Morgan.
1	Number of all farms in the county	2,332	3,173	2,855	2,720	1,661	2,205	2,232	2,564	2,492
2	Farms reporting land having drainage	17	2,830	1,992	1,827	137	1,929	142	2,134	660
3	Farms reporting land needing drainage	19	1,228	943	1,371	199	1,222	199	775	278
4	Farms in drainage and levee districts	.....	427	154	194	19	129	2	138	69
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	291,840	288,000	254,080	282,240	216,960	243,840	266,240	320,640	259,840
6	All land in farms ... acres	251,658	266,203	198,970	265,396	196,490	226,056	228,170	301,398	240,808
7	Improved land in farms ... acres	160,265	236,504	166,799	209,878	119,493	186,930	142,944	247,692	162,723
8	Woodland in farms ... acres	66,931	25,110	26,302	29,586	54,110	29,599	69,013	46,520	66,804
9	Other unimproved land in farms ... acres	24,462	4,589	5,869	25,932	22,887	9,527	16,213	7,186	11,281
10	Farm land reported as provided with drainage ... acres	685	213,579	115,254	105,437	4,816	141,711	4,849	211,108	23,840
11	Farm land reported as needing drainage ... acres	340	24,205	17,933	36,051	5,576	28,178	6,218	22,517	7,338
12	Drainage only ... acres	124	9,010	4,123	14,097	2,299	7,821	2,188	3,725	1,509
13	Drainage and clearing ... acres	216	15,195	13,810	21,954	3,277	20,357	4,030	18,792	5,829

		Newton.	Noble.	Orange.	Owen.	Parke.	Perry.	Pike.	Porter.	Posey.
1	Number of all farms in the county	1,011	2,450	2,315	1,968	2,228	1,836	2,159	1,791	2,071
2	Farms reporting land having drainage	738	1,902	98	60	1,041	178	306	765	1,169
3	Farms reporting land needing drainage	204	1,310	230	78	650	174	377	520	740
4	Farms in drainage and levee districts	47	740	.....	.....	28	1	77	267	136
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	259,200	266,880	260,480	251,520	286,080	245,760	216,320	265,600	257,280
6	All land in farms ... acres	226,508	250,169	236,302	225,471	252,544	215,246	185,994	233,828	239,590
7	Improved land in farms ... acres	183,416	198,848	144,761	144,132	163,139	106,558	154,110	187,008	211,752
8	Woodland in farms ... acres	26,623	30,158	67,092	62,529	66,422	89,423	17,604	25,955	19,197
9	Other unimproved land in farms ... acres	16,469	21,163	24,449	18,810	22,983	19,265	14,280	20,805	8,641
10	Farm land reported as provided with drainage ... acres	145,245	103,539	2,130	1,917	55,466	3,393	10,710	42,195	77,859
11	Farm land reported as needing drainage ... acres	27,658	32,508	5,968	3,006	16,538	3,998	9,510	16,730	22,061
12	Drainage only ... acres	12,652	12,800	1,010	891	6,805	2,318	6,677	8,926	12,115
13	Drainage and clearing ... acres	15,006	19,708	4,958	2,115	9,733	1,680	2,833	7,804	9,946

		Pulaski.	Putnam.	Randolph.	Ripley.	Rush.	St. Joseph.	Scott.	Shelby.	Spencer.
1	Number of all farms in the county	1,763	2,682	3,226	2,836	2,044	2,678	1,104	2,660	2,562
2	Farms reporting land having drainage	1,606	1,553	2,906	227	1,910	1,051	381	2,353	764
3	Farms reporting land needing drainage	954	675	1,663	650	980	610	327	1,146	402
4	Farms in drainage and levee districts	861	32	622	25	98	223	39	196	207
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	276,480	309,120	286,080	286,720	261,760	294,400	121,600	260,480	257,920
6	All land in farms ... acres	253,924	288,452	276,572	269,401	252,997	257,983	105,422	248,756	231,746
7	Improved land in farms ... acres	203,203	192,374	241,259	199,515	222,687	215,250	76,755	221,781	188,647
8	Woodland in farms ... acres	36,652	79,443	29,483	42,524	25,274	26,542	23,724	19,731	27,206
9	Other unimproved land in farms ... acres	13,979	16,635	5,830	27,362	5,036	16,191	4,943	7,244	15,893
10	Farm land reported as provided with drainage ... acres	172,900	85,866	215,218	6,705	201,649	58,805	11,339	174,114	30,736
11	Farm land reported as needing drainage ... acres	48,744	17,883	33,051	15,141	22,617	15,265	9,107	20,345	9,512
12	Drainage only ... acres	18,524	6,113	9,179	2,439	6,097	7,248	2,092	6,059	5,477
13	Drainage and clearing ... acres	30,220	11,770	23,872	12,702	16,520	8,017	7,015	14,286	4,035

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Starke.	Steuben.	Sullivan.	Tippecanoe.	Tipton.	Union.	Vanderburg.	Vermillion.	Vigo.
1	Number of all farms in the county	1,402	1,787	2,837	2,401	1,857	796	1,680	1,058	2,770
2	Farms reporting land having drainage	1,032	996	603	1,550	1,545	563	542	467	570
3	Farms reporting land needing drainage	610	685	281	590	787	323	302	214	292
4	Farms in drainage and levee districts	252	221	81	34	.....	21	56	3	85
	LAND AND FARM AREA.									
5	Approximate land area of the county ....acres..	195,200	195,200	294,400	321,920	166,400	103,680	149,120	162,560	261,760
6	All land in farms ....acres..	168,178	183,072	252,861	299,228	153,969	100,269	132,538	132,357	222,285
7	Improved land in farms ....acres..	122,419	140,560	210,676	262,341	142,340	77,927	113,611	102,463	180,023
8	Woodland in farms ....acres..	27,226	22,439	24,213	27,205	16,192	11,624	10,632	21,789	25,925
9	Other unimproved land in farms ....acres..	18,533	20,073	17,972	9,682	437	10,718	8,295	8,105	16,337
10	Farm land reported as provided with drainage ....acres..	87,839	50,567	31,516	160,879	125,287	51,904	25,114	41,700	28,348
11	Farm land reported as needing drainage ....acres..	30,901	19,892	10,051	13,313	13,350	6,206	4,991	6,387	7,408
12	Drainage only ....acres..	11,997	8,302	5,942	4,283	2,532	1,349	3,214	1,693	3,530
13	Drainage and clearing ....acres..	18,904	11,590	4,109	9,030	10,818	4,857	1,777	4,694	3,878

		Wabash.	Warren.	Warrick.	Washington.	Wayne.	Wells.	White.	Whitley.	All other counties.[1]
1	Number of all farms in the county	2,529	1,286	2,503	2,549	2,410	2,545	1,991	2,041	8,885
2	Farms reporting land having drainage	2,220	845	681	90	1,722	2,457	1,697	1,943	96
3	Farms reporting land needing drainage	1,528	323	469	165	1,054	1,741	787	1,326	317
4	Farms in drainage and levee districts	620	117	245	1	77	464	193	295	8
	LAND AND FARM AREA.									
5	Approximate land area of the county ....acres..	272,000	235,520	250,880	332,160	263,040	233,600	324,480	216,320	823,680
6	All land in farms ....acres..	249,862	208,204	220,461	304,091	243,777	219,356	314,520	194,917	784,704
7	Improved land in farms ....acres..	205,986	179,162	188,831	208,274	197,717	192,372	276,447	159,653	519,692
8	Woodland in farms ....acres..	30,452	20,727	17,389	81,630	31,756	25,029	20,832	28,026	165,435
9	Other unimproved land in farms ....acres..	13,424	8,315	14,241	14,187	14,304	1,955	17,241	7,238	99,577
10	Farm land reported as provided with drainage ....acres..	159,664	119,148	25,783	3,459	105,457	168,895	209,682	136,110	1,168
11	Farm land reported as needing drainage ....acres..	39,935	14,121	11,782	8,593	26,384	38,190	41,234	28,864	5,814
12	Drainage only ....acres..	16,735	6,144	7,692	5,792	9,654	15,045	26,450	7,772	1,244
13	Drainage and clearing ....acres..	23,200	7,977	4,090	2,801	16,730	23,145	14,784	21,092	4,570

[1] Drainage on farms was reported in all counties in Indiana.

County Table II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		The State.	Adams.	Allen.	Bartholomew.	Benton.	Blackford.	Boone.	Carroll.	Cass.
	LAND AREA.									
1	Approximate land area of the state or county ... acres	23,068,800	215,680	423,040	260,480	261,120	107,520	273,280	241,280	266,240
2	All land in operating drainage enterprises ... acres	9,087,183	212,644	391,540	19,007	103,574	91,731	252,887	163,494	218,421
3	Improved land ... acres	7,605,565	172,400	281,817	14,012	84,313	79,464	[1] 220,686	147,037	196,581
4	Per cent of all improved land in farms	45.6	94.9	87.7	7.1	35.2	90.7	98.7	75.2	94.7
5	Timber and cut-over land ... acres	942,378	32,801	31,169	2,133	9,867	11,283	31,598	16,457	21,840
6	Other unimproved land ... acres	539,240	7,443	78,554	2,862	9,394	984	603	.....	.....
7	Swampy or subject to overflow, in enterprises ... acres	386,320	22,553	5,103	3,157	942	3,092	951	106	227
8	Suffering a loss of crops from defective drainage ... acres	210,678	2,119	1,055	3,125	870	752	69	.....	.....
9	Assessed acreage	15,015,221	781,606	484,619	19,007	105,122	111,397	315,899	164,861	351,038
10	Excess over all land in operating enterprises ... acres	5,928,038	568,962	93,079	.....	1,548	19,666	63,012	1,367	132,617
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed ... miles	17,470.7	761.3	1,045.2	64.8	89.0	212.2	368.5	258.1	532.9
12	Additional under construction ... miles	123.4	.....	5.9	.....	.....	.....	.....	.....	.....
13	Maximum completed in any enterprise ... miles	100.0	24.9	15.8	8.0	7.5	12.4	17.0	11.7	36.3
14	Maximum width at bottom of ditch [2] ... feet	125	125	20	6	30	65	12	12	12
15	Maximum of average depths of outlet ditches [2] ... feet	27.5	11.1	21.0	8.0	14.0	10.0	15.0	12.0	10.0
16	Mean depth of branch ditches [2] ... feet	5.1	3.5	4.8	3.6	3.4	4.7	4.3	4.6	4.2
	Tile drains:									
17	Completed ... miles	8,227.6	242.2	264.8	15.3	94.6	102.6	245.7	262.2	258.4
18	Additional under construction ... miles	185.7	.....	2.5	.....	.....	0.5	.....	1.6	.....
19	Maximum completed in any enterprise ... miles	100.0	4.5	4.9	7.0	6.0	5.0	9.0	4.6	12.2
20	Maximum size of tile [2] ... inches	48	30	30	20	36	24	27	30	30
	Accessory levees and dikes:									
21	Completed ... miles	165.8	.....	.....	2.5	.....	.....	.....	.....	.....
22	Additional under construction ... miles	9.2	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:									
23	Engine capacity ... horsepower	625	.....	.....	.....	.....	.....	.....	.....	.....
24	Pump capacity ... gallons per minute	55,348	.....	.....	.....	.....	.....	.....	.....	.....
25	Area served by pumps ... acres	5,611	.....	.....	.....	.....	.....	.....	.....	.....
26	Area drained by open ditches only [2] ... acres	5,133,620	118,130	295,573	14,917	49,975	46,133	123,146	67,680	123,318
27	Length of these ditches ... miles	12,487.2	523.0	883.3	58.6	66.0	112.7	291.8	199.0	333.6
28	Average length per acre ... feet	12.8	23.4	15.8	20.7	7.0	12.9	12.5	15.5	14.3
29	Area having open ditches and levees [2] ... acres	270,784	.....	.....	640	.....	.....	.....	.....	.....
30	Length of these ditches ... miles	210.5	.....	.....	2.2	.....	.....	.....	.....	.....
31	Average length per acre ... feet	4.1	.....	.....	18.2	.....	.....	.....	.....	.....
32	Length of the accessory levees ... miles	153.6	.....	.....	2.5	.....	.....	.....	.....	.....
33	Area drained by tile only [2] ... acres	1,234,320	12,008	33,210	2,465	33,767	11,774	84,948	54,472	25,686
34	Length of these tile ... miles	4,639.5	111.1	159.4	12.8	73.2	53.2	206.6	193.6	126.6
35	Average length per acre ... feet	19.8	48.9	25.3	27.4	11.4	23.9	12.8	18.8	26.0
36	Area drained by open ditches and tile [2] ... acres	2,423,949	82,506	62,757	985	19,832	33,824	44,793	41,342	69,417
37	Length of these drains ... miles	8,481.7	369.4	275.7	6.5	44.4	149.4	115.8	129.3	331.1
38	Average length per acre ... feet	18.5	23.6	23.2	34.8	11.8	23.3	13.6	16.5	25.2
39	Area having open ditches, tile drains, and levees [2] ... acres	24,510	.....	.....	.....	.....	.....	.....	.....	.....
40	Length of these drains ... miles	188.5	.....	.....	.....	.....	.....	.....	.....	.....
41	Average length per acre ... feet	40.6	.....	.....	.....	.....	.....	.....	.....	.....
42	Length of the accessory levees ... miles	21.4	.....	.....	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.									
43	Improved land in operating enterprises, 1920 ... acres	7,605,565	172,400	281,817	14,012	84,313	79,464	[1] 220,686	147,037	196,581
44	Improved land prior to drainage ... acres	5,396,387	117,897	144,101	10,371	74,540	42,150	[3] 158,490	132,329	173,527
45	Increase since drainage ... acres	2,209,178	54,503	137,716	3,641	9,773	37,314	62,196	14,708	23,054
46	Per cent of increase	40.9	46.2	95.6	35.1	13.1	88.5	39.2	11.1	13.3
47	Per cent increase is of all improved land in farms, 1920	13.2	30.0	42.9	1.9	4.1	42.6	27.8	7.5	11.1
48	Timber and cut-over land, 1920 ... acres	942,378	32,801	31,169	2,133	9,867	11,283	31,598	16,457	21,840
49	Timber and cut-over land prior to drainage ... acres	2,324,978	86,446	119,685	3,494	14,853	47,097	87,117	31,165	44,894
50	Decrease since drainage ... acres	1,382,600	53,645	88,516	1,361	4,986	35,814	55,519	14,708	23,054
51	Per cent of decrease	59.5	62.1	74.0	39.0	33.6	76.0	63.7	47.2	51.4
52	Other unimproved land, 1920 ... acres	539,240	7,443	78,554	2,862	9,394	984	603	.....	.....
53	Other unimproved land prior to drainage ... acres	1,365,818	8,301	127,754	5,142	14,181	2,484	7,280	.....	.....
54	Decrease since drainage ... acres	826,578	858	49,200	2,280	4,787	1,500	6,677	.....	.....
55	Per cent of decrease	60.5	10.3	38.5	44.3	33.8	60.4	91.7	.....	.....
56	Swampy or subject to overflow, 1920 ... acres	386,320	22,553	5,103	3,157	942	3,092	951	106	227
57	Swampy or subject to overflow prior to drainage ... acres	3,247,265	83,665	149,005	5,882	16,116	25,656	97,954	58,401	89,793
58	Decrease since drainage ... acres	2,860,945	61,112	143,902	2,725	15,174	22,564	97,003	58,295	89,566
59	Per cent of decrease	88.1	73.0	96.6	46.3	94.2	87.9	99.0	99.8	99.7
	CAPITAL INVESTED AND COST PER ACRE.									
60	Total capital invested in and required for completion of operating enterprises ... dollars	31,943,858	943,698	1,324,245	72,042	308,431	465,578	482,953	543,424	960,800
61	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	31,147,682	943,698	1,306,669	72,042	308,431	461,828	482,953	530,336	960,800
62	Additional capital required to complete these enterprises ... dollars	796,176	.....	17,576	.....	.....	3,750	.....	13,088	.....
63	Average cost per acre when completed ... dollars	3.52	4.44	3.38	3.79	2.98	5.08	1.91	3.32	4.40
64	Enterprises constructing open ditches only ... dollars	14,565,990	534,473	853,920	55,153	58,757	186,748	217,753	154,515	217,254
65	Average cost per acre when completed ... dollars	2.84	4.52	2.89	3.70	1.18	4.05	1.77	2.28	1.76
66	Enterprises constructing open ditches and levees ... dollars	920,976	.....	.....	850	.....	.....	.....	.....	.....
67	Average cost per acre when completed ... dollars	3.40	.....	.....	1.33	.....	.....	.....	.....	.....
68	Enterprises constructing tile drains only ... dollars	6,275,168	130,510	203,530	14,824	174,437	70,822	198,363	243,724	198,875
69	Average cost per acre when completed ... dollars	5.08	10.87	6.13	6.01	5.17	6.02	2.34	4.47	7.74
70	Enterprises constructing open ditches and tile drains ... dollars	9,811,999	278,715	266,795	1,215	75,237	208,008	66,837	145,185	544,671
71	Average cost per acre when completed ... dollars	4.05	3.38	4.25	1.23	3.79	6.15	1.49	3.51	7.85
72	Enterprises constructing open ditches, tile drains, and levees ... dollars	369,725	.....	.....	.....	.....	.....	.....	.....	.....
73	Average cost per acre when completed ... dollars	15.10	.....	.....	.....	.....	.....	.....	.....	.....
	CROPS.									
	Improved land in enterprises reporting—									
74	Corn as principal crop on drained land ... acres	6,943,654	171,086	240,117	14,012	84,313	79,464	220,440	146,276	196,581
75	Wheat as principal crop on drained land ... acres	392,459	.....	186	.....	.....	.....	100	761	.....
76	Hay as principal crop on drained land ... acres	121,608	.....	41,514	.....	.....	.....	.....	.....	.....
77	Oats as principal crop on drained land ... acres	64,647	.....	.....	.....	.....	.....	.....	.....	.....
78	Vegetables as principal crop on drained land ... acres	2,296	412	.....	.....	.....	.....	146	.....	.....
79	Not reporting principal crop on drained land ... acres	80,901	902	.....	.....	.....	.....	.....	.....	.....

[1] Office estimate; the reported figures exceed the improved acreage in all farms in the county as determined by the census of agriculture.
[2] When works under construction have been completed.
[3] The reported figures have been reduced by the same acreage as the improved land, 1920.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Clay.	Clinton.	Daviess.	De Kalb.	Delaware.	Dubois.	Elkhart.	Fayette.	Fountain.	Franklin.
	LAND AREA.										
1	Approximate land area of the county ... acres	231,040	261,120	277,120	236,800	250,880	273,280	295,680	138,240	252,800	252,160
2	All land in operating drainage enterprises ... acres	59,050	87,339	40,276	215,859	248,896	8,389	280,847	6,185	11,213	7,180
3	Improved land ... acres	49,497	77,982	40,142	141,782	[1] 196,985	7,823	[1] 217,623	4,785	8,659	6,466
4	Per cent of all improved land in farms	30.6	34.4	18.0	78.1	95.8	4.4	98.8	4.6	4.5	4.1
5	Timber and out-over land ... acres	8,623	4,963	134	18,625	51,615	566	41,676	990	1,371	569
6	Other unimproved land ... acres	930	4,394	.....	55,452	296	.....	21,548	410	1,183	145
7	Swampy or subject to overflow, in enterprises ... acres	1,439	5,924	500	228	6,735	166	7,865	89	110	145
8	Suffering a loss of crops from defective drainage ... acres	.....	332	500	119	2,245	48	7,856	89	110	145
9	Assessed acreage	68,050	96,119	41,422	539,899	271,660	8,389	301,680	6,185	11,213	7,180
10	Excess over all land in operating enterprises ... acres	9,000	8,780	1,146	324,040	22,764	.....	20,833	.....	.....	.....
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	89.2	44.2	64.5	798.1	320.1	25.7	546.0	.....	9.7	.....
12	Additional under construction ... miles	0.8	.....	.....	0.2	.....	.....	.....	.....	.....	.....
13	Maximum completed in any enterprise ... miles	20.7	13.4	34.0	23.1	14.1	15.9	18.1	.....	4.2	.....
14	Maximum width at bottom of ditch [2] ... feet	50	7	60	15	30	27	34	.....	8	.....
15	Maximum of average depths of outlet ditches [2] ... feet	15.0	8.0	16.0	9.0	6.7	8.0	10.0	.....	0.0	.....
16	Mean depth of branch ditches [2] ... feet	5.8	4.0	7.1	5.9	3.4	5.0	5.1	.....	.....	.....
	Tile drains:										
17	Completed ... miles	4.4	104.1	1.0	369.4	228.1	0.2	84.6	15.2	22.7	22.1
18	Additional under construction ... miles	.....	.....	.....	12.0	.....	.....	.....	.....	.....	.....
19	Maximum completed in any enterprise ... miles	3.0	8.0	0.6	10.5	7.0	0.2	8.0	3.1	5.4	4.5
20	Maximum size of tile [2] ... inches	24	30	12	30	24	15	36	24	30	24
	Accessory levees and dikes:										
21	Completed ... miles	10.9	.....	.....	.....	.....	0.3	.....	.....	.....	.....
22	Additional under construction ... miles	3.3	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:										
23	Engine capacity ... horsepower	200	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	Pump capacity ... gallons per minute	12,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	Area served by pumps ... acres	1,200	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	Area drained by open ditches only [2] ... acres	32,388	32,357	33,090	77,925	99,464	3,089	206,387	.....	2,162	.....
27	Length of these ditches ... miles	36.1	35.5	56.0	536.7	212.9	9.8	439.7	.....	9.2	.....
28	Average length per acre ... feet	5.9	5.8	8.9	36.4	11.3	16.8	11.2	.....	22.5	.....
29	Area having open ditches and levees [2] ... acres	16,332	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	Length of these ditches ... miles	35.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	Average length per acre ... feet	11.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
32	Length of the accessory levees ... miles	14.1	.....	.....	.....	.....	.....	.....	.....	.....	.....
33	Area drained by tile only [2] ... acres	650	39,827	.....	35,447	47,829	.....	17,082	6,185	5,916	7,180
34	Length of these tile ... miles	3.0	80.4	.....	185.3	145.0	.....	41.2	15.2	15.4	22.1
35	Average length per acre ... feet	24.4	10.7	.....	27.6	16.0	.....	12.7	13.0	13.7	16.3
36	Area drained by open ditches and tile [2] ... acres	8,880	15,155	7,186	102,487	101,603	.....	57,378	.....	3,135	.....
37	Length of these drains ... miles	17.3	32.4	9.5	457.7	190.3	.....	149.7	.....	7.8	.....
38	Average length per acre ... feet	10.3	11.3	7.0	23.6	9.9	.....	13.8	.....	13.1	.....
39	Area having open ditches, tile drains, and levees [2] ... acres	800	.....	.....	.....	.....	5,300	.....	.....	.....	.....
40	Length of these drains ... miles	2.5	.....	.....	.....	.....	16.1	.....	.....	.....	.....
41	Average length per acre ... feet	16.5	.....	.....	.....	.....	16.0	.....	.....	.....	.....
42	Length of the accessory levees ... miles	0.1	.....	.....	.....	.....	0.3	.....	.....	.....	.....
	DEVELOPMENT OF LAND.										
43	Improved land in operating enterprises, 1920 ... acres	49,497	77,982	40,142	141,782	[1] 196,985	7,823	[1] 217,623	4,785	8,659	6,466
44	Improved land prior to drainage ... acres	40,885	45,023	32,516	100,709	[3] 188,833	5,252	[3] 160,821	4,135	5,737	5,739
45	Increase since drainage ... acres	8,612	32,959	7,626	41,073	8,152	2,571	56,802	650	2,922	727
46	Per cent of increase	21.1	73.2	23.5	40.8	4.3	49.0	35.3	15.7	50.9	12.7
47	Per cent increase is of all improved land in farms, 1920	5.3	14.5	3.4	22.6	4.0	1.4	25.8	0.6	1.5	0.5
48	Timber and cut-over land, 1920 ... acres	8,623	4,963	134	18,625	51,615	566	41,676	990	1,371	569
49	Timber and cut-over land prior to drainage ... acres	15,147	31,360	6,078	45,338	59,014	3,119	74,563	1,292	3,048	720
50	Decrease since drainage ... acres	6,524	26,397	5,944	26,713	7,399	2,553	32,887	302	1,677	151
51	Per cent of decrease	43.1	84.2	97.8	58.9	12.5	81.9	44.1	23.4	55.0	21.0
52	Other unimproved land, 1920 ... acres	930	4,394	.....	55,452	296	.....	21,548	410	1,183	145
53	Other unimproved land prior to drainage ... acres	3,018	10,956	1,682	69,812	1,049	18	45,463	758	2,428	721
54	Decrease since drainage ... acres	2,088	6,562	1,682	14,360	753	18	23,915	348	1,245	576
55	Per cent of decrease	69.2	59.9	100.0	20.6	71.8	100.0	52.6	45.9	51.3	79.9
56	Swampy or subject to overflow, 1920 ... acres	1,439	5,924	500	228	6,735	166	7,865	89	110	145
57	Swampy or subject to overflow prior to drainage ... acres	9,638	59,880	15,485	22,170	59,294	6,276	75,828	768	1,940	721
58	Decrease since drainage ... acres	8,199	53,956	14,985	21,942	52,559	6,110	67,903	679	1,830	576
59	Per cent of decrease	85.1	90.1	96.8	99.0	88.6	97.4	89.6	88.4	94.3	79.9
	CAPITAL INVESTED AND COST PER ACRE.										
60	Total capital invested in and required for completion of operating enterprises ... dollars	391,223	224,420	104,304	879,466	422,035	60,697	523,692	23,484	97,839	49,333
61	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	380,223	224,420	104,304	841,020	422,035	60,697	523,692	23,484	97,839	49,333
62	Additional capital required to complete these enterprises ... dollars	11,000	.....	.....	38,446	.....	.....	.....	.....	.....	.....
63	Average cost per acre when completed ... dollars	6.63	2.57	2.59	4.07	1.70	7.24	1.86	3.80	8.73	6.87
64	Enterprises constructing open ditches only ... dollars	236,244	48,968	90,960	256,251	119,021	11,643	372,664	.....	23,821	.....
65	Average cost per acre when completed ... dollars	7.29	1.51	2.75	3.29	1.20	3.77	1.81	.....	11.02	.....
66	Enterprises constructing open ditches and levees ... dollars	106,661	.....	.....	.....	.....	.....	.....	.....	.....	.....
67	Average cost per acre when completed ... dollars	6.53	.....	.....	.....	.....	.....	.....	.....	.....	.....
68	Enterprises constructing tile drains only ... dollars	3,855	127,026	.....	215,219	141,422	.....	35,722	23,484	49,963	49,333
69	Average cost per acre when completed ... dollars	5.93	3.19	.....	6.07	2.96	.....	2.09	3.80	8.45	6.87
70	Enterprises constructing open ditches and tile drains ... dollars	37,499	48,426	13,344	407,996	161,592	.....	115,306	.....	24,055	.....
71	Average cost per acre when completed ... dollars	4.22	3.20	1.86	3.98	1.59	.....	2.01	.....	7.67	.....
72	Enterprises constructing open ditches, tile drains, and levees ... dollars	6,964	.....	.....	.....	.....	49,054	.....	.....	.....	.....
73	Average cost per acre when completed ... dollars	8.71	.....	.....	.....	.....	9.26	.....	.....	.....	.....
	CROPS.										
	Improved land in enterprises reporting—										
74	Corn as principal crop on drained land ... acres	49,497	77,586	39,502	106,670	196,985	7,598	217,623	4,785	8,659	6,466
75	Wheat as principal crop on drained land ... acres	.....	396	640	35,057	.....	.....	.....	.....	.....	.....
76	Hay as principal crop on drained land ... acres	.....	.....	.....	.....	.....	225	.....	.....	.....	.....
77	Oats as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
78	Vegetables as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
79	Not reporting principal crop on drained land ... acres	.....	.....	.....	55	.....	.....	.....	.....	.....	.....

[1] Office estimate; the reported figures exceed the improved acreage in all farms in the county as determined by the census of agriculture.
[2] When works under construction have been completed.
[3] The reported figures have been reduced by the same acreage as the improved land, 1920.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Fulton.	Gibson.	Grant.	Greene.	Hamilton.	Hancock.	Hendricks.	Henry.	Howard.	Huntington.
	LAND AREA.										
1	Approximate land area of the county ... acres	234,880	311,040	270,720	347,520	255,360	196,480	261,120	254,080	190,080	247,040
2	All land in operating drainage enterprises ... acres	221,911	190,403	221,636	51,077	128,591	141,119	106,094	129,478	154,655	210,132
3	Improved land ... acres	186,287	182,915	193,747	44,960	124,560	133,409	91,116	119,326	139,468	137,851
4	Per cent of all improved land in farms	99.4	77.3	88.3	18.9	59.4	79.9	46.1	56.5	86.0	70.3
5	Timber and cut-over land ... acres	15,482	3,979	21,643	5,380	4,031	7,710	14,978	10,152	15,169	51,379
6	Other unimproved land ... acres	20,142	3,509	6,246	737	.....	.....	.....	.....	18	20,902
7	Swampy or subject to overflow, in enterprises ... acres	280	3,740	6,410	12,455	807	393	1,379	11,839	164	20,647
8	Suffering a loss of crops from defective drainage ... acres	268	1,699	3,210	10,390	319	309	.....	6,301	38	5,183
9	Assessed acreage	269,604	212,153	529,758	51,077	130,400	150,020	107,314	151,449	238,818	252,519
10	Excess over all land in operating enterprises ... acres	47,693	21,750	308,122	.....	1,809	8,901	1,220	21,971	84,163	42,387
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	323.2	284.2	497.4	101.0	100.6	142.0	191.3	98.0	277.9	336.4
12	Additional under construction ... miles	1.0	.....	1.1	.....	.....	.....	.....	.....	8.3	10.6
13	Maximum completed in any enterprise ... miles	9.1	26.3	22.3	10.2	6.6	12.3	10.3	15.0	9.7	8.7
14	Maximum width at bottom of ditch [1] ... feet	15	30	20	50	10	36	10	12	25	60
15	Maximum of average depths of outlet ditches [1] ... feet	10.0	11.0	10.5	17.0	6.5	6.0	8.0	6.5	9.0	12.0
16	Mean depth of branch ditches [1] ... feet	4.3	4.7	5.1	4.4	4.0	3.6	3.9	3.6	5.2	4.6
	Tile drains:										
17	Completed ... miles	182.4	6.5	242.9	57.0	213.5	122.6	67.5	150.4	209.4	216.1
18	Additional under construction ... miles	.....	.....	3.9	70.0	1.3	2.6	1.8	2.6	0.1	3.5
19	Maximum completed in any enterprise ... miles	4.0	1.6	6.8	55.0	7.4	6.0	3.0	8.7	5.6	8.8
20	Maximum size of tile [1] ... inches	20	22	30	20	48	30	33	30	30	27
	Accessory levees and dikes:										
21	Completed ... miles	.....	.....	.....	11.6	.....	.....	.....	.....	.....	.....
22	Additional under construction ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:										
23	Engine capacity ... horsepower	.....	.....	.....	400	.....	.....	.....	.....	.....	.....
24	Pump capacity ... gallons per minute	.....	.....	.....	43,000	.....	.....	.....	.....	.....	.....
25	Area served by pumps ... acres	.....	.....	.....	3,300	.....	.....	.....	.....	.....	.....
26	Area drained by open ditches only [1] ... acres	100,417	172,841	108,625	45,364	31,442	63,250	61,036	42,090	56,984	113,467
27	Length of these ditches ... miles	202.0	236.4	291.7	89.0	44.6	98.5	149.7	53.9	158.5	217.8
28	Average length per acre ... feet	10.6	7.2	14.2	10.4	7.5	8.2	12.9	6.8	14.7	10.1
29	Area having open ditches and levees [1] ... acres	.....	.....	.....	193	.....	.....	.....	.....	.....	.....
30	Length of these ditches ... miles	.....	.....	.....	0.3	.....	.....	.....	.....	.....	.....
31	Average length per acre ... feet	.....	.....	.....	8.2	.....	.....	.....	.....	.....	.....
32	Length of the accessory levees ... miles	.....	.....	.....	3.6	.....	.....	.....	.....	.....	.....
33	Area drained by tile only [1] ... acres	36,917	631	8,516	.....	39,953	33,045	16,441	30,339	33,091	20,903
34	Length of these tile ... miles	98.1	2.0	127.5	.....	115.8	79.1	41.2	69.0	101.1	106.9
35	Average length per acre ... feet	14.0	16.7	79.1	.....	15.3	12.6	13.2	12.0	16.1	27.0
36	Area drained by open ditches and tile [1] ... acres	84,577	16,931	104,495	1,720	57,196	44,824	28,617	57,049	64,580	75,762
37	Length of these drains ... miles	206.5	52.3	326.1	6.7	155.0	89.6	69.7	128.1	236.1	240.9
38	Average length per acre ... feet	12.9	16.3	16.5	20.6	14.3	10.6	12.9	11.9	19.3	16.8
39	Area having open ditches, tile drains, and levees [1] ... acres	.....	.....	.....	3,800	.....	.....	.....	.....	.....	.....
40	Length of these drains ... miles	.....	.....	.....	132.0	.....	.....	.....	.....	.....	.....
41	Average length per acre ... feet	.....	.....	.....	183.4	.....	.....	.....	.....	.....	.....
42	Length of the accessory levees ... miles	.....	.....	.....	8.0	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.										
43	Improved land in operating enterprises, 1920 ... acres	186,287	182,915	193,747	44,960	124,560	133,409	91,116	119,326	139,468	137,851
44	Improved land prior to drainage ... acres	152,984	118,531	75,931	11,627	121,150	130,521	74,996	115,828	119,338	85,674
45	Increase since drainage ... acres	33,303	64,384	117,816	33,333	3,410	2,888	16,120	3,498	20,130	52,177
46	Per cent of increase	21.8	54.3	155.2	286.7	2.8	2.2	21.5	3.0	16.9	60.9
47	Per cent increase is of all improved land in farms, 1920	17.8	27.2	53.7	14.0	1.6	1.7	8.1	1.7	12.4	26.6
48	Timber and cut-over land, 1920 ... acres	15,482	3,979	21,643	5,380	4,031	7,710	14,978	10,152	15,169	51,379
49	Timber and cut-over land prior to drainage ... acres	29,135	40,647	86,617	20,260	7,441	10,598	31,098	13,650	34,089	103,226
50	Decrease since drainage ... acres	13,653	36,668	64,974	14,880	3,410	2,888	16,120	3,498	19,820	51,847
51	Per cent of decrease	46.9	90.2	75.0	73.4	45.8	27.3	51.8	25.6	56.6	50.2
52	Other unimproved land, 1920 ... acres	20,142	3,509	6,246	737	.....	.....	.....	.....	18	20,902
53	Other unimproved land prior to drainage ... acres	39,792	31,225	59,088	19,190	.....	.....	.....	.....	328	21,232
54	Decrease since drainage ... acres	19,650	27,716	52,842	18,453	.....	.....	.....	.....	310	330
55	Per cent of decrease	49.4	88.8	89.4	96.2	.....	.....	.....	.....	94.5	1.6
56	Swampy or subject to overflow, 1920 ... acres	280	3,740	6,410	12,455	807	393	1,379	11,839	164	20,647
57	Swampy or subject to overflow prior to drainage ... acres	96,285	126,694	63,907	33,473	16,295	23,467	17,501	34,018	64,468	81,426
58	Decrease since drainage ... acres	96,005	122,954	57,497	21,018	15,488	23,074	16,122	22,179	64,304	60,779
59	Per cent of decrease	99.7	97.0	90.0	62.8	95.0	98.3	92.1	65.2	99.7	74.5
	CAPITAL INVESTED AND COST PER ACRE.										
60	Total capital invested in and required for completion of operating enterprises ... dollars	364,509	576,984	731,674	441,491	272,971	272,631	212,894	355,443	515,217	625,794
61	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	364,509	576,984	710,207	411,491	272,700	264,887	205,894	349,243	473,761	498,145
62	Additional capital required to complete these enterprises ... dollars	.....	.....	21,467	30,000	271	7,744	7,000	6,200	41,456	127,649
63	Average cost per acre when completed ... dollars	1.64	3.03	3.30	8.64	2.12	1.93	2.01	2.75	3.33	2.98
64	Enterprises constructing open ditches only ... dollars	137,241	486,810	176,393	271,012	30,128	78,009	88,965	88,102	126,047	272,120
65	Average cost per acre when completed ... dollars	1.37	2.82	1.62	5.97	0.96	1.23	1.46	2.09	2.21	2.40
66	Enterprises constructing open ditches and levees ... dollars	.....	.....	.....	519	.....	.....	.....	.....	.....	.....
67	Average cost per acre when completed ... dollars	.....	.....	.....	2.69	.....	.....	.....	.....	.....	.....
68	Enterprises constructing tile drains only ... dollars	73,655	2,035	205,316	.....	120,705	111,185	70,625	121,332	156,151	154,154
69	Average cost per acre when completed ... dollars	2.00	3.23	24.11	.....	3.02	3.36	4.30	4.00	4.72	7.37
70	Enterprises constructing open ditches and tile drains ... dollars	153,613	88,139	349,965	8,960	122,138	83,437	53,304	146,009	233,019	199,520
71	Average cost per acre when completed ... dollars	1.82	5.21	3.35	5.21	2.14	1.86	1.86	2.56	3.61	2.63
72	Enterprises constructing open ditches, tile drains, and levees ... dollars	.....	.....	.....	161,000	.....	.....	.....	.....	.....	.....
73	Average cost per acre when completed ... dollars	.....	.....	.....	42.37	.....	.....	.....	.....	.....	.....
	CROPS.										
	Improved land in enterprises reporting—										
74	Corn as principal crop on drained land ... acres	186,287	182,915	191,709	44,960	124,560	133,409	91,116	119,326	139,468	137,851
75	Wheat as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
76	Hay as principal crop on drained land ... acres	.....	.....	2,038	.....	.....	.....	.....	.....	.....	.....
77	Oats as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
78	Vegetables as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
79	Not reporting principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Jackson.	Jasper.	Jay.	Jennings.	Johnson.	Knox.	Kosciusko.	Lagrange.	Lake.	La Porte.
	LAND AREA.										
1	Approximate land area of the county ... acres	331,520	359,680	240,000	245,120	206,080	326,400	346,240	247,680	314,880	380,800
2	All land in operating drainage enterprises ... acres	46,281	126,649	179,712	4,000	33,544	112,496	308,708	192,212	112,008	180,843
3	Improved land ... acres	39,332	105,472	161,252	3,080	31,709	95,299	[1] 229,035	141,370	82,614	162,759
4	Per cent of all improved land in farms	19.0	42.3	80.0	1.9	19.3	36.5	91.8	79.7	45.5	58.1
5	Timber and cut-over land ... acres	4,637	20,558	13,090	800	1,835	7,500	47,687	27,991	867	4,192
6	Other unimproved land ... acres	2,312	619	5,370	120	.....	9,697	31,986	22,851	28,527	13,892
7	Swampy or subject to overflow, in enterprises ... acres	3	14,616	24	120	1,047	11,809	18,799	17,516	26,755	21,082
8	Suffering a loss of crops from defective drainage ... acres	3	13,536	10	120	432	10,220	13,765	17,370	26,755	13,450
9	Assessed acreage	46,610	762,691	647,994	4,000	33,544	112,496	846,886	193,739	199,545	293,318
10	Excess over all land in operating enterprises ... acres	329	636,042	468,282	.....	.....	.....	538,178	1,527	87,537	112,475
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	35.6	434.5	367.2	6.9	50.0	207.7	577.8	317.2	261.0	312.1
12	Additional under construction ... miles	.....	6.6	.....	.....	.....	.....	.....	.....	2.7	0.3
13	Maximum completed in any enterprise ... miles	13.0	100.0	21.9	2.9	3.5	43.4	16.6	18.0	23.0	25.0
14	Maximum width at bottom of ditch [2] ... feet	28	100	65	13	3	30	42	46	100	90
15	Maximum of average depths of outlet ditches [2] ... feet	14.0	15.0	11.1	8.0	4.0	12.0	9.0	10.6	27.5	12.0
16	Mean depth of branch ditches [2] ... feet	8.8	6.8	3.9	.....	.....	6.1	4.5	4.4	5.3	6.0
	Tile drains:										
17	Completed ... miles	.....	226.8	175.2	.....	20.7	9.4	388.0	119.8	21.6	89.2
18	Additional under construction ... miles	.....	3.8	0.2	.....	.....	.....	1.0	3.5	5.5	0.6
19	Maximum completed in any enterprise ... miles	.....	100.0	9.3	.....	2.1	7.6	12.6	15.9	3.5	75.0
20	Maximum size of tile [2] ... inches	.....	30	30	.....	24	24	30	24	36	18
	Accessory levees and dikes:										
21	Completed ... miles	.....	9.9	.....	.....	.....	5.5	.....	.....	12.9	.....
22	Additional under construction ... miles	.....	1.2	.....	.....	.....	.....	.....	.....	0.3	.....
	Pumping plants:										
23	Engine capacity ... horsepower	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	Pump capacity ... gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	Area served by pumps ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	Area drained by open ditches only [2] ... acres	46,281	61,988	76,095	4,000	21,238	105,771	181,717	97,783	77,431	176,703
27	Length of these ditches ... miles	35.6	216.7	206.4	6.9	42.8	194.8	362.9	208.0	203.6	295.8
28	Average length per acre ... feet	4.1	18.5	14.3	9.1	10.6	9.7	10.5	11.2	13.9	8.8
29	Area having open ditches and levees [2] ... acres	.....	50,845	.....	.....	.....	1,094	.....	.....	16,173	.....
30	Length of these ditches ... miles	.....	12.0	.....	.....	.....	5.6	.....	.....	16.6	.....
31	Average length per acre ... feet	.....	1.2	.....	.....	.....	27.0	.....	.....	5.4	.....
32	Length of the accessory levees ... miles	.....	11.1	.....	.....	.....	5.5	.....	.....	13.2	.....
33	Area drained by tile only [2] ... acres	.....	5,278	19,240	.....	6,772	1,151	32,178	12,991	4,183	500
34	Length of these tile ... miles	.....	80.1	79.3	.....	17.6	7.6	212.0	41.1	8.8	0.6
35	Average length per acre ... feet	.....	80.1	21.8	.....	13.7	34.9	34.8	16.7	11.1	6.3
36	Area drained by open ditches and tile [2] ... acres	.....	[3] 8,538	84,377	.....	5,534	4,480	94,813	81,438	14,221	3,640
37	Length of these drains ... miles	.....	362.9	256.9	.....	10.3	9.1	391.9	191.4	61.8	105.8
38	Average length per acre ... feet	.....	.....	16.1	.....	9.8	10.7	21.8	12.4	22.9	153.5
39	Area having open ditches, tile drains, and levees [2] ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
40	Length of these drains ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
41	Average length per acre ... feet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
42	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.										
43	Improved land in operating enterprises, 1920 ... acres	39,332	105,472	161,252	3,080	31,709	95,299	[1] 229,035	141,370	82,614	162,759
44	Improved land prior to drainage ... acres	20,842	69,202	126,058	2,400	30,552	37,931	[4] 180,039	104,797	21,049	31,481
45	Increase since drainage ... acres	18,490	36,270	35,194	680	1,157	57,318	48,996	36,573	61,565	131,278
46	Per cent of increase	88.7	52.4	27.9	28.3	3.8	150.9	27.2	34.9	292.5	417.0
47	Per cent increase is of all improved land in farms, 1920	8.9	14.5	17.5	0.4	0.7	21.9	19.6	20.6	33.9	46.8
48	Timber and cut-over land, 1920 ... acres	4,637	20,558	13,090	800	1,835	7,500	47,687	27,991	867	4,192
49	Timber and cut-over land prior to drainage ... acres	13,883	38,579	41,750	1,200	2,992	17,815	62,383	61,429	1,468	29,716
50	Decrease since drainage ... acres	9,246	18,021	28,660	400	1,157	10,315	14,696	33,438	601	25,524
51	Per cent of decrease	66.6	46.7	68.6	33.3	38.7	57.9	23.6	54.4	40.9	85.9
52	Other unimproved land, 1920 ... acres	2,312	619	5,370	120	.....	9,697	31,986	22,851	28,527	13,892
53	Other unimproved land prior to drainage ... acres	11,556	18,868	11,904	400	.....	56,700	66,286	25,986	89,491	119,646
54	Decrease since drainage ... acres	9,244	18,249	6,534	280	.....	47,003	34,300	3,135	60,964	105,754
55	Per cent of decrease	80.0	96.7	54.9	70.0	.....	82.9	51.7	12.1	68.1	88.4
56	Swampy or subject to overflow, 1920 ... acres	3	14,616	24	120	1,047	11,809	18,799	17,516	26,755	21,082
57	Swampy or subject to overflow prior to drainage ... acres	25,410	50,190	51,922	400	3,611	63,289	40,655	60,240	89,481	142,315
58	Decrease since drainage ... acres	25,407	35,574	51,898	280	2,564	51,480	21,856	42,724	62,726	121,233
59	Per cent of decrease	100.0	70.9	100.0	70.0	71.0	81.3	53.8	70.9	70.1	85.2
	CAPITAL INVESTED AND COST PER ACRE.										
60	Total capital invested in and required for completion of operating enterprises ... dollars	141,271	1,346,359	940,294	22,800	42,843	549,729	1,054,797	427,192	527,837	770,362
61	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	141,271	1,306,633	940,130	22,800	42,843	549,729	1,054,797	416,242	513,174	768,462
62	Additional capital required to complete these enterprises ... dollars	.....	39,726	164	.....	.....	.....	.....	10,950	14,663	1,900
63	Average cost per acre when completed ... dollars	3.05	10.63	5.23	5.70	1.28	4.89	3.42	2.22	4.71	4.26
64	Enterprises constructing open ditches only ... dollars	141,271	483,583	581,282	22,800	14,456	516,992	335,495	127,293	305,349	701,994
65	Average cost per acre when completed ... dollars	3.05	7.80	7.64	5.70	0.68	4.89	1.85	1.30	3.94	3.97
66	Enterprises constructing open ditches and levees ... dollars	.....	150,122	.....	.....	.....	3,940	.....	.....	102,351	.....
67	Average cost per acre when completed ... dollars	.....	2.95	.....	.....	.....	3.60	.....	.....	6.33	.....
68	Enterprises constructing tile drains only ... dollars	.....	128,768	91,303	.....	18,010	13,047	276,576	40,873	18,121	1,200
69	Average cost per acre when completed ... dollars	.....	24.40	4.75	.....	2.66	11.34	8.60	3.15	4.33	2.40
70	Enterprises constructing open ditches and tile drains ... dollars	.....	583,886	267,709	.....	10,377	15,750	442,726	259,026	102,016	67,168
71	Average cost per acre when completed ... dollars	.....	.....	3.17	.....	1.88	3.52	4.67	3.18	7.17	18.45
72	Enterprises constructing open ditches, tile drains, and levees ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
73	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	CROPS.										
	Improved land in enterprises reporting—										
74	Corn as principal crop on drained land ... acres	39,332	64,753	161,252	3,080	31,709	90,364	219,505	140,474	20,391	30,100
75	Wheat as principal crop on drained land ... acres	.....	1,891	.....	.....	.....	4,935	9,186	.....	39,024	132,659
76	Hay as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
77	Oats as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	4,703	.....
78	Vegetables as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	124	.....	1,614	.....
79	Not reporting principal crop on drained land ... acres	.....	38,828	.....	.....	.....	.....	220	896	16,882	.....

