

Special Censuses and Program Sample Surveys

INTRODUCTION

General Information

In addition to the farm enumeration and the census of agricultural services, the 1978 program included the decennial censuses of irrigation organizations and drainage (required by law—see below), a census of horticultural specialties taken with the cooperation of the USDA's Statistical Reporting Service, and several supplementary surveys. These last involved the investigation, as is usual after each census, of particular agricultural subjects, using samples drawn from the in-scope census files; for 1978, they were the sample surveys of farm and ranch irrigation, farm finance, and farm energy use.

Legal Authority

Title 13, United States Code, section 142, paragraph (b) directs that, in conjunction with the regular census of agriculture, censuses of irrigation and drainage be carried out "in 1979, in 1988, and every tenth year beginning after 1988. . . ." Section 193 further provides that the Secretary [of Commerce] "may make surveys and collect such preliminary and supplementary statistics related to the main topic of the census as are necessary to the initiation, taking, or completion thereof."

A major portion of the data for the census of drainage is obtained from the census of governments. The authority to conduct this census is given to the Bureau in section 161 of title 13, which provides for a census of governments in 1957 and in every fifth year thereafter.

Part of the data collected in the census of horticultural specialties was gathered by the Statistical Reporting Service (SRS). Report forms used in the census were designed in close cooperation with SRS, and data from that agency's surveys were incorporated into the census file. Under the provisions of title 13, addresses and individual records obtained by the Bureau of the Census cannot be made available to any agency or individual outside the Bureau, including the SRS, but the confidentiality regulations of the USDA, augmented by the authority of the Secretary of Commerce under section 6 of title 13, do permit the Bureau to have access to some SRS data. Paragraph (a) of section 6 states that the Secretary [of Commerce], "whenever he considers it advisable, may call upon any other department, agency, or establishment of the Federal Government, . . . for information pertinent to the work provided for in this title."

Reference Year and General Procedures

The Bureau requested calendar-year data for the censuses of irrigation organizations (1978) and drainage (1977 and 1978), while the reference year for the census of horticultural specialties and all three of the follow-on surveys was calendar year 1979. All of these data-collection efforts used mailout/mailback procedures supplemented by telephone enumeration. The pre-computer and computer processing of the data generally followed the broad outline of the same phase of the regular census program, but the General Tabulating System (GTS) software package was employed to tabulate the data. The statistics from these supplemental operations were printed and released as part of the 1978 census publication program.

The special censuses and program sample (follow-on) surveys of the 1978 Census of Agriculture are each described in greater detail below.

THE 1978 CENSUS OF IRRIGATION ORGANIZATIONS

Background Information

Introduction—Basic data on land irrigated were requested of farm operators in section 11 of the forms 78-A1(S) and 78-A1(N) used in the census of agriculture. Responses to this section provided some information on land being irrigated, as well as enabled the Bureau of the Census to identify farms employing irrigation for possible sampling in a follow-on survey (see below). Information from earlier censuses, USDA, trade associations, and the like indicated that one-half of the irrigated lands in the United States are supplied with water by a relatively small number of irrigation organizations. In many Western States particularly, agricultural operations are dependent on water supplied by irrigation projects or other irrigation organizations. In order to accurately describe irrigation in the United States, it was considered necessary to collect (1) data from water-supplying organizations that divert, store, and convey water from its source to the farm, as well as (2) on-farm irrigation characteristics.

Historical background—Data on irrigation organizations have been collected since 1910, when a separate census of irrigation "enterprises," or organizations supplying water to farms, was taken as part of the decennial census program. While data on

irrigation of farm lands have been collected in each decennial census of agriculture since 1890 and in the quinquennial census of agriculture starting in 1938, the enumeration of irrigation organizations has been undertaken only on a 10-year basis.

Scope—The census of irrigation organizations derived its data from an enumeration of irrigation organizations in 17 Western States¹ and Louisiana. Two report forms were used to collect data from irrigation organizations: the form 78-A60 for single-drainage-basin enterprises and the 78-A61 for those with operations in more than one basin. For census purposes, an irrigation organization was defined as "... a group of individuals, a company, a governmental district or agency, or an individual that operates facilities to supply irrigation water to two or more farms or ranches" or that stores water for irrigation purposes. Such an "organization" could be either formal and legal, as in a regular business venture, or an informal or cooperative arrangement.

