APPENDIX

INSTRUCTIONS AND SCHEDULES
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For the purpose of making inquiries with regard to irrigation and drainage of lands for agriculture in connection with the Fourteenth Decennial Census of the United States, as provided by the act of Congress approved March 3, 1919, the accompanying instructions were issued for the guidance of special agents and enumerators. These instructions relate in particular to the special schedule for irrigation enterprises and the special schedule for drainage enterprises, copies of which appear herein, and set forth the procedure which was followed in obtaining reports of irrigation and drainage enterprises on these schedules.

The data relating to irrigated crops, as well as certain information concerning drainage, were obtained on the general farm schedule by the census enumerators. The instructions pertaining to irrigation and drainage which were used in connection with the general farm schedule, together with the inquiries concerning these subjects as they appeared on the schedule, are also shown herein.

INSTRUCTIONS TO SPECIAL AGENTS.

[Note—These instructions were not on the schedules themselves but in a separate pamphlet.]

GENERAL INSTRUCTIONS.

Supervision.—The inquiries regarding irrigation and drainage are a part of the Census of Agriculture and therefore under the general supervision of the Chief Statistician for Agriculture.

To whom special agents doing field work should report.—In sections where both irrigation and drainage are practiced, the same field agents will canvass both irrigation and drainage enterprises. All special agents doing field work on irrigation or drainage will report to the Chief Statistician for Agriculture. If for any reason arising during the canvass any other arrangement shall become necessary in any individual case, the special agent in the field will be given instructions by the Chief Statistician for Agriculture.

Obligation to secrecy.—Special agents engaged in field work, in common with other employees of the Census Bureau, are prohibited by law from communicating to anyone, without authority of the Director of the Census, any information coming into their possession by reason of their employment in the Census Bureau. Attention is called to the penal provision of the Census act.

Answers to inquiries to be based upon records.—Agents may occasionally find a disposition on the part of persons furnishing information to give general statements or estimates. In no case should such estimates be accepted when it is possible to secure more exact information directly from records. It is not expected that special agents will spend much time in compiling figures from the records of independent enterprises, but they should try to get from the officials of enterprises exact information based on records, rather than general statements. In many cases, particularly with small enterprises, full records do not exist; in such cases, of course, estimates should be accepted.

In cases where one public officer has the records for a large number of enterprises, the special agent should assist as far as practicable in securing the data from the books or other records.

Date to which information should relate.—Where inquiries are made with regard to present conditions, the information given should represent conditions on January 1, 1920, rather than on the (later) date when the schedule is filled out.

General reports.—Before completing his work each special agent should prepare a brief report on conditions within the territory covered by him, showing in a general way, not in detail, the opportunities for further reclamation of land by irrigation or drainage, or both; attempts which have been made to bring about such reclamation; and proposed plans for reclamation. It is not expected that special agents will make extensive studies as a basis for these reports, but they should keep the matter in mind during their work and make notes as information of the kind desired comes to their notice. These reports are not intended for publication, but for use in discussing the results of the definite data collected.

Mapping of irrigated areas.—Agents will be furnished with maps of their districts. These maps have been subdivided sufficiently to permit of indicating 40-acre tracts, and in some cases smaller tracts. When enumerating a farm on which irrigation is practiced agents should locate the ground on the map, and block in with pencil the land irrigated. This should be attended to when the farm is enumerated.

THE CENSUS OF IRRIGATION.

Data from general farm schedules.—The acreage of farm land irrigated and the data regarding irrigated crops, as well as the acreage supplied with artificial drainage, are to be obtained on the general farm schedule by the census enumerators. The general farm schedule also calls for the name of the irrigation enterprise supplying water (Inquiry 56) and for the name of the company, district, etc., affording drainage (Inquiry 23).

Special schedule for irrigation enterprises.—A special irrigation schedule is to be obtained for each irrigation enterprise, whether it supplies water for a single farm or for many farms. Schedules are not to be returned, however, for small plants used for watering lawns or home gardens. Note that while the unit for the general farm schedule is the individual farm, the unit for the special irrigation schedule is the enterprise or organization supplying water for irrigation. Schedules should be returned for enterprises which have been organized and have begun work, although no land is yet irrigated; or in case the enterprise is a going concern with plans for proceeding with construction, even if construction has not yet begun. In such cases answer the questions which apply, and explain the facts in some blank space or on the margin of the schedule.

Drainage schedules to be secured in connection with irrigation census. As indicated above, special agents engaged primarily in work on the irrigation census in the arid and semiarid regions will be expected also to secure drainage schedules for all drainage enterprises in their respective territories.

How special schedules are to be secured. Most of the irrigation schedules for large enterprises will be secured by special agents, as indicated below. Irrigation schedules for enterprises supplying less than five farms, however, are to be obtained by enumerators at the same time that they secure the population and general farm schedules.

In enumeration districts which are difficult of access and in which most of the enterprises are small, even though some may supply more than four farms, the enumerator will be instructed to get schedules for all enterprises regardless of size.

Special agents assigned to supervisors' districts. A special agent will be stationed in each supervisor's district in which irrigation is extensively practiced. It will be the duty of such special agent to instruct the enumerators in his district with regard to the irrigation schedule, to check over the irrigation schedules turned in by the enumerators, to return these schedules to the enumerators for correction when necessary, and to make additions to the lists of irrigation and drainage enterprises sent him from Washington by comparing them with the names of the irrigation and drainage en-
Duplicate schedules.—Special agents stationed in supervisors' districts should check carefully the names of farmers reported on irrigation schedules filed in by the farmers, as well as the names of the enterprises, to see that only one schedule is turned in for any canal supplying water for more than one farm. If duplicates are discovered, that fact should be brought to the attention of the supervisor, in order that he may take it into consideration in computing the pay of the enumerators turning in the duplicates.