[1] Office estimate; the reported figures exceed the improved acreage in all farms in the county as determined by the census of agriculture.
[2] When works under construction have been completed.
[3] Additional area reported under other classifications.
[4] The reported figures have been reduced by the same acreage as the improved land, 1920.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Madison.	Marion.	Marshall.	Miami.	Montgomery.	Morgan.	Newton.	Noble.	Owen.	Parke.
	LAND AREA.										
1	Approximate land area of the county ... acres	288,000	254,080	282,240	243,840	320,640	259,840	259,200	266,880	251,520	286,080
2	All land in operating drainage enterprises ... acres	226,660	40,309	256,037	201,728	77,573	29,147	172,687	198,866	6,540	12,399
3	Improved land ... acres	210,573	39,439	[1]200,796	182,089	59,491	24,773	146,033	151,554	5,532	10,539
4	Per cent of all improved land in farms	89.0	23.6	95.7	97.4	24.0	15.2	79.6	76.2	3.8	6.5
5	Timber and cut-over land ... acres	16,087	870	36,770	19,532	8,230	2,921	13,118	23,759	882	1,860
6	Other unimproved land ... acres	.....	.....	18,471	107	9,852	1,453	13,536	23,553	126	.....
7	Swampy or subject to overflow, in enterprises ... acres	9,572	1,925	4,330	26	2,252	1	4,141	20,581	1,018	259
8	Suffering a loss of crops from defective drainage ... acres	2,675	1,026	3,100	3	2,251	.....	4,141	13,255	506	96
9	Assessed acreage	336,502	41,569	682,269	248,482	79,897	49,947	476,572	345,759	6,540	12,399
10	Excess over all land in operating enterprises ... acres	109,842	1,260	426,232	46,754	2,324	20,800	303,885	146,893	.....	.....
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	427.6	77.0	571.3	248.6	67.0	49.2	244.1	459.5	11.0	13.0
12	Additional under construction ... miles	.....	.....	3.6	.....	6.0	.....	.....	0.1	.....	.....
13	Maximum completed in any enterprise ... miles	14.0	7.6	24.0	13.5	7.9	6.5	23.1	53.0	5.1	3.6
14	Maximum width at bottom of ditch [2] ... feet	30	15	40	25	10	24	100	16	50	4
15	Maximum of average depths of outlet ditches [2] ... feet	7.0	8.0	16.0	9.0	11.9	12.0	16.4	12.7	13.0	7.0
16	Mean depth of branch ditches [2] ... feet	3.9	.....	4.4	6.6	3.7	4.9	6.1	5.2	4.0	.....
	Tile drains:										
17	Completed ... miles	290.6	7.8	217.2	167.8	98.0	1.3	78.0	317.4	1.0	1.0
18	Additional under construction ... miles	1.9	0.7	1.5	.....	2.2	.....	0.3	.....	.....	.....
19	Maximum completed in any enterprise ... miles	8.4	1.6	8.2	5.6	6.7	1.3	8.0	19.6	1.0	1.0
20	Maximum size of tile [2] ... inches	40	18	30	24	27	16	30	30	16	15
	Accessory levees and dikes:										
21	Completed ... miles	.....	2.8	.....	.....	.....	.....	1.9	.....	.....	21.0
22	Additional under construction ... miles	.....	.....	.....	.....	.....	.....	0.2	.....	.....	.....
	Pumping plants:										
23	Engine capacity ... horsepower	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	Pump capacity ... gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	Area served by pumps ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	Area drained by open ditches only [2] ... acres	137,947	30,144	155,398	115,269	22,680	28,517	130,271	84,692	5,150	1,255
27	Length of these ditches ... miles	359.9	58.0	414.3	137.6	38.3	47.7	182.0	228.2	8.0	7.0
28	Average length per acre ... feet	13.8	10.2	14.1	6.3	8.9	8.8	7.4	14.2	8.2	29.5
29	Area having open ditches and levees [2] ... acres	.....	2,232	.....	.....	.....	.....	8,538	.....	.....	10,724
30	Length of these ditches ... miles	.....	1.0	.....	.....	.....	.....	2.3	.....	.....	4.5
31	Average length per acre ... feet	.....	2.4	.....	.....	.....	.....	1.4	.....	.....	2.2
32	Length of the accessory levees ... miles	.....	2.8	.....	.....	.....	.....	2.1	.....	.....	21.0
33	Area drained by tile only [2] ... acres	46,150	1,569	23,911	17,952	18,545	.....	15,007	27,362	.....	.....
34	Length of these tile ... miles	201.0	3.5	115.5	70.9	55.3	.....	35.1	149.1	.....	.....
35	Average length per acre ... feet	23.0	11.8	25.5	20.9	15.7	.....	12.3	28.8	.....	.....
36	Area drained by open ditches and tile [2] ... acres	42,563	6,364	76,728	68,507	36,348	630	18,871	86,812	1,390	420
37	Length of these drains ... miles	159.2	23.0	263.8	207.9	79.6	2.8	103.0	399.7	4.9	2.5
38	Average length per acre ... feet	19.7	19.1	18.2	16.0	11.6	23.5	28.8	24.3	18.6	31.4
39	Area having open ditches, tile drains, and levees [2] ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
40	Length of these drains ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
41	Average length per acre ... feet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
42	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.										
43	Improved land in operating enterprises, 1920 ... acres	210,573	39,439	[1]200,796	182,089	59,491	24,773	146,033	151,554	5,532	10,539
44	Improved land prior to drainage ... acres	202,795	38,626	[3]146,912	160,583	45,355	11,674	112,766	112,991	4,992	7,364
45	Increase since drainage ... acres	7,778	813	53,884	21,506	14,136	13,099	33,267	38,563	540	3,175
46	Per cent of increase	3.8	2.1	36.7	13.4	31.2	112.2	29.5	34.1	10.8	43.1
47	Per cent increase is of all improved land in farms, 1920	.....	.....	.....	11.5	5.7	8.0	18.1	19.4	0.4	1.9
48	Timber and cut-over land, 1920 ... acres	16,087	870	36,770	19,532	8,230	2,921	13,118	23,759	882	1,860
49	Timber and cut-over land prior to drainage ... acres	23,865	1,683	68,506	40,030	14,469	14,558	25,993	60,376	1,338	5,035
50	Decrease since drainage ... acres	7,778	813	31,736	21,398	6,239	11,637	12,875	36,617	456	3,175
51	Per cent of decrease	32.6	48.3	46.3	52.3	43.1	79.9	49.5	60.6	34.1	63.1
52	Other unimproved land, 1920 ... acres	.....	.....	18,471	107	9,852	1,453	13,536	23,553	126	.....
53	Other unimproved land prior to drainage ... acres	.....	.....	40,619	215	17,749	2,915	33,928	25,499	210	.....
54	Decrease since drainage ... acres	.....	.....	22,148	108	7,897	1,462	20,392	1,946	84	.....
55	Per cent of decrease	.....	.....	54.5	50.2	44.5	50.2	60.1	7.6	40.0	.....
56	Swampy or subject to overflow, 1920 ... acres	9,572	1,925	4,330	26	2,252	1	4,141	20,581	1,018	259
57	Swampy or subject to overflow prior to drainage ... acres	67,442	8,170	20,360	69,849	13,676	8,735	36,445	59,903	2,898	1,990
58	Decrease since drainage ... acres	57,870	6,245	16,030	69,823	11,424	8,734	32,304	39,322	1,880	1,731
59	Per cent of decrease	85.8	76.4	78.7	100.0	83.5	100.0	88.6	65.6	64.9	87.0
	CAPITAL INVESTED AND COST PER ACRE.										
60	Total capital invested in and required for completion of operating enterprises ... dollars	730,276	97,719	803,208	497,034	210,245	70,813	631,742	788,434	60,514	53,425
61	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	722,012	95,615	793,383	497,034	183,569	70,813	630,390	788,205	60,514	53,425
62	Additional capital required to complete these enterprises ... dollars	8,264	2,104	9,825	.....	26,676	.....	1,352	139	.....	.....
63	Average cost per acre when completed ... dollars	3.22	2.42	3.14	2.46	2.71	2.43	3.66	3.96	9.25	4.31
64	Enterprises constructing open ditches only ... dollars	253,877	66,070	358,118	148,802	43,456	66,813	399,401	164,960	47,499	3,232
65	Average cost per acre when completed ... dollars	1.84	2.19	2.30	1.29	1.92	2.34	3.07	1.95	9.22	2.58
66	Enterprises constructing open ditches and levees ... dollars	.....	11,500	.....	.....	.....	.....	27,032	.....	.....	47,714
67	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	3.17	.....	.....	4.45
68	Enterprises constructing tile drains only ... dollars	265,270	7,060	128,468	87,675	61,481	.....	52,333	174,389	.....	.....
69	Average cost per acre when completed ... dollars	5.75	4.50	5.37	4.88	3.32	.....	3.49	6.37	.....	.....
70	Enterprises constructing open ditches and tile drains ... dollars	211,129	13,089	316,622	260,557	105,308	4,000	152,976	449,085	13,015	2,479
71	Average cost per acre when completed ... dollars	4.96	2.06	4.13	3.80	2.90	6.35	8.11	5.17	9.36	5.90
72	Enterprises constructing open ditches, tile drains, and levees ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
73	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	CROPS.										
	Improved land in enterprises reporting—										
74	Corn as principal crop on drained land ... acres	210,115	39,439	200,796	182,089	59,491	24,773	146,033	151,551	5,532	10,539
75	Wheat as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	3	.....	.....
76	Hay as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
77	Oats as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
78	Vegetables as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
79	Not reporting principal crop on drained land ... acres	458	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Office estimate; the reported figures exceed the improved acreage in all farms in the county as determined by the census of agriculture.
[2] When works under construction have been completed.
[3] The reported figures have been reduced by the same acreage as the improved land, 1920.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Pike.	Porter.	Posey.	Pulaski.	Putnam.	Randolph.	Rush.	St. Joseph.	Scott.	Shelby.
	LAND AREA.										
1	Approximate land area of the county ... acres	216,320	265,600	257,280	276,480	309,120	286,080	261,760	294,400	121,600	260,480
2	All land in operating drainage enterprises ... acres	32,152	149,323	146,970	135,754	5,225	59,618	101,373	198,571	11,895	80,508
3	Improved land ... acres	31,298	121,331	145,117	121,510	4,198	53,659	87,969	170,763	10,707	75,636
4	Per cent of all improved land in farms	20.3	64.9	68.5	59.8	2.2	22.2	39.5	79.3	13.9	34.1
5	Timber and cut-over land ... acres	854	25,584	1,711	11,313	1,027	3,626	13,404	11,912	594	4,872
6	Other unimproved land ... acres	.....	2,408	142	2,931	.....	2,333	.....	15,896	594	.....
7	Swampy or subject to overflow, in enterprises ... acres	669	10,918	627	3,323	76	.....	3,233	7,380	.....	9,556
8	Suffering a loss of crops from defective drainage ... acres	193	7,518	176	809	.....	.....	3,231	5,889	.....	.....
9	Assessed acreage	32,152	185,424	149,264	166,731	6,025	59,796	102,254	345,877	11,895	80,890
10	Excess over all land in operating enterprises ... acres	.....	36,101	2,294	30,977	800	178	881	147,306	.....	382
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	56.4	228.9	133.5	154.7	47.1	17.8	135.8	442.0	19.0	182.8
12	Additional under construction ... miles	.....	2.8	.....	3.8	.....	.....	.....	.....	.....	.....
13	Maximum completed in any enterprise ... miles	18.0	19.2	41.6	41.8	45.0	2.8	6.9	21.2	10.0	6.2
14	Maximum width at bottom of ditch [1] ... feet	20	100	40	40	14	10	5	35	28	10
15	Maximum of average depths of outlet ditches [1] ... feet	10.0	10.0	9.0	15.0	10.0	6.2	4.5	12.0	12.0	4.0
16	Mean depth of branch ditches [1] ... feet	4.7	4.0	6.0	5.5	6.5	3.6	3.0	4.8	4.0	.....
	Tile drains:										
17	Completed ... miles	0.2	81.7	0.3	65.2	7.7	75.9	145.0	66.7	.....	60.6
18	Additional under construction ... miles	.....	.....	.....	.....	.....	1.8	4.9	.....	.....	.....
19	Maximum completed in any enterprise ... miles	0.2	12.4	0.3	8.0	2.2	6.0	5.0	7.0	.....	3.4
20	Maximum size of tile [1] ... inches	10	20	10	24	20	30	24	24	.....	24
	Accessory levees and dikes:										
21	Completed ... miles	.....	16.4	12.0	.....	.....	.....	.....	.....	.....	0.1
22	Additional under construction ... miles	.....	1.2	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:										
23	Engine capacity ... horsepower	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	Pump capacity ... gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	Area served by pumps ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	Area drained by open ditches only [1] ... acres	30,891	54,436	28,185	91,765	2,540	3,678	43,742	151,056	11,895	50,123
27	Length of these ditches ... miles	53.2	120.1	71.6	140.3	45.4	5.7	121.3	330.0	19.0	165.6
28	Average length per acre ... feet	9.1	11.6	13.4	8.1	94.4	8.2	14.6	11.5	8.4	17.4
29	Area having open ditches and levees [1] ... acres	.....	32,358	95,085	.....	.....	.....	.....	.....	.....	.....
30	Length of these ditches ... miles	.....	27.0	41.6	.....	.....	.....	.....	.....	.....	.....
31	Average length per acre ... feet	.....	4.4	2.3	.....	.....	.....	.....	.....	.....	.....
32	Length of the accessory levees ... miles	.....	17.6	12.0	.....	.....	.....	.....	.....	.....	.....
33	Area drained by tile only [1] ... acres	.....	10,814	.....	36,264	1,680	13,969	44,276	4,324	.....	19,744
34	Length of these tile ... miles	.....	36.9	.....	58.7	5.4	45.2	128.3	32.3	.....	47.4
35	Average length per acre ... feet	.....	18.0	.....	8.5	17.0	17.1	15.3	39.4	.....	12.7
36	Area drained by open ditches and tile [1] ... acres	1,261	51,715	23,700	7,725	1,005	41,971	13,355	43,191	.....	9,842
37	Length of these drains ... miles	3.4	129.4	20.6	24.7	4.0	44.6	36.1	146.4	.....	28.2
38	Average length per acre ... feet	14.2	13.2	4.6	16.9	21.0	5.6	14.3	17.9	.....	15.1
39	Area having open ditches, tile drains, and levees [1] ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	799
40	Length of these drains ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.2
41	Average length per acre ... feet	.....	.....	.....	.....	.....	.....	.....	.....	.....	14.5
42	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.1
	DEVELOPMENT OF LAND.										
43	Improved land in operating enterprises, 1920 ... acres	31,298	121,331	145,117	121,510	4,198	53,659	87,969	170,763	10,707	75,636
44	Improved land prior to drainage ... acres	16,118	78,734	124,245	56,704	3,569	42,027	75,953	109,680	7,135	74,345
45	Increase since drainage ... acres	15,180	42,597	20,872	64,806	629	11,632	12,016	61,083	3,572	1,291
46	Per cent of increase	94.2	54.1	16.8	114.3	17.6	27.7	16.8	55.7	50.1	1.7
47	Per cent increase is of all improved land in farms, 1920	9.9	22.8	9.9	31.9	0.3	4.8	5.4	28.4	4.7	0.6
48	Timber and cut-over land, 1920 ... acres	854	25,584	1,711	11,313	1,027	3,626	13,404	11,912	594	4,872
49	Timber and cut-over land prior to drainage ... acres	16,034	40,954	22,339	64,824	1,271	9,879	25,420	48,183	2,380	6,163
50	Decrease since drainage ... acres	15,180	15,370	20,628	53,511	244	6,253	12,016	36,271	1,786	1,291
51	Per cent of decrease	94.7	37.5	92.3	82.5	19.2	63.3	47.3	75.3	75.0	20.9
52	Other unimproved land, 1920 ... acres	.....	2,408	142	2,931	.....	2,333	.....	15,896	594	.....
53	Other unimproved land prior to drainage ... acres	.....	29,635	386	14,226	385	7,712	.....	40,708	2,380	.....
54	Decrease since drainage ... acres	.....	27,227	244	11,295	385	5,379	.....	24,812	1,786	.....
55	Per cent of decrease	.....	91.9	63.2	79.4	100.0	69.7	.....	61.0	75.0	.....
56	Swampy or subject to overflow, 1920 ... acres	669	10,918	627	3,323	76	.....	3,233	7,380	.....	9,556
57	Swampy or subject to overflow prior to drainage ... acres	27,633	54,471	82,188	103,341	566	13,469	4,193	39,249	4,758	29,826
58	Decrease since drainage ... acres	26,964	43,553	81,561	100,018	490	13,469	960	31,869	4,758	20,270
59	Per cent of decrease	97.6	80.0	99.2	96.8	86.6	100.0	22.9	81.2	100.0	68.0
	CAPITAL INVESTED AND COST PER ACRE.										
60	Total capital invested in and required for completion of operating enterprises ... dollars	133,763	582,404	210,000	489,650	24,965	142,965	462,811	498,766	78,689	142,927
61	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	133,763	572,204	210,000	482,276	24,965	139,112	462,811	498,766	78,689	142,927
62	Additional capital required to complete these enterprises ... dollars	.....	10,200	.....	7,374	.....	3,853	.....	.....	.....	.....
63	Average cost per acre when completed ... dollars	4.16	3.90	1.43	3.61	4.78	2.40	4.57	2.51	6.62	1.78
64	Enterprises constructing open ditches only ... dollars	131,119	228,006	48,337	389,619	10,255	5,809	165,142	293,387	78,689	68,997
65	Average cost per acre when completed ... dollars	4.24	4.19	1.71	4.25	4.04	1.58	3.78	1.94	6.62	1.38
66	Enterprises constructing open ditches and levees ... dollars	.....	128,524	112,500	.....	.....	.....	.....	.....	.....	.....
67	Average cost per acre when completed ... dollars	.....	3.97	1.18	.....	.....	.....	.....	.....	.....	.....
68	Enterprises constructing tile drains only ... dollars	.....	48,835	.....	77,746	8,293	71,350	248,368	37,815	.....	55,299
69	Average cost per acre when completed ... dollars	.....	4.52	.....	2.14	4.94	5.11	5.61	8.75	.....	2.80
70	Enterprises constructing open ditches and tile drains ... dollars	2,644	177,039	49,163	22,285	6,417	65,806	49,301	167,564	.....	14,093
71	Average cost per acre when completed ... dollars	2.10	3.42	2.07	2.88	6.39	1.57	3.69	3.88	.....	1.43
72	Enterprises constructing open ditches, tile drains, and levees ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,538
73	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.68
	CROPS.										
	Improved land in enterprises reporting—										
74	Corn as principal crop on drained land ... acres	29,634	7,732	145,117	120,497	4,198	53,659	87,969	165,604	10,707	75,636
75	Wheat as principal crop on drained land ... acres	.....	91,747	.....	1,013	.....	.....	.....	5,159	.....	.....
76	Hay as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
77	Oats as principal crop on drained land ... acres	.....	856	.....	.....	.....	.....	.....	.....	.....	.....
78	Vegetables as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
79	Not reporting principal crop on drained land ... acres	1,664	20,996	.....	.....	.....	.....	.....	.....	.....	.....

[1] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Spencer.	Starke.	Steuben.	Sullivan.	Tippecanoe.	Tipton.	Union.	Vanderburg.	Vermillion.	Vigo.
	LAND AREA.										
1	Approximate land area of the county ... acres	257,920	195,200	195,200	294,400	321,920	166,400	103,680	149,120	162,560	261,760
2	All land in operating drainage enterprises ... acres	88,143	181,208	133,743	22,958	91,795	155,109	4,640	53,014	6,548	50,835
3	Improved land ... acres	85,109	[1]119,310	86,495	21,091	78,522	140,851	3,748	48,680	5,292	48,019
4	Per cent of all improved land in farms	45.1	97.5	61.5	10.0	29.9	99.0	4.8	42.8	5.2	26.7
5	Timber and cut-over land ... acres	3,034	53,252	15,106	1,867	8,098	14,227	562	3,779	1,256	2,816
6	Other unimproved land ... acres	.....	8,646	32,142	.....	5,175	31	330	555	.....	.....
7	Swampy or subject to overflow, in enterprises ... acres	926	3,255	2,669	5,925	643	28,142	20	10,597	132	578
8	Suffering a loss of crops from defective drainage ... acres	374	1,941	.....	979	246	9,757	20	1,556	.....	.....
9	Assessed acreage	94,222	487,275	160,704	24,689	91,890	388,247	4,640	53,398	6,548	50,894
10	Excess over all land in operating enterprises ... acres	6,079	306,067	26,961	1,631	95	233,138	.....	384	.....	59
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	198.8	637.5	352.5	41.8	31.7	558.4	.....	119.0	11.9	91.9
12	Additional under construction ... miles	.....	31.9	1.6	1.5	.....	.....	.....	.....	.....	.....
13	Maximum completed in any enterprise ... miles	18.3	28.8	37.7	12.7	5.2	11.0	.....	10.4	5.8	13.2
14	Maximum width at bottom of ditch [2] ... feet	30	100	12	30	30	12	.....	16	4	30
15	Maximum of average depths of outlet ditches [2] ... feet	14.0	15.0	10.0	10.0	7.9	9.0	.....	9.0	5.5	15.0
16	Mean depth of branch ditches [2] ... feet	4.3	5.1	7.5	4.9	4.3	3.6	.....	.....	4.0	4.3
	Tile drains:										
17	Completed ... miles	7.4	35.3	248.2	11.7	213.5	253.5	18.1	3.4	2.4	1.6
18	Additional under construction ... miles	.....	1.3	6.7	0.3	2.8	.....	.....	.....	.....	.....
19	Maximum completed in any enterprise ... miles	2.0	10.0	6.9	5.2	21.2	6.4	5.0	1.5	1.3	1.6
20	Maximum size of tile [2] ... inches	12	20	30	18	30	36	24	18	12	20
	Accessory levees and dikes:										
21	Completed ... miles	.....	4.0	.....	18.2	.....	.....	.....	.....	.....	35.8
22	Additional under construction ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.0
	Pumping plants:										
23	Engine capacity ... horsepower	.....	.....	.....	25	.....	.....	.....	.....	.....	([3])
24	Pump capacity ... gallons per minute	.....	.....	.....	348	.....	.....	.....	.....	.....	([3])
25	Area served by pumps ... acres	.....	.....	.....	311	.....	.....	.....	.....	.....	800
26	Area drained by open ditches only [2] ... acres	81,281	162,247	82,293	5,193	1,400	127,137	.....	50,886	2,337	15,955
27	Length of these ditches ... miles	180.7	580.5	218.5	13.8	1.0	494.6	.....	115.4	3.2	59.4
28	Average length per acre ... feet	11.7	18.9	14.0	14.0	3.8	20.5	.....	12.0	7.2	13.0
29	Area having open ditches and levees [2] ... acres	.....	([4])	.....	2,290	.....	.....	.....	.....	.....	34,280
30	Length of these ditches ... miles	.....	1.6	.....	7.8	.....	.....	.....	.....	.....	52.5
31	Average length per acre ... feet	.....	.....	.....	18.0	.....	.....	.....	.....	.....	8.1
32	Length of the accessory levees ... miles	.....	1.5	.....	7.8	.....	.....	.....	.....	.....	38.8
33	Area drained by tile only [2] ... acres	737	1,386	14,247	.....	38,438	14,051	4,640	713	.....	600
34	Length of these tile ... miles	2.7	11.8	116.8	.....	124.2	218.6	18.1	2.3	.....	1.6
35	Average length per acre ... feet	19.3	45.0	43.3	.....	17.1	82.1	20.6	17.0	.....	14.1
36	Area drained by open ditches and tile [2] ... acres	6,125	17,575	37,203	1,664	51,957	13,921	.....	1,415	4,211	.....
37	Length of these drains ... miles	22.8	99.6	273.7	10.5	122.8	93.7	.....	4.7	11.1	.....
38	Average length per acre ... feet	19.7	29.9	38.8	33.3	12.5	37.4	.....	17.5	13.9	.....
39	Area having open ditches, tile drains, and levees [2] ... acres	.....	([4])	.....	13,811	.....	.....	.....	.....	.....	.....
40	Length of these drains ... miles	.....	12.5	.....	23.2	.....	.....	.....	.....	.....	.....
41	Average length per acre ... feet	.....	.....	.....	8.9	.....	.....	.....	.....	.....	.....
42	Length of the accessory levees ... miles	.....	2.5	.....	10.4	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.										
43	Improved land in operating enterprises, 1920 ... acres	85,109	[1]119,310	86,495	21,091	78,522	140,851	3,748	48,680	5,292	48,019
44	Improved land prior to drainage ... acres	46,922	[5]12,637	75,764	4,937	60,848	136,376	3,478	37,930	4,617	29,567
45	Increase since drainage ... acres	38,187	106,673	10,731	16,154	17,674	4,475	270	10,750	675	18,452
46	Per cent of increase	81.4	844.1	14.2	327.2	29.0	3.3	7.8	28.3	14.6	62.4
47	Per cent increase is of all improved land in farms, 1920	20.2	87.1	7.6	7.7	6.7	3.1	0.3	9.5	0.7	10.2
48	Timber and cut-over land, 1920 ... acres	3,034	53,252	15,106	1,867	8,098	14,227	562	3,779	1,256	2,816
49	Timber and cut-over land prior to drainage ... acres	41,221	75,037	25,822	3,574	15,999	18,118	832	13,553	1,931	14,822
50	Decrease since drainage ... acres	38,187	21,785	10,716	1,707	7,901	3,891	270	9,774	675	12,006
51	Per cent of decrease	92.6	29.0	41.5	47.8	49.4	21.5	32.5	72.1	35.0	81.0
52	Other unimproved land, 1920 ... acres	.....	8,646	32,142	.....	5,175	31	330	555	.....	.....
53	Other unimproved land prior to drainage ... acres	.....	93,534	32,157	14,447	14,948	615	330	1,531	.....	6,446
54	Decrease since drainage ... acres	.....	84,888	15	14,447	9,773	584	.....	976	.....	6,446
55	Per cent of decrease	.....	90.8	.....	100.0	65.4	95.0	.....	63.7	.....	100.0
56	Swampy or subject to overflow, 1920 ... acres	926	3,255	2,669	5,925	643	28,142	20	10,597	132	578
57	Swampy or subject to overflow prior to drainage ... acres	66,004	101,734	20,266	20,421	14,455	35,241	210	35,606	561	17,495
58	Decrease since drainage ... acres	65,078	98,479	17,597	14,496	13,812	7,099	190	25,009	429	16,827
59	Per cent of decrease	98.6	96.8	86.8	71.0	95.6	20.1	90.5	70.2	76.5	96.7
	CAPITAL INVESTED AND COST PER ACRE.										
60	Total capital invested in and required for completion of operating enterprises ... dollars	290,239	755,124	516,751	206,499	433,931	746,053	19,634	167,874	11,957	289,453
61	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	290,239	718,185	504,041	204,499	424,771	746,053	19,634	167,874	11,957	279,453
62	Additional capital required to complete these enterprises ... dollars	.....	36,939	12,710	2,000	9,160	.....	.....	.....	.....	10,000
63	Average cost per acre when completed ... dollars	3.29	4.17	3.86	8.99	4.73	4.81	4.23	3.17	1.83	5.69
64	Enterprises constructing open ditches only ... dollars	263,934	601,080	176,605	61,937	4,000	346,677	.....	161,814	3,642	60,469
65	Average cost per acre when completed ... dollars	3.25	3.70	2.15	11.93	2.86	2.73	.....	3.18	1.56	3.79
66	Enterprises constructing open ditches and levees ... dollars	.....	5,339	.....	.....	.....	.....	.....	.....	.....	223,924
67	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.53
68	Enterprises constructing tile drains only ... dollars	2,808	10,091	111,798	.....	223,845	325,393	19,634	2,308	.....	5,060
69	Average cost per acre when completed ... dollars	3.81	7.28	7.85	.....	5.82	23.16	4.23	3.24	.....	8.43
70	Enterprises constructing open ditches and tile drains ... dollars	23,497	126,614	228,348	8,393	206,086	73,983	.....	3,752	8,315	.....
71	Average cost per acre when completed ... dollars	3.84	7.20	6.14	5.04	3.97	5.31	.....	2.65	1.97	.....
72	Enterprises constructing open ditches, tile drains, and levees ... dollars	.....	12,000	.....	136,169	.....	.....	.....	.....	.....	.....
73	Average cost per acre when completed ... dollars	.....	.....	.....	9.86	.....	.....	.....	.....	.....	.....
	CROPS.										
	Improved land in enterprises reporting—										
74	Corn as principal crop on drained land ... acres	7,537	70,996	86,495	21,091	78,522	140,851	3,748	48,680	5,292	48,019
75	Wheat as principal crop on drained land ... acres	.....	41,345	.....	.....	.....	.....	.....	.....	.....	.....
76	Hay as principal crop on drained land ... acres	77,572	.....	.....	.....	.....	.....	.....	.....	.....	.....
77	Oats as principal crop on drained land ... acres	.....	6,969	.....	.....	.....	.....	.....	.....	.....	.....
78	Vegetables as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
79	Not reporting principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Office estimate; the reported figures exceed the improved acreage in all farms in the county as determined by the census of agriculture.
[2] When works under construction have been completed.
[3] Pump located in Clay County.
[4] Area included in "open ditches only."
[5] The reported figures have been reduced by the same acreage as the improved land, 1920

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Wabash.	Warren.	Warrick.	Washington.	Wayne.	Wells.	White.	Whitley.	Other counties.[1]
	LAND AREA.									
1	Approximate land area of the county ....acres..	272,000	235,520	250,880	332,160	263,040	233,600	324,480	216,320	1,025,280
2	All land in operating drainage enterprises....acres..	150,886	48,174	85,501	11,121	9,065	166,377	238,020	172,685	3,945
3	Improved land....acres..	115,590	35,927	81,860	10,009	7,705	139,130	222,496	145,687	3,422
4	Per cent of all improved land in farms....	56.1	20.1	43.4	4.8	3.9	72.3	80.5	91.3	2.1
5	Timber and cut-over land....acres..	14,609	4,932	2,246	556	453	26,786	14,938	9,175	420
6	Other unimproved land....acres..	20,687	7,315	1,395	556	907	461	586	17,823	103
7	Swampy or subject to overflow, in enterprises....acres..	7,276	.....	1,507	.....	.....	10,698	3,387	588	873
8	Suffering a loss of crops from defective drainage....acres..	173	.....	560	.....	.....	6,286	657	419	29
9	Assessed acreage....	154,779	52,905	85,501	11,121	9,065	350,570	305,912	339,491	3,945
10	Excess over all land in operating enterprises....acres..	3,893	4,731	.....	.....	.....	184,193	67,892	166,806	.....
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed....miles..	266.6	46.0	166.0	11.0	17.4	648.3	149.1	372.4	13.6
12	Additional under construction....miles..	1.1	.....	.....	.....	.....	18.9	.....	14.6	.....
13	Maximum completed in any enterprise....miles..	10.0	11.9	20.5	11.0	4.0	21.0	16.3	45.6	3.0
14	Maximum width at bottom of ditch [2]....feet..	12	6	30	28	10	125	40	14	15
15	Maximum of average depths of outlet ditches [2]....feet..	7.4	7.2	11.0	12.0	5.0	12.0	15.0	13.0	8.0
16	Mean depth of branch ditches [2]....feet..	4.5	3.9	4.5	.....	3.7	5.2	4.4	5.2	4.0
	Tile drains:									
17	Completed....miles..	121.9	70.8	.....	.....	5.1	282.5	74.3	336.0	1.0
18	Additional under construction....miles..	3.9	.....	.....	.....	0.6	17.0	.....	22.8	.....
19	Maximum completed in any enterprise....miles..	4.2	28.0	.....	.....	1.9	18.3	4.1	29.0	1.0
20	Maximum size of tile [2]....inches..	30	30	.....	.....	20	33	30	30	16
	Accessory levees and dikes:									
21	Completed....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....
22	Additional under construction....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:									
23	Engine capacity....horsepower..	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	Pump capacity....gallons per minute..	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	Area served by pumps....acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	Area drained by open ditches only [2]....acres..	105,534	17,495	85,501	11,121	5,615	74,675	121,447	29,967	3,645
27	Length of these ditches....miles..	231.9	24.0	166.0	11.0	15.6	493.5	109.4	102.4	13.6
28	Average length per acre....feet..	11.6	7.2	10.3	5.2	14.7	34.9	4.8	18.0	19.7
29	Area having open ditches and levees [2]....acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	Length of these ditches....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	Average length per acre....feet..	.....	.....	.....	.....	.....	.....	.....	.....	.....
32	Length of the accessory levees....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....
33	Area drained by tile only [2]....acres..	29,946	14,148	.....	.....	1,864	50,674	30,875	29,559	300
34	Length of these tile....miles..	96.6	56.9	.....	.....	4.3	191.5	56.6	120.0	1.0
35	Average length per acre....feet..	17.0	21.2	.....	.....	12.2	20.0	9.7	21.4	17.6
36	Area drained by open ditches and tile [2]....acres..	15,406	16,531	.....	.....	1,586	41,028	85,698	113,159	.....
37	Length of these drains....miles..	65.0	35.9	.....	.....	3.2	281.7	57.4	523.4	.....
38	Average length per acre....feet..	22.3	11.5	.....	.....	10.7	36.3	3.5	24.4	.....
39	Area having open ditches, tile drains, and levees [2]....acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....
40	Length of these drains....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....
41	Average length per acre....feet..	.....	.....	.....	.....	.....	.....	.....	.....	.....
42	Length of the accessory levees....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.									
43	Improved land in operating enterprises, 1920....acres..	115,590	35,927	81,860	10,009	7,705	139,130	222,496	145,687	3,422
44	Improved land prior to drainage....acres..	80,269	24,435	42,285	4,449	6,345	75,266	118,338	123,212	2,108
45	Increase since drainage....acres..	35,321	11,492	39,575	5,560	1,360	63,864	104,158	22,475	1,314
46	Per cent of increase....	44.0	47.0	93.6	125.0	21.4	84.9	88.0	18.2	62.3
47	Per cent increase is of all improved land in farms, 1920....	17.1	6.4	21.0	2.7	0.7	33.2	37.7	14.1	0.2
48	Timber and cut-over land, 1920....acres..	14,609	4,932	2,246	556	453	26,786	14,938	9,175	420
49	Timber and cut-over land prior to drainage....acres..	28,835	6,768	32,049	3,336	1,359	90,487	109,060	23,383	1,286
50	Decrease since drainage....acres..	14,226	1,836	29,803	2,780	906	63,701	94,122	14,208	866
51	Per cent of decrease....	49.3	27.1	93.0	83.3	66.7	70.4	86.3	60.8	67.3
52	Other unimproved land, 1920....acres..	20,687	7,315	1,395	556	907	461	586	17,823	103
53	Other unimproved land prior to drainage....acres..	41,782	16,971	11,167	3,336	1,361	624	10,622	26,090	551
54	Decrease since drainage....acres..	21,095	9,656	9,772	2,780	454	163	10,036	8,267	448
55	Per cent of decrease....	50.5	56.9	87.5	83.3	33.4	26.1	94.5	31.7	81.3
56	Swampy or subject to overflow, 1920....acres..	7,276	.....	1,507	.....	.....	10,698	3,387	588	873
57	Swampy or subject to overflow prior to drainage....acres..	70,438	9,263	63,950	6,673	1,362	88,393	162,752	17,707	2,148
58	Decrease since drainage....acres..	63,162	9,263	62,443	6,673	1,362	77,695	159,365	17,119	1,270
59	Per cent of decrease....	89.7	100.0	97.6	100.0	100.0	87.9	97.9	96.7	59.3
	CAPITAL INVESTED AND COST PER ACRE.									
60	Total capital invested in and required for completion of operating enterprises....dollars..	640,543	102,247	305,980	79,000	17,765	1,018,035	561,777	979,936	19,954
61	Capital invested in these enterprises to Dec. 31, 1919....dollars..	627,043	102,247	305,980	79,000	16,640	866,817	561,777	883,249	19,954
62	Additional capital required to complete these enterprises..dollars..	13,500	.....	.....	.....	1,125	151,218	.....	96,687	.....
63	Average cost per acre when completed....dollars..	4.25	2.12	3.58	7.10	1.96	6.12	2.36	5.67	5.06
64	Enterprises constructing open ditches only....dollars..	366,450	25,774	305,980	79,000	5,745	334,091	225,858	131,105	16,754
65	Average cost per acre when completed....dollars..	3.47	1.47	3.58	7.10	1.02	4.47	1.86	4.37	4.60
66	Enterprises constructing open ditches and levees....dollars..	.....	.....	.....	.....	.....	.....	.....	.....	.....
67	Average cost per acre when completed....dollars..	.....	.....	.....	.....	.....	.....	.....	.....	.....
68	Enterprises constructing tile drains only....dollars..	176,229	38,373	.....	.....	9,745	284,460	95,407	158,270	3,200
69	Average cost per acre when completed....dollars..	5.88	2.71	.....	.....	5.23	5.61	3.09	5.35	10.67
70	Enterprises constructing open ditches and tile drains....dollars..	97,864	38,100	.....	.....	2,275	399,484	240,512	690,561	.....
71	Average cost per acre when completed....dollars..	6.35	2.30	.....	.....	1.43	9.74	2.81	6.10	.....
72	Enterprises constructing open ditches, tile drains, and levees..dollars..	.....	.....	.....	.....	.....	.....	.....	.....	.....
73	Average cost per acre when completed....dollars..	.....	.....	.....	.....	.....	.....	.....	.....	.....
	CROPS.									
	Improved land in enterprises reporting—									
74	Corn as principal crop on drained land....acres..	115,590	35,927	79,934	10,009	7,705	139,130	143,687	145,687	3,422
75	Wheat as principal crop on drained land....acres..	.....	.....	1,667	.....	.....	.....	26,690	.....	.....
76	Hay as principal crop on drained land....acres..	.....	.....	259	.....	.....	.....	.....	.....	.....
77	Oats as principal crop on drained land....acres..	.....	.....	.....	.....	.....	.....	52,119	.....	.....
78	Vegetables as principal crop on drained land....acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....
79	Not reporting principal crop on drained land....acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Includes only Decatur, Martin, Monroe, Ohio, and Perry Counties.