The census covered any business entity, cooperative group, or district that delivered, conveyed, or stored irrigation water, or would normally do so. Report forms *were not* required for lateral ditches or small groups of water users who divided water obtained from, and paid fees directly to, a parent supply company. In such cases, the parent company was to include any such subsidiary or dependent operation in *its* report.

Planning and Preparation

Initial planning—Planning for the 1978 Census of Irrigation Organizations began in December 1976 when Bureau officials contacted the Water Resources Council (WRC). The Council agreed to act as coordinator of irrigation (and drainage) items requested for inclusion in the 1978 census program. The plan was to assemble, from administrative records (primarily from 1969 Census of Irrigation Organizations records and information supplied by State officials), an address list of irrigation organizations in the States covered by the census, and use that list as the universe for a mailout/mailback enumeration.

In February 1977, an interagency committee on the data requirements of the irrigation (organizations) census was formed with the following agencies represented at its first meeting:

- U.S. Department of Agriculture: Economic Research Service (ERS), Statistical Reporting Service (SRS)
- U.S. Department of Commerce: Bureau of the Census, Bureau of Economic Analysis
- U.S. Department of Defense: U.S. Army Corps of Engineers
- U.S. Department of Interior: Bureau of Reclamation (USBR)

The committee held a series of meetings throughout 1977² at which it considered the data requirements in the area of

irrigation organizations and made recommendations to the Bureau on the content of the report forms for this census and the follow-on survey of farm and ranch irrigation, and on the data to be processed and published for the census of drainage (see below).

March 1978 Content Pretest

Development of the report forms—By December 1977, proposed versions of the report forms for single- and multi-basin irrigation organizations had been designed and were submitted to the Office of Management and Budget (OMB) for approval for use in a content pretest in the spring of 1978. Each of the forms, the 77-A60-T1 for single-basin and the 77-A61-T1 for multi-basin organizations, were 21" x 17" sheets of white stock, folded to 10½" x 17". The A60-T1 had shading in blue, while the A61-T1 was shaded in green; both versions had printing in black ink. The content of the forms was similar, except that several sections of the 77-A61-T1 requested data for each basin or State in which the respondent organization had irrigation operations.

Sample selection and mailout—The Bureau decided early that the content pretest for the irrigation organizations survey would be a relatively small-scale activity, but the sample chosen was designed to provide a good geographic cross-section of operations in the States to be covered by the census. About 30 irrigation operations were selected randomly from the preliminary address lists of single-basin operations in 10 States (Arizona, California, Colorado, Idaho, Louisiana, Montana, Nebraska, South Dakota, Texas, and Washington), while approximately a dozen more addresses were chosen, at random, from the preliminary list of multi-basin operations for all the heavy-irrigation States. Pretest packages were assembled at Suitland in early March. Each contained the appropriate report form, a cover letter explaining the purpose of the pretest, a return envelope, an instruction sheet, and the appropriate hydrological unit map (or, in the case of some multi-basin organizations, two or more maps). A total of 332 pretest packages were mailed on March 22, with a requested response date of April 17.

Followup—A single mail followup to the pretest was conducted. By mid-April an overall response rate of 50 percent (including PMR's) had been achieved, and reminder letters were addressed and mailed to nonrespondents (PMR's were not remailed). By the end of April, 216 report forms and 28 PMR's had been received—an overall response rate of approximately 71 percent. A field followup was undertaken to try to determine operators' reactions to the report forms. In the first week of May representatives of the Bureau's Agriculture Division, assisted by members of the U.S. Geological Survey sworn in as temporary census agents, visited approximately 70 irrigation operations, evenly divided between respondents and nonrespondents, to interview the operators. The information from the field followup and analysis of the responses received to the report forms were used by the Agriculture Division to revise the report forms for the census proper.

Finalization of report form design—The Bureau found that operators had little difficulty answering most items, although

¹Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

²The later meetings were attended by representatives of various private and/or non-Federal governmental agencies, as well as officials from the Bureau of Indian Affairs (BIA), various offices and staffs within USDA (in addition to those listed), the U.S. Geological Survey, etc.

considerable use of business records was required. Nevertheless, certain changes in format and content were indicated. The items on the A60 and A61 comparing current acres irrigated, water delivered, etc., to the same kinds of data for the period 1972-1976, or to "normal" quantities, were changed. On both report forms, the format was altered from one asking the respondent to provide a specific percentage estimate of the change to one that provided a set of check-off boxes indicating the approximate degree and the percentage range of changes (e.g., "Much above average (50% or more)," "Above average (20% to 49%)," etc.).