Schedules to be obtained by special agents.—The special agents are to keep enterprise schedules for all general farms under their inspection for purposes of comparison with his list of irrigation and drainage enterprises at such times and in such manner as may be agreeable to the supervisor. If there is any difficulty in making satisfactory arrangements, the matter should be referred to the Chief Statistician for Agriculture, at Washington.

Lists of irrigation enterprises.—The special agent in each supervisor's district will be supplied with lists of irrigation enterprises in his district, made up from the returns of the last preceding census, and from other available sources of information. A typewritten list is provided for the agent's use as a permanent record, and a card list, containing the same names, to be returned to Washington card by card, with the schedules as they are secured. These lists may not be complete, and they will probably contain names of enterprises which are now inactive or have changed hands since the last census.

For the purpose of completing and correcting the lists, an inquiry has been placed on the general farm schedule calling for the name of the enterprise supplying water for irrigation, in case a farm, or any part of it, is irrigated.

Lists to be checked with general farm schedules.—The first duty of the special agent will be to examine all the general farm schedules and the information received from the enterprise by the enumerator to check against his list the names of enterprises reported under Inquiry 60 on these schedules; and to add to the list the names of any such enterprises which it does not already contain. New names and corrections should be promptly reported to the Washington office on the daily report card, or on a memorandum attached thereto.

Additional names to be placed on lists.—The names of all enterprises which are to be added to the list should be inserted in their proper alphabetical places, and should be provided with the number, or numbers in brackets, 5, 5, etc., to the last preceding number. Thus, two new names inserted between No. 10 and No. 17 would be numbered 10a and 10b, respectively.

Where the irrigation enterprise is reported as “private” in answer to Inquiry 60 on the general farm schedule, the enterprise should be entered on the lists in the name of the farm operator.

Lists of drainage enterprises in irrigation areas.—Lists of drainage enterprises, as well as of irrigation enterprises, will be supplied to special agents in the arid and semiarid regions. The names of drainage enterprises reported under Inquiry 33 on the general farm schedule should be checked against these lists, and the names of any such enterprises not already on the list should be inserted in their proper places and numbered, as already directed for additional irrigation enterprises.

Records of work accomplished.—The lists, as revised, are to be used as a guide in making the canvass, and as irrigation or drainage schedules are received, this fact should be indicated on the cards and on the typewritten lists, with the date of receipt. As the schedules are returned for correction, or forwarded to Washington, the dates of returning or forwarding should also be recorded on the cards and on the typewritten lists. There should be a report of some kind for every enterprise on the list, if the enterprise has ceased to operate, or if it has changed hands, or if there is any other good reason why a schedule should not be obtained, this reason should be clearly stated. When such facts are ascertained they should be entered on the cards and on the typewritten lists and also reported at once to the Chief Statistician for Agriculture, at Washington.

Schedules to be obtained by enumerators.—As stated in these instructions, the enumerators are to secure irrigation schedules for irrigation enterprises supplying water to less than five farms, at the same time that they get general farm schedules from the operators of farms which they visit. It is the duty of the special agents to examine these schedules as they come in from the enumerators; to return them to the enumerators for completion or correction, if necessary; to check them up with the enterprise schedules filed; and to see that all enterprises have been added; to see that the enumerators are making out irrigation schedules in all cases where they should; and to make proper notes of receipt, return, and forwarding of schedules. In general, it will be the duty of the special agent in each supervisor's district to see that the canvass of small enterprises by the enumerators in his district is completed in a satisfactory manner.

The following paragraphs give detailed explanations and instructions relative to the inquiries on the irrigation schedule: Items not specifically referred to in these paragraphs are assumed to be self-explanatory.

Questions requiring additional space.—If the reply to any question on the schedule requires additional space, or needs explanation, use any blank spaces on the schedule (with appropriate reference mark), or, if necessary, attach a separate sheet to the schedule. If an extra sheet is used, it should be numbered and correspond to the inquiries with which it refers, and all explanations relating to one schedule should be written on a single sheet, if possible.

Information concerning management.—The first entry under this inquiry should be the name of the individual or company controlling the enterprise. Then, in case of an enterprise supplying less than five farms, the names of the farmers who are supplied with water should be given on the extra blank line. In the case of enterprises supplying more than five farms, the names and addresses of the farmers supplied by different farms should be given on the extra sheet or sheets, if necessary.

Farms supplied by two or more ditches.—If a farm is supplied by two or more ditches, and the same ditches supply water to other farms, a schedule should be made out for each ditch; but if a farm is supplied with water by more than one ditch and these ditches supply water to other farms, a schedule should be made out for each ditch. If a farm is supplied by water by more than one ditch and these ditches supply water to other farms, a schedule should be made out for each ditch. If a farm is supplied by water by more than one ditch, each ditch should be included on a single schedule, the names of the farmers named, being written on the blank lines under Inquiry 1.

Separate enterprises controlling lateral.—If the lateral directions the water from a main canal are controlled by separate enterprises, rather than by the organization controlling the main canal, a fact should be stated on the blank line under Inquiry 1, or on a separate sheet, but the information regarding the laterals should be included in the enterprise schedule. If the enterprise controls the laterals, the special agent should exercise his best judgment, but, in every case, the facts should be stated in the schedule. In case the water is obtained without duplication, the special agent should report that this is the case.