[2] When works under construction have been completed.

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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS

DRAINAGE : IOWA

STATISTICS FOR THE STATE AND ITS COUNTIES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

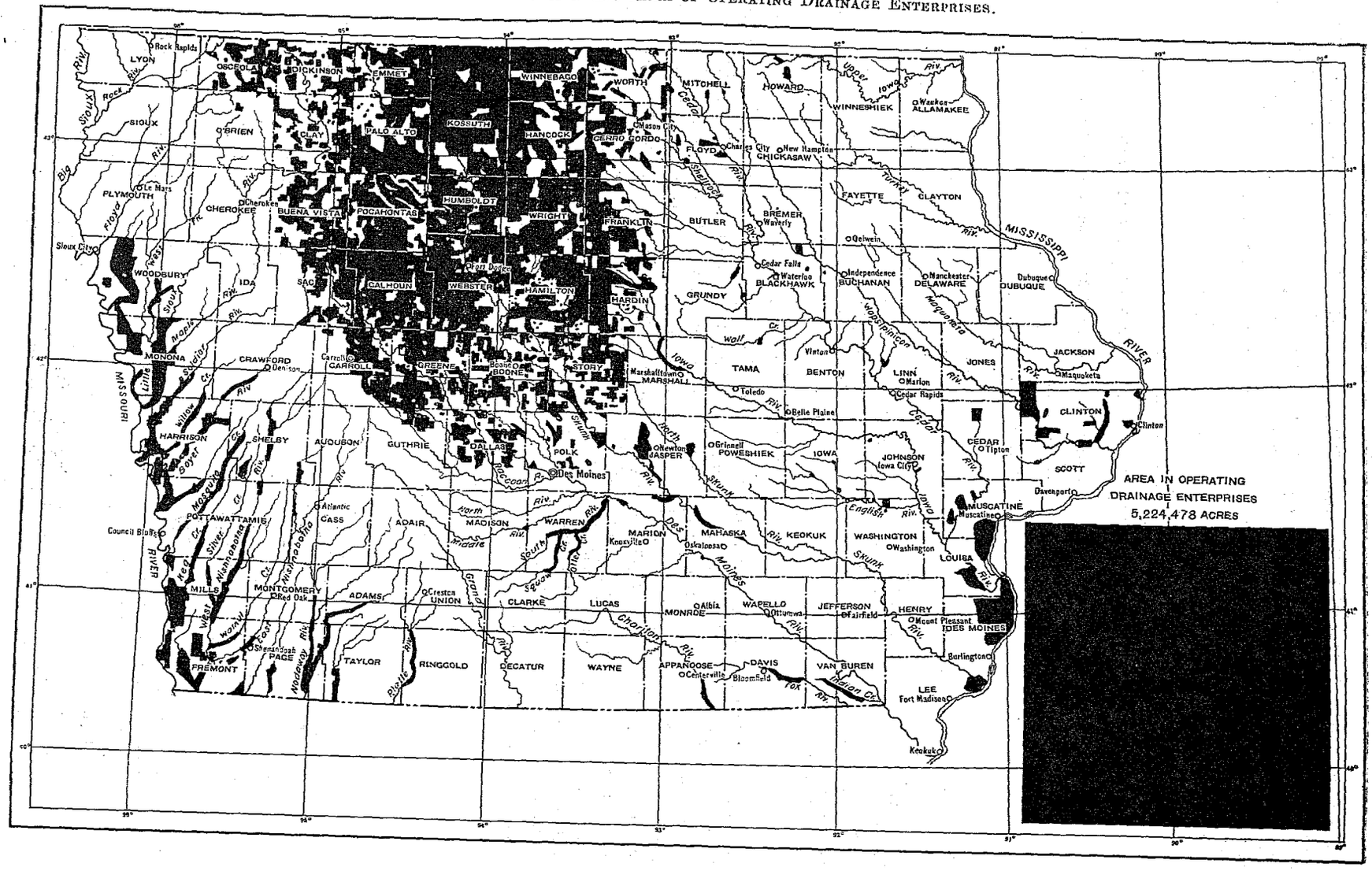
This bulletin presents the statistics of drainage for Iowa collected at the census of 1920. The figures relate to conditions on January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises might include areas of unimproved land not yet in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner installs upon his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are presented separately.

TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	213,439	100.0
Farms reporting land having drainage	88,865	41.6
Farms reporting land needing drainage	56,083	26.3
All land in farms ... acres	33,474,896	100.0
Improved land in farms ... acres	28,606,951	85.5
Farm land reported as provided with drainage ... acres	7,334,404	21.9
Farm land reported as needing drainage ... acres	2,052,942	6.1
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	35,575,040	100.0
All land in operating drainage enterprises ... acres	5,224,478	14.7
Improved land ... acres	4,493,407	12.6
Timber and cut-over land ... acres	74,652	0.2
Other unimproved land ... acres	656,419	1.8
Capital invested in and required for completion of operating enterprises	$54,169,878	100.0
Capital invested in these enterprises to Dec. 31, 1919	$49,627,304	91.6
Additional capital required to complete these enterprises	$4,542,574	8.4

IOWA

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which are substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, is the acreage actually benefited or made of more value for agricultural purposes by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators have answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual." Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises, below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter may be some that had completed the original plan of reclamation several years ago but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include districts that on the census date had completed their plans, sold bonds and let contracts for construction work, and also districts that had just been established by court decree and were still subject to considerable change in area, plan of drainage works, and cost.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.[1]		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	5,383,012	100.0	$49,649,775	100.0	$6,858,477
Operating enterprises	5,224,478	97.1	49,627,304	100.0	4,542,574
With works completed	4,685,080	87.0	44,630,537	89.9	.....
With works under construction	539,398	10.0	4,996,767	10.1	4,542,574
Nonoperating enterprises	158,534	2.9	22,471	(2)	2,315,903

[1] The inquiry asked for "the total cost of the enterprise to Dec. 31, 1919," and for an "*estimate of additional* investment to complete."
[2] Less than one-tenth of 1 per cent.

Location of enterprises.—The drainage enterprises in Iowa are located mostly in the central and north-central part of the state. There are some enterprises in the southeastern part and some along Missouri River, but comparatively few in the southern, eastern, and extreme northwestern counties.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	5,383,012	100.0	$49,649,775	100.0	$6,858,477
Operating enterprises	5,224,478	97.1	49,627,304	100.0	4,542,574
Big Sioux River	8,290	0.2	30,770	0.1	1,310
Missouri River	856,531	15.9	8,078,698	16.3	499,930
Des Moines River	2,687,073	49.9	25,490,561	51.3	1,529,770
Cedar River	936,841	17.4	9,201,181	18.5	1,935,207
Minnesota River	178,424	3.3	2,046,333	4.1	54,625
Mississippi River	557,319	10.4	4,779,761	9.6	521,732
Nonoperating enterprises	158,534	2.9	22,471	(1)	2,315,903
Big Sioux River	320	(1)	.....	(1)	4,500
Missouri River	19,622	0.4	1,085	(1)	311,713
Des Moines River	96,987	1.8	15,099	(1)	1,350,743
Minnesota River	20,758	0.4	5,386	(1)	333,243
Mississippi River	20,847	0.4	901	(1)	315,704

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

The pumping districts for drainage are almost entirely in the southeastern part of the state, along or near the Mississippi; but there are two near the Missouri in Fremont and Monona Counties.

Condition of land in enterprises.—The drainage enterprises in this state are generally for the improvement or protection of land already in farms, much of which was under some degree of cultivation before drainage was undertaken. In the low, level land along the Missouri, many of the natural watercourses are inadequate to carry the rapid run-off from the more hilly land to the eastward, and protection against overflow is necessary. In the northern part of the state, artificial works are needed to remove the drainage water from saucer-like depressions and to supplement the farm drainage installed by individual landowners.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms and to afford relief from overflows for the district as a unit. Therefore, the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy or subject to overflow, or land that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total. Acreage.	Total. Per cent of all land.	Works completed (acres).	Works under construction (acres).	
All land in enterprises	5,224,478	100.0	4,685,080	539,398	158,534
Improved land	4,493,407	86.0	4,075,026	418,381	84,722
Timber and cut-over land	74,652	1.4	71,028	3,624	4,350
Other unimproved land	656,419	12.6	539,026	117,393	69,462
Swampy or subject to overflow	320,893	6.1	258,243	62,650	68,197
Suffering a loss of crops	157,542	3.0	145,474	12,068	5,053

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided, and the part in each county be considered a separate enterprise. In this way 2,883 operating drainage enterprises are counted in Iowa, with an average area of 2,048 acres assessed. Of this number, 110 comprise 10,000 acres or more each, 1010 comprise 1,000 to 5,000 acres, and 263 are smaller than 200 acres each. The assessed acreage exceeds the land in enterprises by 681,265 acres, which is the amount of overlapping. The land in enterprises and the assessed acreage on each line of Table 5 refer to the same enterprises. From the total area of each enterprise, designated as the assessed area, the net amount of overlapping with enterprises organized previously was deducted, to determine the area to be tabulated as land in enterprise.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	5,224,478	5,905,743	100.0
Less than 200 acres	19,676	31,256	0.5
200 to 499 acres	167,264	222,779	3.8
500 to 999 acres	409,317	500,458	8.5
1,000 to 4,999 acres	1,794,264	2,065,762	35.0
5,000 to 9,999 acres	928,723	1,005,124	17.0
10,000 to 49,999 acres	1,732,664	1,895,497	32.1
50,000 acres and over	172,570	184,867	3.1

Character of enterprises.—The drainage enterprises in Iowa are drainage districts, though sometimes called county drains, organized in accordance with chapters 2 and 2-A of Title X of the Code of Iowa Laws (1897) and of the Supplements to the Code (1907 and 1913). These districts are established and controlled by the boards of supervisors of the counties in which the districts are located or, under some circumstances, by trustees elected by the landowners of the districts. The statistics given in this bulletin include also figures for five enterprises under private ownership. The information secured regarding districts embracing about one-third of the total acreage reported was not sufficiently definite to determine under just what laws those enterprises were organized.

Drainage districts organized under sections 1939 to 1989 of the code (ch. 2, T. X), as amended, are each established upon petition from a majority of the residents of the county who own land abutting upon the proposed improvement, if the county board of supervisors finds that the undertaking will be conducive to the public welfare. Before public hearing is held and establishment is granted or denied, the county surveyor or an engineer appointed by the county auditor makes a survey, plan of drainage, and estimate of the cost, and submits a report regarding the practicability and utility of the project. Damages are assessed by three appraisers appointed by the county auditor. The same official appoints three persons whose duty it is to classify the land as dry, low, wet, and swamp, and to make an equitable apportionment of the total cost of the enterprise. Hearings are held by the supervisors before they confirm the assessments of damages and the apportionment of cost, which before confirmation may be amended by the supervisors and afterwards are subject to appeal to the district court. Contracts for construction are let by the county auditor. Drainage bonds may be issued by the supervisors, to run not exceeding 15 years, payable only from taxes levied against the land in the district for which the issue was made. For an improvement in more than one county, each board of supervisors affected appoints a commissioner who acts with the commissioners from the other counties in appointing the engineer and in formulating the drainage plan and report, and thereafter each county acts independently.

This chapter of the code embraces, in amended form, sections 1207 to 1216 of the code of 1873, requiring petition from a majority of the residents of the county owning land abutting on the proposed improvement, and chapter 186 of the laws of 1884, authorizing the drainage of wet or overflowed land upon petition from any 100 voters of the county. It embraces also chapter 46 of the laws of 1896, providing for establishing districts to aid in building and maintaining protection and drainage works in cases where the United States has undertaken the construction of levees. Proceedings under the statute of 1896 are initiated by petition from one or more owners of land within the proposed district. The chapter provides for establishing private drains across the land of objecting owners. Upon petition for such a drain, the township trustees hold hearing, decide the necessity for the improvement, award damages, and determine the location and depth of the drain.

Drainage districts may be organized under sections 1989a 1 to 1989a 79 (ch. 2-A, T. X) upon petition from one or more landowners to be affected. This chapter is the act of April 29, 1904 (ch. 68), with amendments and additions. An engineer appointed by the county board of supervisors prepares a plan of drainage, estimates the cost, and recommends the boundaries of the district. After public hearing upon the petition and the engineer's report, the supervisors may establish the district. Damages are awarded by three appraisers appointed by the county auditor. The cost is apportioned according to benefits as determined by three commissioners appointed by the supervisors, the parcel of land to receive most benefit being graded 100 per cent and the other parcels proportionately. Damages and benefits are subject to review by the county supervisors at public hearing, and then to appeal to the district court. Contracts for construction are let by the supervisors, who may issue drainage bonds to run not more than 20 years, to be paid in each instance by taxes against the district for which they are issued. For the drainage of their own land persons may sign an agreement covering the location and character of the work to be done, the classification of the land, and the amount of taxes to be paid. When this agreement has been filed with the county auditor, the county supervisors establish the district in accordance therewith and take control as over other districts. Subdistricts may be established within drainage districts in the same manner as drainage districts. For a district in more than one county, petition is filed in each county and the boards of supervisors act jointly. In case one or more of the boards of supervisors fail to act, proceedings may be transferred to the district court of any county in which a part of the district is situated.

Drainage pumping stations may be established in any district established under the chapter 2–A, upon petition from one-third of the landowners to be benefited, and in districts established under the chapter 2 upon petition from 50 per cent of the landowners (sections 1989a 49 and 1989a 52). Any drainage district operating a pumping station may be placed under control of three trustees to be elected by the landowners in the district, upon petition from a majority of those owners, after the drainage works have been constructed. Any district not operating a pumping plant, but which has cost $100,000 or more and of which less than 25 per cent has been spent for tile construction, may similarly be placed under control of elected trustees upon petition from a majority of the landowners holding a major part of the acreage in the district.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All drainage enterprises	5,383,012	100.0	$49,649,775	100.0	$6,858,477
Operating enterprises	5,224,478	97.1	49,627,304	100.0	4,542,574
Drainage districts	5,211,683	96.8	49,460,193	99.6	4,542,574
1873 Code, sec. 1207 to 1216	64,574	1.2	163,708	0.3	.....
Laws of 1884, ch. 186	31,611	0.6	69,586	0.1	.....
1897 Code, sec. 1939 to 1989	558,553	10.4	2,966,237	6.0	71,295
Laws of 1904, ch. 68	2,073,155	38.5	19,649,964	39.6	1,566,245
1907 Supp. sec. 1939 to 1989 [1]	1,050,031	19.5	9,568,804	19.3	47,755
1907 Supp. sec. 1989a 1 to 1989a 53 [1]	141,355	2.6	777,866	1.6	.....
1913 Supp. sec. 1939 to 1989 [1]	776,811	14.4	10,130,544	20.4	1,580,026
1913 Supp. sec. 1989a 1 to 1989a 60 [1]	515,593	9.6	6,133,484	12.4	1,277,253
Individual ownership	12,795	0.2	167,111	0.3	.....
Nonoperating enterprises	158,534	2.9	22,471	(2)	2,315,903
Drainage districts	158,534	2.9	22,471	(2)	2,315,903
1897 Code, sec. 1939 to 1989	822	(2)	1,121	(2)	14,576
Laws of 1904, ch. 68	16,045	0.3	9,101	(2)	258,865
1907 Supp. sec. 1939 to 1989 [1]	158	(2)	.....	.....	645
1913 Supp. sec. 1939 to 1989 [1]	116,037	2.2	10,930	(2)	1,457,909
1913 Supp. sec. 1989a1 to 1989a 60 [1]	25,472	0.5	1,319	(2)	583,908

[1] Most of the districts tabulated as formed under sections 1939 to 1989 of the Code Supplements of 1907 and 1913 were reported merely as organized under chapter 2 of Title X of the Supplements. At least some of those districts are organized under chapter 2-A (secs. 1989a 1 to 1989a 60).
[2] Less than one-tenth of 1 per cent.

The first drainage law of Iowa was approved February 5, 1851, providing for the election of a swamp land commissioner to acquire the swamp land granted to the state by Congress in 1850. This statute was repealed in 1853, and the swamp land was given to the counties in which it was situated. An act of April 15, 1870, provided for condemning right of way by one owner across the land of another, upon petition to the township trustees. The first drainage district law was enacted April 24, 1872, which became sections 1207 to 1216, code of 1873. Originally applicable only to counties of 10,000 or more population, it was made applicable in counties of 5,000 population in 1876.

Nearly every general assembly has amended the drainage laws, usually in several respects. Most of the changes affect details of the method of procedure in completing the organization and the construction work, but there have been some changes in the number of signatures required on petitions. The provisions described herein are those effective January 1, 1920.

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 3,998.0 miles of open ditches, 10,384.9 miles of tile drains, and 45.2 miles of levees; the additional lengths under construction were 81.1 miles of open ditches and 768.6 miles of tile drains. These figures do not include drains or levees installed by individual farm owners supplemental to the works of the enterprises, nor the works of flood-protection or levee districts that had not undertaken the construction of ditches or tile drains. There are eight pumping districts among the operating drainage enterprises in the state, all equipped with centrifugal pumps.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All kinds	5,224,478	100.0	$49,627,304	100.0	$4,542,574
Open ditches only	1,294,243	24.8	8,315,489	16.8	540,681
Open ditches and levees	26,228	0.5	673,770	1.4	.....
Tile drains only [1]	1,421,176	27.2	19,297,008	38.9	1,679,468
Open ditches and tile drains	2,444,906	46.8	21,111,775	42.5	2,312,425
Open ditches, tile drains and levees	37,925	0.7	229,262	0.5	10,000

[1] Includes 6,000 acres having tile drains and levees.

TABLE 8.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY TYPE OF DRAINAGE: 1920.

TYPE OF DRAINAGE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All operating enterprises	5,224,478	100.0	$49,627,304	100.0	$4,542,574
Gravity drainage only	5,085,312	97.3	48,482,112	97.7	4,542,574
All drainage by pumping	79,686	1.5	778,770	1.6	.....
Part gravity and part pumping	59,480	1.1	366,422	0.7	.....
Total area served by pumps	134,616	.....	.....	.....	.....

TABLE 9.—PUMPING PLANTS OF OPERATING ENTERPRISES, AND ACREAGE SERVED, CLASSIFIED BY KIND OF POWER: 1920.

KIND OF POWER.	ENGINE CAPACITY.		PUMP CAPACITY.		AREA SERVED.	
	Horsepower.	Per cent of total.	Gallons per minute.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	3,153	100.0	530,800	100.0	134,616	100.0
Steam	1,400	44.4	209,300	39.4	60,717	45.1
Electric	1,700	53.9	302,500	57.0	39,821	29.6
Internal-combustion	53	1.7	19,000	3.6	1,450	1.1
Not reported [1]	.....	.....	.....	.....	32,628	24.2

[1] Enterprises under construction; pumping plants not installed.

The average depth of the main or outlet ditch was reported for each enterprise. The maximum depth of outlet reported for any enterprise in the state and the maximum in each county are shown in line 15 of County Table II. The maximum length, width, and depth shown in that table for any county may not refer to the same enterprise.

In County Table II, line 16 shows the mean depth of branch ditches (open ditches only), which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations. Depths 10 feet and greater were omitted because it seemed that they did not represent so well the average depths of outlet provided for all the farms in those districts. To include this group, computed as 10 feet, would make the mean depth for the state 6.6 instead of 6.5 feet.

TABLE 10.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	5,224,478	100.0
3.0 to 3.9 feet	47,215	0.9
4.0 to 4.9 feet	57,522	1.1
5.0 to 5.9 feet	240,846	4.6
6.0 to 6.9 feet	697,076	13.3
7.0 to 7.9 feet	295,630	5.7
8.0 to 8.9 feet	301,129	5.8
9.0 to 9.9 feet	146,912	2.8
10.0 feet and more	93,164	1.8
Not reporting branches	3,344,984	64.0

Maintenance of works.—The drainage district act of 1904 (ch. 68) makes it the duty of the county boards of supervisors to keep in repair the works of all districts organized under that act, except that districts under the control of elected trustees are to be maintained by those trustees. The cost of repairs and maintenance is to be assessed against the land in the same proportion as the original cost, except when additional land is to be benefited. That statute requires that the supervisors shall have an engineer inspect the drains at least once each year, and report regarding the condition of them.

For districts established under sections 1939 to 1954 of the code, repairs are made and the cost is apportioned in the same manner as for establishing and assessing new enterprises. For districts formed under sections 1975 to 1989 of the code, the county supervisors may maintain the works and levy assessments against the real estate of the respective districts, but such assessment may not exceed 50 mills on the dollar unless the work is authorized by petition and proceedings similar to the requirements for inaugurating new work.

TABLE 11.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All operating enterprises	5,224,478	100.0	$49,627,304	100.0	$4,542,574
By district forces	2,680,030	51.3	26,898,463	54.2	2,559,242
By contract	1,327,323	25.4	11,087,882	22.3	379,083
Method not specified [1]	9,603	0.2	132,053	0.3	.....
No maintenance provided	775,540	14.8	6,718,904	13.5	1,175,464
Not reported	431,982	8.3	4,790,002	9.7	428,785

[1] Includes 6,000 acres maintained by landowners.

Date of organization.—The progress in drainage is shown only roughly by the dates of the organization of enterprises, which are the dates when the districts were established by the county courts, since there may be a period of one or more years between the decree of establishment and the beginning of actual construction, and since the work of construction may occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including extensions made after the original plan of reclamation was completed.

TABLE 12.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	5,224,478	100.0	5,905,743	100.0
1870 to 1879	3,400	0.1	3,400	0.1
1880 to 1889	14,782	0.3	14,782	0.3
1890 to 1899	71,216	1.4	72,614	1.2
1900 to 1904	385,688	7.4	399,548	6.8
1905 to 1909	1,659,438	31.8	1,805,083	30.6
1910 to 1914	1,629,807	31.2	1,861,228	31.5
1915 to 1919	1,447,246	27.7	1,736,119	29.4
Not reported	12,811	0.2	12,969	0.2

TABLE 13.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$49,627,304	100.0	$4,542,574
1870 to 1879	34,388	0.1	.....
1880 to 1889	26,660	0.1	.....
1890 to 1899	217,848	0.4	.....
1900 to 1904	2,019,819	4.1	.....
1905 to 1909	11,288,616	22.7	46,631
1910 to 1914	17,290,526	34.8	60,431
1915 to 1919	18,619,833	37.5	4,400,918
Not reported	129,614	0.3	34,594

TABLE 14.—DRAINS AND LEVEES (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		TILE.		LEVEES.	
	Miles.	Per cent of total.	Miles.	Per cent of total.	Miles.	Per cent of total.
All drains and levees	4,079.1	100.0	11,153.5	100.0	45.2	100.0
1870 to 1879	3.7	0.1	.....	.....	.....	.....
1880 to 1889	24.7	0.6	5.5	(1)	.....	.....
1890 to 1899	136.5	3.3	21.8	0.2	.....	.....
1900 to 1904	364.0	8.9	133.3	1.2	.....	.....
1905 to 1909	1,569.7	38.5	1,987.0	17.8	1.1	2.4
1910 to 1914	1,041.9	25.5	4,422.5	39.7	14.4	31.9
1915 to 1919	930.5	22.8	4,547.0	40.8	21.7	48.0
Not reported	8.1	0.2	36.4	0.3	8.0	17.7

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

Crops.—The principal crops grown upon the drained land in drainage enterprises are corn and hay. Data were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified, in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920.

		THE STATE.	Adair.	Adams.	Appanoose.	Audubon.	Benton.	Blackhawk.	Boone.
1	Number of all farms in the state or county	213,439	2,113	1,629	2,283	1,818	2,562	2,358	2,541
2	Farms reporting land having drainage	88,865	1,124	617	85	718	1,912	1,031	1,936
3	Farms reporting land needing drainage	56,083	1,001	408	101	445	1,277	1,009	1,111
4	Farms in drainage and levee districts	20,658	1	11	46	2	3	20	773
	LAND AND FARM AREA.								
5	Approximate land area of the state or county ... acres	35,575,040	366,720	273,280	328,320	283,520	455,680	361,600	364,160
6	All land in farms ... acres	33,474,896	340,943	265,499	309,041	277,570	431,483	339,771	340,844
7	Improved land in farms ... acres	28,606,951	320,926	242,020	241,524	260,992	376,818	282,025	286,873
8	Woodland in farms ... acres	2,295,274	10,789	14,868	42,287	7,055	20,532	19,332	30,205
9	Other unimproved land in farms ... acres	2,572,671	15,228	8,611	25,230	9,523	34,133	37,314	23,766
10	Farm land reported as provided with drainage ... acres	7,334,404	47,236	26,790	3,791	13,791	155,257	60,901	181,302
11	Farm land reported as needing drainage ... acres	2,052,942	27,467	12,145	5,354	9,207	38,701	35,065	37,131
12	Drainage only ... acres	1,661,744	22,042	7,431	2,146	5,948	32,580	32,004	31,622
13	Drainage and clearing ... acres	391,198	4,525	4,714	3,208	3,259	6,121	3,061	5,509

		Bremer.	Buchanan.	Buena Vista.	Butler.	Calhoun.	Carroll.	Cass.	Cedar.	Cerro Gordo.
1	Number of all farms in the county	2,018	2,232	2,055	2,244	2,060	2,087	2,182	2,212	1,944
2	Farms reporting land having drainage	367	961	1,725	577	1,664	1,105	793	1,650	1,224
3	Farms reporting land needing drainage	828	1,275	663	647	522	828	746	698	1,040
4	Farms in drainage and levee districts	7	4	864	7	917	367	6	31	593
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	277,760	362,880	365,440	369,280	363,520	365,440	360,960	364,800	362,880
6	All land in farms ... acres	263,396	341,855	351,479	348,892	349,731	355,380	355,479	346,658	336,776
7	Improved land in farms ... acres	206,816	280,501	326,109	307,515	330,173	327,420	326,641	307,577	274,819
8	Woodland in farms ... acres	15,060	15,190	6,930	14,995	4,428	7,022	12,113	20,630	15,146
9	Other unimproved land in farms ... acres	41,520	46,164	18,440	26,382	15,130	20,938	16,725	18,451	46,811
10	Farm land reported as provided with drainage ... acres	7,683	41,290	190,611	22,265	240,105	73,020	20,878	117,917	94,446
11	Farm land reported as needing drainage ... acres	23,049	46,797	21,105	22,440	20,397	21,296	19,823	17,994	59,735
12	Drainage only ... acres	18,709	34,771	18,913	18,584	18,881	20,281	14,312	9,202	53,244
13	Drainage and clearing ... acres	4,340	12,026	2,192	3,856	1,516	1,015	5,511	8,792	6,491

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Cherokee.	Chickasaw.	Clay.	Clayton.	Clinton.	Crawford.	Dallas.	Davis.
1	Number of all farms in the county	1,844	2,003	1,769	3,101	2,729	2,444	2,320	2,089
2	Farms reporting land having drainage	729	358	1,230	71	1,222	97	1,607	79
3	Farms reporting land needing drainage	467	882	661	191	706	146	813	135
4	Farms in drainage and levee districts	2	5	482	1	231	10	414	46
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	366,720	318,080	360,320	487,680	442,240	457,600	376,960	320,640
6	All land in farms ... acres	352,003	299,881	341,029	463,749	420,592	438,369	356,359	303,700
7	Improved land in farms ... acres	306,883	231,975	287,642	327,399	365,842	406,952	300,949	248,718
8	Woodland in farms ... acres	7,998	14,448	8,518	94,533	24,060	18,123	28,576	43,617
9	Other unimproved land in farms ... acres	37,122	53,458	44,869	41,817	30,690	13,294	26,834	11,365
10	Farm land reported as provided with drainage ... acres	34,582	8,668	126,885	1,385	59,844	2,501	160,194	3,294
11	Farm land reported as needing drainage ... acres	11,641	26,732	34,701	5,286	25,311	2,298	25,353	4,650
12	Drainage only ... acres	11,198	19,236	32,933	1,757	20,871	2,025	19,807	1,101
13	Drainage and clearing ... acres	443	7,496	1,768	3,529	4,440	273	5,546	3,549

		Decatur.	Delaware.	Des Moines.	Dickinson.	Dubuque.	Emmet.	Fayette.	Floyd.
1	Number of all farms in the county	2,029	2,284	1,926	1,043	2,372	1,193	3,157	1,916
2	Farms reporting land having drainage	61	645	1,062	804	156	1,051	607	631
3	Farms reporting land needing drainage	160	913	266	710	254	598	1,545	544
4	Farms in drainage and levee districts	14	3	154	310	9	541	4	85
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	341,120	365,440	261,760	240,640	384,640	251,520	463,360	316,800
6	All land in farms ... acres	322,246	347,787	243,516	208,396	386,017	232,053	437,626	295,458
7	Improved land in farms ... acres	264,154	278,610	181,069	186,890	269,830	200,675	336,346	254,433
8	Woodland in farms ... acres	40,484	28,246	35,682	3,550	52,453	5,558	28,467	14,788
9	Other unimproved land in farms ... acres	17,608	40,931	26,765	17,956	43,734	25,820	72,813	26,237
10	Farm land reported as provided with drainage ... acres	2,776	22,894	100,814	84,439	3,830	145,888	20,688	31,602
11	Farm land reported as needing drainage ... acres	4,662	31,727	12,390	45,825	6,627	34,260	51,129	18,144
12	Drainage only ... acres	1,324	24,789	8,533	42,573	4,500	31,318	39,812	13,961
13	Drainage and clearing ... acres	3,338	6,938	3,857	3,252	2,127	2,942	11,317	4,183

		Franklin.	Fremont.	Greene.	Grundy.	Guthrie.	Hamilton.	Hancock.	Hardin.
1	Number of all farms in the county	2,040	1,858	2,059	1,725	2,315	2,181	1,875	2,129
2	Farms reporting land having drainage	1,481	304	1,759	1,173	1,027	1,990	1,354	1,476
3	Farms reporting land needing drainage	1,110	175	681	928	838	645	934	827
4	Farms in drainage and levee districts	707	169	884	8	58	1,239	723	446
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	369,920	324,480	367,360	320,640	380,800	364,800	364,800	364,160
6	All land in farms ... acres	356,479	283,658	339,050	313,516	357,986	353,069	345,713	350,027
7	Improved land in farms ... acres	306,062	254,475	305,840	281,303	291,806	316,755	300,755	300,986
8	Woodland in farms ... acres	11,559	14,800	14,394	3,110	32,955	13,205	6,584	24,535
9	Other unimproved land in farms ... acres	38,858	14,383	18,816	29,103	33,225	23,109	38,374	24,506
10	Farm land reported as provided with drainage ... acres	156,488	25,653	201,675	73,998	57,065	254,872	154,493	145,748
11	Farm land reported as needing drainage ... acres	48,952	9,896	23,085	29,981	26,637	23,953	55,719	26,675
12	Drainage only ... acres	43,861	6,886	21,225	29,205	16,409	21,912	49,526	23,105
13	Drainage and clearing ... acres	5,091	3,010	1,860	776	10,228	2,041	6,193	3,570

		Harrison.	Henry.	Howard.	Humboldt.	Ida.	Iowa.	Jackson.	Jasper.
1	Number of all farms in the county	2,881	1,989	1,708	1,380	1,398	2,256	2,327	2,946
2	Farms reporting land having drainage	311	819	320	1,256	246	1,569	97	1,541
3	Farms reporting land needing drainage	277	133	832	536	153	865	187	725
4	Farms in drainage and levee districts	262	2	49	768	.....	6	2	53
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	442,240	273,280	299,520	275,840	275,200	373,120	404,480	467,200
6	All land in farms ... acres	414,961	252,368	280,807	254,844	270,906	360,634	392,339	439,155
7	Improved land in farms ... acres	330,633	201,173	232,451	235,655	258,787	312,071	266,453	385,825
8	Woodland in farms ... acres	35,451	27,399	11,544	8,333	4,403	31,962	78,577	29,576
9	Other unimproved land in farms ... acres	48,877	23,796	36,812	10,856	7,716	16,601	47,309	23,754
10	Farm land reported as provided with drainage ... acres	27,579	70,039	10,178	156,801	6,473	102,511	3,272	92,797
11	Farm land reported as needing drainage ... acres	9,733	3,914	42,005	29,321	2,791	19,229	3,577	22,435
12	Drainage only ... acres	4,626	2,513	39,722	27,873	2,674	16,291	1,311	16,957
13	Drainage and clearing ... acres	5,107	1,401	2,283	1,448	117	2,938	2,266	5,478

		Jefferson.	Johnson.	Jones.	Keokuk.	Kossuth.	Lee.	Linn.	Louisa.
1	Number of all farms in the county	1,960	2,625	2,090	2,764	2,928	2,297	3,666	1,470
2	Farms reporting land having drainage	683	1,409	1,043	1,670	2,605	306	1,781	818
3	Farms reporting land needing drainage	155	919	733	847	1,353	160	1,370	310
4	Farms in drainage and levee districts	3	6	3	.....	1,185	62	19	196
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	275,840	390,400	364,160	369,920	622,720	327,040	453,760	253,440
6	All land in farms ... acres	262,038	374,243	339,502	357,112	574,605	303,415	418,676	228,438
7	Improved land in farms ... acres	192,358	320,596	275,873	303,497	505,669	205,508	335,164	186,344
8	Woodland in farms ... acres	27,292	34,187	35,715	38,315	10,520	63,216	35,943	29,477
9	Other unimproved land in farms ... acres	42,388	19,460	27,914	15,300	58,416	34,691	47,569	12,617
10	Farm land reported as provided with drainage ... acres	44,337	105,139	61,879	124,907	342,681	12,876	79,505	83,013
11	Farm land reported as needing drainage ... acres	5,461	27,842	20,391	37,575	77,339	8,005	35,932	11,675
12	Drainage only ... acres	2,714	15,589	12,778	26,913	73,470	5,673	24,331	5,362
13	Drainage and clearing ... acres	2,747	12,253	7,613	10,662	3,869	2,332	11,601	6,313

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Lucas.	Lyon.	Madison.	Mahaska.	Marion.	Marshall.	Mills.	Mitchell.
1	Number of all farms in the county	1,617	1,774	2,125	2,784	2,402	2,315	1,571	1,770
2	Farms reporting land having drainage	36	780	1,020	1,411	633	1,385	85	472
3	Farms reporting land needing drainage	118	201	742	613	204	798	86	484
4	Farms in drainage and levee districts	.....	59	71	7	11	30	51	59
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	276,480	372,480	360,320	363,520	360,320	366,080	280,320	296,320
6	All land in farms ... acres	246,292	356,071	335,445	342,155	336,015	354,069	245,301	277,152
7	Improved land in farms ... acres	193,806	323,593	262,441	293,850	275,545	320,266	220,223	244,711
8	Woodland in farms ... acres	36,302	7,560	30,060	27,098	39,999	15,375	16,869	13,896
9	Other unimproved land in farms ... acres	16,184	24,918	42,944	21,207	20,471	18,428	8,209	18,545
10	Farm land reported as provided with drainage ... acres	801	34,613	70,023	106,093	38,916	87,391	4,727	20,885
11	Farm land reported as needing drainage ... acres	4,483	3,967	28,117	27,041	9,130	16,698	4,320	20,923
12	Drainage only ... acres	1,306	3,760	22,115	21,622	6,276	12,216	2,930	17,927
13	Drainage and clearing ... acres	3,177	207	6,002	5,419	2,854	4,482	1,390	2,996

		Monona.	Monroe.	Montgomery.	Muscatine.	O'Brien.	Osceola.	Page.	Palo Alto.
1	Number of all farms in the county	2,166	1,793	1,650	1,923	1,903	1,265	2,252	1,815
2	Farms reporting land having drainage	277	107	322	953	1,307	917	879	1,464
3	Farms reporting land needing drainage	104	72	205	456	670	626	495	902
4	Farms in drainage and levee districts	275	2	7	132	26	219	73	731
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	439,040	276,480	271,360	276,480	364,160	252,800	339,840	359,040
6	All land in farms ... acres	383,956	247,685	258,887	263,051	348,783	247,864	328,323	334,409
7	Improved land in farms ... acres	319,953	179,209	240,186	217,466	322,132	230,971	304,508	289,679
8	Woodland in farms ... acres	20,523	47,254	10,196	32,213	5,181	2,460	14,696	4,774
9	Other unimproved land in farms ... acres	34,480	21,222	8,505	13,372	21,470	14,433	9,119	39,956
10	Farm land reported as provided with drainage ... acres	33,457	3,874	8,497	69,204	97,253	69,170	30,643	172,760
11	Farm land reported as needing drainage ... acres	7,926	1,782	4,777	16,813	25,223	26,686	12,229	53,463
12	Drainage only ... acres	6,977	880	3,909	10,686	24,584	26,195	8,386	51,067
13	Drainage and clearing ... acres	949	902	868	6,127	639	491	3,843	2,396

		Pocahontas.	Polk.	Pottawattamie.	Poweshiek.	Ringgold.	Sac.	Scott.	Shelby.
1	Number of all farms in the county	1,992	2,948	3,781	2,179	1,923	1,945	2,316	2,049
2	Farms reporting land having drainage	1,873	1,440	297	1,668	38	1,044	1,213	274
3	Farms reporting land needing drainage	644	670	225	840	190	527	707	237
4	Farms in drainage and levee districts	922	71	146	3	1	224	23	26
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	368,640	372,480	602,880	371,200	345,600	367,360	287,360	376,960
6	All land in farms ... acres	348,189	326,840	568,473	357,265	315,350	356,528	273,351	355,336
7	Improved land in farms ... acres	326,339	283,211	527,476	317,999	284,742	329,046	242,446	333,663
8	Woodland in farms ... acres	4,435	25,722	25,606	14,199	20,660	6,603	14,466	8,781
9	Other unimproved land in farms ... acres	17,415	17,907	15,391	25,067	9,948	20,879	16,439	12,892
10	Farm land reported as provided with drainage ... acres	268,758	98,808	17,683	169,942	1,649	87,369	81,023	6,718
11	Farm land reported as needing drainage ... acres	29,477	14,678	7,668	46,661	8,940	16,465	17,021	6,826
12	Drainage only ... acres	26,053	11,744	3,958	33,051	5,725	13,613	14,549	4,095
13	Drainage and clearing ... acres	3,424	2,934	3,710	12,610	3,215	2,852	2,472	2,731

		Sioux.	Story.	Tama.	Taylor.	Union.	Van Buren.	Wapello.	Warren.
1	Number of all farms in the county	2,801	2,215	2,484	2,159	1,631	2,013	2,112	2,402
2	Farms reporting land having drainage	841	1,871	1,088	386	323	142	630	860
3	Farms reporting land needing drainage	193	550	590	294	273	147	208	436
4	Farms in drainage and levee districts	5	902	3	33	7	53	7	29
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	486,400	362,880	460,800	341,760	273,280	305,280	273,920	364,800
6	All land in farms ... acres	467,473	328,058	424,132	324,279	259,064	291,384	254,866	337,533
7	Improved land in farms ... acres	443,980	292,748	370,662	290,186	222,420	209,197	203,280	284,107
8	Woodland in farms ... acres	7,893	19,021	24,785	16,075	16,932	55,529	30,328	30,724
9	Other unimproved land in farms ... acres	15,600	16,289	28,685	18,018	19,712	26,658	21,258	22,702
10	Farm land reported as provided with drainage ... acres	41,150	197,633	48,193	17,107	14,842	8,165	47,432	54,266
11	Farm land reported as needing drainage ... acres	4,922	13,954	13,273	8,877	6,873	5,504	6,028	13,958
12	Drainage only ... acres	4,540	11,189	9,889	5,984	5,074	1,789	1,889	8,967
13	Drainage and clearing ... acres	382	2,765	3,384	2,893	1,799	3,715	4,139	4,991

		Washington.	Webster.	Winnebago.	Winneshiek.	Woodbury.	Worth.	Wright.	All other counties.[1]
1	Number of all farms in the county	2,307	2,566	1,543	2,915	2,969	1,461	1,927	8,252
2	Farms reporting land having drainage	1,722	2,210	1,016	135	150	894	1,721	44
3	Farms reporting land needing drainage	820	977	758	491	42	894	885	336
4	Farms in drainage and levee districts	20	1,406	487	4	97	551	1,071	1
	LAND AND FARM AREA.								
5	Approximate land area of the county ... acres	357,760	456,960	255,360	439,040	552,960	255,360	368,000	1,566,080
6	All land in farms ... acres	336,801	424,727	243,076	428,386	492,820	242,561	344,516	1,455,311
7	Improved land in farms ... acres	276,960	376,031	212,584	329,113	460,451	201,195	309,649	1,187,172
8	Woodland in farms ... acres	33,171	25,512	6,559	55,721	16,973	8,139	7,377	157,872
9	Other unimproved land in farms ... acres	26,670	23,184	23,933	43,552	15,396	33,227	27,490	110,267
10	Farm land reported as provided with drainage ... acres	157,957	295,854	67,350	2,429	24,042	50,190	224,760	1,231
11	Farm land reported as needing drainage ... acres	36,803	41,433	27,755	9,658	1,450	44,080	37,830	9,665
12	Drainage only ... acres	24,654	36,567	24,702	6,885	842	39,456	36,195	1,264
13	Drainage and clearing ... acres	12,149	4,866	3,053	2,773	608	4,624	1,635	8,401

[1] Comprises Allamakee, Clarke, Plymouth, and Wayne Counties.