The data item requesting the source of funds for improvements and new construction was deleted from the final design of both report forms.

The Bureau also decided to use two versions of the A60 single-basin report form. The revised standard A60 "blue" form would remain the principal single-basin report form, but an A60A version, identical in content and format to the A60, but with yellow shading instead of blue, was instituted for the enumeration of large single-basin operations. (The color coding was adopted to facilitate manual identification and sorting upon receipt.) A large single-basin operation was defined as any irrigation organization that (1) provided irrigation water for 10,000 acres or more or transferred 100,000 acre feet of water, or (2) exchanged 3,000 acre feet of water with two or more other organizations or 5,000 acre feet of water with one other organization.

Compilation of the Mailing List

Sources—The 1978 Census of Irrigation Organizations was to be primarily a mailout/mailback operation. The two principal sources of addresses for the 1978 census mailing list were the lists of in-scope irrigation organizations and A1 "must" cases from the 1969 Census of Agriculture. The 9-year lapse between the censuses of irrigation organizations meant that these lists were unavoidably out of date, and while they could serve as a starting point and core source, they would have to be extensively supplemented.

The 1977 Census of Governments provided addresses for irrigation and drainage operations run by local and/or State government agencies. The Bureau's contacts and conferences with the Bureaus of Reclamation and Indian Affairs included negotiations for the transfer of lists of addresses of irrigation operations controlled by those agencies for addition to the census mail universe. The USDA Agriculture Stabilization and Conservation Service (ASCS) was also contacted and supplied lists of irrigation organizations from its files.

The Bureau also consulted those offices of the State governments (e.g., State departments of agriculture, water conservation boards, etc.) with an interest in irrigation and/or agriculture for lists of irrigation organizations within each State. (Every State was contacted, but 24 reported no irrigation organizations.³)

³While the principal focus of the census of irrigation organizations was on the 18 "irrigation" States, there were operations listed, and enumerated, in other States as well. The number was very small (e.g., 2 in Arkansas, 17 in Florida, and so on), and the 1969 lists were used as the primary source for addresses for these operations.

Control cards—A control card containing, in both alphanumeric and coded form, name, address, size code, a control number, and the census file number (CFN) was prepared for each organization on each source list used. If available, size data included the number of users served, acres irrigated, and the volume of water conveyed. The cards, approximately 18,000 in all, were used first for a manual match to other source-list control cards to unduplicate the file, and to facilitate transfer of the coded information to address labels.

Assignment of census file numbers—Any irrigation organization that became part of the census address file had a census file number (CFN) assigned to it. Eleven-digit CFN's were generated by computer for each of the "irrigation" States; the first two-digits were the State code, followed by a three-digit county code, a five-digit serial number, and a check digit. Each county (parish in Louisiana) in the 18 "irrigation" States had 200 CFN's reserved for its use, with the numbers assigned to individual operations in each county as each address was added to the mail file for that county.

Preparation of Maps

The census packages sent to the organizations on the Bureau's mailing list included the appropriate State hydrological unit map (HUM—standard maps produced by the U.S. Geological Survey (USGS)) for each operation. The respondent was to use this map as a reference in providing drainage basin identification numbers and other data on the report form. For States (mostly in the East) with very few irrigation organizations, the Bureau purchased the required maps from USGS distribution centers. Over 12,000 maps would have been needed to cover the major irrigation States, but it was determined that partial State HUM's, with attached legends, would suffice in many cases and only about 9,200 complete maps were required. The USGS agreed to prepare the necessary maps and legends, including cutting and folding to Bureau specifications and delivery to the Bureau in November 1978, on a reimbursable basis.

Enumeration

General plan—The enumeration consisted of an initial mailing of report forms and other census materials, followed by a thank you/reminder letter, and three followup mailings to nonrespondents. There was no field followup of delinquent cases, but a telephone followup operation was undertaken. This latter effort was intended to improve the coverage of large, complex nonrespondent cases, but toward the end of the enumeration period significant numbers of small nonrespondent cases were added to the telephone file as well.