Inquiry 3. Source of water supply.—If water is secured from more than one source, all should be marked and the principal source indicated by underlining. Similarly, if water is secured from two or more streams or other sources, the names of all should be given.

Stored storm water.—"Stored storm water" refers to reservoirs filled by entering storm water from drainage channels that carry water only during storms, and are not classified as streams. When water is obtained from a reservoir filled from a stream, the source should be given as the source. The other designations are self-explanatory.

Drainage basins.—Under "drainage basin" the name of the smallest stream that is well known and which is shown on ordinary maps is given. It is the basin that the large river system which the valley where the enterprise is located is tributary to. For example, an enterprise in Wyoming or Montana should not be reported as in the Missouri, Colorado, or Columbia drainage basins unless the general drainage basin of some such stream as the Big Horn, Bitter Root, or Green River, or some of their larger tributaries. This inquiry should be answered, even if water is not obtained from a stream.

Inquiry 5. Classification of enterprise.—The classes into which irrigation enterprises are divided for census purposes are defined on the schedule. This is one of the most important classifications to
be made and great care should be exercised to report enterprises correctly, and to explain, in the blank spaces provided for that purpose, in terms of exactness which must be taken
place. This is particularly important in the case of the Carey Act, United States Reclamation Service, and commercial enterprises which have been recognized as irrigation districts or cooperative enterprises.

Public records of irrigation enterprises.—Irrigation districts are organized under public supervision, in most states that of the counties or states, and in some the municipal. All records should be made to some county official. Consequently it is possible to get much of the information regarding districts from county records, and if there is difficulty in getting it from district officials, request the record of the public records of the particular district or enterprise. Carey Act enterprises operate under more or less close supervision of state land boards, and information regarding them can be obtained from state land boards.

Inquiry 4. Water rights.—This inquiry relates to the rights of the enterprise to take water from the stream or other source from which it is obtained. (See note on schedule.) If it does not fall into any of the classes given, state the nature of the right on the blank line. Units of measure for water.—If rights have been defined by a court, a state board, or a state official, the description shall be given by the unit and in which they are defined. Otherwise, to flowing water should be expressed in cubic feet per second, and rights to store water in acre-feet.

Selection of words.—Under "General description of system" should be given such information as will make clear the general character of the water supply and the works for diverting, conveying, storing, or lifting it, and distributing it to the description of any important items of equipment not called for on the schedule should be noted.

Definitions of main and lateral ditches are given in the note at the head of this inquiry. If drainage works have been built either by the organization controlling the irrigation enterprise or by a separate organization, secure a drainage schedule covering the drainage works. Information should be reported here whether the pipes form a part of the main enterprise or not. Inquiries should be extended to these pipes which have been built and controlled by the agency controlling the main enterprise. If the handle lines of more than one size are used, the length of pipe of each size should be given, by writing between the lines on the schedule, or on an extra sheet.

Reservoirs.—If capacity of reservoirs is not known, it should be estimated by multiplying the area of the water surface when reservoir is full, expressed in acres, by the average depth above the level of the bottom of the outlet, expressed in feet.

Wells.—If capacities of dug or pumped wells are not known, agents should get the best estimates possible. In the case of dug wells, capacities should be determined beyond the maximum of the pumps used, and the capacities of the pumps should be given as the capacities of the wells.

Total capacity to be reported.—In every case give the total capacity of the tank, the well, or the pumps, or pumping stations to the enterprise being reported—not the capacity of individual reservoirs, wells, etc.

Kind of power.—Under "Kind of power" state whether power is run by wind, water, steam, electricity, or internal-combustion engines. If electric power is obtained from a power company, report electricity, regardless of how the power is developed.

Windmills.—If windmills are used, under capacity give diameters of wheels rather than horsepower.

Kind of pumps.—Under "Kind of pumps" state whether the pumps are centrifugal, rotary, plunger, or other kind. If some unusual type of pumps or other water-lifting device is used, use the words "unusual type of pumps" or "other water-lifting device." If the pumps have been built or are proprietary to the enterprise, then the enterprise's name should be given.

Average distance.—Under "Average distance" give the average vertical distance between the level of the water in the well or reservoir and the point to which the water is lifted. Do not consider friction and velocity heads or horizontal distances.

Inquiry 6. Lands.—Particular attention should be paid to the nature of the land included in the irrigation district. If the irrigation enterprise controls a canal or reservoir which supplies water to lands covered by other enterprises, this fact should be stated, and the names of the enterprises which have control of the water should be given, but no acreage which is reported by another enterprise should be included. See instructions under Inquiry 1 for treatments of enterprises under which tenants are controlled by separate organization.

Inquiry 7. Total acreage in project only the acreage to which it is definitely planned to supply water should be reported. Possible extensions not yet definitely planned should not be included.

Area irrigated in 1919.—The "Area actually irrigated during 1919" should be limited to land to which water was actually applied during 1919. If the enterprise does not include land which is sometimes irrigated, but which was not watered in 1919, nor land yet cropped and irrigated on farms that are in process of reclamation, if water is supplied to canals rather than directly to the land, and if the names of the canals to which water is supplied should be given.