County Table II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		The State.	Adams.	Appanoose.	Boone.	Buena Vista.	Calhoun.	Carroll.	Cedar.	Cerro Gordo.
	LAND AREA.									
1	Approximate land area of the state or county ....acres..	35,575,040	273,280	328,320	364,160	365,440	363,520	365,440	364,800	362,880
2	All land in operating drainage enterprises....acres..	5,224,478	4,797	6,805	90,039	116,826	246,559	78,040	6,333	108,300
3	Improved land....acres..	4,493,407	2,650	6,464	86,089	114,264	123,377	72,531	6,206	95,385
4	Per cent of all improved land in farms....	15.7	1.1	2.7	30.0	35.0	37.4	22.2	2.0	34.7
5	Timber and cut-over land....acres..	74,652	240	.....	.....	.....	1,015	.....	.....	13
6	Other unimproved land....acres..	656,419	1,907	341	3,950	2,562	122,167	5,509	127	12,902
7	Swampy or subject to overflow, in enterprises....acres..	320,893	594	308	3,895	204	24,149	4,321	127	12,018
8	Suffering a loss of crops from defective drainage....acres..	157,542	46	204	2,531	.....	4,094	3,406	127	2,390
9	Assessed acreage....	5,905,743	4,797	6,805	91,709	190,286	335,032	91,163	6,333	108,300
10	Excess over all land in enterprises....acres..	681,265	.....	.....	1,670	73,460	88,473	13,123	.....	.....
	DRAINAGE WORKS.									
	Open ditches:									
11	Completed....miles..	3,998.0	16.6	10.0	7.5	96.7	191.7	51.9	3.1	37.7
12	Additional under construction....miles..	81.1	.....	.....	.....	.....	6.8	.....	.....	3.0
13	Maximum completed in any enterprise....miles..	82.3	14.4	5.0	2.3	64.4	20.0	36.3	3.1	10.6
14	Maximum width at bottom of ditch [1]....feet..	90	12	.....	14	45	68	35	10	30
15	Maximum of average depths of outlet ditches [1]....feet..	25.0	10.0	.....	8.4	11.5	12.0	14.0	6.0	8.3
16	Mean depth of branch ditches [1]....feet..	6.5	8.0	.....	.....	9.0	5.4	6.8	.....	5.8
	Tile drains:									
17	Completed....miles..	10,384.9	.....	.....	455.7	395.1	422.5	230.8	3.0	323.1
18	Additional under construction....miles..	768.6	.....	.....	6.0	6.6	3.4	12.3	.....	121.7
19	Maximum completed in any enterprise....miles..	127.0	.....	.....	20.6	20.0	14.0	12.9	3.0	50.4
20	Maximum size of tile [1]....inches..	52	.....	.....	44	42	36	44	24	48
	Accessory levees and dikes:									
21	Completed....miles..	45.2	.....	.....	.....	.....	.....	.....	.....	.....
22	Additional under construction....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:									
23	Engine capacity....horsepower..	3,153	.....	.....	.....	.....	.....	.....	.....	.....
24	Pump capacity....gallons per minute..	530,800	.....	.....	.....	.....	.....	.....	.....	.....
25	Area served by pumps....acres..	134,616	.....	.....	.....	.....	.....	.....	.....	.....
26	Area drained by open ditches only [1]....acres..	1,294,243	4,797	6,805	.....	41,809	76,902	3,496	.....	.....
27	Length of these ditches....miles..	1,934.7	16.6	10.0	.....	76.4	89.7	9.8	.....	.....
28	Average length per acre....feet..	7.9	18.3	7.8	.....	9.6	6.2	14.8	.....	.....
29	Area having open ditches and levees [1]....acres..	26,228	.....	.....	.....	.....	.....	.....	.....	.....
30	Length of these ditches....miles..	45.4	.....	.....	.....	.....	.....	.....	.....	.....
31	Average length per acre....feet..	9.1	.....	.....	.....	.....	.....	.....	.....	.....
32	Length of the accessory levees....miles..	29.1	.....	.....	.....	.....	.....	.....	.....	.....
33	Area drained by tile only [1]....acres..	1,415,176	.....	.....	75,551	39,067	78,559	40,702	.....	48,586
34	Length of these tile....miles..	6,785.7	.....	.....	397.2	343.2	349.6	215.5	.....	259.7
35	Average length per acre....feet..	25.3	.....	.....	27.8	46.4	23.5	28.0	.....	28.2
36	Area drained by open ditches and tile [1]....acres..	2,444,906	.....	.....	14,488	35,950	91,098	33,842	6,333	59,714
37	Length of these drains....miles..	6,392.2	.....	.....	72.0	78.8	185.1	69.7	6.1	225.8
38	Average length per acre....feet..	13.8	.....	.....	26.2	11.6	10.7	10.9	5.1	20.0
39	Area having tile drains and levees [1]....acres..	6,000	.....	.....	.....	.....	.....	.....	.....	.....
40	Length of these tile....miles..	6.0	.....	.....	.....	.....	.....	.....	.....	.....
41	Average length per acre....feet..	5.3	.....	.....	.....	.....	.....	.....	.....	.....
42	Length of the accessory levees....miles..	8.0	.....	.....	.....	.....	.....	.....	.....	.....
43	Area having open ditches, tile drains, and levees [1]....acres..	37,925	.....	.....	.....	.....	.....	.....	.....	.....
44	Length of these drains....miles..	68.6	.....	.....	.....	.....	.....	.....	.....	.....
45	Average length per acre....feet..	9.6	.....	.....	.....	.....	.....	.....	.....	.....
46	Length of the accessory levees....miles..	8.1	.....	.....	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.									
47	Improved land in operating enterprises, 1920....acres..	4,493,407	2,650	6,464	86,089	114,264	123,377	72,531	6,206	95,385
48	Improved land prior to drainage....acres..	3,210,496	1,439	5,791	63,958	87,048	62,761	28,411	1,583	89,976
49	Increase since drainage....acres..	1,282,911	1,211	673	22,131	27,216	60,616	44,120	4,623	5,409
50	Per cent of increase....	40.0	84.2	11.6	34.6	31.3	96.6	155.3	292.0	6.0
51	Per cent increase is of all improved land in farms, 1920....	4.5	0.5	0.3	7.7	8.3	18.4	13.5	1.5	2.0
52	Timber and cut-over land, 1920....acres..	74,652	240	.....	.....	.....	1,015	.....	.....	13
53	Timber and cut-over land prior to drainage....acres..	93,994	240	.....	.....	.....	1,015	.....	.....	13
54	Decrease since drainage....acres..	19,342	.....	.....	.....	.....	.....	.....	.....	.....
55	Per cent of decrease....	20.6	.....	.....	.....	.....	.....	.....	.....	.....
56	Other unimproved land, 1920....acres..	656,419	1,907	341	3,950	2,562	122,167	5,509	127	12,902
57	Other unimproved land prior to drainage....acres..	1,919,988	3,118	1,014	26,081	29,778	182,783	49,629	4,750	18,311
58	Decrease since drainage....acres..	1,263,569	1,211	673	22,131	27,216	60,616	44,120	4,623	5,409
59	Per cent of decrease....	65.8	38.8	66.4	84.9	91.4	33.2	88.9	97.3	29.5
60	Swampy or subject to overflow, 1920....acres..	320,893	594	308	3,895	204	24,149	4,321	127	12,018
61	Swampy or subject to overflow prior to drainage....acres..	1,567,960	2,878	774	25,813	34,246	148,334	29,258	4,750	15,421
62	Decrease since drainage....acres..	1,247,067	2,284	466	21,918	34,042	124,185	24,937	4,623	3,403
63	Per cent of decrease....	79.5	79.4	60.2	84.9	99.4	83.7	85.2	97.3	22.1
	CAPITAL INVESTED AND COST PER ACRE.									
64	Total capital invested in and required for completion of operating enterprises....dollars..	54,169,878	102,760	61,989	1,551,773	1,508,798	2,182,582	728,624	31,773	1,809,193
65	Capital invested in these enterprises to Dec. 31, 1919....dollars..	49,627,304	102,760	61,989	1,516,735	1,485,798	2,042,119	677,815	31,773	1,064,892
66	Additional capital required to complete these enterprises.dollars..	4,542,574	.....	.....	35,038	23,000	140,463	50,809	.....	744,301
67	Average cost per acre when completed....dollars..	10.37	21.42	9.11	17.23	21.91	8.85	9.34	5.02	16.71
68	Enterprises constructing open ditches only....dollars..	8,856,170	102,760	61,989	.....	243,678	285,747	37,226	.....	.....
69	Average cost per acre when completed....dollars..	6.84	21.42	9.11	.....	5.83	3.72	10.65	.....	.....
70	Enterprises constructing open ditches and levees....dollars..	673,770	.....	.....	.....	.....	.....	.....	.....	.....
71	Average cost per acre when completed....dollars..	25.69	.....	.....	.....	.....	.....	.....	.....	.....
72	Enterprises constructing tile drains only....dollars..	20,886,476	.....	.....	1,301,993	936,684	1,141,733	379,860	.....	543,077
73	Average cost per acre when completed....dollars..	14.76	.....	.....	17.23	23.98	14.53	9.33	.....	11.18
74	Enterprises constructing open ditches and tile drains....dollars..	23,424,200	.....	.....	249,780	328,436	755,102	311,538	31,773	1,266,116
75	Average cost per acre when completed....dollars..	9.58	.....	.....	17.24	9.14	8.29	9.21	5.02	21.20
76	Enterprises constructing tile drainsand levees....dollars..	90,000	.....	.....	.....	.....	.....	.....	.....	.....
77	Average cost per acre when completed....dollars..	15.00	.....	.....	.....	.....	.....	.....	.....	.....
78	Enterprises constructing open ditches, tile drains, and levees.dollars..	239,262	.....	.....	.....	.....	.....	.....	.....	.....
79	Average cost per acre when completed....dollars..	6.31	.....	.....	.....	.....	.....	.....	.....	.....
	CROPS.									
	Improved land in enterprises reporting—									
80	Corn as principal crop on drained land....acres..	4,365,787	2,650	6,464	86,089	114,264	123,377	72,531	6,206	95,385
81	Hay as principal crop on drained land....acres..	90,381	.....	.....	.....	.....	.....	.....	.....	.....
82	Not reporting principal crop on drained land....acres..	[2] 37,239	.....	.....	.....	.....	.....	.....	.....	.....

[1] When works under construction have been completed.

[2] Includes 360 acres reporting vegetables as principal crop.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Clay.	Clinton.	Crawford.	Dallas.	Davis.	Des Moines.	Dickinson.	Emmet.	Floyd.	Franklin.
	LAND AREA.										
1	Approximate land area of the county ... acres	350,320	442,240	457,600	376,960	320,640	261,760	240,640	251,520	316,800	369,920
2	All land in operating drainage enterprises ... acres	105,912	68,279	5,500	72,637	7,978	53,188	100,317	164,355	15,543	139,852
3	Improved land ... acres	103,553	51,910	2,750	69,469	7,658	49,965	98,233	162,624	14,878	132,504
4	Per cent of all improved land in farms	36.0	14.2	0.7	23.1	3.1	27.6	52.6	81.0	5.8	43.3
5	Timber and cut-over land ... acres	.....	13,175	550	.....	.....	.....	.....	68	.....	.....
6	Other unimproved land ... acres	2,359	3,194	2,200	3,168	320	3,223	2,084	1,663	665	7,348
7	Swampy or subject to overflow, in enterprises ... acres	2,453	3,669	550	873	320	2,628	1,833	718	665	6,674
8	Suffering a loss of crops from defective drainage ... acres	676	5,387	550	16	.....	659	1,573	206	117	2,812
9	Assessed acreage	107,692	72,119	6,000	77,763	7,978	103,188	133,024	169,871	15,543	152,747
10	Excess over all land in enterprises ... acres	1,780	3,840	500	5,126	.....	50,000	32,707	5,516	.....	12,895
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	45.7	89.8	12.0	35.9	14.4	18.6	76.1	120.5	14.3	51.6
12	Additional under construction ... miles	.....	.....	.....	.....	.....	0.8	.....	6.6	.....	0.7
13	Maximum completed in any enterprise ... miles	12.1	25.0	11.2	7.0	13.5	15.2	13.0	15.0	10.0	11.3
14	Maximum width at bottom of ditch [1] ... feet	25	25	20	24	12	60	25	24	12	16
15	Maximum of average depths of outlet ditches [1] ... feet	11.5	10.0	13.0	8.0	12.0	7.2	10.0	12.0	5.0	8.3
16	Mean depth of branch ditches [1] ... feet	6.4	7.2	.....	5.0	.....	6.0	5.9	7.0	5.0	5.0
	Tile drains:										
17	Completed ... miles	293.8	29.9	.....	166.2	.....	11.8	410.3	492.9	42.3	423.6
18	Additional under construction ... miles	45.7	1.1	.....	8.5	.....	0.3	27.5	14.2	.....	35.2
19	Maximum completed in any enterprise ... miles	76.0	6.0	.....	10.0	.....	6.6	53.3	64.5	20.0	37.4
20	Maximum size of tile [1] ... inches	38	36	.....	42	.....	33	44	36	36	48
	Accessory levees and dikes:										
21	Completed ... miles	.....	2.0	.....	.....	.....	.....	.....	.....	.....	.....
22	Additional under construction ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:										
23	Engine capacity ... horsepower	.....	.....	.....	.....	.....	600	.....	.....	.....	.....
24	Pump capacity ... gallons per minute	.....	.....	.....	.....	.....	74,300	.....	.....	.....	.....
25	Area served by pumps ... acres	.....	.....	.....	.....	.....	53,188	.....	.....	.....	.....
26	Area drained by open ditches only [1] ... acres	12,440	8,000	5,500	8,821	7,978	.....	2,852	46,350	802	8,660
27	Length of these ditches ... miles	15.8	11.0	12.0	15.5	14.4	.....	11.3	63.2	10.0	16.9
28	Average length per acre ... feet	6.7	7.3	11.5	9.3	9.5	.....	20.9	7.2	65.8	10.3
29	Area having open ditches and levees [1] ... acres	.....	1,000	.....	.....	.....	.....	.....	.....	.....	.....
30	Length of these ditches ... miles	.....	3.0	.....	.....	.....	.....	.....	.....	.....	.....
31	Average length per acre ... feet	.....	15.8	.....	.....	.....	.....	.....	.....	.....	.....
32	Length of the accessory levees ... miles	.....	1.0	.....	.....	.....	.....	.....	.....	.....	.....
33	Area drained by tile only [1] ... acres	37,883	1,800	.....	43,000	.....	3,188	18,967	51,831	6,550	65,550
34	Length of these tile ... miles	152.5	6.0	.....	138.4	.....	5.2	125.7	262.0	22.3	316.6
35	Average length per acre ... feet	21.3	17.6	.....	17.0	.....	8.6	35.0	26.7	18.0	25.5
36	Area drained by open ditches and tile [1] ... acres	55,589	56,260	.....	20,816	.....	50,000	78,498	66,174	8,191	65,642
37	Length of these drains ... miles	216.9	97.3	.....	55.7	.....	26.3	376.9	309.0	24.3	177.6
38	Average length per acre ... feet	20.6	9.1	.....	14.4	.....	2.8	25.4	24.7	15.7	14.3
39	Area having tile drains and levees [1] ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
40	Length of these tile ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
41	Average length per acre ... feet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
42	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
43	Area having open ditches, tile drains, and levees [1] ... acres	.....	1,229	.....	.....	.....	.....	.....	.....	.....	.....
44	Length of these drains ... miles	.....	3.5	.....	.....	.....	.....	.....	.....	.....	.....
45	Average length per acre ... feet	.....	15.0	.....	.....	.....	.....	.....	.....	.....	.....
46	Length of the accessory levees ... miles	.....	1.0	.....	.....	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.										
47	Improved land in operating enterprises, 1920 ... acres	103,553	51,910	2,750	69,469	7,658	49,965	98,233	162,624	14,878	132,504
48	Improved land prior to drainage ... acres	81,025	10,352	1,650	33,703	6,124	44,072	75,106	121,617	13,081	112,871
49	Increase since drainage ... acres	22,528	41,558	1,100	35,766	1,534	5,893	23,127	41,007	1,797	19,633
50	Per cent of increase	27.8	401.4	66.7	106.1	25.0	13.4	30.8	33.7	13.7	17.4
51	Per cent increase is of all improved land in farms, 1920	7.8	11.4	0.3	11.9	0.6	3.3	12.4	20.4	0.7	6.4
52	Timber and cut-over land, 1920 ... acres	.....	13,175	550	.....	.....	.....	.....	68	.....	.....
53	Timber and cut-over land prior to drainage ... acres	.....	17,675	550	.....	.....	.....	.....	68	32	.....
54	Decrease since drainage ... acres	.....	4,500	.....	.....	.....	.....	.....	.....	32	.....
55	Per cent of decrease	.....	25.5	.....	.....	.....	.....	.....	.....	100.0	.....
56	Other unimproved land, 1920 ... acres	2,359	3,194	2,200	3,168	320	3,223	2,084	1,663	665	7,348
57	Other unimproved land prior to drainage ... acres	24,887	40,252	3,300	38,934	1,854	9,116	25,211	42,670	2,430	26,981
58	Decrease since drainage ... acres	22,528	37,058	1,100	35,766	1,534	5,893	23,127	41,007	1,765	19,633
59	Per cent of decrease	90.5	92.1	33.3	91.9	82.7	64.6	91.7	96.1	72.6	72.8
60	Swampy or subject to overflow, 1920 ... acres	2,453	3,669	550	873	320	2,628	1,833	718	665	6,674
61	Swampy or subject to overflow prior to drainage ... acres	32,756	52,977	3,850	24,444	2,122	7,138	20,221	29,120	1,947	21,620
62	Decrease since drainage ... acres	30,303	49,308	3,300	23,571	1,802	4,510	18,388	28,402	1,282	14,946
63	Per cent of decrease	92.5	93.1	85.7	96.4	84.9	63.2	90.9	97.5	65.8	69.1
	CAPITAL INVESTED AND COST PER ACRE.										
64	Total capital invested in and required for completion of operating enterprises ... dollars	1,024,852	406,500	86,447	807,668	46,887	255,057	1,376,275	1,713,804	230,204	2,020,349
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	879,678	396,500	86,447	746,448	46,887	248,260	1,199,111	1,627,901	230,204	1,784,811
66	Additional capital required to complete these enterprises ... dollars	145,174	10,000	.....	61,220	.....	6,797	177,164	85,903	.....	235,538
67	Average cost per acre when completed ... dollars	9.68	5.95	15.72	11.12	5.88	4.80	13.72	10.43	14.81	14.45
68	Enterprises constructing open ditches only ... dollars	54,664	35,000	86,447	62,670	46,887	.....	13,155	226,902	16,842	46,464
69	Average cost per acre when completed ... dollars	4.39	4.38	15.72	7.10	5.88	.....	4.61	4.90	21.00	7.67
70	Enterprises constructing open ditches and levees ... dollars	.....	12,000	.....	.....	.....	.....	.....	.....	.....	.....
71	Average cost per acre when completed ... dollars	.....	12.00	.....	.....	.....	.....	.....	.....	.....	.....
72	Enterprises constructing tile drains only ... dollars	376,887	20,000	.....	535,485	.....	128,986	303,611	688,031	102,575	1,264,535
73	Average cost per acre when completed ... dollars	9.95	11.11	.....	12.45	.....	40.46	16.01	13.27	15.66	19.29
74	Enterprises constructing open ditches and tile drains ... dollars	593,301	299,500	.....	209,513	.....	126,071	1,059,509	798,871	110,787	689,350
75	Average cost per acre when completed ... dollars	10.67	5.32	.....	10.06	.....	2.52	13.50	12.07	13.53	10.50
76	Enterprises constructing tile drains and levees ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
77	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
78	Enterprises constructing open ditches, tile drains, and levees ... dollars	.....	40,000	.....	.....	.....	.....	.....	.....	.....	.....
79	Average cost per acre when completed ... dollars	.....	32.55	.....	.....	.....	.....	.....	.....	.....	.....
	CROPS.										
	Improved land in enterprises reporting—										
80	Corn as principal crop on drained land ... acres	102,168	51,910	2,750	69,109	7,658	49,965	91,393	153,772	14,878	132,504
81	Hay as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
82	Not reporting principal crop on drained land ... acres	1,385	.....	.....	360	.....	.....	6,840	8,852	.....	.....

[1] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Fremont.	Greene.	Guthrie.	Hamilton.	Hancock.	Hardin.	Harrison.	Humboldt.	Jasper.	Kossuth.
	LAND AREA.										
1	Approximate land area of the county ... acres	324,480	367,360	380,800	364,800	364,800	364,160	442,240	275,840	467,200	622,720
2	All land in operating drainage enterprises ... acres	67,493	139,487	14,176	238,515	261,498	121,228	66,951	187,425	25,170	488,297
3	Improved land ... acres	33,829	126,870	10,523	231,858	229,256	117,860	31,492	176,691	23,690	459,984
4	Per cent of all improved land in farms	13.3	41.5	3.6	73.2	76.2	39.2	9.5	75.0	6.1	91.0
5	Timber and cut-over land ... acres	3,514				731		7,724		232	38
6	Other unimproved land ... acres	30,150	12,617	3,653	6,657	31,511	3,368	27,735	10,734	1,248	28,275
7	Swampy or subject to overflow, in enterprises ... acres	13,374	8,377	2,919	6,145	18,464	3,265	7,851	10,729	1,024	23,005
8	Suffering a loss of crops from defective drainage ... acres	4,980	4,512	739	1,991	11,728	2,760	3,799	10,610	251	9,708
9	Assessed acreage	67,493	150,823	14,176	287,066	333,555	129,335	73,827	204,429	25,170	488,755
10	Excess over all land in enterprises ... acres		11,336		48,551	72,057	8,107	6,876	17,004		458
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	88.4	24.2	0.7	171.5	226.9	52.5	113.7	153.5	27.7	316.2
12	Additional under construction ... miles				1.1		0.5				1.7
13	Maximum completed in any enterprise ... miles	16.1	6.3	0.4	17.0	24.6	24.0	18.6	18.4	20.3	33.0
14	Maximum width at bottom of ditch [1] ... feet	40	12	8	28	40	16	20	24	30	30
15	Maximum of average depths of outlet ditches [1] ... feet	16.0	9.2	5.4	11.6	12.0	8.1	15.0	7.0	10.0	10.5
16	Mean depth of branch ditches [1] ... feet	5.4			6.4	5.8	6.6	6.2	5.9		6.9
	Tile drains:										
17	Completed ... miles	6.0	482.5	34.3	504.4	431.2	284.9	16.4	311.6		1,343.1
18	Additional under construction ... miles		48.6	7.4	23.5	48.4	4.0		0.4		108.1
19	Maximum completed in any enterprise ... miles	6.0	32.5	7.9	19.1	72.3	23.3	10.6	14.8		127.0
20	Maximum size of tile [1] ... inches		44	44	52	40	48	34	36		45
	Accessory levees and dikes:										
21	Completed ... miles	8.0						0.3			
22	Additional under construction ... miles										
	Pumping plants:										
23	Engine capacity ... horsepower	25									
24	Pump capacity ... gallons per minute	4,000									
25	Area served by pumps ... acres	650									
26	Area drained by open ditches only [1] ... acres	61,493	233		40,478	40,446	30,106	55,956	35,798	25,170	22,998
27	Length of these ditches ... miles	88.4	1.7		59.0	107.8	35.1	107.9	51.5	27.7	26.6
28	Average length per acre ... feet	7.6	38.5		7.7	14.1	6.2	10.2	7.6	5.8	6.1
29	Area having open ditches and levees [1] ... acres							527			
30	Length of these ditches ... miles							1.8			
31	Average length per acre ... feet							18.0			
32	Length of the accessory levees ... miles							0.3			
33	Area drained by tile only [1] ... acres		93,501	9,014	91,222	38,420	62,318	(2)	38,069		85,510
34	Length of these tile ... miles		398.9	26.4	425.1	272.6	251.8	2.0	193.0		547.9
35	Average length per acre ... feet		22.5	15.5	24.6	37.5	21.3		26.8		33.8
36	Area drained by open ditches and tile [1] ... acres		45,753	5,162	106,815	182,632	28,804	10,468	113,558		379,789
37	Length of these drains ... miles		154.7	16.0	216.4	326.1	55.0	18.4	221.0		1,194.6
38	Average length per acre ... feet		17.9	16.4	10.7	9.4	10.1	9.3	10.3		16.6
39	Area having tile drains and levees [1] ... acres	6,000									
40	Length of these tile ... miles	6.0									
41	Average length per acre ... feet	5.3									
42	Length of the accessory levees ... miles	8.0									
43	Area having open ditches, tile drains, and levees [1] ... acres										
44	Length of these drains ... miles										
45	Average length per acre ... feet										
46	Length of the accessory levees ... miles										
	DEVELOPMENT OF LAND.										
47	Improved land in operating enterprises, 1920 ... acres	33,829	126,870	10,523	231,858	229,256	117,860	31,492	176,691	23,690	459,984
48	Improved land prior to drainage ... acres	21,269	70,972	6,891	213,497	109,761	108,623	21,136	110,982	20,834	402,055
49	Increase since drainage ... acres	12,560	55,898	3,632	18,361	119,495	9,237	10,356	65,709	2,856	57,929
50	Per cent of increase	59.1	78.8	52.7	8.6	108.9	8.5	49.0	59.2	13.7	14.4
51	Per cent increase is of all improved land in farms, 1920	4.9	18.3	1.2	5.8	39.7	3.1	3.1	27.9	0.7	11.5
52	Timber and cut-over land, 1920 ... acres	3,514				731		7,724		232	38
53	Timber and cut-over land prior to drainage ... acres	4,714				731		8,480		441	38
54	Decrease since drainage ... acres	1,200						756		209	
55	Per cent of decrease	25.5						8.9		47.4	
56	Other unimproved land, 1920 ... acres	30,150	12,617	3,653	6,657	31,511	3,368	27,735	10,734	1,248	28,275
57	Other unimproved land prior to drainage ... acres	41,510	68,515	7,285	25,018	151,006	12,605	37,335	76,443	3,895	86,204
58	Decrease since drainage ... acres	11,360	55,898	3,632	18,361	119,495	9,237	9,600	65,709	2,647	57,929
59	Per cent of decrease	27.4	81.6	49.9	73.4	79.1	73.3	25.7	86.0	68.0	67.2
60	Swampy or subject to overflow, 1920 ... acres	13,374	8,377	2,919	6,145	18,464	3,265	7,851	10,729	1,024	23,005
61	Swampy or subject to overflow prior to drainage ... acres	32,337	41,462	3,310	14,638	113,202	11,484	28,099	72,836	3,367	54,809
62	Decrease since drainage ... acres	18,963	33,085	391	8,493	94,738	8,219	20,248	62,107	2,343	31,804
63	Per cent of decrease	58.6	79.8	11.8	58.0	83.7	71.6	72.1	85.3	69.6	58.0
	CAPITAL INVESTED AND COST PER ACRE.										
64	Total capital invested in and required for completion of operating enterprises ... dollars	418,940	2,018,172	183,245	2,460,514	2,734,297	950,141	693,221	1,437,527	142,635	6,220,759
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	418,940	1,749,554	146,744	2,341,671	2,355,636	931,232	693,221	1,437,381	142,635	5,738,533
66	Additional capital required to complete these enterprises ... dollars		268,618	36,501	118,843	378,661	18,909		146		482,226
67	Average cost per acre when completed ... dollars	6.21	14.47	12.93	10.32	10.46	7.84	10.35	7.67	5.67	12.74
68	Enterprises constructing open ditches only ... dollars	328,940	1,207		103,649	91,315	108,452	611,597	111,103	142,635	121,426
69	Average cost per acre when completed ... dollars	5.35	5.18		2.56	2.26	3.60	10.93	3.10	5.67	5.28
70	Enterprises constructing open ditches and levees ... dollars							6,497			
71	Average cost per acre when completed ... dollars							12.33			
72	Enterprises constructing tile drains only ... dollars		1,263,454	86,639	1,564,805	1,230,642	660,415	5,198	574,565		1,118,012
73	Average cost per acre when completed ... dollars		13.51	9.61	17.15	32.03	10.60		15.09		13.07
74	Enterprises constructing open ditches and tile drains ... dollars		753,511	96,606	792,060	1,412,340	181,274	69,929	751,859		4,981,321
75	Average cost per acre when completed ... dollars		16.47	18.71	7.42	7.73	6.29	6.68	6.62		13.12
76	Enterprises constructing tile drains and levees ... dollars	90,000									
77	Average cost per acre when completed ... dollars	15.00									
78	Enterprises constructing open ditches, tile drains, and levees ... dollars										
79	Average cost per acre when completed ... dollars										
	CROPS.										
	Improved land in enterprises reporting—										
80	Corn as principal crop on drained land ... acres	33,829	126,684	10,523	231,048	207,576	117,152	22,314	176,691	23,690	459,984
81	Hay as principal crop on drained land ... acres					21,680		9,178			
82	Not reporting principal crop on drained land ... acres		186		810		708				

[1] When works under construction have been completed.

[2] Acreage included under open ditches.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Lee.	Louisa.	Mahaska.	Marion.	Marshall.	Mills.	Mitchell.	Monona.	Montgomery.	Muscatine.
	LAND AREA.										
1	Approximate land area of the county ... acres	327,040	253,440	363,520	360,320	366,080	280,320	296,320	439,040	271,360	276,480
2	All land in operating drainage enterprises ... acres	15,781	52,113	16,415	8,707	9,000	55,420	7,875	129,004	6,777	43,922
3	Improved land ... acres	14,676	48,572	14,203	8,272	8,730	27,045	6,640	69,751	2,711	40,770
4	Per cent of all improved land in farms	7.1	26.1	4.8	3.0	2.7	12.3	2.7	21.8	1.1	18.7
5	Timber and cut-over land ... acres			750		270	5,543		13,433	338	88
6	Other unimproved land ... acres	1,105	3,541	1,462	435		22,832	1,235	45,820	3,728	3,064
7	Swampy or subject to overflow, in enterprises ... acres	947	2,565	1,462	435	270	7,923	918	11,846	3,203	2,475
8	Suffering a loss of crops from defective drainage ... acres	316	1,200	608	348		2,797	625	10,604	271	784
9	Assessed acreage	15,781	52,113	16,415	8,707	9,000	58,850	7,875	202,631	6,777	43,922
10	Excess over all land in enterprises ... acres						3,430		73,627		
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	24.0	28.0	6.9	8.3	9.3	58.6	1.9	196.5	9.6	42.8
12	Additional under construction ... miles			15.8		4.7					
13	Maximum completed in any enterprise ... miles	24.0	17.9	5.1	5.6	9.3	8.3	1.9	24.3	8.5	10.5
14	Maximum width at bottom of ditch [1] ... feet	30	30	32	30	90	36	8	80	20	24
15	Maximum of average depths of outlet ditches [1] ... feet	8.6	8.0	11.0	11.0	12.0	14.0	5.0	25.0	17.0	7.8
16	Mean depth of branch ditches [1] ... feet	7.0	7.4			5.0	5.0		8.2		6.7
	Tile drains:										
17	Completed ... miles		4.1	3.8				23.7	33.8		
18	Additional under construction ... miles							2.3			
19	Maximum completed in any enterprise ... miles		2.6	3.8				5.7	17.0		
20	Maximum size of tile [1] ... inches		18	16				36	24		
	Accessory levees and dikes:										
21	Completed ... miles	19.0	3.8						8.3		
22	Additional under construction ... miles										
	Pumping plants:										
23	Engine capacity ... horsepower	600	1,900						28		
24	Pump capacity ... gallons per minute	100,000	337,500						15,000		
25	Area served by pumps ... acres	15,781	34,757						800		[2] 29,440
26	Area drained by open ditches only [1] ... acres		24,040	15,665	8,707	9,000	55,420		128,622	6,777	43,922
27	Length of these ditches ... miles		8.8	22.7	8.3	14.0	58.6		101.5	9.6	42.8
28	Average length per acre ... feet		1.9	7.7	5.0	8.2	5.6		7.9	7.5	5.1
29	Area having open ditches and levees [1] ... acres	15,781	900						272		
30	Length of these ditches ... miles	24.0	0.8						4.0		
31	Average length per acre ... feet	8.0	4.7						77.6		
32	Length of the accessory levees ... miles	19.0	3.1						2.3		
33	Area drained by tile only [1] ... acres			750				3,122	110		
34	Length of these tile ... miles			3.8				10.0	16.8		
35	Average length per acre ... feet			26.8				16.9	806.4		
36	Area drained by open ditches and tile [1] ... acres		10,717					4,753			
37	Length of these drains ... miles		2.0					17.9			
38	Average length per acre ... feet		1.0					19.9			
39	Area having tile drains and levees [1] ... acres										
40	Length of these tile ... miles										
41	Average length per acre ... feet										
42	Length of the accessory levees ... miles										
43	Area having open ditches, tile drains, and levees [1] ... acres		16,456						[3]		
44	Length of these drains ... miles		20.5						18.0		
45	Average length per acre ... feet		6.6								
46	Length of the accessory levees ... miles		0.7						6.0		
	DEVELOPMENT OF LAND.										
47	Improved land in operating enterprises, 1920 ... acres	14,676	48,572	14,203	8,272	8,730	27,045	6,640	69,751	2,711	40,770
48	Improved land prior to drainage ... acres	11,362	37,969	14,068	6,808	8,730	19,892	6,568	39,675	2,626	33,943
49	Increase since drainage ... acres	3,314	10,603	135	1,464		7,153	72	30,076	85	6,827
50	Per cent of increase	29.2	27.9	1.0	21.5		36.0	1.1	75.8	3.2	20.1
51	Per cent increase is of all improved land in farms, 1920	1.6	5.7	(4)	0.5		3.2	(4)	9.4	(4)	3.1
52	Timber and cut-over land, 1920 ... acres			750		270	5,543		13,433	338	88
53	Timber and cut-over land prior to drainage ... acres			795	348	270	5,543		21,629	338	88
54	Decrease since drainage ... acres			45	348				8,196		
55	Per cent of decrease			5.7	100.0				37.9		
56	Other unimproved land, 1920 ... acres	1,105	3,541	1,462	435		22,832	1,235	45,820	3,728	3,064
57	Other unimproved land prior to drainage ... acres	4,419	14,144	1,552	1,551		29,985	1,307	67,700	3,813	9,891
58	Decrease since drainage ... acres	3,314	10,603	90	1,116		7,153	72	21,880	85	6,827
59	Per cent of decrease	75.0	75.0	5.8	72.0		23.9	5.5	32.3	2.2	69.0
60	Swampy or subject to overflow, 1920 ... acres	947	2,565	1,462	435	270	7,923	918	11,846	3,203	2,475
61	Swampy or subject to overflow prior to drainage ... acres	3,787	12,370	1,552	1,551	1,000	25,489	961	48,317	3,542	8,354
62	Decrease since drainage ... acres	2,840	9,805	90	1,116	730	17,566	43	36,471	339	5,879
63	Per cent of decrease	75.0	79.3	5.8	72.0	73.0	68.9	4.5	75.5	9.6	70.4
	CAPITAL INVESTED AND COST PER ACRE.										
64	Total capital invested in and required for completion of operating enterprises ... dollars	551,888	366,461	190,542	44,151	260,000	392,201	96,620	1,551,571	88,613	201,939
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	551,888	366,461	88,175	44,151	200,000	392,201	85,499	1,551,571	88,613	201,939
66	Additional capital required to complete these enterprises ... dollars			102,367		60,000		11,121			
67	Average cost per acre when completed ... dollars	34.97	7.03	11.61	5.07	28.89	7.08	12.27	12.03	13.08	4.60
68	Enterprises constructing open ditches only ... dollars		112,010	177,813	44,151	260,000	392,201		1,457,252	88,613	201,939
69	Average cost per acre when completed ... dollars		4.66	11.35	5.07	28.89	7.08		11.33	13.08	4.60
70	Enterprises constructing open ditches and levees ... dollars	551,888	32,620						17,434		
71	Average cost per acre when completed ... dollars	34.97	36.25						64.10		
72	Enterprises constructing tile drains only ... dollars			12,729				50,499	46,885		
73	Average cost per acre when completed ... dollars			16.97				16.18	426.23		
74	Enterprises constructing open ditches and tile drains ... dollars		96,000					46,121			
75	Average cost per acre when completed ... dollars		8.96					9.70			
76	Enterprises constructing tile drains and levees ... dollars										
77	Average cost per acre when completed ... dollars										
78	Enterprises constructing open ditches, tile drains, and levees ... dollars		125,822						30,000		
79	Average cost per acre when completed ... dollars		7.65								
	CROPS.										
	Improved land in enterprises reporting—										
80	Corn as principal crop on drained land ... acres	14,676	48,572	14,203	8,272	8,730	25,857	6,640	23,289	2,711	40,770
81	Hay as principal crop on drained land ... acres						1,188		46,462		
82	Not reporting principal crop on drained land ... acres										