Land watered from two or more enterprises.—If the same land received water from more than one enterprise, the acreage should be divided among the enterprises approximately in proportion to the quantity of water received from each, except that in case land receives its main supply from a canal and gets additional water from other enterprises the entire acreage should be reported under the enterprise controlling the canal, with a statement that the land receives stored water from the enterprise controlling the reservoir. The total must not in any case exceed the total acreage actually irrigated. Agents need not spend much time in trying to determine exactly the relative amounts of water received from different sources for the purpose of distributing the acreage, but should estimate it roughly from statements of officials of enterprises.

Area which works are capable of irrigating in 1920.—This item should include all land to which the enterprise is ready and able to supply water, whether land is settled or not.

Lands available for settlement covered by this enterprise.—This item should be limited to land for which water is available and which is not already settled. Land already settled should not be included even if it is for sale, unless the holdings are to be subdivided, when only the parts of such holdings that are to be sold for new farms should be reported as available.

If the management of an enterprise is itself farming land pending its settlement, the land should be reported as available for settlement. Price of unimproved lands suitable for agriculture covered by this enterprise.—This item relates strictly to land covered by the enterprise being reported, and not to other land in the vicinity.

Average cost of preparing land for irrigation.—Under this heading should be given the best estimate obtainable from the officials of the enterprise being reported or from farmers operating under the enterprise. Frequently this amount will vary so much from farm to farm that a strictly accurate reply to this inquiry can not be obtained; yet for any enterprise it should be possible to make a fairly representative estimate.

Inquiry 7. Capital invested.—For the purpose of this inquiry, "Capital invested" is defined as "cost," and the original cost plus the cost of extensions and improvements should be reported, if this can be done. If irrigation works have been purchased, then the original purchase price, if it is known, should be determined or estimated; but if this can not be done the purchase price plus the cost of improvements and extensions since the works came into the present ownership should be given, with a note stating that this is what the figures represent. If drainage works have been built, report the cost of these works separately on a drainage schedule.

Irrigation works and equipment.—Under "Irrigation works and equipment" should be reported the cost of dikes, canals, structures, pipe lines, etc., including extensions and permanent improvements; the cost of land and buildings used for measurement and control; the cost of machinery, tools, and work animals used principally for maintenance and operation; and all legal and administrative expenditures connected with geographical description (or acquisition) or with improvements and extensions. Engineering equipment and live stock used principally for other purposes and only incidentally for canal maintenance and operations should be excluded.

Inquiry 8. Water rights.—Under "Water rights" indicate the amount and kind of water owned or leased and held for use in connection with the acquisition of such rights, and if rights have been purchased give the purchase price. If canals or lands have been purchased for the purpose of acquiring water rights, or if the former holder has sold or leased the right by contract, the purchase price should be reported. The amount of water chargeable to the water rights should be estimated and included in capital invested in water rights.

Cost to include value of property given in exchange.—If other property of any kind has been exchanged for either irrigation works or water rights, the fair market value of this property at the time
of the exchange should be included in computing cost. If old canals or their rights have been taken over in exchange for rights in a new enterprise, the value of the rights in the new enterprises given in exchange should be included in the cost.

Cost to include value of owner's labor.—If there are no records of cost, or if the owners have done all or part of the construction, the best estimate of cost obtainable should be reported, including the estimated value of the work done by the owner.

Inquiry 8. Maintenance and operation.—Under this inquiry only the cost of maintenance or repairs, and ordinary cleaning and repairs should be reported. The cost of enlargements, rebuilding of structures, and other permanent improvements, although paid for from current assessments, should not be included here but under "Capital invested," in Inquiry 7.

Inquiry 9. Cost of water to farmers.—This inquiry relates to the prices at which water rights are sold to farmers by the enterprise reported, and to the current charges for water. For enterprises the plans for which do not include the sale of water rights, this inquiry should not be answered.

If there is no charge for water rights, as is sometimes the case, this fact should be stated on the schedule. For such enterprises the rates charged for supplying water should be reported under the inquiries relating to annual charges.

Irrigation districts.—For irrigation districts the average amount of the district bonds issued per acre should be given as the cost of water rights. If this bond issue is not paid equally on all land in the district, the bond issue should be explained. For annual charges in districts, the amount of the levy for operation, maintenance, and general expenses should be given, but interest on the payment of bonds or interest should not be included.

Cooperative companies.—For cooperative companies, most of which are of recent formation, the annual charges per acre will be given. The form, any is for sale, and none is for sale the prevailing estimate of the current value should be given, with the average per acre stated.

Under enterprises of this type current charges usually amount to a form of assessment on stock. In such cases the total of all assessments per share should be given, with an estimate of the average amount per share.

Carey Act enterprises.—Under Carey Act enterprises the prices at which water is sold to farmers by the company are now to be included by the constraining companies should be given. If a Carey Act enterprise has been turned over to the water users organized as a stock company, the prevailing present price of stock and the average per acre should be given.

Reclamation Service enterprises.—For United States Reclamation Service enterprises the cost per acre fixed by the Secretary of the Interior should be given, and if the price has not been fixed this fact should be stated. If a project has been turned over to the water users organized as a stock company, the prevailing estimate of present value of stock and average per acre should be given. If the project is organized as a district, the average amount of bond issues per acre in the project should be reported. If the current charge for water is a fixed rate per unit of capacity or rate of flow, the rate should be stated and the average amount per acre estimated.

Where no specific annual charge is made.—If an enterprise supplies water at rates which can not be considered an annual charge, the rates charged, with an estimate of the average annual charge per acre irrigated, should be given.

Inquiry 10. Quantity of water used in 1915.—The two "Yes or No" questions under this inquiry should be answered for every enterprise, and the length of the irrigation season should be given. The question relating to the actual quantities of water are put in two forms, one only of which need be answered. That is, if average volume is given, it is not necessary also to give total quantity, either for water received by canal or for water delivered to individual irrigators. These alternative forms have been given in order that the officials of enterprises and special agents may not be called on to make computations in the field. If records are kept in some unit other than given on the schedule, report the quantities as found, with explanatory notes. All necessary convensions to a common unit will be made after the schedules reach Washington.

Inquiry 11. Drainage of irrigated land.—Particular attention is called to the note under this inquiry on the schedule, stating that the inquiry relates only to land that has been irrigated, is now irrigated, or is to be irrigated by the enterprise being reported. The "Additional area in need of drainage" and the distribution of this area under the subinquiries will necessarily be estimated. The special agent should make the best estimates possible, based on information furnished him by the officials of the enterprise and by others in the community, and on his observation. He should not attempt to make surveys or extended observations. (See instructions regarding the drainage schedule on the following pages.)

If the drainage work is being done by the organization controlling the irrigation enterprise or by a separate organization, a drainage schedule must be prepared. A drainage schedule must also be prepared for drainage work being done by an individual when the area drained is 500 acres or over.

THE CENSUS OF DRAINAGE.

Scope of the drainage census.—The purpose of the census of drainage is to obtain statistics relating to enterprises or undertakings having for their object the drainage of land for agricultural use.

Definition of drainage.—Drainage of agricultural lands, as defined for census purposes, is the act or process of draining off an excess of water by underground conduits, pipes, or tile, or by open or covered trenches in the surface of the ground for the purpose of improving the condition of the soil and crops. In this connection the area drained does not include land from which water flows without artificial aid into natural water courses; nor does it include land protected from overflow by levees, dikes, embankments, or other structures furnished by the run-off from higher lands, unless some form of drainage works has been constructed on the protected land.

The name of an organization, or even the title of the law under which it was established, is not a reliable guide as to whether it is a drainage enterprise as defined for the purposes of this census; by the character of the works will determine whether a drainage schedule should be made out.

Drainage enterprise.—A drainage enterprise is that area (1) organized in one drainage district, or (3) assessed for the sums public drain, or (3) under corporate or private ownership, drained by works operated or constructed as one undertaking. The term "enterprise" is also used, incidentally, to refer to the organization which has undertaken the drainage work.

Special schedule for drainage enterprises.—A special drainage schedule is to be obtained for each organized drainage enterprise and for each private enterprise drainage 500 acres or more.

Drainage primarily for nonagricultural purposes.—For such an undertaking as one draining marsh lands for mosquito control, a schedule will be made out if the undertaking has drained lands used or usable for agricultural purposes, or lands that will be so usable when the drainage works have been completed in accordance with the plans already adopted and which the enterprise has authority to finance and carry out.

A drainage enterprise may include town or city property, but a city sewer system is not an enterprise to be reported.

Land relieved from excess moisture by diversion drains.—A drainage enterprise may comprise an area relieved by an intercepting or diversion drain that collects water at the border of the area and carries it around instead of across the land to be drained; but an area is not a drainage enterprise if it is merely benefited by terraces or hilled ditches upon the adjoining lands.

Levees and dikes.—Earthen embankments, concrete walls, etc., to protect lands against overflow from streams, floods or other surface waters, are not strictly drainage works, but they are to be counted as such when and only when the enterprise includes both levees and drain (or pumping plant) construction.

Enterprises in more than one county.—Where one enterprise embraces land in more than one county, the part in each county will be reported upon a separate schedule. However, each schedule not only must show to what county the schedule applies, but also must bear the full name of the enterprise with the names of all counties in which any part of the enterprise is located.

Subdistricts.—An area wholly or only partly within an organized drainage district may be organized as a subdistrict in some states. Each such subdistrict should be considered as an enterprise separate from the drainage district in which the subdistrict is situated, and should be reported upon a separate schedule, if the records of the subdistricts have been kept separate from the records of the drainage districts.

The schedule for each enterprise (whether main district or subdistrict) should show the facts regarding that enterprise, and supplementary statements should be made on the schedules or on accompanying sheets, to make perfectly clear the relation between two or more enterprises that are connected.

Reconstruction or extension as separate enterprises.—Where reconstruction or extension of the drainage works has been made at a separate undertaking, it will be reported as a separate enterprise and reported upon a separate schedule, but with notation of the relation to earlier enterprises where there is any overlap. The proper acreage (inquiry 2) and the proper amount of drainage works (inquiries 4, 5, 6, and 7) should be shown for the enterprise schedule, and additional statement should be made to show what
IRRIGATION AND DRAINAGE.

Inquiry 1. Management and location. The name of the enterprise comprising the irrigation system, and also the name and address of the owner, shall be stated on the county or other public records, if the enterprise is a legally organized drain or district, or a corporation; if it is under private ownership, the correct name of the individual, firm, or company shall be stated.

Name of official or other person in control of enterprise. Under the section calling for "Name of individual, company, or other controlling enterprise" should be added: (1) For an enterprise owned by an individual or by a private firm or company, the name of such individual or firm; (2) for an organized drainage district or any other drainage enterprise under local government control, the name and official title of the officer immediately in charge; or, (3) for a cooperative association organized under a general law, both the name of the association and the name of another law or the statute also should be specified. One purpose of this item is to secure the name and address of the official or other person responsible for directing the affairs of the enterprise, from whom authoritative information regarding the enterprise may be obtained.

Location. The location of the enterprise comprising not more than a few square miles should be given in the form of the township, range, and section, number. The sections of the townships should be given, or the general location within the township should otherwise be made clear.