[1] When works under construction have been completed.
[2] Pump located in Louisa County.
[3] Acreage included under open ditches.
[4] Less than one-tenth of 1 per cent.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		O'Brien.	Osceola.	Page.	Palo Alto.	Pocahontas.	Polk.	Pottawattamie.	Ringgold.	Sac.	Shelby.
	LAND AREA.										
1	Approximate land area of the county ... acres	364,160	252,800	339,840	359,040	368,640	372,480	602,880	345,600	367,360	376,960
2	All land in operating drainage enterprises ... acres	5,453	63,342	31,412	221,389	265,904	26,019	41,036	9,530	98,600	22,700
3	Improved land ... acres	5,453	60,151	13,990	195,471	263,091	24,275	20,890	3,812	53,050	12,074
4	Per cent of all improved land in farms	1.7	26.0	4.6	67.5	80.6	8.6	4.0	1.3	16.1	3.6
5	Timber and cut-over land ... acres			3,140	1,350	23		4,105	953	707	1,199
6	Other unimproved land ... acres		3,191	14,282	24,568	2,790	1,744	16,041	4,765	44,843	9,427
7	Swampy or subject to overflow, in enterprises ... acres		2,932	5,191	3,953	1,075	1,438	5,797	5,718	8,615	2,686
8	Suffering a loss of crops from defective drainage ... acres			1,028	3,426		243	1,217		330	1,207
9	Assessed acreage	5,453	63,342	32,932	223,209	298,941	26,019	45,250	9,530	100,234	22,700
10	Excess over all land in enterprises ... acres			1,520	1,820	33,037		4,214		1,634	
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	2.5	45.4	53.0	130.4	200.1	16.0	81.0	18.4	47.3	50.9
12	Additional under construction ... miles		0.5		6.5		12.9			0.9	
13	Maximum completed in any enterprise ... miles	2.5	9.3	12.4	21.5	23.4	14.0	13.3	18.4	11.2	11.6
14	Maximum width at bottom of ditch [1] ... feet	15	20	24	40	35	16	20	20	68	20
15	Maximum of average depths of outlet ditches [1] ... feet	6.6	8.4	16.0	10.5	10.0	8.0	15.0	10.0	10.6	12.0
16	Mean depth of branch ditches [1] ... feet		5.7	4.0	6.5	6.4		6.4		6.6	6.7
	Tile drains:										
17	Completed ... miles	11.8	179.4		442.0	400.0	30.5	4.1		190.1	0.4
18	Additional under construction ... miles		66.0		24.0					0.2	
19	Maximum completed in any enterprise ... miles	6.3	22.0		41.5	32.3	5.9	2.5		11.6	0.4
20	Maximum size of tile [1] ... inches	30	42		38	40	34	15		44	12
	Accessory levees and dikes:										
21	Completed ... miles						0.4	3.0			
22	Additional under construction ... miles										
	Pumping plants:										
23	Engine capacity ... horsepower										
24	Pump capacity ... gallons per minute										
25	Area served by pumps ... acres										
26	Area drained by open ditches only [1] ... acres	1,850	9,397	31,412	24,474	68,900	11,258	32,661	9,530	680	19,980
27	Length of these ditches ... miles	2.5	28.7	53.0	26.5	41.3	25.1	65.9	18.4	1.5	43.4
28	Average length per acre ... feet	7.1	16.1	8.9	5.7	3.2	11.8	10.7	10.2	11.6	11.5
29	Area having open ditches and levees [1] ... acres						1,373	6,375			
30	Length of these ditches ... miles						0.8	11.0			
31	Average length per acre ... feet						3.1	9.1			
32	Length of the accessory levees ... miles						0.4	3.0			
33	Area drained by tile only [1] ... acres	3,603	21,199		42,468	46,152	12,823			38,012	
34	Length of these tile ... miles	11.8	130.5		161.4	156.1	30.1			121.3	
35	Average length per acre ... feet	17.3	32.5		20.1	17.9	12.4			16.8	
36	Area drained by open ditches and tile [1] ... acres		32,746		154,447	150,852	565	2,000		59,908	2,720
37	Length of these drains ... miles		132.1		415.0	411.7	3.4	8.2		115.7	7.9
38	Average length per acre ... feet		21.3		14.2	14.4	31.8	21.6		10.2	15.3
39	Area having tile drains and levees [1] ... acres										
40	Length of these tile ... miles										
41	Average length per acre ... feet										
42	Length of the accessory levees ... miles										
43	Area having open ditches, tile drains, and levees [1] ... acres										
44	Length of these drains ... miles										
45	Average length per acre ... feet										
46	Length of the accessory levees ... miles										
	DEVELOPMENT OF LAND.										
47	Improved land, in operating enterprises, 1920 ... acres	5,453	60,151	13,990	195,471	263,091	24,275	20,890	3,812	53,050	12,074
48	Improved land prior to drainage ... acres	4,561	43,830	10,440	109,035	151,742	22,279	17,264	3,812	36,440	7,676
49	Increase since drainage ... acres	892	16,321	3,550	86,436	111,349	1,996	3,626		16,610	4,398
50	Per cent of increase	19.6	37.2	34.0	79.3	73.4	9.0	21.0		45.6	57.3
51	Per cent increase is of all improved land in farms, 1920	0.3	7.1	1.2	29.8	34.1	0.7	0.7		5.0	1.3
52	Timber and cut-over land, 1920 ... acres			3,140	1,350	23		4,105	953	707	1,199
53	Timber and cut-over land prior to drainage ... acres		755	3,140	1,350	46		4,105	953	707	1,199
54	Decrease since drainage ... acres		755			23					
55	Per cent of decrease		100.0			50.0					
56	Other unimproved land, 1920 ... acres		3,191	14,282	24,568	2,790	1,744	16,041	4,765	44,843	9,427
57	Other unimproved land prior to drainage ... acres	892	18,757	17,832	111,004	114,116	3,740	19,667	4,765	61,453	13,825
58	Decrease since drainage ... acres	892	15,566	3,550	86,436	111,326	1,996	3,626		16,610	4,398
59	Per cent of decrease	100.0	83.0	19.9	77.9	97.6	53.4	18.4		27.0	31.8
60	Swampy or subject to overflow, 1920 ... acres		2,932	5,191	3,953	1,075	1,438	5,797	5,718	8,615	2,686
61	Swampy or subject to overflow prior to drainage ... acres	892	17,879	18,698	43,949	95,207	2,720	19,768	5,718	50,787	13,670
62	Decrease since drainage ... acres	892	14,947	13,507	39,996	94,132	1,282	13,971		42,172	10,984
63	Per cent of decrease	100.0	83.6	72.2	91.0	98.9	47.1	70.7		83.0	80.4
	CAPITAL INVESTED AND COST PER ACRE.										
64	Total capital invested in and required for completion of operating enterprises ... dollars	51,558	722,847	292,364	1,649,640	2,041,778	473,596	592,302	125,000	1,008,267	240,971
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	51,558	543,945	292,364	1,547,570	2,041,778	203,507	592,302	125,000	989,898	240,971
66	Additional capital required to complete these enterprises ... dollars		178,902		102,070		270,089			18,369	
67	Average cost per acre when completed ... dollars	9.45	11.41	9.31	7.45	7.68	18.20	14.43	13.12	10.23	10.62
68	Enterprises constructing open ditches only ... dollars	9,505	64,100	292,364	109,789	169,316	326,293	484,732	125,000	7,183	208,001
69	Average cost per acre when completed ... dollars	5.14	6.82	9.31	4.49	2.46	28.98	14.84	13.12	10.56	10.41
70	Enterprises constructing open ditches and levees ... dollars						2,980	50,342			
71	Average cost per acre when completed ... dollars						2.17	7.90			
72	Enterprises constructing tile drains only ... dollars	42,053	310,155		363,054	558,503	140,277			357,172	
73	Average cost per acre when completed ... dollars	11.67	14.63		8.55	12.10	10.94			9.40	
74	Enterprises constructing open ditches and tile drains ... dollars		348,592		1,176,797	1,313,959	4,046	57,228		643,912	32,970
75	Average cost per acre when completed ... dollars		10.65		7.62	8.71	7.16	28.61		10.75	12.12
76	Enterprises constructing tile drains and levees ... dollars										
77	Average cost per acre when completed ... dollars										
78	Enterprises constructing open ditches, tile drains, and levees ... dollars										
79	Average cost per acre when completed ... dollars										
	CROPS.										
	Improved land in enterprises reporting—										
80	Corn as principal crop on drained land ... acres	5,453	54,391	13,699	195,471	257,791	24,275	13,317	3,812	53,050	12,074
81	Hay as principal crop on drained land ... acres							958			
82	Not reporting principal crop on drained land ... acres		5,760	291		5,300		6,615			

[1] When works under construction have been completed.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Story.	Taylor.	Van Buren.	Warren.	Webster.	Winnebago.	Woodbury.	Worth.	Wright.	Other counties.[1]
	LAND AREA.										
1	Approximate land area of the county ... acres	362,880	341,760	305,280	364,800	456,960	255,360	552,960	255,360	368,000	4,758,400
2	All land in operating drainage enterprises ... acres	143,336	10,585	5,200	16,497	267,788	181,023	94,795	92,860	261,167	19,328
3	Improved land ... acres	135,125	6,351	5,044	8,958	243,386	162,076	51,115	78,210	250,456	16,496
4	Per cent of all improved land in farms	46.2	2.2	2.4	3.2	64.7	76.2	11.1	38.9	80.9	0.4
5	Timber and cut-over land ... acres	1,276	529	.....	2,184	.....	547	10,773	41	.....	103
6	Other unimproved land ... acres	6,935	3,705	156	5,355	24,402	18,400	32,907	14,609	10,711	2,729
7	Swampy or subject to overflow, in enterprises ... acres	13,943	1,429	156	1,649	24,920	11,054	14,875	6,625	13,794	1,847
8	Suffering a loss of crops from defective drainage ... acres	6,043	462	260	426	23,918	1,907	10,453	420	11,003	1,774
9	Assessed acreage ...	145,668	10,585	5,200	16,829	325,773	182,695	96,872	92,860	305,273	19,328
10	Excess over all land in enterprises ... acres	2,332	.....	.....	332	57,985	1,672	2,077	.....	44,106	.....
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	53.2	17.1	16.2	40.8	223.5	120.9	144.6	74.3	183.0	15.1
12	Additional under construction ... miles	.....	.....	.....	11.4	.....	.....	.....	4.4	1.3	1.5
13	Maximum completed in any enterprise ... miles	8.8	7.0	16.2	15.6	37.4	30.3	82.3	16.9	32.0	3.8
14	Maximum width at bottom of ditch [2] ... feet	20	12	12	24	30	30	30	30	30	16
15	Maximum of average depths of outlet ditches [2] ... feet	9.8	15.5	10.8	15.0	12.0	9.5	12.0	9.1	8.0	10.0
16	Mean depth of branch ditches [2] ... feet	5.0	.....	.....	.....	7.7	6.4	5.9	6.0	6.1	7.3
	Tile drains:										
17	Completed ... miles	324.0	.....	.....	1.2	506.3	442.4	8.1	172.9	448.8	42.1
18	Additional under construction ... miles	4.4	.....	.....	.....	19.8	55.3	.....	52.3	13.1	8.3
19	Maximum completed in any enterprise ... miles	18.0	.....	.....	1.2	20.4	29.3	6.1	34.0	22.2	7.1
20	Maximum size of tile [2] ... inches	45	.....	.....	24	36	48	24	36	48	30
	Accessory levees and dikes:										
21	Completed ... miles	.....	.....	.....	.....	.....	0.2	.....	0.2	.....	.....
22	Additional under construction ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pumping plants:										
23	Engine capacity ... horsepower	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	Pump capacity ... gallons per minute	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	Area served by pumps ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	Area drained by open ditches only [2] ... acres	13,575	10,585	5,200	16,191	28,459	6,610	39,801	3,719	115,761	4,157
27	Length of these ditches ... miles	22.6	17.1	16.2	52.2	32.7	28.8	60.6	14.1	140.8	8.7
28	Average length per acre ... feet	8.8	8.5	16.4	17.0	6.1	23.0	8.0	20.0	6.4	11.1
29	Area having open ditches and levees [2] ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	Length of these ditches ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	Average length per acre ... feet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
32	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
33	Area drained by tile only [2] ... acres	90,333	.....	.....	306	66,225	44,908	2,275	25,850	78,882	8,870
34	Length of these tile ... miles	276.1	.....	.....	1.2	390.1	223.0	1.0	166.9	343.2	30.8
35	Average length per acre ... feet	16.1	.....	.....	20.7	31.1	26.2	2.3	34.1	23.0	18.3
36	Area drained by open ditches and tile [2] ... acres	39,428	.....	.....	.....	173,104	113,330	52,719	59,226	66,524	6,301
37	Length of these drains ... miles	82.9	.....	.....	.....	326.8	351.2	91.1	111.9	162.2	27.5
38	Average length per acre ... feet	11.1	.....	.....	.....	10.0	16.4	9.1	10.0	12.9	23.0
39	Area having tile drains and levees [2] ... acres	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
40	Length of these tile ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
41	Average length per acre ... feet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
42	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
43	Area having open ditches, tile drains, and levees [2] ... acres	.....	.....	.....	.....	.....	16,175	.....	4,065	.....	.....
44	Length of these drains ... miles	.....	.....	.....	.....	.....	15.6	.....	11.0	.....	.....
45	Average length per acre ... feet	.....	.....	.....	.....	.....	5.1	.....	14.3	.....	.....
46	Length of the accessory levees ... miles	.....	.....	.....	.....	.....	0.2	.....	0.2	.....	.....
	DEVELOPMENT OF LAND.										
47	Improved land in operating enterprises, 1920 ... acres	135,125	6,351	5,044	8,958	243,386	162,076	51,115	78,210	250,453	16,496
48	Improved land prior to drainage ... acres	92,531	3,176	4,004	5,658	166,389	142,442	37,719	73,247	155,484	14,598
49	Increase since drainage ... acres	42,594	3,175	1,040	3,300	76,997	19,634	13,396	4,963	94,972	1,958
50	Per cent of increase	46.0	100.0	26.0	58.3	46.3	13.8	35.5	6.8	61.1	13.5
51	Per cent increase is of all improved land in farms, 1920	14.5	1.1	0.5	1.2	20.5	9.2	2.9	2.5	30.7	0.1
52	Timber and cut-over land, 1920 ... acres	1,276	529	.....	2,184	.....	547	10,773	41	.....	103
53	Timber and cut-over land prior to drainage ... acres	3,608	529	.....	2,184	.....	1,227	10,877	203	.....	103
54	Decrease since drainage ... acres	2,332	.....	.....	.....	.....	680	104	162	.....	.....
55	Per cent of decrease	64.6	.....	.....	.....	.....	55.4	1.0	79.8	.....	.....
56	Other unimproved land, 1920 ... acres	6,935	3,705	156	5,355	24,402	18,400	32,907	14,609	10,711	2,729
57	Other unimproved land prior to drainage ... acres	47,197	6,880	1,196	8,655	101,399	37,354	46,199	19,410	105,683	4,687
58	Decrease since drainage ... acres	40,262	3,175	1,040	3,300	76,997	18,954	13,292	4,801	94,972	1,958
59	Per cent of decrease	85.3	46.1	87.0	38.1	75.9	50.7	28.8	24.7	89.9	41.8
60	Swampy or subject to overflow, 1920 ... acres	13,943	1,429	156	1,649	24,920	11,054	14,875	6,625	13,794	1,847
61	Swampy or subject to overflow prior to drainage ... acres	52,035	6,536	1,144	11,077	97,073	13,894	53,867	8,377	105,683	3,850
62	Decrease since drainage ... acres	38,092	5,107	988	9,428	72,153	7,840	38,992	1,752	91,889	2,003
63	Per cent of decrease	73.2	78.1	86.4	85.1	74.3	41.5	72.4	20.9	86.9	52.0
	CAPITAL INVESTED AND COST PER ACRE.										
64	Total capital invested in and required for completion of operating enterprises ... dollars	1,358,036	82,196	47,169	333,379	2,532,904	1,613,542	476,816	867,350	2,514,519	196,672
65	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	1,339,365	82,196	47,169	252,302	2,412,781	1,368,324	476,816	684,411	2,417,034	161,840
66	Additional capital required to complete these enterprises ... dollars	18,671	.....	.....	81,077	120,123	245,218	.....	182,939	97,485	34,832
67	Average cost per acre when completed ... dollars	9.47	7.77	9.07	20.21	9.46	8.91	5.03	9.34	9.03	10.18
68	Enterprises constructing open ditches only ... dollars	33,974	82,196	47,169	327,741	97,050	18,761	259,412	32,802	430,437	35,611
69	Average cost per acre when completed ... dollars	2.50	7.77	9.07	20.24	3.41	2.84	6.52	8.82	3.72	8.57
70	Enterprises constructing open ditches and levees ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
71	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
72	Enterprises constructing tile drains only ... dollars	976,136	.....	.....	5,638	1,269,070	624,210	16,110	459,144	1,336,370	91,284
73	Average cost per acre when completed ... dollars	10.81	.....	.....	18.42	19.16	13.90	7.08	17.76	16.94	10.29
74	Enterprises constructing open ditches and tile drains ... dollars	347,926	.....	.....	.....	1,166,784	945,157	201,294	357,378	747,712	69,777
75	Average cost per acre when completed ... dollars	8.82	.....	.....	.....	6.74	8.34	3.82	6.03	11.24	11.07
76	Enterprises constructing tile drains and levees ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
77	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
78	Enterprises constructing open ditches, tile drains, and levees ... dollars	.....	.....	.....	.....	.....	25,414	.....	18,026	.....	.....
79	Average cost per acre when completed ... dollars	.....	.....	.....	.....	.....	1.57	.....	4.43	.....	.....
	CROPS.										
	Improved land in enterprises reporting—										
80	Corn as principal crop on drained land ... acres	135,125	6,351	5,044	8,958	243,386	162,076	40,200	78,210	250,324	16,496
81	Hay as principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	10,915	.....	.....	.....
82	Not reporting principal crop on drained land ... acres	.....	.....	.....	.....	.....	.....	.....	.....	132	.....

[1] Includes only Blackhawk, Buchanan, Butler, Cass, Grundy, Howard, Iowa, Johnson, Linn, Madison, Scott, Tama, and Washington Counties.
[2] When works under construction have been completed.

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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS

DRAINAGE : KANSAS

STATISTICS FOR THE STATE AND ITS COUNTIES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

This bulletin presents the statistics of drainage for Kansas collected at the census of 1920. The figures relate to conditions as of January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises may include areas of unimproved land not yet in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise and the drains that each individual owner constructs on his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are shown separately.

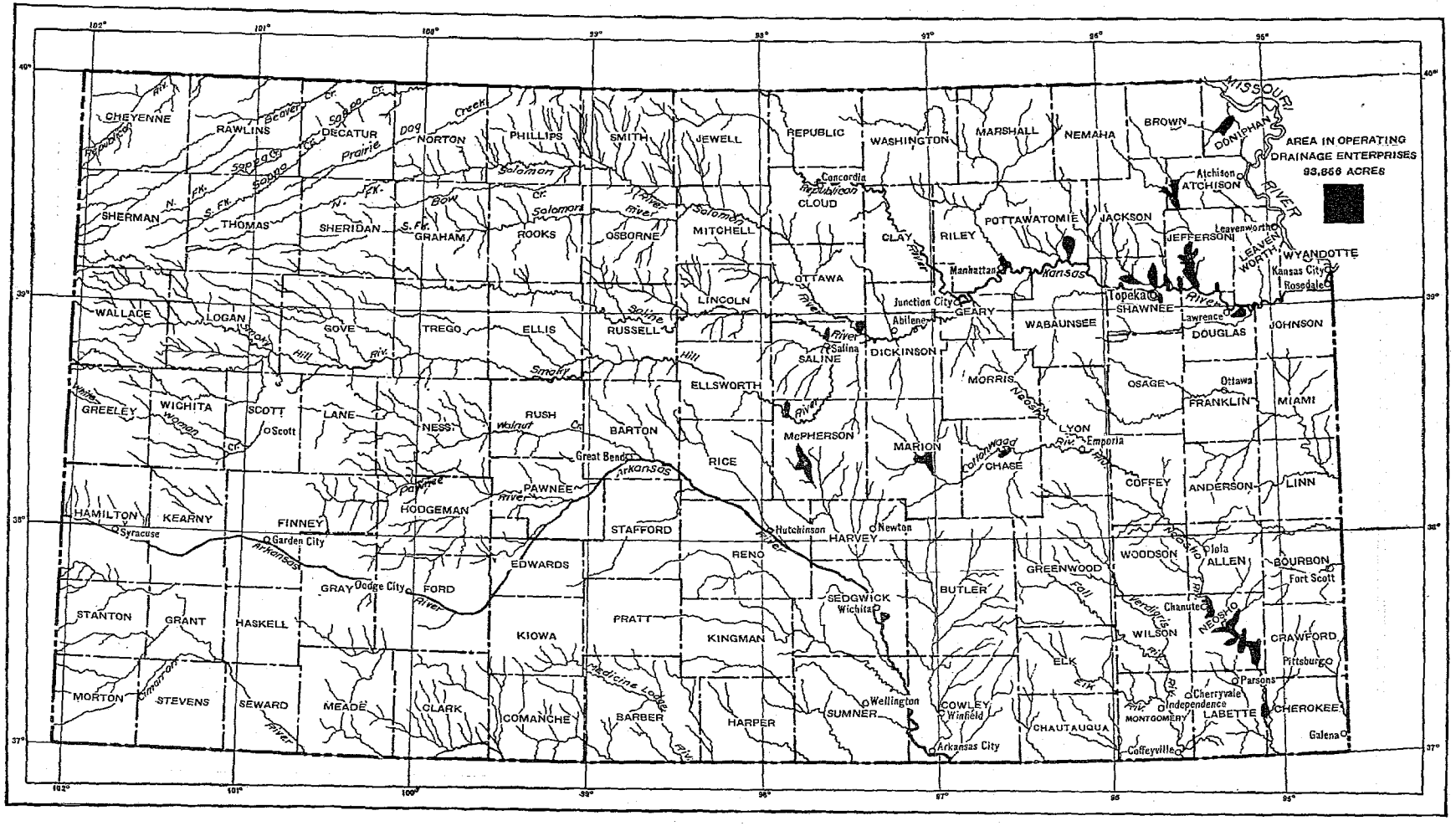
TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	165,286	100.0
Farms reporting land having drainage	2,806	1.7
Farms reporting land needing drainage	2,573	1.6
All land in farms ... acres	45,425,179	100.0
Improved land in farms ... acres	30,600,760	67.4
Farm land reported as provided with drainage ... acres	106,985	0.2
Farm land reported as needing drainage ... acres	68,292	0.2
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	52,335,360	100.0
All land in operating drainage enterprises ... acres	93,856	0.2
Improved land ... acres	87,449	0.2
Timber and cut-over land ... acres	4,135	(1)
Other unimproved land ... acres	2,272	(1)
Capital invested in and required for completion of operating enterprises	$1,210,353	100.0
Capital invested in these enterprises to Dec. 31, 1919	$936,508	77.4
Additional capital required to complete these enterprises	$273,845	22.6

1 Less than one-tenth of 1 per cent.

KANSAS

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which are substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, is the acreage actually benefited or made of more value for agricultural purposes by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators have answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual." Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises, below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter might be any that had completed the original plan of reclamation some years ago but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include districts that on the census date had completed their plans, sold bonds to cover the cost of the undertaking, and let contracts for the construction work, and also districts that had just been established by court decree and were still subject to considerable change in area, plan of drainage works, and cost.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	105,934	100.0	$938,103	100.0	$440,634
Operating enterprises	93,856	88.6	936,508	99.8	273,845
With works completed	72,780	68.7	747,853	79.7	.....
With works under construction	21,076	19.9	188,655	20.1	273,845
Nonoperating enterprises	12,078	11.4	1,595	0.2	166,789

Location of enterprises.—All the drainage enterprises in Kansas are in the eastern half of the state. There is a considerable area in such enterprises in Neosho County, but most of the other land in drainage organizations is located in the northeast corner of the state, in only a few counties.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	105,934	100.0	$938,103	100.0	$440,634
Operating enterprises	93,856	88.6	936,508	99.8	273,845
Arkansas River	37,534	35.4	316,246	33.8	261,845
Kansas River	52,928	50.0	574,848	61.2	12,000
Missouri River	3,394	3.2	45,414	4.8	.....
Nonoperating enterprises	12,078	11.4	1,595	0.2	166,789
Arkansas River	7,040	6.6	1,164	0.1	85,000
Kansas River	3,038	2.9	372	(1)	59,628
Missouri River	2,000	1.9	59	(1)	22,161

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

Condition of land in enterprises.—The drainage enterprises in this state are mostly for the protection and improvement of land subject to overflow by stream floods. This is done most economically, in very many instances, by a drainage plan that combines levees and ditches. The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms, and to afford relief from overflows for the district as a unit. Therefore the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy or subject to overflow, or land that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total.		Works completed (acres).	Works under construction (acres).	
	Acreage.	Per cent of all land.			
All land in enterprises	93,856	100.0	72,780	21,076	12,078
Improved land	87,449	93.2	67,473	19,976	11,278
Timber and cut-over land	4,135	4.4	3,035	1,100	400
Other unimproved land	2,272	2.4	2,272	.....	400
Swampy or subject to overflow	6,704	7.1	910	5,794	12,078
Suffering a loss of crops	6,088	6.5	294	5,794	(1)

[1] Not reported.

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided and the part in each county be considered a separate enterprise. In this way, 54 operating drainage enterprises are counted in Kansas, with an average area of 1,738 acres. There is no overlapping of the enterprises in this state.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	93,856	93,856	100.0
Less than 200 acres	575	575	0.6
200 to 499 acres	4,419	4,419	4.7
500 to 999 acres	11,944	11,944	12.7
1,000 to 4,999 acres	33,086	33,086	35.3
5,000 to 9,999 acres	22,792	22,792	24.3
10,000 acres or more	21,040	21,040	22.4

Character of enterprises.—Most of the drainage enterprises in Jefferson and Neosho Counties, Kans., are organized as county drains under a law applicable to only those counties, while nearly all of the enterprises elsewhere in the state are drainage districts. The distinction made here between county drains and drainage districts is merely that the county commissioners serve as the executive officers for the county drains, while special officers are chosen for each drainage district.

The state water commission was created in 1917, to have control of the problems of flood prevention, drainage, domestic water supply, water power, navigation, and irrigation, but the law provided that this commission should not interfere with any drainage systems then established in drainage districts created under

existing laws. The water commission is composed of the governor of the state and two civil engineers appointed by him.

The character of the organized drainage enterprises in Kansas is determined by the statutes of the state, as follows:

1. Township drains may be organized under a law of March 12, 1879 (ch. 100). Only a very few small enterprises are organized under this statute. They are established by the township trustee after petition from one or more owners of land adjacent to the line of the proposed drain, if the trustee finds that the enterprise will be of public benefit. Claims for damages are determined by him at public hearing before the drain is established. He apportions the construction work to the landowners that will be benefited, and lets contract for the parts not completed within the time specified. Appeals from his decision may be taken to the probate court of the county for trial by jury.

2. County drains may be organized under a law of February 19, 1886 (ch. 161). Though this statute applies to the whole state, only a small amount of drainage has been done under it. The procedure is the same as provided for township drains by the law of 1879, except that the board of county commissioners acts instead of the township trustee, and the county clerk instead of the township clerk.

3. County drains in Jefferson and Neosho Counties are organized under a law of March 6, 1891 (ch. 204). It is applicable only in those counties, yet the enterprises organized under it comprise in number more than half the drainage enterprises in the state. A petition for the drain is submitted to the board of county commissioners from one or more owners of land that would be benefited. The commissioners, or three viewers appointed by them, and the county surveyor lay out the drain and assess damages and benefits, notice of the proposed assessments having been given previously. Appeals from the decisions of the commissioners may be taken to the district court of the county. The commissioners establish the drain if they find it will be of public benefit and that the cost will not be excessive. They have the plan of drainage improvement works prepared, and let contract for construction.

4. Drainage districts may be incorporated under a law of February 22, 1905 (ch. 215), for the benefit of land and property subject to damage from the overflow of natural watercourses. Several of the larger enterprises are organized under this law. The petition defining the proposed district, signed by two-fifths or more of the taxpayers residing in the district, must be submitted to the board of county commissioners, who establish the district if they find, after public hearing, that the petition conforms to the law and that the allegations therein are true, including the fact that the enterprise will be conducive to the public health, convenience, and welfare. The executive officers are three elected directors (before 1914 the number was five), who determine the plan of improvement works and decide which parts shall be paid for by general taxation and which parts by special assessment. Construction of works to be paid for by general taxation must be approved by a majority vote of the taxpayers; construction to be paid for by special assessments against the lands benefited need not be submitted to vote of the taxpayers if no tract will be assessed more than 10 per cent of its value. Assessments of special benefits and of damages are made by a board of three freeholders appointed by the directors. The determinations of the directors upon these assessments, made after public hearing, are final. Bonds for drainage works may be issued if authorized by vote of the taxpayers. Special provision is made for districts where three-fifths of the owners are nonresident.

5. Drainage districts may be incorporated under a law of March 14, 1911 (ch. 168), for reclaiming or protecting a contiguous body of swamp or overflowed lands, not less than 160 acres, situated in one or more counties. This statute has been used by some of the larger enterprises. Articles of association must be signed by a majority in interest of the owners of the land to be affected and filed with the district court of the county containing the greater portion of the proposed district. Five elected supervisors have exclusive charge of the construction and maintenance of the drainage works. Damages are awarded by appraisers appointed by the court; the cost of the enterprise is apportioned by the supervisors against the lands according to the benefits that will be conferred. Public hearings are held upon the engineer's report describing the plan of improvement and his determination of benefits, and also upon the supervisor's apportionment of the costs. The supervisors may issue bonds of the district running 5 to 20 years.

6. Drainage districts in counties having not more than 100,000 population may be established by the district court according to a law of March 5, 1907 (ch. 197). However, no enterprises were reported as organized under this statute. The officers provided for are three special commissioners appointed by the court. They assess benefits and damages subject to review by the court; the cost is apportioned against the lands according to benefits. Contracts for work must not be let until sufficient money to pay for the work has been paid to the county clerk.

7. Drainage districts may be established by the governor of the state, in accordance with the act of March 27, 1911 (ch. 170), but no enterprises have been reported as established in this manner. Petition for the district must be signed by two-fifths of the landowners of the district, and must be approved by the board of county commissioners after public hearing. Three elected directors adopt the plan of drainage improvements, which must be approved by the college of engineering of the state university or by the state college of agriculture. Benefits and damages are assessed by a commission appointed by the directors. The benefits are divided into two classes, general and special.

The first general drainage law of Kansas was enacted March 3, 1868, providing for the establishment of private ditches when necessary to secure outlet for one landowner across the land of another. Petition was made to a justice of the peace, who summoned a jury to hold a hearing upon the petition and to assess benefits and damages. An act of March 3, 1870, provided for the construction of levees and drains by three or more persons signing articles of association to be recorded in the county recorder's office. Appraisers to assess benefits and damages were appointed by the county commissioners upon petition of the directors of the association after the plan of improvement had been adopted. The appropriation of land for right of way was authorized. Both of these laws were repealed by the township drain law of March 12, 1879. The many amendments to the various drainage laws have not changed the general character of the enterprises as described in the preceding paragraphs.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All organized enterprises	105,934	100.0	$938,103	100.0	$440,634
Operating enterprises	93,856	88.6	936,508	99.8	273,845
County drains	25,865	24.4	164,420	17.5	.....
Laws of 1886, ch. 161	1,051	1.0	8,678	0.9	.....
Laws of 1891, ch. 204	24,814	23.4	155,742	16.6	.....
Drainage districts	64,291	60.7	704,588	75.1	269,345
Laws of 1905, ch. 215	29,750	28.1	373,136	39.8	7,500
Laws of 1911, ch. 168	34,541	32.6	331,452	35.3	261,845
Individual ownership [1]	3,700	3.5	67,500	7.2	4,500
Nonoperating enterprises	12,078	11.4	1,595	0.2	166,789
Drainage districts—Laws of 1911, ch. 168 [2]	12,078	11.4	1,595	0.2	166,789

[1] Includes 1,500 acres established under township drain law of 1879.
[2] Includes 3,038 acres not reporting character of enterprise.

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 138.4 miles of open ditches, 213 miles of tile drains, and 165.1 miles of accessory levees; the additional lengths under construction were 7.2 miles of open ditches and 7.8 miles of levees. Most of the tile drains are in one enterprise that is under individual ownership, but otherwise these figures do not include drains or levees installed by individual farm owners supplemental to the works of the drainage enterprises, nor the works of flood protection or levee districts that had not undertaken the construction of ditches or tile drains. Only one pumping district was reported, in which 2,200 acres are served by pumps part of the time.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All kinds	93,856	100.0	$936,508	100.0	$273,845
Open ditches only	37,038	39.5	426,616	45.5	251,345
Open ditches and levees	47,993	51.1	408,962	43.7	22,500
Open ditches, tile drains, and levees[1]	8,825	9.4	100,930	10.8	.....

[1] Includes 4,215 acres reporting open ditches and tile drains only.

The average depth of the main or outlet ditch was reported for each enterprise. The maximum reported for any enterprise in the state and the maximum in each county are shown in line 15 of County Table II. The maximum length, width, and depth of outlet shown in that table for any county may not refer to the same enterprise.

TABLE 8.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	93,856	100.0
Less than 3 feet	8,082	8.6
3.0 to 3.9 feet	7,574	8.1
4.0 to 4.9 feet	13,922	14.8
5.0 to 5.9 feet	18,996	20.2
6.0 to 6.9 feet	346	0.4
7.0 to 7.9 feet	.....	.....
8.0 to 8.9 feet	266	0.3
9.0 to 9.9 feet	.....	.....
10.0 feet and more	13,525	14.4
Not reporting branches	31,145	33.2

In County Table II, line 16 shows the mean depth of branch ditches (open ditches only), which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations. Depths less than 3 feet were omitted, also those of 10 feet and more; the latter seemed not to represent so well the average depths of outlet provided for all the farms in those districts. To include both of these groups, computed as 3 feet and 10 feet, respectively, would make the mean depth for the state 5.4 instead of 4.3 feet.

Maintenance of works.—Township drains are to be repaired by the township trustee upon notice from interested persons that repairs are needed. The cost is assessed against the parties to be benefited by the work. The county drains established under the law effective only in Jefferson and Neosho Counties may use for repair work any surplus of funds left after payment is made for construction of the drainage works; additional assessments for maintenance purposes may be made by the county commissioners apportioned like the cost of original construction. The directors of drainage districts incorporated under the law of 1905 are empowered to establish a general fund by an annual general tax not exceeding 5 mills on the dollar on all taxable property in the district, from which payment may be made for repairing the drainage works. The supervisors of drainage districts incorporated under the law of 1911 are authorized to levy assessments for repairing the drainage works of the district, based upon the original assessment of benefits, and they may appoint overseers to see that the works are maintained in good condition.

TABLE 9.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All operating enterprises	93,856	100.0	$936,508	100.0	$273,845
By district forces[1]	69,154	73.7	676,377	72.2	12,000
No maintenance provided	13,126	14.0	117,976	12.6	.....
Not reporting[2]	11,576	12.3	142,155	15.2	261,845

[1] Includes 2,500 acres reporting maintenance by contract.
[2] Includes 2,200 acres maintained by private owners.

Date of organization.—The progress in drainage is shown only roughly by the dates of the organization of the enterprises, which are the dates when the districts were established by the courts, since there may be a period of a year or more between the decree of establishment and the beginning of actual construction and since the work of construction may occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including extensions made after the original plan of reclamation was completed. No drainage enterprises were reported as organized in Kansas earlier than 1879.

TABLE 10.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	93,856	100.0	93,856	100.0
1880-1889 [1]	1,446	1.5	1,446	1.5
1890-1899	18,482	19.7	18,482	19.7
1900-1904	9,368	10.0	9,368	10.0
1905-1909	16,981	18.1	16,981	18.1
1910-1914	20,932	22.3	20,932	22.3
1915-1919	26,647	28.4	26,647	28.4

[1] Includes 800 acres organized 1879.

TABLE 11.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$936,508	100.0	$273,845
1880-1889 [1]	8,900	1.0	.....
1890-1899	98,662	10.5	.....
1900-1904	93,272	10.0	.....
1905-1909	213,000	22.7	7,500
1910-1914	290,459	31.0	.....
1915-1919	232,215	24.8	266,345

[1] Includes estimated cost of 800 acres organized 1879.

TABLE 12.—DRAINS AND LEVEES (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		TILE.		LEVEES.	
	Miles.	Per cent of total.	Miles.	Per cent of total.	Miles.	Per cent of total.
All drains and levees	145.6	100.0	213.0	100.0	172.9	100.0
1880-1889 [1]	4.2	2.9	.....	.....	1.2	0.7
1890-1899	59.8	41.1	1.7	0.8	82.0	47.4
1900-1904	17.5	12.0	1.0	0.5	35.3	20.4
1905-1909	11.4	7.8	210.0	98.6	19.6	11.3
1910-1914	13.8	9.5	0.3	0.1	0.2	0.1
1915-1919	38.9	26.7	.....	.....	34.6	20.1

[1] Includes 1.2 miles of ditch and 1.2 miles of levee in district organized 1879.

Crops.—The principal crops grown upon the drained land in drainage enterprises are wheat, corn, and vegetables. Statistics were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920.