Outlet. The stream used as an outlet is the watercourse or lake into which the water flows from the lower end of the drainage construction or improvement made by the enterprise. If the lake or stream used as an outlet is not shown on any map, the course of the stream into which the water flows next should be stated also.

Map of enterprise. A map of the enterprise should be secured if available, showing the boundaries of the drainage district or other entities comprising the enterprise, the location and extent of the works undertaken, in order that the enterprise may be definitely located upon a map of the county. Care should be taken that the name of the enterprise is clearly marked on the map and the map is not only the map on which it is located, but is not written upon every map, and that each map is securely attached to the proper schedule. A special authorization must be given the map by the Secretary of State under the terms and conditions in which it is located, and is plainly written upon every map, and that each map is securely attached to the proper schedule. A special authorization must be given the map by the Secretary of State under the terms and conditions in which it is located, and is plain upon every map, and that each map is securely attached to the proper schedule.

Year of organization. — The year in which an enterprise was organized will be that of the date establishing the district, in the case of one established by petition, or the date of organization public official. It will be that of organization for an incorporated company. This question refers to the year when the enterprise was first organized, not to the date on which the form of organization may have been changed to conform to a new or more convenient statute.

In some instances the date of organization of a company or district does not represent the date of beginning the drainage undertaking. For example, in an irrigation district organized in 1877, need of drainage may not have become apparent until 1905; then the district made plans and installed a system of drainage under such circumstances both the date of organization of the enterprise and the date of beginning drainage should be stated in answer to the last question under Inquiry 2, thus: "Year in which organization was established 1877; drainage began 1905.

Building and improvements. — The information which is wanted regarding the method of financing is that which will show how funds were raised with which the enterprise was begun, and show the amount of duplication for the different types of improvement undertaken.
issued by the county. Sometimes farm owners have paid their total assessments as soon as the amounts have been determined, the bond issues being reduced accordingly; under such circum-
stances, the unpaid by immediate cash pay-ments and the percentage raised by bond issues should be stated.
The contractor constructing the drains sometimes has to finance the work, and wait for his pay until the assessments have been collected, or he has had to accept warrants that he might sell to get the money with which to pay his debts.

Method of appropriating cost.—While the law usually specifies the basis on which the cost of construction shall be distributed over the lands or property in the district, such as not always the case, and the method actually used should be stated for each enterprise.

Often the assessments of the cost against railroads, county roads, irrigation works, etc., have been made on a basis different from those against the farm lands. The statement here should show, as definitely as possible, just how the amounts assessed against such public utilities were determined.

If a considerable part of the area is assessed on some other basis than to benefits to agriculture, the part so assessed and the basis of such assessments should be stated. If any considerable part of the cost is paid from some other funds than those raised by assessment against the lands benefited, the amount of that part and the sources of those funds should be stated.

Inquiry 4. Type of drainage. — The drainage is partly by gravity and partly by pumping. The volume of water is regulated, but not for all the drainage from all the area. Any device for lifting the water is to be classed as a pump, in this inquiry.

Power.—Where a draining enterprise purchases electricity from a company selling power, electric power should be reported.

Pumps.—Note that the kind of pump called for is the type, as centrifugal, rotary, or reciprocating, not the maker’s name.

Average lift.—The average lift of the pumps is the actual average height from the water level in the sump or fire-hydrant to the point where the water is discharged from the pump, not including friction head or horizontal distance; if the end of the discharge pipe is back of the water level in the main stream or drainage, the lift is the average difference between the water level in the sump and that in the outlet stream.

Area served.—The area served is the maximum area from which water flows to the pumps.

Inquiry 5. Open ditches.—This inquiry refers only to those ditches constructed by or for the enterprise, not including private drains. The dimensions to be given are those of the ditches as constructed, or as last opened if they have been enlarged artificially.

Outlet ditches.—The outlet ditch, in this inquiry, is the main drain installed by the enterprise, and may be either an entirely new ditch or a natural watercourse that the enterprise has enlarged or cleared of obstructions; it is not the “stream used as outlet” mentioned in Inquiry 1.

Branch ditches.—The branch ditches referred to are those which carry the discharge from the individual farm systems to the outlet ditches defined in the preceding paragraphs; they do not include the drains installed by individual farm owners, but only those paid for by the enterprise.

If all the farm drains discharge directly into the outlet ditch, the fact that there are no branch ditches should be stated.

Inquiry 6. Tile drains.—This inquiry, like Inquiry 5, relates only to those drains that are a part of the district system and does not include the private drains. The sizes to be stated are the inside dimensions, not the lengths of the pieces; if the shape is not circular, state the shape and give the principal dimensions.

INSTRUCTIONS TO ENUMERATORS.

Inquiry 7. Levees and dikes.—This inquiry relates only to the embankments constructed by this enterprise to protect its lands from overflow by stream floods or on water from any other source. Levees built by some other agency (e. g., by the Mississippi River Commission) should not be reported, even though lands in this drainage enterprise may have contributed toward the cost.

Inquiry 8. Maintenance.—Under this heading should be shown what provision is made for regular inspection and repair of the drainage works, whether the maintenance work (clean out, repair, etc.) is done by contract or is done by labor employed directly by the enterprise, either regularly or temporarily; whether funds for this work are raised by regular or by special assessments, or by what other method; and what amount and what kinds of machinery, tools, work animals, etc., are owned by the enterprise and used principally for maintenance work. Equipment used principally for other work and only incidentally for maintenance of the drainage works should not be reported.

Inquiry 9. Capital invested.—For the purpose of this inquiry, the capital invested is cost, including all expenditures properly chargeable to this work and paid by the enterprise. If none or all of the works were constructed by an earlier enterprise and purchased by the present enterprise, the original cost should be stated, not the price for which the works were purchased by the present owners. If exact figures are not obtainable, the best possible estimate should be secured.

The cost of the enterprise facilities, expenses for surveys and plans, attorneys’ fees and court costs, land, buildings, machinery, and tools for building, maintaining, and operating the drainage works, labor and other items for constructing and maintaining the works, including supervision and administration. The cost figure wanted is for the drainage undertaking only, and in reporting upon such enterprises as land-development companies, expenditures not properly pertaining to the drainage should be eliminated. Cost of the rights of way may be given at the actual cost, and not at the price of improved land in the district.

Note that the first part of this inquiry relates to the work actually done previous to January 1, 1909, and that the second part asks for the additional expenditure required to carry out the drainage work for which plans have been adopted.

Inquiry 10. Crops.—The principal crops grown on the drained land should be listed in the order of their importance as determined by the acres.

Inquiry 11. Results secured.—The percentage of the area in the drainage enterprise which still suffers from defective drainage should indicate the injury suffered in years of normal rains and floods.

The carefully considered opinion of some one conversant with the conditions is all that is desired. The cause of inadequate drainage need not be considered here, nor whether it is soil or outside the area embraced in the enterprise.

Where the drainage works were under construction or newly completed in 1909, a statement of conditions in that year should be given, supplemented with a brief statement to indicate whether rains or floods were normal in that season or were greater or less than usual.

The two statements regarding the general condition of the lands before drainage and on January 1, 1909, should be as complete as possible, yet definite and concise.

Inquiry 12. Flood protection by outside agencies.—This inquiry relates to works which furnish protection to this drainage enterprise but which were constructed by some outside agency or organization.

Inquiry 50. Irrigation enterprises.—If the water used was supplied by a company, association, or any other organization, you should enter the name of such organization or enterprises on the blank line. If water was supplied by a canal or other works belonging to the owner of the farm, the word “Private” should be written on this line.

The note under this inquiry indicates that an irriga-
tion schedule in certain cases applies only in the arid and semi-arid regions of the West, and enumerators in other sections should ignore this note unless instructed otherwise by the supervising

Inquiry 87. Payments for water.—The total amount of payments for water for the season of 1919 should be given in answering this inquiry. This amount should not include any part of the purchase price for equipment or water rights. If the payment for the use of the water includes the cost of water service to the consumer, the cost of the water alone should be estimated and reported. For individual enterprises there should be reported the cost of pumping, mainte-
nance, cleaning main ditches, and all other items which could economically be charged as a part of the cost of bringing water to the land.
IRRIGATION AND DRAINAGE.

DRAINAGE.

Inquiry 30. Area drained.—Report the acreage which is actually benefited or made of more value for agricultural purposes by artificial drainage. This will often be less than the total area from which water flows to the drains. Do not include land on which only temporary work has been done, such as "holding" the fields or laying out "dry furrows" to hasten the surface flow.

Inquiry 31. Area needing drainage.—Under inquiry 31 report the area of land in the farm not now suitable for crops which could be made available for cultivation by drainage. Report under section 1, "By drainage only," the acreage which needs no clearing or which is merely covered with grass, weeds, or other annual growth, and under section 2, as needing both "drainage and clearing," the acreage which is covered with trees, stumps, or perennial woody shrubs.

The purpose of inquiries 32 and 33 is to establish a complete list of drainage and flood-protection enterprises, such as drainage districts, levee districts, county drains, irrigation districts doing drainage work, and development companies, and to determine the number of farms in each drainage enterprise.

IRRIGATION AND DRAINAGE SECTIONS FROM GENERAL FARM SCHEDULE.

IRRIGATION, JANUARY 1, 1920.

55. If any part of this farm is irrigated, give total number of acres irrigated in 1920. .................................................. (Acres)

56. Name of irrigation enterprise supplying water.

[Enterprise supplying less than 5 farms, secure irrigation schedule]

57. Amount expended in 1920 for irrigation water, exclusive of payment

58. Were any crops grown on this farm in 1920 without irrigation? 

Answer Yes or No)

DRAINAGE, JANUARY 1, 1920.

34. Area of land in this farm which is provided with artificial drainage

35. Additional area of land in this farm which could be made suitable

for crops:

1. By drainage only ........................................... (Acres)

2. By drainage and clearing .................................... (Acres)

36. Has any part of this farm been affected by drainage or protection

against overflow by a drainage or levee district, or by the state,

37. If answer is "Yes," give name of company, district, etc.: 

Answer Yes or No)
**UNITED STATES CENSUS OF IRRIGATION**

**EXTRACT FROM FOURTEENTH CENSUS ACT.**

Section 8 of the act to provide for the Fourth Census includes the following provision:

"Inquiries shall be made as to the quantity of land reclaimed by irrigation and drainage and the crops produced, also as to the location and character of irrigation and drainage enterprises, and the capital invested in such enterprises."