		THE STATE.	Allen.	Anderson.	Atchison.	Bourbon.	Brown.	Butler.	Chase.
1	Number of all farms in the state or county	165,286	1,932	1,914	1,717	2,517	2,107	2,680	873
2	Farms reporting land having drainage	2,806	69	98	156	59	167	24	26
3	Farms reporting land needing drainage	2,573	84	92	125	74	100	20	13
4	Farms in drainage and levee districts	628	18	.....	32	.....	4	3	10
	LAND AND FARM AREA.								
5	Approximate land area of the state or county ... acres	52,335,360	325,120	369,280	263,680	419,840	365,440	917,760	492,160
6	All land in farms ... acres	45,425,179	293,849	310,641	245,810	401,550	334,407	770,878	350,315
7	Improved land in farms ... acres	30,600,760	238,042	261,164	209,939	285,849	299,810	419,017	105,041
8	Woodland in farms ... acres	1,313,093	7,180	18,241	18,856	18,214	16,332	19,408	9,874
9	Other unimproved land in farms ... acres	13,511,326	48,627	61,236	17,045	97,487	18,265	332,453	234,800
10	Farm land reported as provided with drainage ... acres	106,985	1,631	2,286	4,410	3,163	5,300	1,014	1,447
11	Farm land reported as needing drainage ... acres	68,292	1,684	2,325	2,094	1,832	1,875	271	226
12	Drainage only ... acres	36,371	823	1,163	1,233	1,397	1,103	38	75
13	Drainage and clearing ... acres	31,921	861	1,162	861	435	772	233	151

		Chautauqua.	Cherokee.	Clay.	Cowley.	Crawford.	Doniphan.	Douglas.	Elk.	Franklin.
1	Number of all farms in the county	1,291	2,350	1,938	2,896	2,439	1,722	2,035	1,289	2,261
2	Farms reporting land having drainage	10	86	13	42	43	55	159	41	118
3	Farms reporting land needing drainage	26	228	5	38	64	56	90	41	104
4	Farms in drainage and levee districts	5	3	1	8	2	18	70	.....	1
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	417,280	387,200	408,320	725,120	387,200	241,920	300,160	417,280	374,400
6	All land in farms ... acres	386,963	321,462	397,096	660,370	321,058	219,428	281,872	360,693	337,704
7	Improved land in farms ... acres	134,509	279,864	321,724	340,640	267,927	185,119	202,104	167,205	258,622
8	Woodland in farms ... acres	40,074	23,860	8,744	21,663	12,050	23,562	30,947	19,289	22,480
9	Other unimproved land in farms ... acres	212,380	17,738	66,628	298,067	41,081	10,747	48,821	174,199	56,602
10	Farm land reported as provided with drainage ... acres	563	3,076	753	1,682	1,702	1,364	7,887	1,242	2,684
11	Farm land reported as needing drainage ... acres	289	6,637	83	931	1,275	1,434	1,834	598	1,982
12	Drainage only ... acres	48	1,065	20	795	554	1,147	1,373	246	543
13	Drainage and clearing ... acres	241	5,572	63	136	721	287	461	352	1,439

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Greenwood.	Harvey.	Jackson.	Jefferson.	Johnson.	Labette.	Leavenworth.	Lincoln.	Linn.
1	Number of all farms in the county	1,883	1,719	2,416	2,261	2,223	2,505	2,115	1,466	2,111
2	Farms reporting land having drainage	36	58	71	81	259	84	89	7	48
3	Farms reporting land needing drainage	53	41	20	134	65	51	54	7	61
4	Farms in drainage and levee districts	.....	32	57	72	.....	15	13	2	1
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	741,120	345,600	432,000	347,520	311,040	411,520	281,600	461,440	392,320
6	All land in farms ... acres	617,730	324,428	380,070	343,529	271,248	373,417	270,416	441,498	341,559
7	Improved land in farms ... acres	250,793	296,447	330,279	282,532	232,757	303,701	207,560	276,127	248,423
8	Woodland in farms ... acres	30,617	2,985	22,055	34,683	14,838	14,149	41,665	6,225	32,589
9	Other unimproved land in farms ... acres	336,320	24,996	27,736	26,314	23,653	55,567	21,191	159,146	60,547
10	Farm land reported as provided with drainage ... acres	1,108	4,801	2,024	3,588	8,353	4,118	2,300	835	812
11	Farm land reported as needing drainage ... acres	647	871	392	2,837	1,036	1,616	3,855	120	1,071
12	Drainage only ... acres	157	784	33	672	663	750	1,184	60	294
13	Drainage and clearing ... acres	490	87	359	2,165	373	866	2,671	60	777

		McPherson.	Marshall.	Miami.	Montgomery.	Nemaha.	Neosho.	Osage.	Pottawatomie.	Reno.
1	Number of all farms in the county	2,656	2,798	2,303	2,250	2,503	2,160	2,578	2,151	3,353
2	Farms reporting land having drainage	36	12	283	60	22	55	32	22	10
3	Farms reporting land needing drainage	79	10	130	38	70	49	28	37	20
4	Farms in drainage and levee districts	23	3	7	18	8	19	.....	18	1
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	576,000	579,200	385,280	412,160	458,240	371,200	459,520	530,560	794,880
6	All land in farms ... acres	557,662	552,308	354,375	362,134	426,132	326,171	431,204	500,933	757,440
7	Improved land in farms ... acres	458,673	434,248	287,068	265,948	373,052	259,827	312,964	278,609	642,358
8	Woodland in farms ... acres	6,403	24,567	25,179	23,439	21,686	17,127	14,012	27,027	11,098
9	Other unimproved land in farms ... acres	92,586	93,493	42,128	72,747	31,394	49,217	104,228	195,297	103,984
10	Farm land reported as provided with drainage ... acres	4,992	1,850	6,150	2,350	763	1,388	1,058	1,447	557
11	Farm land reported as needing drainage ... acres	3,329	179	3,807	819	1,269	2,237	537	939	774
12	Drainage only ... acres	3,259	18	2,594	209	516	645	330	424	354
13	Drainage and clearing ... acres	70	161	1,213	610	753	1,592	207	515	420

		Riley.	Saline.	Sedgwick.	Shawnee.	Sumner.	Washington.	Wilson.	Woodson.	All other counties.[1]
1	Number of all farms in the county	1,572	1,804	3,347	2,303	3,066	2,790	1,917	1,121	73,951
2	Farms reporting land having drainage	15	20	26	63	18	13	125	14	81
3	Farms reporting land needing drainage	11	7	54	83	16	40	98	17	140
4	Farms in drainage and levee districts	11	14	20	64	9	8	21	4	13
	LAND AND FARM AREA.									
5	Approximate land area of the county ... acres	386,560	460,800	636,160	348,160	754,560	577,280	371,840	321,920	33,374,720
6	All land in farms ... acres	339,636	421,867	614,429	293,576	705,135	540,225	333,371	240,043	28,280,517
7	Improved land in farms ... acres	180,672	295,218	537,829	212,829	619,102	382,871	248,052	189,771	18,215,874
8	Woodland in farms ... acres	14,857	17,485	16,256	20,087	13,258	17,846	17,820	19,810	494,556
9	Other unimproved land in farms ... acres	144,107	109,164	60,344	60,660	72,775	139,508	67,499	30,462	9,570,087
10	Farm land reported as provided with drainage ... acres	980	1,916	1,132	2,949	2,036	428	5,598	432	2,816
11	Farm land reported as needing drainage ... acres	2,617	953	956	2,674	558	735	2,773	280	5,041
12	Drainage only ... acres	2,532	953	767	528	388	352	2,153	133	3,996
13	Drainage and clearing ... acres	85	.....	189	2,146	170	383	620	147	1,045

[1] No drainage reported in Barber, Cheyenne, Clark, Comanche, Decatur, Ellis, Ellsworth, Finney, Ford, Gove, Grant, Gray, Greeley, Hamilton, Haskell, Hodgeman, Kiowa, Lane, Logan, Mitchell, Morton, Ness, Norton, Russell, Scott, Seward, Sheridan, Sherman, Stafford, Stanton, Stevens, Thomas, Trego, Wallace, and Wichita Counties.

County Table II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		The State.	Atchison.	Jefferson.	McPherson.	Marion.	Neosho.	Pottawatomie.	Saline.	Shawnee.	Other counties.[1]
	LAND AREA.										
1	Approximate land area of the state or county ....acres..	52,335,360	263,680	347,520	576,000	609,920	371,200	530,560	460,800	348,160	2,900,480
2	All land in operating drainage enterprises ....acres..	93,856	8,009	14,147	4,760	5,216	21,758	9,567	4,636	12,516	13,247
3	Improved land ....acres..	87,449	7,208	14,046	4,760	5,216	17,556	9,567	4,636	11,281	13,179
4	Per cent of all improved land in farms, 1920	0.3	3.4	5.0	1.0	1.2	6.8	3.4	1.6	5.3	0.7
5	Timber and cut-over land ....acres..	4,135	801	26	.....	.....	2,005	.....	.....	1,235	68
6	Other unimproved land ....acres..	2,272	.....	75	.....	.....	2,197	.....	.....	.....	.....
7	Swampy or subject to overflow ....acres..	6,704	.....	.....	600	4,694	95	.....	96	1,219	.....
8	Suffering loss of crops from defective drainage ....acres..	6,088	.....	79	.....	4,694	.....	.....	96	1,219	.....
9	Assessed acreage ....acres..	93,856	8,009	14,147	4,760	5,216	21,758	9,567	4,636	12,516	13,247
10	Excess over all land in operating enterprises ....acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ....miles..	138.4	4.4	18.3	8.3	1.6	58.9	7.7	9.0	2.6	27.6
12	Additional under construction ....miles..	7.2	.....	.....	.....	3.2	.....	.....	.....	4.0	.....
13	Maximum completed in any enterprise ....miles..	14.4	4.4	2.9	8.0	1.6	14.4	7.7	7.8	0.9	8.2
14	Maximum width at bottom of ditch [2] ....feet..	54	24	45	20	54	8	25	16	40	20
15	*Maximum of average depths of outlet ditches* [2] ....feet..	30.0	20.0	30.0	5.0	25.0	8.0	8.0	7.0	22.0	20.0
16	Mean depth of branch ditches [2] ....feet..	4.3	.....	5.8	5.0	.....	3.3	4.0	5.0	5.0	3.6
	Tile drains:										
17	Completed ....miles..	213.0	.....	0.2	.....	.....	2.5	.....	.....	.....	210.3
18	Additional under construction ....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	Maximum total length completed in any enterprise ....miles..	210.0	.....	0.2	.....	.....	1.5	.....	.....	.....	210.0
20	Maximum size of tile ....inches..	30	.....	14	.....	.....	8	.....	.....	.....	30
	Accessory levees and dikes:										
21	Completed ....miles..	165.1	.....	.....	9.5	.....	119.8	13.5	1.2	6.0	15.1
22	Additional under construction ....miles..	7.8	.....	.....	7.1	.....	.....	.....	.....	0.7	.....
	Pumping plants:										
23	Engine capacity ....horsepower..	65	.....	.....	.....	.....	.....	.....	.....	.....	65
24	Pump capacity ....gallons per minute..	4,000	.....	.....	.....	.....	.....	.....	.....	.....	4,000
25	Area served by pumps ....acres..	2,200	.....	.....	.....	.....	.....	.....	.....	.....	2,200
26	Area drained by open ditches only [2] ....acres..	37,038	8,009	13,737	.....	5,216	1,200	.....	3,836	888	4,152
27	Length of these ditches [2] ....miles..	53.3	4.4	16.4	.....	4.8	3.0	.....	7.8	5.2	11.7
28	Average length per acre ....feet..	7.6	2.9	6.3	.....	4.9	13.2	.....	10.7	30.9	14.9
29	Area having open ditches and levees [2] ....acres..	47,993	.....	.....	4,760	.....	16,343	9,567	800	11,628	4,895
30	Length of these ditches [2] ....miles..	68.3	.....	.....	8.3	.....	40.2	7.7	1.2	1.4	9.5
31	Average length per acre ....feet..	7.5	.....	.....	9.2	.....	13.0	4.2	7.9	0.6	10.2
32	Length of accessory levees ....miles..	138.7	.....	.....	16.6	.....	95.5	13.5	1.2	6.7	5.2
33	Area drained by open ditches and tile drains [2] ....acres..	[3] 8,825	.....	410	.....	.....	[4] 4,215	.....	.....	.....	[5] 4,200
34	Length of these drains ....miles..	237.0	.....	2.1	.....	.....	18.2	.....	.....	.....	216.7
35	Average length per acre ....feet..	141.8	.....	27.0	.....	.....	22.8	.....	.....	.....	272.4
36	Length of accessory levees ....miles..	34.2	.....	.....	.....	.....	24.3	.....	.....	.....	9.9
	DEVELOPMENT OF LANDS.										
37	Improved land in operating enterprises, 1920 ....acres..	87,449	7,208	14,046	4,760	5,216	17,556	9,567	4,636	11,281	13,179
38	Improved land prior to drainage ....acres..	74,072	6,407	11,522	4,760	5,216	16,113	4,530	4,636	11,281	9,607
39	Increase since drainage ....acres..	13,377	801	2,524	.....	.....	1,443	5,037	.....	.....	3,572
40	Per cent of increase	18.1	12.5	21.9	.....	.....	9.0	111.2	.....	.....	37.2
41	Per cent increase is of all improved land in farms, 1920	(6)	0.4	0.9	.....	.....	0.6	1.8	.....	.....	0.2
42	Timber and cut-over land, 1920 ....acres..	4,135	801	26	.....	.....	2,005	.....	.....	1,235	68
43	Timber and cut-over land prior to drainage ....acres..	6,848	1,602	539	.....	.....	2,917	.....	.....	1,235	555
44	Decrease since drainage ....acres..	2,713	801	513	.....	.....	912	.....	.....	.....	487
45	Per cent of decrease	39.6	50.0	95.2	.....	.....	31.3	.....	.....	.....	87.7
46	Other unimproved land, 1920 ....acres..	2,272	.....	75	.....	.....	2,197	.....	.....	.....	.....
47	Other unimproved land prior to drainage ....acres..	12,936	.....	2,086	.....	.....	2,728	5,037	.....	.....	3,085
48	Decrease since drainage ....acres..	10,664	.....	2,011	.....	.....	531	5,037	.....	.....	3,085
49	Per cent of decrease	824	.....	96.4	.....	.....	19.5	.....	.....	.....	100.0
50	Swampy or subject to overflow, 1920 ....acres..	6,704	.....	.....	600	4,694	95	.....	96	1,219	.....
51	Swampy or subject to overflow prior to drainage ....acres..	16,452	.....	2,820	3,720	4,694	649	1,232	134	1,219	1,984
52	Decrease since drainage ....acres..	9,748	.....	2,820	3,120	.....	554	1,232	38	.....	1,984
53	Per cent of decrease	59.3	.....	100.0	83.9	.....	85.4	100.0	28.4	.....	.....
	CAPITAL INVESTED AND COST PER ACRE.										
54	Total capital invested in and required for completion of operating enterprises ....dollars..	1,210,353	90,000	127,692	43,500	300,000	122,450	74,439	23,730	232,500	196,042
55	Capital invested in these enterprises to Dec. 31, 1919 ....dollars..	936,508	90,000	127,692	28,500	53,155	122,450	74,439	23,730	220,500	196,042
56	Additional capital required to complete these enterprises ....dollars..	273,845	.....	.....	15,000	246,845	.....	.....	.....	12,000	.....
57	Average cost per acre when completed ....dollars..	12.90	11.24	9.03	9.14	57.52	5.63	7.78	5.12	18.58	14.80
58	Enterprises constructing open ditches only ....dollars..	677,961	90,000	125,427	.....	300,000	1,140	.....	20,730	90,000	50,664
59	Average cost per acre when completed ....dollars..	18.30	11.24	9.13	.....	5.75	0.95	.....	5.40	101.35	12.20
60	Enterprises constructing open ditches and levees ....dollars..	431,462	.....	.....	43,500	.....	98,645	74,439	3,000	142,500	69,378
61	Average cost per acre when completed ....dollars..	8.99	.....	.....	9.14	.....	6.04	7.78	3.75	12.25	14.17
62	Enterprises constructing open ditches and tile drains ....dollars..	[7] 100,930	.....	2,265	.....	.....	[8] 22,665	.....	.....	.....	[9] 76,000
63	Average cost per acre when completed ....dollars..	11.44	.....	5.52	.....	.....	5.38	.....	.....	.....	18.10
	CROPS.										
	Improved land in enterprises reporting—										
64	Wheat as principal crop on drained land ....acres..	51,819	.....	14,046	4,760	5,216	16,674	.....	4,636	1,202	5,285
65	Corn as principal crop on drained land ....acres..	33,451	7,208	.....	.....	.....	882	9,567	.....	9,900	5,894
66	Vegetables as principal crop on drained land ....acres..	2,179	.....	.....	.....	.....	.....	.....	.....	179	2,000

[1] Includes only Chase, Doniphan, Douglas, Jackson, Labette, Riley, and Sedgwick Counties.
[2] When works under construction have been completed.
[3] Includes 6,415 acres having open ditches, tile drains, and levees.
[4] Includes 4,215 acres having open ditches, tile drains, and levees.
[5] Includes 2,200 acres having open ditches, tile drains, and levees.
[6] Less than one-tenth of 1 per cent.
[7] Includes cost of 34.2 miles of accessory levees.
[8] Includes cost of 24.3 miles of accessory levees.
[9] Includes cost of 9.9 miles of accessory levees.

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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS

DRAINAGE : KENTUCKY

STATISTICS FOR THE STATE AND ITS COUNTIES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

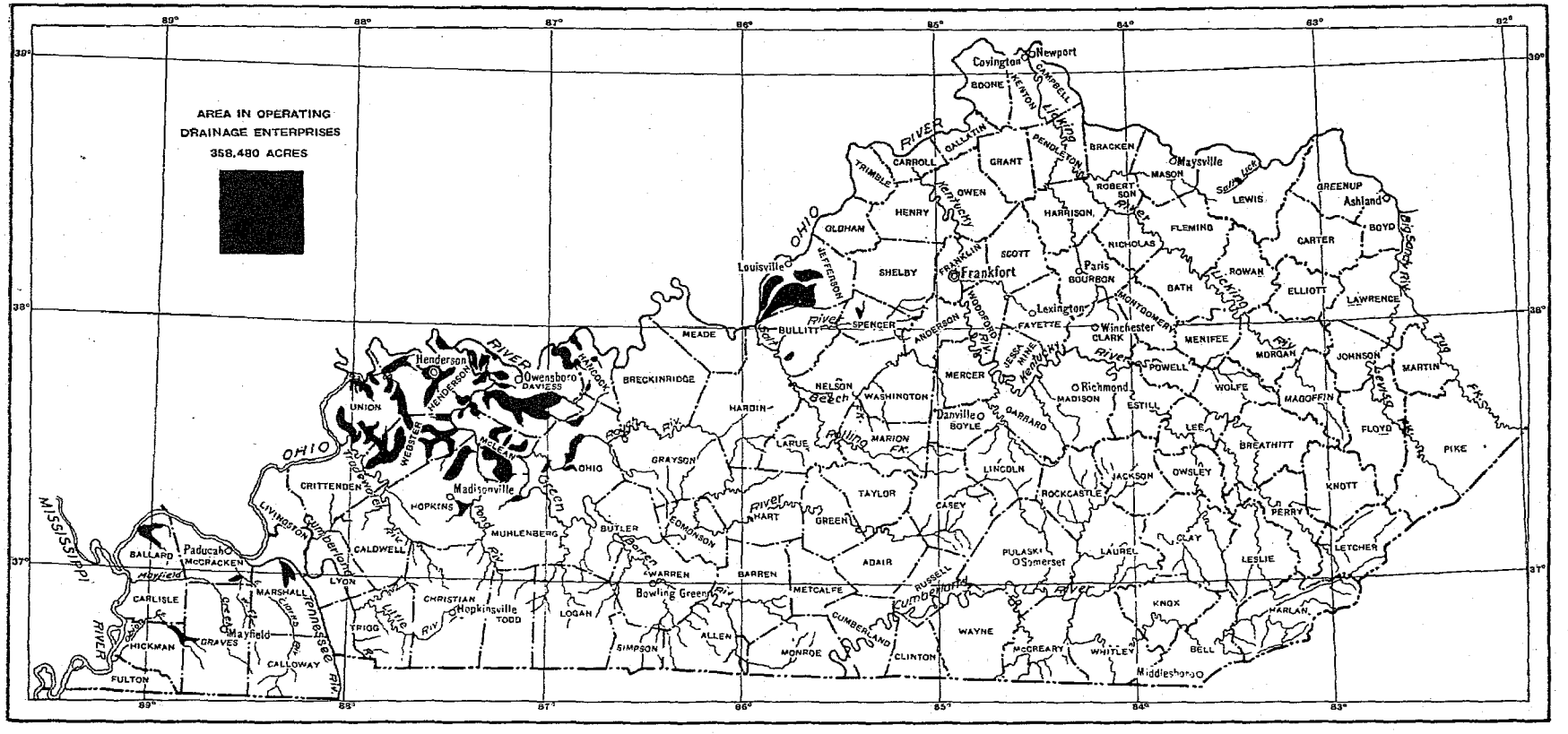
This bulletin presents the statistics of drainage for Kentucky collected at the census of 1920. The figures relate to conditions on January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises may include considerable areas of timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner installs upon his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are presented separately.

TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	270,626	100.0
Farms reporting land having drainage	5,817	2.1
Farms reporting land needing drainage	19,592	7.2
All land in farms ... acres	21,612,772	100.0
Improved land in farms ... acres	13,975,746	64.7
Farm land reported as provided with drainage ... acres	225,228	1.0
Farm land reported as needing drainage ... acres	573,299	2.7
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	25,715,840	100.0
All land in operating drainage enterprises ... acres	358,480	1.4
Improved land ... acres	245,334	1.0
Timber and cut-over land ... acres	92,495	0.4
Other unimproved land ... acres	20,651	0.1
Total capital invested in and required for completion of operating enterprises	$1,820,996	100.0
Capital invested in these enterprises to Dec. 31, 1919	$1,521,725	83.6
Additional capital required to complete these enterprises	$299,271	16.4

KENTUCKY

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which are substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, is the acreage actually benefited or made of more value for agricultural purposes by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators have answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual." Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises, below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one county were divided, for tabulation, and the part in each county treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the counties in which the plants are located.

Operating enterprises, as designated in this bulletin, are those that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the county or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter may be some that had completed the original plan of reclamation several years ago but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include districts that on the census date had completed their plans, sold bonds to cover the cost of the undertaking, and let contracts for the construction work, and also districts that had just been established by court decree and were still subject to considerable change in area, plan of drainage works, and cost.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.[1]		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	471,874	100.0	$1,620,027	100.0	$1,825,513
Operating enterprises	358,480	76.0	1,521,725	93.9	299,271
With works completed	288,143	61.1	1,278,701	78.9	.....
With works under construction	70,337	14.9	243,024	15.0	299,271
Nonoperating enterprises	113,394	24.0	98,302	6.1	1,526,242

[1] The inquiry asked for the "total cost of the enterprise to Dec. 31, 1919," and for an "estimate of additional investment to complete."

Location of enterprises.—Almost two-thirds of the area in operating drainage enterprises in Kentucky are situated in Daviess and Henderson Counties and the counties adjoining. One-fourth of the area is in Jefferson County, and nearly all the rest is in the counties west of Tennessee River.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	471,874	100.0	$1,620,027	100.0	$1,825,513
Operating enterprises	358,480	76.0	1,521,725	93.9	299,271
Green River	138,829	29.4	629,517	38.9	46,869
Mississippi River	8,079	1.7	50,000	3.1	.....
Ohio River	203,392	43.1	760,042	46.9	252,402
Tennessee River	8,180	1.7	82,166	5.1	.....
Nonoperating enterprises	113,394	24.0	98,302	6.1	1,526,242
Green River	73,045	15.5	.....	.....	957,050
Mississippi River	21,143	4.5	50,000	3.1	500,000
Ohio River	19,206	4.1	48,302	3.0	69,192

One enterprise under private ownership in Lewis County is the only operating enterprise found in the eastern half of the state. From most of the enterprises the drainage water is discharged into one or another of the smaller tributaries of Ohio River.

Condition of land in enterprises.—In the extreme western end of the state the drainage enterprises are for the purpose of relieving the bottom land in the narrow stream valleys, which is subject to overflow in flood seasons. In the group of counties where the greatest amount of drainage has been done, in the region of Henderson and Owensboro, the enterprises are for draining rather broad tracts of swamp land caused by overflow of the larger tributaries of Ohio River. The lower courses of such streams as Green River and its principal branches have but slight fall, and the channels are not sufficient to carry the more rapid run-off from the rolling land lying to the south and east. The nature of the drainage problem in the vicinity of Louisville is similar to that just described. In all counties along the Ohio and the Mississippi, high water in those rivers causes overflow of considerable areas.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms, and to afford relief from overflow for the district as a unit. Therefore, the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy or subject to overflow, or land that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total. Acreage.	Total. Per cent of total.	Works completed (acres).	Works under construction (acres).	
All land in enterprises	358,480	100.0	288,143	70,337	113,394
Improved land	245,334	68.4	209,468	35,866	67,526
Timber and cut-over land	92,495	25.8	71,152	21,343	28,539
Other unimproved land	20,651	5.8	7,523	13,128	17,329
Swampy or subject to overflow	69,413	19.4	37,429	31,984	55,339
Suffering loss of crops	36,723	10.2	26,673	10,050	875

Size of enterprises.—Presentation of the statistics by counties requires that an enterprise located in more than one county be divided, and the part in each county be considered a separate enterprise. In this way 179 operating drainage enterprises are counted in Kentucky, with an average area of 2,003 acres each. There are 18 such enterprises of 5,000 acres or more each, 100 of between 500 and 5,000 acres, and 61 of less than 500 acres each. There is no overlapping of the enterprises in this state.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	358,480	358,480	100.0
Less than 200 acres	1,651	1,651	0.5
200 to 499 acres	16,537	16,537	4.6
500 to 999 acres	23,143	23,143	6.5
1,000 to 4,999 acres	130,176	130,176	36.3
5,000 to 9,999 acres	79,592	79,592	22.2
10,000 to 49,999 acres	107,381	107,381	30.0

Character of enterprises.—Very nearly all of the drainage enterprises in Kentucky are drainage districts under the control of the county drainage commissioners, though the enterprises in Jefferson County are county drains under the fiscal court, and nine of the operating enterprises in the state are under individual ownership. The drainage law of 1912 provided that in each county where there is a public ditch, drain, levee, or similar improvement established, the county judge should appoint a board of three drainage commissioners. An amendment in 1918 provides for the appointment of one county drainage commissioner.

The drainage districts, with one exception, have been established by decree of the county judges in accordance with the laws of July 10, 1893 (ch. 266), of March 23, 1900 (ch. 30), and of March 19, 1912 (ch. 132). Each of these superseded the earlier statute. The first of these acts was the first general drainage law of the state.

Under the first drainage law, one or more persons interested filed a petition for a drain, and the county judge appointed three viewers to examine the land that would be affected by the proposed work, to locate the drain, to assess benefits and damages, and to determine whether the proposed improvement would be of public utility and benefit. The judge ordered the district established or he dismissed proceedings, in accordance with the report of the viewers, except that in case of remonstrance a report was first obtained from reviewers specially appointed by the judge to review the work and findings of the first viewers. Construction of the drain was apportioned to the landowners in proportion to the benefits they would receive. For work not done by the landowners, contract was let by the county clerk and the costs were collected by the sheriff. The requirements and method of procedure under the law of 1900 were very similar to those under the law of 1893.

The law of 1912 required only that the petition for the drainage district be signed by one or more owners of land that would be assessed for the enterprise, but an amendment of March 28, 1918 (ch. 114), requires the signatures of at least 25 per cent of the landowners, or of the owners of not less than 25 per cent of the land to be affected. A board of three viewers appointed by the county judge makes such a survey of the proposed district as is necessary to report regarding the practicability and utility of the project and the boundary of the area that will be benefited. If the report is unfavorable, proceedings are dismissed at the cost of the petitioners. If the report is favorable, public hearing upon it is held by the county court before the order of establishment is issued. Appeals may be taken to the circuit court and to the court of appeals. The county board of drainage commissioners employs an engineer to make plans and specifications for the drainage improvements. Damages then are assessed by the original viewers, who also divide the land in the district into five classes for assessment of the cost of the district. The cost assessments per acre in the five classes are made in the ratio 5 : 4 : 3 : 2 : 1. When necessary, in order to secure substantial justice, the number of classes may be increased or diminished. Benefits to railroad companies are assessed as fixed sums. The amendment of March 28, 1918, permits the viewers to estimate the value of the benefits that will accrue to each tract instead of classifying the land. If the total cost averages less than 25 cents per acre, it is collected in one installment; if more than 25 cents per acre, the drainage commissioners issue bonds running 2 to 11 years for the amount of the cost assessments not paid within 30 days.

Separate drainage districts may be formed under the law of 1912, to be under the control of special commissioners elected by the landowners instead of under the county drainage commissioners. When the improvement works have been constructed and paid for, control of the enterprise passes to the county drainage commissioners. A special petition for such separate district must be filed at the time of filing exceptions to the viewers' preliminary report, and must be signed by the owners of at least 50 per cent of the land, who must comprise one-fourth or more of all the landowners in the district.

Drainage districts may be established by either the county courts or the circuit courts, under a law of March 26, 1918 (ch. 64). The petition for a district must be signed by 25 per cent of the landowners or by the owners of 25 per cent of the land in the proposed district. Viewers are appointed to make a preliminary report, as for districts organized under the law of 1912, and after the court orders the district established it is under control of the county drainage commissioners. Damages and benefits are assessed by a board of appraisers appointed by the court. The circuit court has appellate jurisdiction from judgments of the county court, and appeals may be taken from the circuit court to the court of appeals. After contract for construction has been let, the board of drainage commissioners assesses the estimated cost against the land in proportion to the assessed benefits. The board may

issue bonds of the district to run not more than 30 years.

County drains may be constructed to reclaim swamp land for benefit of health and for other purposes, under a statute of March 19, 1894 (ch. 97). The fiscal court has control over this work. The cost is paid by a general tax upon all property in the county subject to taxation for state purposes. The cost is limited to 2 per cent of the value of such property. If the probable cost will exceed the county revenue for the year in which the works will be constructed, the project must be approved by two-thirds of the votes cast at a special election. Should the proposed drainage affect but a small part of the county, a special taxing district may be formed to vote upon and to pay for the improvements, but this was not done in Jefferson County.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All organized enterprises	471,874	100.0	$1,620,027	100.0	$1,825,513
Operating enterprises	358,480	76.0	1,521,725	93.9	299,271
Drainage districts	262,080	55.5	1,297,237	80.1	277,271
Laws of 1893, ch. 266	70,330	15.0	239,786	14.8	.....
Laws of 1900, ch. 30	48,361	10.2	157,595	9.7	.....
Laws of 1912, ch. 132	138,409	29.3	827,290	51.1	277,271
Laws of 1918, ch. 64	4,480	0.9	72,566	4.5	.....
County drains—Laws of 1894, ch. 97	90,000	19.1	175,000	10.8	22,000
Individual ownership	6,400	1.4	49,488	3.1	.....
Nonoperating enterprises	113,394	24.0	98,302	6.1	1,526,242
Drainage districts [1]	113,394	24.0	98,302	6.1	1,526,242
Laws of 1900, ch. 30 [1]	1,726	0.4	1,000	0.1	2,489
Laws of 1912, ch. 132	85,434	18.1	47,302	2.9	988,445
Laws of 1918, ch. 64	26,234	5.6	50,000	3.1	535,308

[1] Includes 1 enterprise under individual ownership.

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 664.5 miles of open ditches, 86.2 miles of tile drains, and 0.2 mile of accessory levees; the additional lengths under construction were 77.0 miles of open ditches and 1.0 mile of tile drains. These figures do not include drains or levees installed by individual farm owners supplemental to the works of the enterprises, nor the works of flood-protection or levee districts that had not undertaken the construction of ditches or tile drains. There are no pumping districts for land drainage in Kentucky.

The average depth of the main or outlet ditch was reported for each enterprise. The maximum depth of outlet reported for any enterprise in the state and the maximum in each county are shown in line 15 of County Table II. The maximum length, width, and depth of outlet shown in that table for any county may not refer to the same enterprise.

In County Table II, line 16 shows the mean depth of branch ditches (open ditches only), which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations. Depths less than 3 feet were omitted; to include this group, computed as 3 feet, would show the mean depth for the state 5.0 instead of 5.1 feet.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
	Acreage.	Per cent of total.	To Dec. 31, 1919. Amount.	To Dec. 31, 1919. Per cent of total.	Additional required to complete.
All kinds	358,480	100.0	$1,521,725	100.0	$299,271
Open ditches only	345,605	96.4	1,406,696	92.4	295,701
Open ditches and levees	1,140	0.3	8,333	0.5	.....
Tile drains only	117	(1)	1,979	0.1	.....
Open ditches and tile drains	11,618	3.2	104,717	6.9	3,570

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

TABLE 8.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	358,480	100.0
Less than 3 feet	4,491	1.3
3.0 to 3.9 feet	21,031	5.9
4.0 to 4.9 feet	41,243	11.5
5.0 to 5.9 feet	19,379	5.4
6.0 to 6.9 feet	21,444	6.0
7.0 to 7.9 feet	15,747	4.4
8.0 to 8.9 feet	13,579	3.8
Not reporting branches	221,566	61.8

Maintenance of works.—The drainage law of 1912 requires that all ditches, levees, and like public improvements under control of the board of drainage commissioners shall be kept in good repair by that board, which is authorized to appoint a superintendent of drainage to have charge of the work. Assessments for maintenance and repair work may be made, apportioned like the cost of original construction, but not to exceed in any year 10 per cent of that cost. The law of 1918 also provides for maintenance of drainage works by the board of drainage commissioners. Both statutes define as public ditches all watercourses into which any public drains empty, and place such streams under control of the county drainage commissioners. The later law does not limit such natural public drains to nonnavigable streams, as was done in the earlier statute.

TABLE 9.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All operating enterprises	358,480	100.0	$1,521,725	100.0	$299,271
By district forces [1]	221,674	61.8	896,795	58.9	37,000
By contract	79,959	22.3	309,932	20.4	8,780
By landowners	27,513	7.7	220,266	14.5	10,790
Not reporting [2]	29,334	8.2	94,732	6.2	242,701

[1] Includes 8,079 acres for which method of maintenance was not specified.
[2] Includes 1,514 acres reporting maintenance not provided.

Date of organization.—The progress in drainage is shown only roughly by the dates of the organization of the enterprises, which are the dates when the districts were established by the courts, since there may be a period of a year or more between the decree of establishment and the beginning of actual construction, and since the work of construction may occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including extensions made after the original plan of reclamation was completed.

TABLE 10.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		ASSESSED AREA.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	358,480	100.0	358,480	100.0
1890 to 1899 [1]	15,111	4.2	15,111	4.2
1900 to 1904	28,085	7.8	28,085	7.8
1905 to 1909	69,741	19.5	69,741	19.5
1910 to 1914	131,160	36.6	131,160	36.6
1915 to 1919	112,583	31.4	112,583	31.4
Not reported [2]	1,800	0.5	1,800	0.5

[1] Includes 800 acres under individual ownership, on which drainage was begun in 1888.
[2] All under individual ownership.

TABLE 11.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$1,521,725	100.0	$299,271
1890 to 1899 [1]	74,326	4.9	.....
1900 to 1904	69,499	4.6	.....
1905 to 1909	190,355	12.5	.....
1910 to 1914	516,628	34.0	10,700
1915 to 1919	650,629	42.8	288,571
Not reported [2]	20,288	1.3	.....

[1] Includes cost for 800 acres under individual ownership, on which drainage was begun in 1888.
[2] All under individual ownership.

TABLE 12.—DRAINS AND LEVEES (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		TILE.		LEVEES.	
	Miles.	Per cent of total.	Miles.	Per cent of total.	Miles.	Per cent of total.
All drains and levees	741.5	100.0	87.2	100.0	0.2	100.0
1890 to 1899 [1]	69.6	9.4	10.0	11.5	.....	.....
1900 to 1904	74.3	10.0	2.6	3.0	.....	.....
1905 to 1909	111.6	15.1	.....	.....	0.2	100.0
1910 to 1914	230.5	31.1	32.5	37.3	.....	.....
1915 to 1919	252.6	34.1	13.2	15.1	.....	.....
Not reported [2]	2.9	0.4	28.9	33.1	.....	.....

[1] Includes works on 800 acres under individual ownership, on which drainage was begun in 1888.
[2] All under individual ownership.

Crops.—The principal crop grown upon the drained land in drainage enterprises is corn. Data were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified in County Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

COUNTY TABLE I.—DRAINAGE ON FARMS: 1920.

		THE STATE.	Anderson.	Ballard.	Bath.	Boyd.	Bullitt.	Butler.	Caldwell.
1	Number of all farms in the state or county	270,626	1,650	1,979	2,005	830	1,259	2,540	2,218
2	Farms reporting land having drainage	5,817	20	109	36	70	77	102	57
3	Farms reporting land needing drainage	19,592	15	65	110	80	106	401	44
4	Farms in drainage and levee districts	773	.....	59	.....	.....	1	.....	.....
	LAND AND FARM AREA.								
5	Approximate land area of the state or county ... acres	25,715,840	128,640	161,280	172,800	101,760	197,120	266,880	206,080
6	All land in farms ... acres	21,612,772	128,523	142,010	130,238	72,649	160,306	246,016	202,957
7	Improved land in farms ... acres	13,975,746	92,273	108,971	91,459	50,738	93,640	132,770	143,970
8	Woodland in farms ... acres	6,018,280	8,612	29,766	26,718	15,981	46,364	88,202	39,433
9	Other unimproved land in farms ... acres	1,618,746	27,638	3,273	12,061	5,930	20,302	25,044	19,554
10	Farm land reported as provided with drainage ... acres	225,228	822	2,859	817	1,153	4,393	4,525	885
11	Farm land reported as needing drainage ... acres	573,299	1,051	1,267	4,069	3,020	5,154	14,268	1,818
12	Drainage only ... acres	84,189	141	464	186	209	528	4,227	839
13	Drainage and clearing ... acres	489,110	910	803	3,883	2,811	4,626	10,041	979

County Table I.—DRAINAGE ON FARMS: 1920—Continued.

	Calloway.	Carlisle.	Casey.	Clay.	Crittenden.	Cumberland.	Daviess.	Estill.
1 Number of all farms in the county	4,293	1,437	2,912	3,088	2,041	1,747	3,808	1,832
2 Farms reporting land having drainage	28	18	8	83	31	93	913	33
3 Farms reporting land needing drainage	90	159	176	285	185	205	229	188
4 Farms in drainage and levee districts	.....	3	.....	3	1	10	34	.....
LAND AND FARM AREA.								
5 Approximate land area of the county ... acres	263,680	126,720	242,560	305,920	250,240	247,680	305,920	162,560
6 All land in farms ... acres	243,057	102,199	226,643	250,128	210,711	176,999	240,006	139,160
7 Improved land in farms ... acres	163,346	81,381	102,992	109,492	152,911	70,372	201,722	61,069
8 Woodland in farms ... acres	62,907	17,790	115,993	131,812	47,935	97,733	16,298	70,972
9 Other unimproved land in farms ... acres	16,804	3,028	7,658	8,824	9,865	8,894	21,986	7,119
10 Farm land reported as provided with drainage ... acres	657	713	1,300	756	504	1,196	42,036	955
11 Farm land reported as needing drainage ... acres	1,179	5,303	4,270	8,044	4,145	3,352	5,775	4,126
12 Drainage only ... acres	613	3,324	30	868	1,391	678	2,126	151
13 Drainage and clearing ... acres	566	1,979	4,240	7,176	2,754	2,674	3,649	3,975

	Fulton.	Graves.	Grayson.	Green.	Hancock.	Henderson.	Hickman.	Hopkins.
1 Number of all farms in the county	1,205	6,082	3,362	2,345	1,272	2,949	1,649	3,473
2 Farms reporting land having drainage	110	32	28	8	163	403	53	195
3 Farms reporting land needing drainage	243	202	303	49	140	225	189	122
4 Farms in drainage and levee districts	130	18	1	.....	28	40	8	40
LAND AND FARM AREA.								
5 Approximate land area of the county ... acres	123,520	352,640	318,080	178,560	123,520	278,400	144,000	349,440
6 All land in farms ... acres	101,746	324,454	296,476	163,688	103,691	236,741	142,609	292,794
7 Improved land in farms ... acres	83,826	259,416	198,787	109,277	63,243	201,360	114,244	191,991
8 Woodland in farms ... acres	16,100	47,084	82,909	30,882	13,492	22,270	25,118	70,204
9 Other unimproved land in farms ... acres	1,820	17,954	14,780	23,529	26,956	13,111	3,247	30,689
10 Farm land reported as provided with drainage ... acres	4,074	997	1,281	8,055	5,122	21,757	1,799	7,600
11 Farm land reported as needing drainage ... acres	6,733	5,733	5,532	664	2,860	7,906	4,902	4,656
12 Drainage only ... acres	1,630	2,803	120	333	804	2,750	1,174	914
13 Drainage and clearing ... acres	5,103	2,930	5,412	331	2,056	5,156	3,728	3,742

	Jefferson.	Larue.	Laurel.	Lewis.	Livingston.	Logan.	McCracken.	McLean.
1 Number of all farms in the county	2,826	1,569	2,937	2,777	1,644	3,819	2,128	1,922
2 Farms reporting land having drainage	257	110	111	45	61	42	37	140
3 Farms reporting land needing drainage	354	204	539	191	344	353	170	159
4 Farms in drainage and levee districts	51	42	.....	16	8	3	.....	24
LAND AND FARM AREA.								
5 Approximate land area of the county ... acres	247,680	184,320	286,080	314,240	250,880	411,520	152,960	161,920
6 All land in farms ... acres	181,378	147,847	190,055	242,165	181,718	328,148	127,782	143,083
7 Improved land in farms ... acres	135,903	109,337	103,281	101,689	129,456	236,973	101,390	106,228
8 Woodland in farms ... acres	22,138	27,728	68,510	120,006	48,100	68,614	20,764	24,944
9 Other unimproved land in farms ... acres	23,337	10,732	18,264	20,470	4,162	22,561	5,628	11,911
10 Farm land reported as provided with drainage ... acres	8,716	1,788	1,171	1,181	3,198	868	861	3,994
11 Farm land reported as needing drainage ... acres	9,809	2,804	17,247	5,402	12,299	10,446	3,195	7,841
12 Drainage only ... acres	4,844	563	1,083	185	1,310	1,808	157	3,288
13 Drainage and clearing ... acres	4,965	2,241	16,164	5,217	10,989	8,638	3,038	4,553

	Madison.	Marion.	Metcalfe.	Muhlenberg.	Nelson.	Ohio.	Powell.	Pulaski.	Rowan.
1 Number of all farms in the county	3,558	1,970	2,011	2,836	1,869	4,112	844	5,015	1,363
2 Farms reporting land having drainage	60	74	36	141	128	229	43	77	35
3 Farms reporting land needing drainage	164	310	450	316	273	580	109	744	65
4 Farms in drainage and levee districts	3	.....	1	25	5	103	1	.....	.....
LAND AND FARM AREA.									
5 Approximate land area of the county ... acres	285,440	220,800	193,920	302,080	263,040	373,760	115,840	401,920	174,080
6 All land in farms ... acres	255,451	187,860	156,771	231,620	228,932	336,794	90,267	336,143	132,282
7 Improved land in farms ... acres	222,050	123,665	87,692	125,647	158,652	218,793	31,659	201,604	41,682
8 Woodland in farms ... acres	22,470	56,490	52,455	69,004	58,336	71,544	53,125	119,435	81,609
9 Other unimproved land in farms ... acres	10,931	7,705	16,624	36,969	11,944	46,457	5,483	15,104	8,991
10 Farm land reported as provided with drainage ... acres	1,218	1,436	523	5,384	8,632	8,286	1,096	834	763
11 Farm land reported as needing drainage ... acres	3,645	7,907	8,753	18,500	13,445	14,608	3,936	14,204	2,483
12 Drainage only ... acres	849	1,352	1,663	7,807	2,638	1,584	692	1,972	719
13 Drainage and clearing ... acres	2,796	6,555	7,090	10,693	10,807	13,024	3,244	12,292	1,764