**SAM. L. ROGERS,**
**Director of the Census.**

**DEPARTMENT OF COMMERCE**
**BUREAU OF THE CENSUS**
**SAM. L. ROGERS, DIRECTOR**

**FOURTEENTH CENSUS OF THE UNITED STATES IRRIGATION**

**WILLIAM L. AUSTIN,**
**Chief Statistician for Agriculture.**

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**EXPLANATIONS AND INSTRUCTIONS.**

**Census of Irrigation.**—The plan to be followed in the irrigation census covered by the schedule is to secure one of the schedules for each independent irrigation enterprise, whether it supplies a single farm or many farms. Enumerators are to secure schedules for enterprises supplying less than five farms and should report under Inquiry 6 on the General Farm Schedule the name and address of each enterprise supplying five or more farms operating within their districts. Special apers are to secure schedules for enterprises supplying five or more farms.

**Confidential.**—The information secured in the conduct under all circumstances must be treated as strictly confidential.

**Questions to be answered.**—If exact information is not obtainable in answer to any question, give the best information obtainable, indicating that it is estimated by marking it "est." If any question cannot be answered in the space allotted on the schedule in such a way as to be entirely clear, explain the facts on the margin or on a separate sheet and attach it to the schedule.

**Definition.**—An irrigation enterprise, for the purpose of the census, is a canal or canal system, pumping plant, or reservoir supplying water for irrigation, or any combination of these operated under a single management by either an individual, a partnership, a company, or other organization. If a city, through its water department or the sewage department, makes a business of supplying water for irrigation, it should be reported as an irrigation enterprise, and a schedule should be returned for it. For classification of enterprises see note under Inquiry 3.

**Lands to be cleared as irrigated.**—Land which is flooded during high-water periods should be cleared as irrigated if water is caused to flow over the land by ditches, canals, or otherwise, but should not be cleared as irrigated if the overflow is due to natural causes alone.

1. Information concerning irrigation:
   - Name of canal or enterprise:
   - Name of individual or company controlling enterprise:
   - If supplying more than one farm, give name of farmer (if supplying a single farm, state this fact and give name of district):
   - Post-office address:
   - Location of enterprise:
   - Section:
   - Township:
   - Range:
   - Description of land in acres, feet, square, or square:

2. Source of water supply (indicate class by X):
   - Stream:
   - Pumped well:
   - Flowing well:
   - Lake:
   - Name of stream or other source:
   - Drainage basin:

3. Class of enterprise:—The types of enterprise recognized by the census are as follows:
   - Irrigation districts, which are public corporations established under state laws and empowered to issue bonds to obtain funds for the purchase or construction of irrigation works, and levy and collect taxes for the payment of interest and the payment of the cost of operation and maintenance.
   - Co-operative enterprises, which are controlled by the water users combined in some organized form of cooperation under state laws.
   - Commercial enterprises, which are operated under state laws for the purpose of operating irrigation works.
   - City or sewage disposal enterprises, which are operated under state laws for the purpose of operating irrigation works.

4. Water rights (indicate class by X):
   - Notice filed and posted:
   - Right adjudicated by court:
   - Permit from state:
   - Date and amount of rights:

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*(Over)*
IRRIGATION AND DRAINAGE.

5. Description of works

**Note:** Under “annual maintenance” give the character of the work and the type of labor, equipment, and miscellaneous costs, and describe in detail the cost of labor, equipment, and miscellaneous costs for maintenance and operation, but not water right. If the work is not completed, give estimates required for completion.

### General description of system

- **Capital invested:**  
  - Irrigation works and equipment: $  
  - Maintenance and equipment, including buildings, and land used for irrigation, but not water right: $  
  - If work is not completed, estimate additional investment required for completion: $  
  - Water right: $  

### Maintenance and operation

- **Cost of maintenance and operation in 1918:** $  
- If work was done by others, estimate cost of labor and material: $  

### Cost of water to farmers

- **What is the basis of the charge for water rights?**  
  - By area, by number of hours, or by quantity of water: $  
  - If charges are fixed by public authority, give names of body:  
  - (County commission, courts, railway commission, etc.)  
  - If charge is based on something other than area, give approximate price per acre irrigated: $  
  - If charge is based on something other than area, give approximate average charge per acre served: $  

### Quantity of water used in 1918

- **Was the water measured as it was received by the canal?**  
  - Average volume of water entering the canal during season of 1918 (cubic feet per second):  
  - Total quantity of water entering the canal during season of 1918 (acre-feet):  
  - Length of season during which water was used for irrigation in 1918: From  
  - To  
  - Is water measured as it is delivered to each irrigator?  
  - Average amount of water delivered to all individual irrigators in 1918 (cubic feet per second):  
  - Total quantity of water delivered to irrigators during season of 1918 (acre-feet):  

6. Lands:

- **Note:** If this enterprise supplies water to other enterprises, and not directly to land, as that requiring the service here noted, costs incurred, since the facts on the blank lines below and do not report the acreage here.

- **Number of farms supplied by this enterprise:**  
  - Total acres in project (acre-feet):  
  - Area actually irrigated during 1918 (acre-feet):  
  - (Accompanied by irrigated, not area for which water was available for total number of persons entitled to water.)  
  - Area which the works are capable of irrigating in 1918 (acre-feet):  
  - Lands available for settlement covered by this enterprise (acre-feet):  
  - Price of unimproved lands eligible for agriculture covered by this enterprise, exclusive of water right (per acre): $  
  - Terms of payment and rates of interest:  

7. Capital invested:

- **Average cost of preparing land for irrigation (per acre):** $  
  - (Includes clearing and grading land and building farm ditches and farm irrigation structures.)  

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**Certificate:**

This is to certify that the information contained in this schedule is complete and correct to the best of my knowledge and belief.

(Signature of person furnishing information.)

[Signature and address]