	Shelby.	Spencer.	Taylor.	Union.	Wayne.	Webster.	Whitley.	All other counties.[1]
1 Number of all farms in the county	2,709	1,518	2,152	1,809	2,448	2,407	2,614	155,853
2 Farms reporting land having drainage	20	26	55	292	78	414	103	533
3 Farms reporting land needing drainage	38	49	439	69	132	212	187	9,330
4 Farms in drainage and levee districts	1	1	.....	38	1	40	1	33
LAND AND FARM AREA.								
5 Approximate land area of the county ... acres	273,280	119,040	178,560	208,000	305,920	220,160	282,880	14,779,520
6 All land in farms ... acres	238,926	116,221	165,357	183,507	270,423	170,821	176,988	12,458,432
7 Improved land in farms ... acres	210,252	89,255	100,743	164,968	117,410	133,241	104,247	7,940,719
8 Woodland in farms ... acres	8,761	8,971	51,127	13,936	139,180	18,895	65,220	3,602,343
9 Other unimproved land in farms ... acres	19,913	17,995	13,487	4,603	13,833	18,685	7,521	915,370
10 Farm land reported as provided with drainage ... acres	586	1,425	897	25,554	1,887	21,705	1,053	7,916
11 Farm land reported as needing drainage ... acres	874	1,052	13,026	2,415	3,269	7,336	2,604	280,312
12 Drainage only ... acres	35	75	1,704	1,004	1,334	3,220	1,293	16,781
13 Drainage and clearing ... acres	839	977	11,322	1,411	1,935	4,110	1,371	263,551

[1] No drainage reported in Bourbon, Breathitt, Fayette, Garrard, Grant, Harrison, Knott, Marshall, Martin, Mason, Menifee, Nicholas, Perry, Pike, and Robertson Counties.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		THE STATE.	Ballard.	Daviess.	Hancock.	Henderson.	Hickman.	Hopkins.
	LAND AREA.							
1	Approximate land area of the state or county ... acres	25,715,840	161,280	305,920	123,520	278,400	144,000	349,440
2	All land in operating drainage enterprises ... acres	358,480	8,560	61,477	10,758	48,304	4,879	15,219
3	Improved land ... acres	245,334	2,822	56,004	3,987	33,463	1,952	6,888
4	Per cent of all improved land in farms	1.8	2.6	27.8	6.3	16.6	1.7	3.6
5	Timber and cut-over land ... acres	92,495	5,738	4,677	2,257	7,349	2,927	7,109
6	Other unimproved land ... acres	20,651	...	796	4,514	7,492	...	1,222
7	Swampy or subject to overflow in enterprises ... acres	69,413	...	7,257	8,125	16,327	...	7,788
8	Suffering loss of crops from defective drainage ... acres	36,723	...	3,688	3	11,080	...	2,080
9	Assessed acreage	358,480	8,560	61,477	10,758	48,304	4,879	15,219
10	Excess over all land in operating enterprises ... acres	...	...	...	...	...	...	...
	DRAINAGE WORKS.							
	Open ditches:							
11	Completed ... miles	664.5	17.4	205.1	19.1	79.1	6.5	13.2
12	Additional under construction ... miles	77.0	3.6	13.8	33.3	4.9	...	7.9
13	Maximum completed in any enterprise ... miles	21.3	7.0	21.3	3.0	15.8	6.5	5.2
14	Maximum width at bottom of ditch [1] ... feet	34	10	34	34	20	24	15
15	Maximum of average depths of outlet ditches [1] ... feet	20.0	8.0	12.0	10.0	14.0	8.0	6.0
16	Mean depth of branch ditches [1] ... feet	5.1	4.0	3.9	6.8	4.8	8.0	5.2
	Tile drains:							
17	Completed ... miles	86.2	...	3.1	...	10.0	...	44.0
18	Additional under construction ... miles	1.0	...	0.2	...	...	...	...
19	Maximum completed in any enterprise ... miles	32.0	...	2.6	...	10.0	...	32.0
20	Maximum size of tile [1] ... inches	24	...	24	...	6	...	6
	Accessory levees and dikes:							
21	Completed ... miles	0.2	...	...	...	...	...	...
22	Additional under construction ... miles	...	...	...	...	...	...	...
23	Area drained by open ditches only [1] ... acres	[2] 346,745	8,560	58,812	10,758	47,504	4,879	12,219
24	Length of these ditches ... miles	691.6	21.0	199.2	52.4	82.0	6.5	13.1
25	Average length per acre ... feet	10.5	13.0	17.9	25.7	9.1	7.0	5.7
26	Area having both open ditches and tile [1] ... acres	[3] 11,735	...	2,665	...	800	...	3,000
27	Length of these drains ... miles	137.3	...	23.0	...	12.0	...	52.0
28	Average length per acre ... feet	61.8	...	45.6	...	79.2	...	91.5
	DEVELOPMENT OF LAND.							
29	Improved land in operating enterprises, 1920 ... acres	245,334	2,822	56,004	3,987	33,463	1,952	6,888
30	Improved land prior to drainage ... acres	181,915	1,674	46,262	3,549	22,522	1,220	6,088
31	Increase since drainage ... acres	63,419	1,148	9,742	438	10,941	732	800
32	Per cent of increase	34.9	68.6	21.1	12.3	48.6	60.0	13.1
33	Per cent increase is of all improved land in farms, 1920	0.5	1.1	4.8	0.7	5.4	0.6	0.4
34	Timber and cut-over land, 1920 ... acres	92,495	5,738	4,677	2,257	7,349	2,927	7,109
35	Timber and cut-over land prior to drainage ... acres	146,095	5,838	14,079	2,257	18,044	3,659	7,809
36	Decrease since drainage ... acres	53,600	100	9,402	...	10,695	732	700
37	Per cent of decrease	36.7	1.7	66.8	...	59.3	20.0	9.0
38	Other unimproved land, 1920 ... acres	20,651	...	796	4,514	7,492	...	1,222
39	Other unimproved land prior to drainage ... acres	30,469	1,048	1,135	4,952	7,738	...	1,322
40	Decrease since drainage ... acres	9,818	1,048	339	438	246	...	100
41	Per cent of decrease	32.2	100.0	29.9	8.8	3.2	...	7.6
42	Swampy or subject to overflow, 1920 ... acres	69,413	...	7,257	8,125	16,327	...	7,788
43	Swampy or subject to overflow prior to drainage ... acres	199,161	5,414	35,777	8,763	24,747	4,879	7,888
44	Decrease since drainage ... acres	129,748	5,414	28,520	638	8,420	4,879	100
45	Per cent of decrease	65.1	100.0	79.7	7.3	34.0	100.0	1.3
	CAPITAL INVESTED AND COST PER ACRE.							
46	Total capital invested in and required for completion of operating enterprises ... dollars	1,820,996	66,172	289,555	222,129	197,571	30,196	52,447
47	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	1,521,725	51,172	249,560	37,942	189,829	30,196	31,016
48	Additional capital required to complete these enterprises ... dollars	299,271	15,000	39,995	184,187	7,742	...	21,431
49	Average cost per acre when completed ... dollars	5.08	7.73	4.71	20.65	4.09	6.19	3.45
50	Enterprises constructing open ditches only ... dollars	[4] 1,710,730	66,172	259,682	222,129	193,571	30,196	31,247
51	Average cost per acre when completed ... dollars	4.93	7.73	4.42	20.65	4.07	6.19	2.56
52	Enterprises constructing open ditches and tile drains ... dollars	110,266	...	29,873	...	4,000	...	21,200
53	Average cost per acre when completed ... dollars	9.40	...	11.21	...	5.00	...	7.07
	CROPS.							
	Improved land in enterprises reporting—							
54	Corn as principal crop on drained land ... acres	239,254	2,822	56,004	3,987	33,463	1,952	6,888
55	Other crops as principal products on drained land ... acres	1,080	...	...	...	...	...	...
56	Not reporting principal crops on drained land ... acres	5,000	...	...	...	...	...	...

[1] When works under construction have been completed.
[2] Includes 1,140 acres reporting 0.2 mile of accessory levees, also.
[3] Includes 117 acres reporting 2.6 miles of tile drain only.
[4] Includes cost of 0.2 mile of accessory levees.

COUNTY TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Jefferson.	McLean.	Marshall.	Ohio.	Union.	Webster.	Other counties.[1]
	LAND AREA.							
1	Approximate land area of the county ... acres	247,680	161,920	209,280	373,760	208,000	220,160	1,564,800
2	All land in operating drainage enterprises ... acres	90,000	18,485	5,180	10,320	32,722	42,291	10,285
3	Improved land ... acres	45,000	13,709	4,980	7,657	29,294	32,984	6,594
4	Per cent of all improved land in farms	33.1	12.9	3.8	3.5	17.8	24.8	0.8
5	Timber and cut-over land ... acres	40,000	4,642	200	1,838	3,428	8,809	3,521
6	Other unimproved land ... acres	5,000	134	.....	825	.....	498	170
7	Swampy or subject to overflow in enterprises ... acres	11,750	4,579	.....	1,474	3,646	4,947	3,520
8	Suffering loss of crops from defective drainage ... acres	8,750	250	.....	964	2,326	4,853	2,720
9	Assessed acreage ...	90,000	18,485	5,180	10,320	32,722	42,291	10,285
10	Excess over all land in operating enterprises ... acres	.....	.....	.....	.....	.....	.....	.....
	DRAINAGE WORKS.							
	Open ditches:							
11	Completed ... miles	38.5	76.6	15.8	24.4	64.3	85.7	18.8
12	Additional under construction ... miles	1.5	12.0	.....	.....	.....	.....	.....
13	Maximum completed in any enterprise ... miles	12.0	17.6	12.8	5.6	20.2	7.3	4.2
14	Maximum width at bottom of ditch [2] ... feet	30	16	30	20	30	20	30
15	Maximum of average depths of outlet ditches [2] ... feet	15.0	8.5	7.8	6.0	14.0	10.0	20.0
16	Mean depth of branch ditches [2] ... feet	3.0	5.5	7.0	.....	6.0	4.7	8.0
	Tile drains:							
17	Completed ... miles	.....	0.2	.....	.....	18.9	.....	10.0
18	Additional under construction ... miles	.....	0.8	.....	.....	.....	.....	.....
19	Maximum completed in any enterprise ... miles	.....	0.1	.....	.....	18.9	.....	10.0
20	Maximum size of tile [2] ... inches	.....	12	.....	.....	12	.....	.....
	Accessory levees and dikes:							
21	Completed ... miles	.....	.....	.....	.....	0.2	.....	.....
22	Additional under construction ... miles	.....	.....	.....	.....	.....	.....	.....
23	Area drained by open ditches only [2] ... acres	90,000	15,015	5,180	10,320	[3] 31,922	42,291	9,285
24	Length of these ditches ... miles	40.0	71.1	15.8	24.4	63.1	85.7	17.3
25	Average length per acre ... feet	2.3	25.0	16.1	12.5	10.4	10.7	9.8
26	Area having both open ditches and tile [2] ... acres	.....	3,470	.....	.....	800	.....	1,000
27	Length of these drains ... miles	.....	18.5	.....	.....	20.3	.....	11.5
28	Average length per acre ... feet	.....	28.1	.....	.....	134.0	.....	60.7
	DEVELOPMENT OF LAND.							
29	Improved land in operating enterprises, 1920 ... acres	45,000	13,709	4,980	7,657	29,294	32,984	6,594
30	Improved land prior to drainage ... acres	30,500	12,903	.....	4,368	24,894	24,060	3,875
31	Increase since drainage ... acres	14,500	806	4,980	3,289	4,400	8,924	2,719
32	Per cent of increase	47.5	6.2	.....	75.3	17.7	37.1	70.2
33	Per cent increase is of all improved land in farms, 1920	10.7	0.8	3.8	1.5	2.7	6.7	0.3
34	Timber and cut-over land, 1920 ... acres	40,000	4,642	200	1,838	3,428	8,809	3,521
35	Timber and cut-over land prior to drainage ... acres	54,500	5,448	400	4,737	6,967	16,656	5,701
36	Decrease since drainage ... acres	14,500	806	200	2,899	3,539	7,847	2,180
37	Per cent of decrease	26.6	14.8	50.0	61.2	50.8	47.1	38.2
38	Other unimproved land, 1920 ... acres	5,000	134	.....	825	.....	498	170
39	Other unimproved land prior to drainage ... acres	5,000	134	4,780	1,215	861	1,575	709
40	Decrease since drainage ... acres	.....	.....	4,780	390	861	1,077	539
41	Per cent of decrease	.....	.....	100.0	32.1	100.0	68.4	76.0
42	Swampy or subject to overflow, 1920 ... acres	11,750	4,579	.....	1,474	3,646	4,947	3,520
43	Swampy or subject to overflow prior to drainage ... acres	43,000	13,867	5,180	9,010	10,638	21,667	8,331
44	Decrease since drainage ... acres	31,250	9,288	5,180	7,536	6,992	16,720	4,811
45	Per cent of decrease	72.7	67.0	100.0	83.6	65.7	77.2	57.7
	CAPITAL INVESTED AND AVERAGE COST PER ACRE.							
46	Total capital invested in and required for completion of operating enterprises ... dollars	197,000	202,992	77,366	45,500	267,568	129,609	42,891
47	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	175,000	194,076	77,366	45,500	267,568	129,609	42,891
48	Additional capital required to complete these enterprises ... dollars	22,000	8,916	.....	.....	.....	.....	.....
49	Average cost per acre when completed ... dollars	2.19	10.98	14.94	4.41	8.18	3.06	4.17
50	Enterprises constructing open ditches only [2] ... dollars	197,000	168,087	77,366	45,500	[4] 253,280	129,609	36,891
51	Average cost per acre when completed ... dollars	2.19	11.19	14.94	4.41	7.93	3.06	3.97
52	Enterprises constructing open ditches and tile drains [2] ... dollars	.....	34,905	.....	.....	14,288	.....	6,000
53	Average cost per acre when completed ... dollars	.....	10.06	.....	.....	17.86	.....	6.00
	CROPS.							
	Improved land in enterprises reporting—							
54	Corn as principal crop on drained land ... acres	40,000	13,709	4,980	7,657	29,294	32,984	5,514
55	Other crops as principal products on drained land ... acres	.....	.....	.....	.....	.....	.....	1,080
56	Not reporting principal crops on drained land ... acres	5,000	.....	.....	.....	.....	.....	.....

[1] Includes only Bullitt, Carlisle, Graves, Lewis, McCracken, Muhlenberg and Spencer counties.
[2] When works under construction have been completed.
[3] Includes 1,140 acres reporting 0.2 mile of accessory levees, also.
[4] Includes cost of 0.2 mile of accessory levees.

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FOURTEENTH CENSUS OF THE UNITED STATES: 1920

DEPARTMENT OF COMMERCE

BULLETIN

BUREAU OF THE CENSUS

DRAINAGE : LOUISIANA

STATISTICS FOR THE STATE AND ITS PARISHES

Prepared under the supervision of WILLIAM LANE AUSTIN, Chief Statistician for Agriculture, by ROGER D. MARSDEN, Special Agent in Charge of Drainage

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INTRODUCTION.

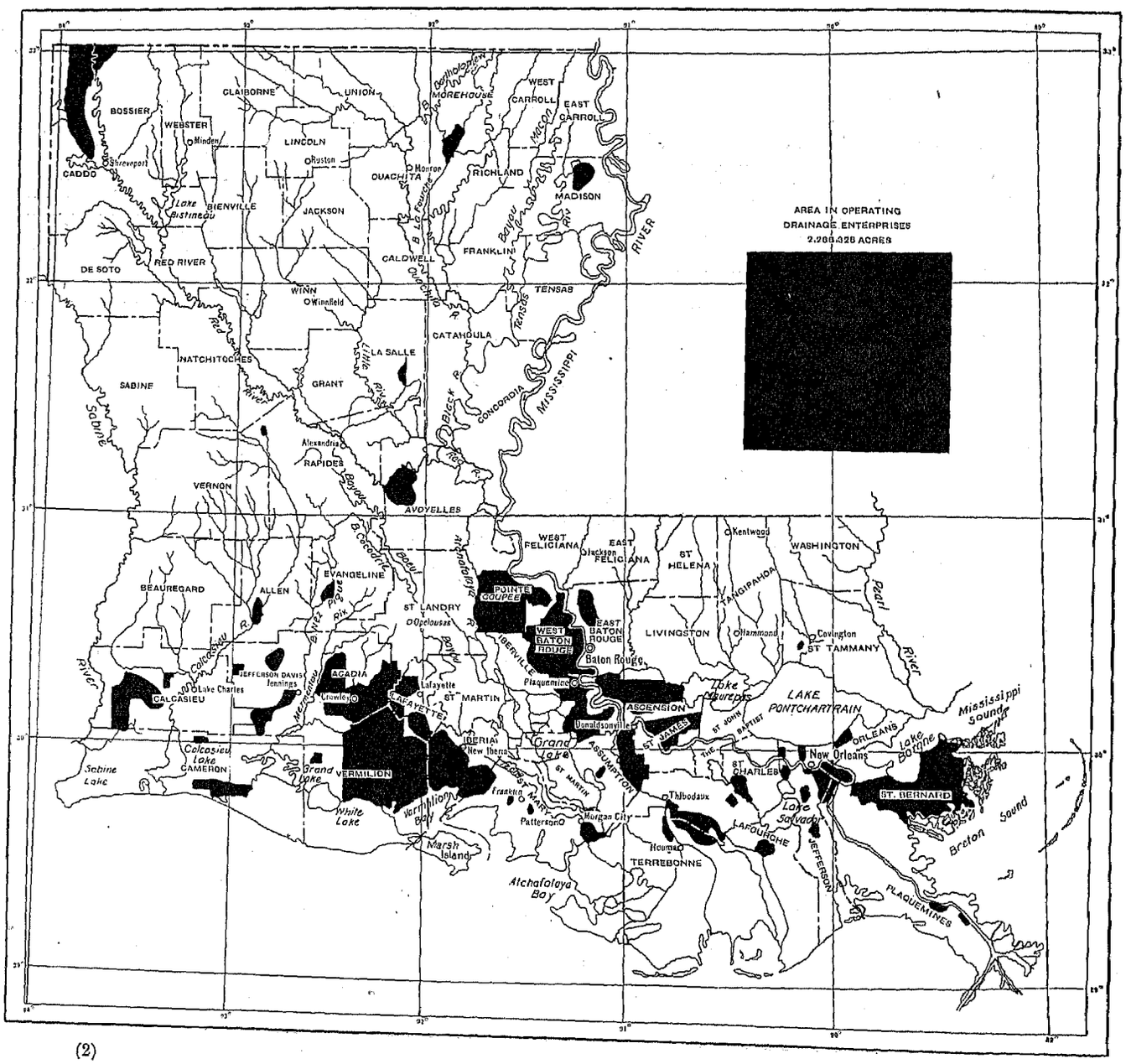
This bulletin presents the statistics of drainage for Louisiana collected at the census of 1920. The figures relate to conditions on January 1, 1920, except where indicated otherwise. No census of drainage has been taken heretofore, so there are no comparable figures for previous years. The data relate to the artificial drainage of land in farms, and of other land that ultimately will be used for agricultural purposes. The organized drainage enterprises include considerable areas of timbered and other unimproved land not yet in farms. The statistics for drainage on farms were collected in the general census of agriculture, while the statistics for drainage enterprises were obtained in a special canvass of those enterprises. Since drainage on farms may be either inside or outside an organized enterprise, and the drains that each individual owner installs upon his own farm may be either supplemental to or entirely independent of the works installed by an enterprise, the figures for the two parts of the drainage census are presented separately.

TABLE 1.—SUMMARY FOR THE STATE: 1920.

ITEM.	Amount.	Per cent of total.
DRAINAGE ON FARMS.		
Number of all farms in the state	135,463	100.0
Farms reporting land having drainage	21,271	15.7
Farms reporting land needing drainage	14,985	11.1
All land in farms ... acres	10,019,822	100.0
Improved land in farms ... acres	5,626,226	56.2
Farm land reported as provided with drainage ... acres	1,004,935	10.0
Farm land reported as needing drainage ... acres	1,095,769	10.9
DRAINAGE ENTERPRISES.		
Approximate land area of the state ... acres	29,061,760	100.0
All land in operating drainage enterprises ... acres	2,266,328	7.8
Improved land ... acres	1,269,391	4.4
Timber and cut-over land ... acres	467,822	1.6
Other unimproved land ... acres	529,115	1.8
Capital invested in and required for completion of operating enterprises	$9,990,788	100.0
Capital invested in these enterprises to Dec. 31, 1919	$9,021,991	90.3
Additional capital required to complete these enterprises	$968,797	9.7

LOUISIANA

APPROXIMATE LOCATION AND AREA OF OPERATING DRAINAGE ENTERPRISES.



DRAINAGE ON FARMS.

Explanation of terms.—To secure uniformity in the returns relating to drainage on farms, the Bureau of the Census supplied its enumerators with certain definitions, which are substantially as follows:

Drainage of agricultural land was defined, for census purposes, as the act or process of drawing off an excess of water by underground conduits, pipes, or tiles, or by open or covered trenches in the surface of the ground, for the purpose of improving the condition of the soil and crops.

The area provided with drainage, in farms, is the acreage actually benefited or made of more value for agricultural purposes by artificial drainage, but does not include land on which only temporary work has been done, such as "bedding" the fields or laying out "dead furrows" to hasten the surface flow.

The area needing drainage, in farms, comprises the additional land not now suitable for crops which could be made available for cultivation (1) "by drainage only," which is the acreage needing no clearing or which is covered with grass, weeds, or other annual growth, and (2) "by drainage and clearing," which is the acreage covered with trees, stumps, or perennial woody shrubs.

Improved land in farms includes all land regularly tilled or mowed, land in pasture which has been cleared or tilled, land lying fallow, land in gardens, orchards, vineyards, and nurseries, and land occupied by farm buildings.

Woodland in farms includes all land covered with natural or planted forest trees which produce, or later may produce, firewood or other forest products.

Farms in drainage and levee districts are those for which the operators have answered affirmatively the question, "Has any part of this farm been afforded drainage or protection against overflow by a drainage or levee district, or by the state, the county, or a private company or individual." Levee districts, however, generally are not included in the enterprises for which data are given in this bulletin (see definition of drainage enterprises, below).

Farms and farm land.—The acreage shown for drainage on farms represents land where drainage is actually in operation and which has actually become more fully available for growing crops by reason of the drainage. This is to be distinguished from the area merely provided with outlet facilities by organized drainage enterprises. Drainage on farms represents in most cases the result of work done by the farm owner, either independently or supplemental to the work done by a drainage enterprise, but the acreage would include also any farm land receiving similar benefits directly from the works of an enterprise.

DRAINAGE ENTERPRISES.

Explanation of terms.—The more important terms used in connection with the census of drainage enterprises were defined as follows:

Drainage enterprises comprise public corporations and local improvement districts formed under state laws, commercial enterprises draining swamp or overflowed land for sale, other organizations that may be engaged in extensive land-drainage work, and also tracts of 500 acres or more drained by individual owners. Enterprises such as levee districts that have not authorized the construction of open ditches or tile drains are not included.

Enterprises located in more than one parish were divided, for tabulation, and the part in each parish treated as a separate enterprise, though the capacities of drainage pumping plants are given only in the parish in which the plants are located.

Operating enterprises, as designated in this bulletin, are those that had completed the drainage works authorized, or had at any rate begun actual construction work, on or before January 1, 1920; enterprises that had been established but had not begun construction are termed "nonoperating."

Land in drainage enterprises comprises the area that has been benefited or is to be benefited by the improvement works constructed by the enterprises. In the case of overlapping enterprises, deduction has been made for the amount of duplication.

All land in drainage enterprises is divided, without regard to drainage condition, into (*a*) improved land; (*b*) timber and cut-over land, which would require clearing to be thoroughly fit for cultivation; and (*c*) all other unimproved land, which would not require expensive clearing before cultivation.

The assessed acreage for any single enterprise is the same as the area in that enterprise. However, the total assessed acreage may be considerably greater than the total land in enterprises, for in summing up the assessed acreage in the parish or state, deduction was not made for acreage assessed in more than one enterprise.

Improved land in drainage enterprises consists very largely of improved farm land, though it may include some other improved land receiving benefit from the works of the enterprises.

Timber and cut-over land includes farm woodland of natural or planted forest trees as well as other timber land or areas that would need clearing of trees, stumps, or perennial woody shrubs.

Land designated as swampy or subject to overflow includes all land permanently or generally too wet for cultivation, land subject to periodical inundation by stream floods, seeped and alkali land in irrigated regions, and all other land unfit for cultivation by reason of insufficient drainage. This classification is without respect to the conditions as to improvement or timber.

The area suffering loss of crops is intended to include only land devoted to planted crops which suffer damage, either partial or complete, because of defective drainage. Land which would be cultivated if drained or protected against overflow is not included.

Capital invested, for the purpose of this investigation, was defined as cost, including charges for engineering, organization, rights of way, construction of drainage works, damages, land and buildings except those held for sale or farming, and any other expenditures properly chargeable to drainage and paid by the enterprise.

The drainage works of an enterprise include all varieties of underground conduits, pipes, or lines of tile, or drains of stone, wood, or other material; also open ditches and canals, together with accessory levees, dikes, dams, weirs, pumping machinery, gates, and other devices for the draining away or control of surface and soil waters.

Tile, as the term is here used, includes pipes of earthenware, concrete, or other material buried beneath the surface in such a way as to permit the excess water to flow away. The size, if circular, is expressed by the inside diameter in inches.

Ditches include all open artificial trenches, usually with sloping sides. The width is that of the bottom.

The type of drainage shows whether the drainage water from an enterprise is discharged by gravity or by pumping.

A pumping district is one where all or a part of the water from the drains collecting at a low point must be raised by some form of machinery in order that it may be removed from the area.

Drainage pumps include all kinds of machinery and devices for lifting the drainage water.

Pumping engines include all kinds of engines and motors for operating the drainage pumps.

Operating and nonoperating enterprises.—In most of the tables that follow, statistics are given for operating enterprises only. These enterprises, as already defined, include both those which have completed their drainage works and those with such works under construction; among the latter may be some that had completed the original plan of reclamation several years ago, but were constructing extensions or enlargements on January 1, 1920. The nonoperating enterprises have a legal existence, though they have not yet accomplished any drainage. They may include districts that on the census date had completed their plans, sold bonds to cover the cost of the undertakings, and let contracts for the construction work, and also districts that had just been established by the police juries of the parishes and were still subject to considerable change in area, plan of drainage works, and cost.

TABLE 2.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED AS BETWEEN OPERATING AND NONOPERATING ENTERPRISES: 1920.

CLASS.	LAND.		CAPITAL.[1]		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	2,732,368	100.0	$9,117,991	100.0	$2,564,497
Operating enterprises	2,266,328	82.9	9,021,991	98.9	968,797
With works completed	1,534,634	56.2	5,956,938	65.3	.....
With works under construction	731,694	26.8	3,065,053	33.6	968,797
Nonoperating enterprises	466,040	17.1	96,000	1.1	1,595,700

[1] The inquiry asked for the "total cost of the enterprise to Dec. 31, 1919," and for an "estimate of additional investment to complete."

Location of enterprises.—Nearly all the drainage enterprises in Louisiana are situated in the southern part of the state. While many of the enterprises are near the Mississippi, the drainage from most of these is away from the river and toward the Gulf of Mexico.

TABLE 3.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY DRAINAGE BASIN: 1920.

DRAINAGE BASIN.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	2,732,368	100.0	$9,117,991	100.0	$2,564,497
Operating enterprises	2,266,328	82.9	9,021,991	98.9	968,797
Black River	43,075	1.6	75,000	0.8	.....
Red River	125,000	4.6	305,449	3.3	70,600
Mississippi River	57,677	2.1	143,140	1.6	11,000
Sabine River and Lake	64,840	2.4	115,000	1.3	.....
Gulf of Mexico	1,975,736	72.3	8,383,402	91.9	887,197
Nonoperating enterprises	466,040	17.1	96,000	1.1	1,595,700
Black River	30,100	1.1	50,000	0.6	120,000
Red River	51,200	1.9	.....	.....	26,200
Mississippi River	1,250	(1)	.....	.....	32,000
Gulf of Mexico	383,490	14.0	46,000	0.5	1,417,500

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

Condition of land in enterprises.—The organized drainage enterprises in this state are mostly for the protection and reclamation of land that in its natural condition was continuously swampy. The enterprises in the parishes along the Mississippi are generally protected from overflows from the river by the system of Government levees. The area southerly from Lake Pontchartrain, and a considerable strip along the whole gulf coast, is but a few feet above sea level and most of it can be drained only by pumping. In districts given largely to rice cultivation, drainage need not be so thorough as that required for such crops as sugar cane, cotton, corn, and vegetables.

The usual purpose of an organized enterprise is merely to provide adequate outlets into which the landowners of the district may drain their farms and to afford relief from overflows for the district as a unit. Therefore, the fact that an enterprise which has completed the construction of the drainage works authorized contains land still swampy or subject to overflow, or land that suffers damage to crops, does not show that the improvement works are inadequate.

TABLE 4.—LAND IN ALL ENTERPRISES, CLASSIFIED BY CONDITION: 1920.

CONDITION OF LAND.	OPERATING ENTERPRISES.				Nonoperating enterprises (acres).
	Total.		Works completed (acres).	Works under construction (acres).	
	Acreage.	Per cent of all land.			
All land in enterprises	2,266,328	100.0	1,534,634	731,694	466,040
Improved land	1,269,391	56.0	855,757	413,634	180,980
Timber and cut-over land	467,822	20.6	395,941	71,881	172,440
Other unimproved land	529,115	23.3	282,936	246,179	112,620
Swampy or subject to overflow	569,189	25.1	303,313	265,876	212,782
Suffering a loss of crops	198,935	8.8	68,134	130,801	47,376

Size of enterprises.—Presentation of the statistics by parishes requires that an enterprise located in more than one parish be divided, and the part in each parish be considered a separate enterprise. In this way 111 operating drainage enterprises are counted in Louisiana, with an average area of 21,099 acres assessed. Of the total number of enterprises, 13 comprise 50,000 acres or more each, and 29 less than 5,000 acres each. The assessed acreage exceeds the land in enterprises by 75,706 acres, which is the amount of overlapping. The land in enterprises and the assessed acreage on each line of Table 5 refer to the same enterprises. From the total area of each enterprise, designated as the assessed area, the net amount of overlapping with enterprises organized previously was deducted, to determine the area to be tabulated as land in enterprises.

TABLE 5.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY SIZE OF AREA ASSESSED: 1920.

AREA ASSESSED.	Land in enterprises (acres).	ASSESSED AREA.	
		Acreage.	Per cent of total.
All operating enterprises	2,266,328	2,342,034	100.0
500 to 999 acres	2,269	2,269	0.1
1,000 to 4,999 acres	55,557	64,063	2.7
5,000 to 9,999 acres	153,161	159,161	6.8
10,000 to 49,999 acres	975,996	1,037,196	44.3
50,000 to 99,999 acres	628,385	628,385	26.8
100,000 acres and over	450,960	450,960	19.3

Character of enterprises.—Of the operating drainage enterprises in Louisiana, all but 10 are drainage districts established by the police juries of the parishes. Two enterprises are organized under a special act of the state legislature, and the others are commercial land developments or private farm improvements by individual landowners.

The state constitution of 1898 (art. 281) as amended specifically authorizes the formation of drainage districts and subdrainage districts as minor political subdivisions of the state, by the police jury of any parish. These districts may levy taxes for drainage purposes, not exceeding in any year 10 mills on the dollar of assessed valuation, when authorized by vote of a majority in number and amount of the property taxpayers. They have power further, when similarly authorized, to impose forced contributions not exceeding 50 cents per acre on all land susceptible of gravity drainage, for not longer than 40 years. Districts having construction work 80 per cent completed may levy additional taxes to complete the works without authorization by vote of the taxpayers, provided the total cost will not exceed 50 cents per acre. Districts involving the construction of levees and the installation of drainage pumping plants may levy annually, upon petition from the owners of a majority of the acreage to be assessed, not exceeding $3.50 per acre for construction of the works and for maintaining the drainage.

The general drainage district law of Louisiana now in effect is that enacted July 7, 1910 (act No. 317), as amended July 9, 1914 (act No. 227). Drainage districts containing not less than five landowners may be established within the parish by the police jury upon its own initiative; a district shall be established upon petition from a majority of the resident landowners in the district or from the owners of a majority of the acreage. The governing board of each such enterprise is a board of five drainage commissioners, two of whom are appointed by the governor of the state and the others by the police jury upon the recommendation of a majority of the resident landowners, in number or in acreage. For a district situated in more than one parish, the commissioners appointed by the police juries are apportioned according to the acreage of the district in each parish. The commissioners prepare the plan of reclamation or improvement and let contracts for construction. For a pumping district the board of state engineers must investigate and report favorably before the work is undertaken. An act of 1906 (No. 103) provides that the board of state engineers shall make surveys and perform such services as may be required by the commissioners of any drainage district for the construction of public works necessary for drainage, but the cost of these services is to be paid by the district. The cost of the enterprise is paid by an ad valorem tax or an acreage tax, as provided by the state constitution. The parish assessor makes the assessment against the property in the district, subject to review by the police jury. Whenever an acreage tax is levied any landowner may appeal to the courts to test the validity of the proceedings. Bonds may be issued if authorized by vote of the landowners or, in the case of a pumping district, by petition from the owners of two-thirds of the acreage.

Subdrainage districts within a drainage district may be established by order of the commissioners of the main district or by petition from two-thirds (but not less than 10) of the property owners concerned. The district commissioners appoint a committee of not more than three members to conduct the work of drainage under the direction of the commissioners.

Before the law of July 12, 1888 (act No. 107), drainage districts were formed only by special acts of the state legislature. That law authorized the establishment of drainage districts and the appointment of commissioners for such districts by the police juries of the parishes. The cost was to be paid by taxes not exceeding 15 mills on the dollar of assessed value of the land to be drained, to be approved by vote of the landowners. This statute was superseded by an act of June 28, 1894 (No. 37), which was similar but required that the district must be established if petition for it was signed by a majority of the landowners. An act of July 9, 1896, provided condemnation of right of way for a private drain across the land of an objecting owner. Upon petition for such drain, the police jury should assess the damages to be paid for the privilege sought.

After the constitution of 1898 was adopted, the earlier drainage district laws were superseded in turn by acts of June 27, 1900 (No. 12), of July 9, 1902 (No. 159), and the present statute of 1910, and the amendments to those laws. The greatest number of changes in these laws have dealt with the matters of petition from and referendum to the voters regarding drainage taxes and bond issues. An act of 1906 (No. 45) authorizes those districts organized under act No. 37 of 1894 and other acts adopted before the constitution of 1898 to levy annually a tax not exceeding 25 cents per acre, each levy to be authorized by vote of the landowners.

An act of July 10, 1902 (No. 211), provides that any drainage district organized under the laws of Louisiana, but not wishing to avail itself of the provisions of article 281 of the constitution of 1898, may levy an annual contribution not exceeding 50 cents per acre if authorized to do so by a majority in number and amount of property taxpayers.

TABLE 6.—LAND AND CAPITAL INVESTED IN ALL ENTERPRISES, CLASSIFIED BY CHARACTER OF ENTERPRISE: 1920.

CHARACTER OF ENTERPRISE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All organized enterprises	2,732,368	100.0	$9,117,991	100.0	$2,564,497
Operating enterprises	2,266,328	82.9	9,021,991	98.9	968,797
Drainage districts	2,229,865	81.6	8,537,991	93.6	712,297
Laws of 1894, act No. 37	128,000	4.7	352,949	3.9	70,000
Laws of 1900, act No. 12	188,000	6.9	190,000	2.1	.....
Laws of 1902, act No. 159	756,329	27.7	1,612,500	17.7	115,000
Laws of 1910, act No. 317	1,115,256	40.8	6,282,542	68.9	527,297
Special act	42,280	1.5	100,000	1.1	.....
Commercial developments [1]	36,493	1.3	484,000	5.3	256,500
Nonoperating enterprises	466,040	17.1	96,000	1.1	1,595,700
Drainage districts	466,040	17.1	96,000	1.1	1,595,700
Laws of 1902, act No. 159 [2]	110,000	4.0	45,000	0.5	375,000
Laws of 1910, act No. 317	356,040	13.0	51,000	0.6	1,220,700

[1] Includes 5,100 acres under individual ownership.
[2] Includes one commercial development.

Drainage works.—The total works completed by drainage enterprises to December 31, 1919, comprised 1,771.6 miles of open ditches, 0.2 mile of tile drain, and 440.7 miles of levees; the additional lengths under construction were 162.7 miles of open ditches and 65.9 miles of levees. These figures do not include drains or levees installed by individual farm owners supplemental to the works of the enterprises, nor the works of flood-protection or levee districts that had not undertaken the construction of open ditches or tile drains. Of the operating enterprises, 30 are pumping districts.

The average depth of the main or outlet ditch was reported for each enterprise. The maximum depth of outlet reported for any enterprise in the state and the maximum in each parish are shown in line 15 of Parish Table II. The maximum length, width, and depth of outlet shown in that table for any parish may not refer to the same enterprise.

TABLE 7.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY KIND OF DRAINAGE WORKS: 1920.

KIND OF WORKS.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All kinds	2,266,328	100.0	$9,021,991	100.0	$968,797
Open ditches only	1,913,870	84.4	4,225,779	46.8	642,472
Open ditches and levees	351,958	15.5	4,793,212	53.1	326,325
Open ditches and tile drains	500	(1)	3,000	(1)	.....

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

TABLE 8.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY TYPE OF DRAINAGE: 1920.

TYPE OF DRAINAGE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		
	Acreage.	Per cent of total.	Amount.	Per cent of total.	Additional required to complete.
All operating enterprises	2,266,328	100.0	$9,021,991	100.0	$968,797
Gravity drainage only	2,111,858	93.2	5,052,248	56.0	529,022
All drainage by pumping	137,250	6.1	3,836,743	42.5	424,775
Part gravity and part pumping	17,220	0.8	133,000	1.5	15,000
Total area served by pumps	140,809	6.2	.....	.....	.....

TABLE 9.—PUMPING PLANTS OF OPERATING ENTERPRISES, AND ACREAGE SERVED, CLASSIFIED BY KIND OF POWER: 1920.

KIND OF POWER.	ENGINE CAPACITY.		PUMP CAPACITY.		AREA SERVED.	
	Horsepower.	Per cent of total.	Gallons per minute.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	7,665	100.0	5,245,150	100.0	140,809	100.0
Steam	5,105	66.6	4,281,300	81.6	104,684	74.3
Internal combustion	1,860	24.3	743,650	14.2	29,182	20.7
Electric and steam [1]	700	9.1	220,200	4.2	6,943	4.9

[1] Includes 500 electric and 200 steam horsepower.

TABLE 10.—PUMPING PLANTS OF OPERATING ENTERPRISES, AND ACREAGE SERVED, CLASSIFIED BY KIND OF PUMPS: 1920.

KIND OF PUMPS.	Number of pumps.	PUMP CAPACITY.		ENGINE CAPACITY.		ACREAGE SERVED.	
		Gallons per minute.	Per cent of total.	Horsepower.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	71	5,245,150	100.0	7,665	100.0	140,809	100.0
Centrifugal	57	4,603,900	87.8	6,420	83.8	89,736	63.7
Rotary	1	3,000	0.1	25	0.3	200	0.1
Screw	6	470,000	9.0	870	11.4	14,804	10.5
Centrifugal and rotary [1]	3	75,000	1.4	200	2.6	2,600	1.8
Centrifugal and screw [2]	3	84,000	1.6	125	1.6	4,200	3.0
Not reported	1	9,250	0.2	25	0.3	29,269	20.8

[1] Includes 1 rotary and 2 centrifugal pumps.
[2] Includes 1 centrifugal and 2 screw pumps.

In Parish Table II, line 16 shows the mean depth of branch ditches, which is a very crude indication of the depth of soil drainage that may be obtained in the enterprises as determined by the depth of outlet provided for farm drains. The mean depth was computed by giving each separate depth a weight in proportion to the acreage it serves. As most enterprises reported depths in whole numbers only, the occasional decimals were omitted in making these computations. Depths less than 3 feet and those 10 feet and greater were omitted because it seemed that they did not represent so well the average depths of outlet provided for all the farms in those districts. To include both these groups, computed as 3 feet and 10 feet, respectively, would make the mean depth for the state 5.5 instead of 5.1 feet.

TABLE 11.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY AVERAGE DEPTH OF BRANCH DITCHES: 1920.

DEPTH OF BRANCH DITCHES.	Acreage.	Per cent of total.
All operating enterprises	2,266,328	100.0
Less than 3 feet	55,247	2.4
3.0 to 3.9 feet	92,817	4.1
4.0 to 4.9 feet	395,590	17.5
5.0 to 5.9 feet	410,350	18.1
6.0 to 6.9 feet	204,756	9.0
7.0 to 7.9 feet	224,900	9.9
8.0 to 8.9 feet	21,629	1.0
9.0 to 9.9 feet	.....	.....
10.0 feet and more	139,000	6.1
Not reporting branches	722,039	31.9

Maintenance of works.—An act of June 29, 1904 (No. 61), provides that the drainage and levee districts shall have control over all public drainage channels of their respective districts, for all purposes, and the present drainage district law authorizes the commissioners to perform all acts necessary to maintain the drainage of the districts and subdistricts. The expense that may be incurred is subject to the limitations on general and acreage taxes for drainage, placed by the constitution and statutes.

TABLE 12.—LAND AND CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY METHOD OF MAINTENANCE: 1920.

METHOD OF MAINTENANCE.	LAND.		CAPITAL.		
			To Dec. 31, 1919.		Additional required to complete.
	Acreage.	Per cent of total.	Amount.	Per cent of total.	
All operating enterprises	2,266,328	100.0	$9,021,991	100.0	$968,797
By district forces	726,106	32.0	4,652,797	51.6	360,500
By contract	241,006	10.6	1,188,249	13.2	115,000
By landowners	28,670	1.3	200,500	2.2	256,500
By method not specified	16,013	0.7	55,000	0.6	.....
No maintenance provided	1,229,593	54.3	2,598,065	28.8	232,797
Not reporting	24,940	1.1	327,380	3.6	4,000

Date of organization.—The progress in drainage is shown only roughly by the dates of the organization of enterprises, which are the dates when the districts were established by the police juries, or when subdistricts were established by the drainage commissioners, since there may be a period of one or more years between the decree of establishment and the beginning of actual construction, and since the work of construction will occupy several years in a large district. It was not practicable, however, for the census to secure data as to the time of the beginning or the completion of the drainage works. Under the date of organization are tabulated the entire area, works, and capital of each enterprise, even including extensions made after the original plan of reclamation was completed.

TABLE 13.—LAND IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	LAND.		AREA ASSESSED.	
	Acreage.	Per cent of total.	Acreage.	Per cent of total.
All operating enterprises	2,266,328	100.0	2,342,034	100.0
1890 to 1899	142,280	6.3	142,280	6.1
1900 to 1904	251,498	11.1	251,498	10.7
1905 to 1909	789,758	34.8	845,758	36.1
1910 to 1914	687,387	30.3	704,687	30.1
1915 to 1919	395,405	17.4	397,811	17.0

TABLE 14.—CAPITAL INVESTED IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	CAPITAL.		
	To Dec. 31, 1919.		Additional required to complete.
	Amount.	Per cent of total.	
All operating enterprises	$9,021,991	100.0	$968,797
1890 to 1899	390,949	4.3	70,000
1900 to 1904	546,000	6.1	.....
1905 to 1909	1,784,500	19.8	115,000
1910 to 1914	4,848,140	53.7	320,275
1915 to 1919	1,452,402	16.1	463,522

TABLE 15.—DRAINS AND LEVEES (COMPLETED AND UNDER CONSTRUCTION) IN OPERATING ENTERPRISES, CLASSIFIED BY DATE ENTERPRISE WAS ORGANIZED: 1920.

DATE OF ORGANIZATION.	DITCHES.		TILE.		LEVEES.	
	Miles.	Per cent of total.	Miles.	Per cent of total.	Miles.	Per cent of total.
All drains and levees	1,934.3	100.0	0.2	100.0	506.6	100.0
1890 to 1899	54.0	2.8	.....	.....	102.0	20.1
1900 to 1904	192.0	9.9	.....	.....	97.0	19.1
1905 to 1909	313.1	16.2	.....	.....	21.0	4.1
1910 to 1914	847.9	43.8	0.2	100.0	215.3	42.5
1915 to 1919	527.3	27.3	.....	.....	71.3	14.1

Crops.—The principal crops grown upon the drained land in drainage enterprises are sugar cane, rice, and cotton. Data were not secured to show the part of each enterprise planted to any crop, so the enterprises have been classified according to the principal crop, and the total area of improved land is shown thus classified, in Parish Table II. No data were secured at the general census of agriculture to separate the crops grown upon land drained artificially from those produced upon land drained naturally.

PARISH TABLE I.—DRAINAGE ON FARMS: 1920.

		THE STATE.	Acadia.	Allen.	Ascension.	Assumption.	Avoyelles.	Bossier.	Caddo.
1	Number of all farms in the state or parish	135,463	3,088	753	1,630	438	5,628	4,227	4,902
2	Farms reporting land having drainage	21,271	34	43	777	92	304	49	109
3	Farms reporting land needing drainage	14,985	9	284	552	86	61	573	26
4	Farms in drainage and levee districts	10,516	16	1	675	4	16	50	111
	LAND AND FARM AREA.								
5	Approximate land area of the state or parish ... acres	29,061,760	414,080	424,320	186,240	309,760	542,080	552,320	563,200
6	All land in farms ... acres	10,019,822	322,061	94,659	108,982	79,282	221,540	244,342	224,282
7	Improved land in farms ... acres	5,626,226	278,939	42,328	72,530	53,856	147,425	150,207	160,411
8	Woodland in farms ... acres	3,614,040	39,414	49,766	33,534	22,677	66,863	82,356	55,074
9	Other unimproved land in farms ... acres	779,556	3,708	2,565	2,918	2,749	7,252	11,779	8,797
10	Farm land reported as provided with drainage ... acres	1,004,935	3,794	5,983	40,166	7,858	7,845	3,392	2,958
11	Farm land reported as needing drainage ... acres	1,095,769	705	21,900	17,692	4,280	9,706	33,991	4,714
12	Drainage only ... acres	179,305	280	1,471	2,648	1,192	1,915	1,103	165
13	Drainage and clearing ... acres	916,464	425	20,429	15,044	3,088	7,791	32,888	4,549

		Calcasieu.	Cameron.	Catahoula.	Claiborne.	Concordia.	East Baton Rouge.	East Carroll.	East Feliciana.	Evangeline.
1	Number of all farms in the parish	922	620	1,827	4,024	2,028	2,427	2,286	2,405	3,550
2	Farms reporting land having drainage	130	157	403	223	761	722	342	9	176
3	Farms reporting land needing drainage	69	7	100	469	141	277	65	28	771
4	Farms in drainage and levee districts	.....	14	5	.....	795	53	207	.....	.....
	LAND AND FARM AREA.									
5	Approximate land area of the parish ... acres	695,040	960,640	459,520	497,920	456,960	291,200	268,800	296,960	616,960
6	All land in farms ... acres	145,591	132,513	118,707	362,808	160,429	177,776	107,323	201,527	179,229
7	Improved land in farms ... acres	104,197	33,264	58,934	206,503	55,795	109,350	71,029	109,430	140,959
8	Woodland in farms ... acres	30,131	14,605	57,817	127,307	102,072	63,233	34,645	69,384	33,804
9	Other unimproved land in farms ... acres	11,263	84,644	1,956	28,998	2,562	5,193	1,649	22,713	4,466
10	Farm land reported as provided with drainage ... acres	29,532	6,534	10,758	10,023	21,300	32,798	11,490	750	12,262
11	Farm land reported as needing drainage ... acres	11,048	8,184	8,594	28,924	46,193	24,522	6,177	5,306	28,594
12	Drainage only ... acres	4,945	8,164	1,343	3,936	1,482	2,183	1,091	548	25,008
13	Drainage and clearing ... acres	6,103	20	7,251	24,988	44,711	22,339	5,086	4,758	3,586

		Franklin.	Grant.	Iberia.	Iberville.	Jefferson.	Jefferson Davis.	Lafayette.	Lafourche.	Livingston.
1	Number of all farms in the parish	4,592	1,649	1,481	669	334	1,163	3,048	1,190	1,311
2	Farms reporting land having drainage	417	455	677	465	150	33	904	344	456
3	Farms reporting land needing drainage	745	21	75	167	8	70	399	389	344
4	Farms in drainage and levee districts	377	.....	250	261	142	22	4	198	18
	LAND AND FARM AREA.									
5	Approximate land area of the parish ... acres	403,200	437,120	376,960	373,760	274,560	466,560	178,560	636,160	423,680
6	All land in farms ... acres	210,198	101,307	110,646	113,802	14,983	264,063	141,154	238,433	79,463
7	Improved land in farms ... acres	108,550	46,664	95,037	72,434	9,086	231,970	128,526	104,949	28,228
8	Woodland in farms ... acres	87,247	49,380	9,495	32,763	3,080	24,371	8,746	49,769	43,926
9	Other unimproved land in farms ... acres	14,401	5,263	6,114	8,605	2,817	7,722	3,882	83,715	7,309
10	Farm land reported as provided with drainage ... acres	8,089	13,858	41,999	60,054	2,765	6,504	31,517	19,983	9,417
11	Farm land reported as needing drainage ... acres	46,232	642	3,528	21,785	574	4,472	3,713	58,747	17,764
12	Drainage only ... acres	2,769	142	1,441	5,381	422	2,006	1,702	10,810	2,159
13	Drainage and clearing ... acres	43,463	500	2,087	16,404	152	2,466	2,011	47,937	15,605

PARISH TABLE I.—DRAINAGE ON FARMS: 1920—Continued.

		Madison.	Morehouse.	Natchitoches.	Orleans.	Ouachita.	Plaquemines.	Pointe Coupee.	Rapides.	Richland.
1	Number of all farms in the parish	2,071	3,239	5,408	246	2,666	571	3,303	3,368	3,383
2	Farms reporting land having drainage	683	801	160	37	390	240	2,085	1,423	256
3	Farms reporting land needing drainage	50	90	200	5	112	233	313	312	407
4	Farms in drainage and levee districts	677	248	2	27	14	262	1,939	663	576
	LAND AND FARM AREA.									
5	Approximate land area of the parish ... acres	416,000	531,840	824,960	113,920	410,880	647,040	368,640	876,800	361,600
6	All land in farms ... acres	150,866	173,777	283,450	9,068	159,490	69,348	194,964	219,284	167,845
7	Improved land in farms ... acres	87,222	94,619	147,933	6,669	79,381	22,419	120,536	113,312	89,357
8	Woodland in farms ... acres	62,698	75,230	125,328	896	77,115	8,823	65,196	93,091	71,833
9	Other unimproved land in farms ... acres	946	3,928	10,189	1,503	2,994	38,106	9,232	12,881	6,655
10	Farm land reported as provided with drainage ... acres	39,074	25,336	5,238	2,899	10,171	9,769	71,989	55,383	4,786
11	Farm land reported as needing drainage ... acres	27,789	16,002	14,400	2,521	7,581	20,770	31,974	23,635	29,543
12	Drainage only ... acres	2,764	1,106	1,642	1,207	647	12,535	10,943	1,901	255
13	Drainage and clearing ... acres	25,025	14,896	12,758	1,314	6,934	8,235	21,031	21,734	29,288

		St. Bernard.	St. Charles.	St. Helena.	St. James.	St. John the Baptist.	St. Landry.	St. Martin.	St. Mary.	St. Tammany.
1	Number of all farms in the parish	121	258	1,452	289	227	6,575	2,006	410	672
2	Farms reporting land having drainage	48	254	90	92	124	1,869	676	260	23
3	Farms reporting land needing drainage	37	50	124	68	63	413	251	70	260
4	Farms in drainage and levee districts	46	118	.....	22	113	1,033	57	168	.....
	LAND AND FARM AREA.									
5	Approximate land area of the parish ... acres	397,440	188,800	268,800	162,560	147,840	435,840	336,000	404,480	579,840
6	All land in farms ... acres	8,250	49,908	115,826	54,324	31,610	302,175	103,673	122,944	73,151
7	Improved land in farms ... acres	3,834	24,740	51,729	39,747	21,813	228,315	81,370	70,774	15,359
8	Woodland in farms ... acres	2,100	22,539	58,068	12,174	8,927	64,331	17,306	37,680	40,254
9	Other unimproved land in farms ... acres	2,316	2,629	6,029	2,403	870	9,529	4,997	14,490	17,538
10	Farm land reported as provided with drainage ... acres	2,552	25,769	750	9,810	13,660	69,089	23,556	54,274	683
11	Farm land reported as needing drainage ... acres	3,686	11,730	8,382	5,729	6,055	27,740	5,732	19,802	23,591
12	Drainage only ... acres	1,773	2,131	135	2,189	2,907	3,446	2,480	3,864	8,133
13	Drainage and clearing ... acres	1,913	9,599	8,247	3,540	3,148	24,294	3,252	15,938	15,458

		Tangipahoa.	Tensas.	Terrebonne.	Union.	Vermilion.	Washington.	West Baton Rouge.	All other parishes.[1]
1	Number of all farms in the parish	2,735	2,089	855	3,426	2,958	2,165	402	28,376
2	Farms reporting land having drainage	362	549	84	262	1,638	188	345	100
3	Farms reporting land needing drainage	463	12	165	628	467	396	133	3,927
4	Farms in drainage and levee districts	2	131	147	.....	805	.....	236	11
	LAND AND FARM AREA.								
5	Approximate land area of the parish ... acres	505,600	404,480	1,126,400	587,520	776,320	419,200	136,960	6,525,440
6	All land in farms ... acres	169,293	161,155	142,530	339,726	258,103	178,794	48,681	2,276,487
7	Improved land in farms ... acres	56,977	82,826	56,815	137,362	201,001	62,602	38,337	1,070,576
8	Woodland in farms ... acres	83,950	67,403	52,081	192,740	25,257	89,440	9,443	1,058,678
9	Other unimproved land in farms ... acres	28,366	10,926	33,634	9,624	31,845	26,752	901	147,233
10	Farm land reported as provided with drainage ... acres	4,711	16,591	7,162	10,606	100,453	2,388	34,782	1,825
11	Farm land reported as needing drainage ... acres	18,991	5,972	18,066	39,280	39,957	1,148	14,886	252,820
12	Drainage only ... acres	752	1,185	7,080	657	16,633	157	2,740	5,737
13	Drainage and clearing ... acres	18,239	4,787	10,986	38,623	23,324	991	12,146	247,083

[1] No drainage on farms reported in Caldwell, Jackson, La Salle, Red River, and Webster Parishes.

PARISH TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920.

		The State.	Acadia.	Allen.	Ascension.	Assumption.	Avoyelles.	Bossier.	Caddo.	Calcasieu.	Cameron.
	LAND AREA.										
1	Approximate land area of the state or parish ... acres	29,061,760	414,080	424,320	186,240	309,760	542,080	552,320	563,200	695,040	960,640
2	All land in operating drainage enterprises ... acres	2,266,328	159,000	12,500	94,500	53,500	55,509	20,000	100,000	101,930	45,587
3	Improved land ... acres	1,269,391	154,000	12,500	56,100	20,625	35,228	12,000	75,000	62,601	21,025
4	Per cent of all improved land in farms	22.6	55.2	29.5	77.3	38.3	23.9	8.0	46.8	60.1	63.2
5	Timber and cut-over land ... acres	467,822	5,000	...	38,400	31,675	20,281	6,000	25,000	6,909	...
6	Other unimproved land ... acres	529,115	...	...	...	1,200	...	2,000	...	32,420	24,562
7	Swampy or subject to overflow, in enterprises ... acres	569,189	31,500	...	6,300	32,700	2,700	2,000	25,000	4,800	16,749
8	Suffering loss of crops from defective drainage ... acres	198,935	3,500	...	...	150	2,700	2,000	25,000	9,600	4,962
9	Assessed acreage	2,342,034	159,000	12,500	94,500	53,500	55,509	20,000	100,000	101,930	45,587
10	Excess over all land in operating enterprises ... acres	75,706	...	...	...	...	...	...	...	...	...
	DRAINAGE WORKS.										
	Open ditches:										
11	Completed ... miles	1,771.6	147.0	15.0	61.5	19.0	9.9	2.5	22.0	92.5	30.1
12	Additional under construction ... miles	162.7	36.0	...	0.5	...	5.6	...	...	23.5	7.7
13	Maximum completed in any enterprise ... miles	100.0	50.0	15.0	30.0	11.5	4.0	2.5	22.0	42.0	20.0
14	Maximum width at bottom of ditch[1] ... feet	100	32	29	40	75	20	10	78	50	25
15	Maximum of average depths of outlet ditches[1] ... feet	30.0	10.0	6.0	15.0	12.0	8.0	15.0	12.0	8.0	6.0
16	Mean depth of branch ditches[1] ... feet	5.1	4.4	3.0	6.1	...	3.0	3.0	...	4.3	5.0
	Tile drains:										
17	Completed ... miles	0.2	...	...	...	0.2	...	...	...	...	...
18	Additional under construction ... miles	...	...	...	...	...	...	...	...	...	...
19	Maximum completed in any enterprise ... miles	0.2	...	...	...	0.2	...	...	...	...	...
20	Maximum size of tile[1] ... inches	40	...	...	...	40	...	...	...	...	...
	Accessory levees and dikes:										
21	Completed ... miles	440.7	...	...	...	...	...	...	78.0	...	21.0
22	Additional under construction ... miles	65.9	...	...	...	...	...	...	24.0	...	2.0
	Pumping plants:										
23	Engine capacity ... horsepower	7,665	...	...	...	...	...	...	...	...	25
24	Pump capacity ... gallons per minute	5,245,150	...	...	...	...	...	...	...	...	3,000
25	Area served by pumps ... acres	140,809	...	...	...	...	...	...	...	...	200
26	Area drained by open ditches only[1] ... acres	1,913,870	159,000	12,500	94,500	53,000	55,509	20,000	...	101,930	25,867
27	Length of these ditches ... miles	1,366.4	183.0	15.0	62.0	18.5	15.5	2.5	...	116.0	18.0
28	Average length per acre ... feet	3.8	6.1	6.3	3.5	1.8	1.5	0.7	...	6.0	3.3
29	Area having open ditches and levees[1] ... acres	351,958	...	...	...	...	...	...	100,000	...	19,720
30	Length of these ditches ... miles	567.4	...	...	...	...	...	...	22.0	...	21.8
31	Average length per acre ... feet	8.5	...	...	...	...	...	...	1.2	...	5.8
32	Length of the accessory levees ... miles	506.6	...	...	...	...	...	...	102.0	...	23.0
33	Area drained by open ditches and tile[1] ... acres	500	...	...	...	500	...	...	...	...	...
34	Length of these drains ... miles	0.7	...	...	...	0.7	...	...	...	...	...
35	Average length per acre ... feet	7.4	...	...	...	7.4	...	...	...	...	...
	DEVELOPMENT OF LAND.										
36	Improved land in operating enterprises, 1920 ... acres	1,269,391	154,000	12,500	56,100	20,625	35,228	12,000	75,000	62,601	21,025
37	Improved land prior to drainage ... acres	936,902	154,000	12,500	49,200	19,575	17,307	1,000	30,000	30,181	5,505
38	Increase since drainage ... acres	332,489	...	...	6,900	1,050	17,921	11,000	45,000	32,420	15,520
39	Per cent of increase[2]	35.5	...	...	14.0	5.4	103.5	...	150.0	107.4	281.9
40	Per cent increase is of all improved land in farms, 1920	5.9	...	...	9.5	1.9	12.2	7.3	28.1	31.1	46.7
41	Timber and cut-over land, 1920 ... acres	467,822	5,000	...	38,400	31,675	20,281	6,000	25,000	6,909	...
42	Timber and cut-over land prior to drainage ... acres	580,418	5,000	...	45,300	31,925	38,202	9,000	70,000	6,909	...
43	Decrease since drainage ... acres	112,596	...	...	6,900	250	17,921	3,000	45,000	...	...
44	Per cent of decrease	19.4	...	...	15.2	0.8	46.9	33.3	64.3	...	...
45	Other unimproved land, 1920 ... acres	529,115	...	...	...	1,200	...	2,000	...	32,420	24,562
46	Other unimproved land prior to drainage ... acres	749,008	...	...	...	2,000	...	10,000	...	64,840	40,082
47	Decrease since drainage ... acres	219,893	...	...	...	800	...	8,000	...	32,420	15,520
48	Per cent of decrease	29.4	...	...	...	40.0	...	80.0	...	50.0	38.7
49	Swampy or subject to overflow, 1920 ... acres	569,189	31,500	...	6,300	32,700	2,700	2,000	25,000	4,800	16,749
50	Swampy or subject to overflow prior to drainage ... acres	1,278,995	123,000	12,000	45,300	39,500	55,509	15,000	70,000	16,593	26,482
51	Decrease since drainage ... acres	709,806	91,500	12,000	39,000	6,800	52,809	13,000	45,000	11,793	9,733
52	Per cent of decrease	55.5	74.4	100.0	86.1	17.2	95.1	86.7	64.3	71.1	36.8
	CAPITAL INVESTED AND COST PER ACRE.										
53	Total capital invested in and required for completion of operating enterprises ... dollars	9,990,788	388,000	80,000	357,740	99,800	71,500	12,000	360,949	260,000	203,000
54	Capital invested in these enterprises to Dec. 31, 1919 ... dollars	9,021,991	379,500	80,000	346,740	99,800	56,500	12,000	290,949	197,500	88,000
55	Additional capital required to complete these enterprises ... dollars	968,797	8,500	...	11,000	...	15,000	...	70,000	62,500	115,000
56	Average cost per acre when completed ... dollars	4.41	2.44	6.40	3.79	1.87	1.29	0.60	3.61	2.55	4.45
57	Enterprises constructing open ditches only ... dollars	4,868,251	388,000	80,000	357,740	96,800	71,500	12,000	...	260,000	160,000
58	Average cost per acre when completed ... dollars	2.54	2.44	6.40	3.79	1.83	1.29	0.60	...	2.55	6.19
59	Enterprises constructing open ditches and levees ... dollars	5,119,537	...	...	...	...	...	...	360,949	...	43,000
60	Average cost per acre when completed ... dollars	14.55	...	...	...	...	...	...	3.61	...	2.18
61	Enterprises constructing open ditches and tile drains ... dollars	3,000	...	...	...	3,000	...	...	...	...	...
62	Average cost per acre when completed ... dollars	6.00	...	...	...	6.00	...	...	...	...	...
	CROPS.										
	Improved land in enterprises reporting—										
63	Sugar cane as principal crop on drained land ... acres	466,273	...	...	5,700	20,625	...	...	...	...	...
64	Rice as principal crop on drained land ... acres	446,130	154,000	12,500	1,500	...	...	...	...	62,601	6,158
65	Cotton as principal crop on drained land ... acres	241,430	...	...	30,000	...	35,228	12,000	75,000	...	14,867
66	Corn as principal crop on drained land ... acres	103,008	...	...	18,900	...	...	...	...	...	...
67	Vegetables as principal crop on drained land ... acres	6,341	...	...	...	...	...	...	...	...	...
68	Other crops as principal ones on drained land ... acres	5,609	...	...	...	...	...	...	...	...	...

[1] When works under construction have been completed.

[2] Per cent not shown when more than 1,000.

PARISH TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		East Baton Rouge.	Evangeline.	Iberia.	Iberville.	Jefferson.	Jefferson Davis.	La Salle.	Lafayette.	Lafourche.	Madison.	Morehouse.
	LAND AREA.											
1	Approximate land area of the parish.....acres..	291,200	616,960	376,960	373,760	274,560	466,560	409,600	178,560	636,160	416,000	531,840
2	All land in operating drainage enterprises.....acres..	28,508	9,100	121,990	102,515	29,293	55,020	5,000	77,990	51,147	25,000	18,075
3	Improved land.....acres..	9,693	9,100	[1] 87,789	66,836	[1] 8,737	53,472	500	75,490	30,075	12,500	14,460
4	Per cent of all improved land in farms.....	8.9	6.5	92.4	92.3	96.2	23.1	2.7	58.7	28.7	14.3	15.3
5	Timber and cut-over land.....acres..	9,408	.....	.....	18,189	7,569	.....	4,500	.....	6,867	12,500	3,615
6	Other unimproved land.....acres..	9,407	.....	34,201	17,490	12,987	1,548	.....	2,500	14,205	.....	.....
7	Swampy or subject to overflow, in enterprises.....acres..	.....	.....	23,947	26,654	7,638	484	1,250	.....	3,940	6,250	.....
8	Suffering loss of crops from defective drainage.....acres..	.....	2,730	9,137	2,392	2,091	484	50	10,948	.....	3,125	6,336
9	Assessed acreage.....	28,508	9,100	121,990	102,515	29,293	55,020	5,000	77,990	51,147	25,000	18,075
10	Excess over all land in operating enterprises.....acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	DRAINAGE WORKS.											
	Open ditches:											
11	Completed.....miles..	10.0	3.6	72.6	93.4	72.9	90.7	6.4	86.9	89.9	18.5	22.5
12	Additional under construction.....miles..	.....	2.4	.....	4.4	0.8	1.6	1.6	23.1	4.5	.....	.....
13	Maximum completed in any enterprise.....miles..	10.0	3.6	26.0	23.4	20.0	33.0	6.4	30.0	25.0	18.5	22.5
14	Maximum width at bottom of ditch [2].....feet..	8	12	64	100	55	40	8	14	60	10	14
15	Maximum of average depths of outlet ditches [2].....feet..	6.0	20.0	7.0	10.0	9.5	7.0	.....	30.0	13.0	10.0	8.0
16	Mean depth of branch ditches [2].....feet..	.....	.....	5.0	6.2	5.7	4.1	.....	5.0	6.4	.....	.....
	Tile drains:											
17	Completed.....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
18	Additional under construction.....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	Maximum completed in any enterprise.....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
20	Maximum size of tile [2].....inches..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Accessory levees and dikes:											
21	Completed.....miles..	.....	.....	.....	9.0	20.6	10.0	.....	.....	86.3	.....	1.0
22	Additional under construction.....miles..	.....	.....	.....	.....	8.4	.....	.....	.....	9.7	.....	.....
	Pumping plants:											
23	Engine capacity.....horsepower..	.....	.....	.....	.....	2,120	.....	.....	.....	2,040	.....	.....
24	Pump capacity.....gallons per minute..	.....	.....	.....	.....	945,000	.....	.....	.....	1,713,400	.....	.....
25	Area served by pumps.....acres..	.....	.....	.....	.....	21,045	.....	.....	.....	23,873	.....	.....
26	Area drained by open ditches only [2].....acres..	28,508	9,100	121,990	86,502	8,248	45,340	5,000	77,990	27,274	25,000	.....
27	Length of these ditches.....miles..	10.0	6.0	72.6	86.8	11.0	78.3	8.0	110.0	22.5	18.5	.....
28	Average length per acre.....feet..	1.9	3.5	3.1	5.3	7.0	9.1	8.4	7.4	4.4	3.9	.....
29	Area having open ditches and levees [2].....acres..	.....	.....	.....	16,013	21,045	9,680	.....	.....	23,873	.....	18,075
30	Length of these ditches.....miles..	.....	.....	.....	11.0	62.7	14.0	.....	.....	71.9	.....	22.5
31	Average length per acre.....feet..	.....	.....	.....	3.6	15.7	7.6	.....	.....	15.9	.....	6.6
32	Length of the accessory levees.....miles..	.....	.....	.....	9.0	29.0	10.0	.....	.....	96.0	.....	1.0
33	Area drained by open ditches and tile [2].....acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
34	Length of these drains.....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
35	Average length per acre.....feet..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.											
36	Improved land in operating enterprises, 1920.....acres..	9,693	9,100	[1] 87,789	66,836	[1] 8,737	53,472	500	75,490	30,075	12,500	14,460
37	Improved land prior to drainage.....acres..	9,693	1,820	84,954	65,637	4,572	.....	500	67,691	6,818	12,500	14,460
38	Increase since drainage.....acres..	.....	7,280	2,835	1,199	4,165	53,472	.....	7,799	23,257	.....	.....
39	Per cent of increase.....	.....	400.0	3.3	1.8	91.1	.....	.....	11.5	341.1	.....	.....
40	Per cent increase is of all improved land in farms, 1920.	.....	5.2	3.0	1.6	45.8	23.1	.....	6.1	22.2	.....	.....
41	Timber and cut-over land, 1920.....acres..	9,408	.....	.....	18,189	7,569	.....	4,500	.....	6,867	12,500	3,615
42	Timber and cut-over land prior to drainage.....acres..	9,408	.....	.....	19,388	7,569	.....	4,500	1,149	10,541	12,500	3,615
43	Decrease since drainage.....acres..	.....	.....	.....	1,199	.....	.....	.....	1,149	3,674	.....	.....
44	Per cent of decrease.....	.....	.....	.....	6.2	.....	.....	.....	100.0	34.9	.....	.....
45	Other unimproved land, 1920.....acres..	9,407	.....	34,201	17,490	12,987	1,548	.....	2,500	14,205	.....	.....
46	Other unimproved land prior to drainage.....acres..	9,407	7,280	37,036	17,490	17,152	55,020	.....	9,150	33,788	.....	.....
47	Decrease since drainage.....acres..	.....	7,280	2,835	.....	4,165	53,472	.....	6,650	19,583	.....	.....
48	Per cent of decrease.....	.....	100.0	7.7	.....	24.3	97.2	.....	72.7	58.0	.....	.....
49	Swampy or subject to overflow, 1920.....acres..	.....	.....	23,947	26,654	7,638	484	1,250	.....	3,940	6,250	.....
50	Swampy or subject to overflow prior to drainage.....acres..	9,408	7,280	27,597	32,899	14,945	22,201	1,250	39,990	44,065	12,500	3,615
51	Decrease since drainage.....acres..	9,408	7,280	3,650	6,245	7,307	21,717	.....	39,990	40,125	6,250	3,615
52	Per cent of decrease.....	100.0	100.0	13.2	19.0	48.9	97.8	.....	100.0	91.1	50.0	100.0
	CAPITAL INVESTED AND COST PER ACRE.											
53	Total capital invested in and required for completion of operating enterprises.....dollars..	20,000	18,000	150,375	464,974	595,400	257,820	3,100	141,500	1,162,077	40,000	35,000
54	Capital invested in these enterprises to Dec. 31, 1919.....dollars..	20,000	10,000	150,375	447,070	524,100	253,820	2,500	107,000	1,087,077	40,000	35,000
55	Additional capital required to complete these enterprises.....dollars..	.....	8,000	.....	17,904	71,300	4,000	600	34,500	75,000	.....	.....
56	Average cost per acre when completed.....dollars..	0.70	1.98	1.23	4.54	20.33	4.69	0.62	1.81	22.72	1.60	1.94
57	Enterprises constructing open ditches only.....dollars..	20,000	18,000	150,375	409,974	58,000	161,000	3,100	141,500	171,577	40,000	.....
58	Average cost per acre when completed.....dollars..	0.70	1.98	1.23	4.74	7.03	3.55	0.62	1.81	6.29	1.60	.....
59	Enterprises constructing open ditches and levees....dollars..	.....	.....	.....	55,000	537,400	96,820	.....	.....	990,500	.....	35,000
60	Average cost per acre when completed.....dollars..	.....	.....	.....	3.43	25.54	10.00	.....	.....	41.49	.....	1.94
61	Enterprises constructing open ditches and tile drains..dollars..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
62	Average cost per acre when completed.....dollars..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	CROPS.											
	Improved land in enterprises reporting—											
63	Sugar cane as principal crop on drained land.....acres..	.....	.....	87,789	57,722	4,019	.....	.....	22,990	.....	.....	.....
64	Rice as principal crop on drained land.....acres..	.....	9,100	.....	9,114	.....	53,472	.....	22,500	.....	.....	.....
65	Cotton as principal crop on drained land.....acres..	.....	.....	.....	.....	.....	.....	500	.....	.....	12,500	14,460
66	Corn as principal crop on drained land.....acres..	9,693	.....	.....	.....	3,320	.....	.....	30,000	30,075	.....	.....
67	Vegetables as principal crop on drained land.....acres..	.....	.....	.....	.....	1,398	.....	.....	.....	.....	.....	.....
68	Other crops as principal ones on drained land.....acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Estimated.

[2] When works under construction have been completed.

PARISH TABLE II.—OPERATING DRAINAGE ENTERPRISES: 1920—Continued.

		Plaquemines.	Pointe Coupee.	Rapides.	St. Bernard.	St. Charles.	St. James.	St. Mary.	Terrebonne.	Vermilion.	West Baton Rouge.	Other parishes.[1]
	LAND AREA.											
1	Approximate land area of the parish.....acres..	647,040	368,640	876,800	397,440	188,800	162,560	404,480	1,126,400	776,320	136,960	693,760
2	All land in operating drainage enterprises.....acres..	21,839	173,880	4,136	222,200	13,420	74,000	58,615	35,400	338,771	136,960	20,943
3	Improved land.....acres..	14,999	96,522	3,309	[2] 3,510	11,164	22,200	42,363	26,550	[2] 186,912	[2] 38,337	[2] 5,794
4	Per cent of all improved land in farms.....	66.9	80.1	2.9	91.5	45.1	55.9	59.9	46.7	93.0	100.0	26.3
5	Timber and cut-over land.....acres..	5,985	77,358	827	1,655	751	51,800	4,055	8,850	17,231	98,623	4,774
6	Other unimproved land.....acres..	855	.....	.....	217,035	1,505	.....	12,197	.....	134,628	.....	10,375
7	Swampy or subject to overflow, in enterprises.....acres..	855	32,013	827	176,330	1,505	51,800	12,197	.....	44,391	54,784	2,575
8	Suffering loss of crops from defective drainage.....acres..	.....	20,902	.....	34,240	.....	.....	540	.....	57,923	.....	125
9	Assessed acreage.....	21,839	173,880	4,136	222,200	13,420	74,000	58,615	41,500	341,177	204,160	20,943
10	Excess over all land in operating enterprises.....acres..	.....	.....	.....	.....	.....	.....	.....	6,100	2,406	67,200	.....
	DRAINAGE WORKS.											
	Open ditches:											
11	Completed.....miles..	82.5	42.0	6.0	98.8	45.3	19.0	71.0	35.0	313.5	45.2	46.4
12	Additional under construction.....miles..	3.1	.....	.....	8.0	.....	.....	.....	.....	32.6	3.0	4.3
13	Maximum completed in any enterprise.....miles..	57.0	24.0	6.0	72.0	35.0	19.0	30.0	14.0	100.0	17.0	21.5
14	Maximum width at bottom of ditch [3].....feet..	55	50	24	80	40	40	60	45	40	80	55
15	Maximum of average depths of outlet ditches[3].....feet..	9.5	7.0	5.0	13.5	8.0	8.0	8.0	8.0	12.0	10.0	12.0
16	Mean depth of branch ditches [3].....feet..	6.0	4.0	.....	7.0	8.0	.....	4.1	4.0	4.7	6.0	8.0
	Tile drains:											
17	Completed.....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
18	Additional under construction.....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	Maximum completed in any enterprise.....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
20	Maximum size of tile [3].....inches..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Accessory levees and dikes:											
21	Completed.....miles..	8.8	.....	.....	22.9	20.5	.....	30.0	7.6	101.0	.....	24.0
22	Additional under construction.....miles..	5.0	.....	.....	.....	6.5	.....	.....	1.3	9.0	.....	.....
	Pumping plants:											
23	Engine capacity.....horsepower..	345	.....	.....	150	600	.....	860	125	525	.....	875
24	Pump capacity.....gallons per minute..	136,250	.....	.....	206,800	434,000	.....	1,230,000	84,000	272,500	.....	220,200
25	Area served by pumps.....acres..	21,839	.....	.....	5,000	13,420	.....	20,725	4,200	11,564	.....	18,943
26	Area drained by open ditches only [3].....acres..	1,770	173,880	4,136	214,000	.....	74,000	28,790	35,400	276,176	136,960	11,500
27	Length of these ditches.....miles..	57.0	42.0	6.0	80.0	.....	19.0	18.0	26.0	205.8	48.2	12.2
28	Average length per acre.....feet..	170.0	1.3	7.7	2.0	.....	1.4	3.3	3.9	3.9	1.9	5.6
29	Area having open ditches and levees [3].....acres..	20,069	.....	.....	8,200	13,420	.....	29,825	(4)	62,595	.....	9,443
30	Length of these ditches.....miles..	28.6	.....	.....	26.8	45.3	.....	53.0	9.0	140.3	.....	38.5
31	Average length per acre.....feet..	7.5	.....	.....	17.3	17.8	.....	9.4	.....	11.8	.....	21.5
32	Length of the accessory levees.....miles..	13.8	.....	.....	22.9	27.0	.....	30.0	8.9	110.0	.....	24.0
33	Area drained by open ditches and tile [3].....acres..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
34	Length of these drains.....miles..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
35	Average length per acre.....feet..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	DEVELOPMENT OF LAND.											
36	Improved land in operating enterprises, 1920.....acres..	14,999	96,522	3,309	[2] 3,510	11,164	22,200	42,363	26,550	[2] 186,912	[2] 38,337	[2] 5,794
37	Improved land prior to drainage.....acres..	8,125	73,677	3,102	3,510	215	22,200	35,077	17,700	146,291	34,492	4,600
38	Increase since drainage.....acres..	6,874	22,845	207	.....	10,949	.....	7,286	8,850	40,621	3,845	1,194
39	Per cent of increase[5].....	84.6	31.0	6.7	.....	.....	.....	20.8	50.0	27.8	11.1	26.0
40	Per cent increase is of all improved land in farms, 1920.	30.7	19.0	0.2	.....	44.3	.....	10.3	15.6	20.2	10.0	5.4
41	Timber and cut-over land, 1920.....acres..	5,985	77,358	827	1,655	751	51,800	4,055	8,850	17,231	98,623	4,774
42	Timber and cut-over land prior to drainage.....acres..	5,985	100,203	1,034	1,655	751	51,800	6,314	8,850	20,938	102,468	5,414
43	Decrease since drainage.....acres..	.....	22,845	207	.....	.....	.....	2,259	.....	3,707	3,845	640
44	Per cent of decrease.....	.....	22.8	20.0	.....	.....	.....	35.8	.....	17.7	3.8	11.8
45	Other unimproved land, 1920.....acres..	855	.....	.....	217,035	1,505	.....	12,197	.....	134,628	.....	10,375
46	Other unimproved land prior to drainage.....acres..	7,729	.....	.....	217,035	12,454	.....	17,224	8,850	171,542	.....	10,929
47	Decrease since drainage.....acres..	6,874	.....	.....	.....	10,949	.....	5,027	8,850	36,914	.....	554
48	Per cent of decrease.....	88.9	.....	.....	.....	87.9	.....	29.2	100.0	21.5	.....	5.1
49	Swampy or subject to overflow, 1920.....acres..	855	32,013	827	176,330	1,505	51,800	12,197	.....	44,391	54,784	2,575
50	Swampy or subject to overflow prior to drainage.....acres..	14,854	100,203	1,034	178,030	12,454	51,800	22,938	8,850	177,511	75,328	16,869
51	Decrease since drainage.....acres..	13,999	68,190	207	1,700	10,949	.....	10,741	8,850	133,120	20,544	14,284
52	Per cent of decrease.....	94.2	68.1	20.0	1.0	87.9	.....	46.8	100.0	75.0	27.3	84.7
	CAPITAL INVESTED AND COST PER ACRE.											
53	Total capital invested in and required for completion of operating enterprises.....dollars..	530,550	167,000	12,500	1,207,380	465,438	76,960	756,625	205,000	1,158,600	226,750	462,750
54	Capital invested in these enterprises to Dec. 31, 1919 .....dollars..	443,800	167,000	12,500	1,122,380	446,438	76,960	756,625	192,225	958,082	213,750	404,300
55	Additional capital required to complete these enterprises.....dollars..	86,750	.....	.....	85,000	19,000	.....	.....	12,775	200,518	13,000	58,450
56	Average cost per acre when completed.....dollars..	24.29	0.96	3.02	5.43	34.68	1.04	12.91	5.79	3.42	1.66	22.10
57	Enterprises constructing open ditches only.....dollars..	65,000	167,000	12,500	885,000	.....	76,960	126,625	65,000	476,100	226,750	167,750
58	Average cost per acre when completed.....dollars..	36.72	0.96	3.02	4.14	.....	1.04	4.40	1.84	1.72	1.66	14.59
59	Enterprises constructing open ditches and levees.....dollars..	465,550	.....	.....	322,380	465,438	.....	630,000	140,000	682,500	.....	295,000
60	Average cost per acre when completed.....dollars..	23.20	.....	.....	39.31	34.68	.....	21.12	.....	10.90	.....	31.24
61	Enterprises constructing open ditches and tile drains.dollars..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
62	Average cost per acre when completed.....dollars..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	CROPS.											
	Improved land in enterprises reporting—											
63	Sugar cane as principal crop on drained land.....acres..	10,260	49,647	.....	2,422	.....	22,200	42,363	26,550	72,896	38,337	2,753
64	Rice as principal crop on drained land.....acres..	669	.....	.....	.....	.....	.....	.....	.....	.....	.....	500
65	Cotton as principal crop on drained land.....acres..	.....	46,875	.....	.....	.....	.....	.....	.....	114,016	.....	.....
66	Corn as principal crop on drained land.....acres..	.....	.....	.....	456	11,164	.....	.....	.....	.....	.....	.....
67	Vegetables as principal crop on drained land.....acres..	1,770	.....	.....	632	.....	.....	.....	.....	.....	.....	.....
68	Other crops as principal ones on drained land.....acres..	2,300	.....	3,309	.....	.....	.....	.....	.....	.....	.....	2,541

[1] Includes only Orleans and St. Tammany Parishes.
[2] Estimated.
[3] When works under construction have been completed.
[4] Included in acreage drained by open ditches only.
[5] Per cent not shown when more than 1,000.

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