Preparations for the initial mailout—The Office of Management and Budget (OMB) approved the final designs for the report forms in August 1978. These, together with the respondents' file copy (A60 or A61 "grey") and the other materials for the initial mailout package (except the maps) were sent to the printers in October. In the meantime, the Bureau made arrangements for the production of the necessary HUM's and finalized the mail address lists.

The mailout materials were delivered to Suitland by the first week in November. The address list of irrigation organizations was keyed to magnetic tape shortly thereafter and the tape then was used for the production of the address labels for the initial mailout. The contents of the mailing packages for both single- and multi-basin organizations were similar in general makeup. Each package assembled contained the appropriate report form, respondent's reference copy of the form (A60 or A61 "grey"), and HUM with legend; a standard form BC-297 return envelope; a transmittal letter (form 78-A63(L1) for single-basin organizations, form 78-A61(L1) for multi-basin organizations, or special letters for organizations operated by the USBIA or the USBR); a form 78-A64(I) reference guide (an 8½-page instruction booklet for completing the report form); and, for USBIA and USBR cases, special instruction sheets. Address labels were applied manually to the census report forms, which then were inserted into the form BC-2107 outgoing envelopes. The mailout was done in the last week of December. The numbers of each type of report form mailed were as follows:

Report forms ¹	No. mailed
Total	12,252
78-A61 ("green") multi-basin report form	² 716
78-A60 ("blue") and 78-A60A ("yellow") single-basin report form	11,536

¹ See app. G for facsimiles.

² Includes 188 USBIA and 105 USBR operations.

Thank you/reminder letters—A combination thank-you and reminder letter, form 78-A70-L1, was sent to addresses on the census list about 3 weeks after the initial mailout, thanking operators who might have completed and returned the report forms and reminding nonrespondents of the requested return date.

Mail followup—Response to the initial mailing was fairly good, with approximately 5,800 completed report forms and nearly 1,300 PMR's received by the requested return date. The first regular followup letter, form 78-A63-L1, was mailed to 5,007 nonrespondent addresses on February 28. By mid-March an overall response rate (including PMR's) of about 67 percent had been achieved, and a second followup letter, form 78-A63-L3, was mailed to 3,988 delinquent cases. The final mail followup, using a form 78-A63-L4 letter requesting prompt response, involved a mailout to 3,588 addresses. By the end of May, the mailout/mailback operation had obtained completed report forms for 8,623 irrigation organizations, while 1,592 PMR's had been received. This yielded an overall mail response rate of approximately 84 percent. The remaining nonresponse cases, a little over 2,000 in all, were referred to the telephone followup unit for resolution.

Telephone followup—Telephone followup for the census of irrigation organizations was done by Agriculture Division personnel in Suitland. In the first week of May 1979, Agriculture Division analysts began making telephone contacts and carrying

out interviews to complete the requisite report forms for very large operations, and by the end of May some 600 cases had been resolved. With the referral of the remaining nonrespondents (about 2,000 in all), the staff began making calls to, and completing report forms for, irrigation organizations of all sizes.

Telephone followup continued through the summer and was closed down at the end of August 1979. At that time only 136 cases in the original census file remained unsatisfied, yielding an overall response rate (including approximately 1,600 PMR's) of 98.8 percent.

Precomputer Processing of the Data

General information—The precomputer processing of the data for irrigation organizations, except for data-keying, was done by Agriculture Division personnel at the Suitland office. The returns from the irrigation organizations had no barcodes, hence check-in and initial sorting was an entirely manual operation. Once the report forms had been edited, they were shipped to Jeffersonville for data-keying and computer processing.

Check-in—Check-in of report forms began in mid-January 1979, when the first responses were received at Suitland. The principal purpose of the check-in procedures was to remove respondent's names and addresses from the follow-up file, so that followup would be done only for nonrespondent cases, and the check-in unit continued its work until the mail enumeration was closed out at the end of May.

The check-in staff handled three primary types of materials, (1) completed report forms; (2) postmaster returns (PMR's); and (3) respondent-originated correspondence. The basic procedures for handling these three types of receipts were as follows:

1. **Completed report forms.** Clerks checked the contents of the return envelopes to ensure that the report form and map were included. The respondent's address and CFN were used to make a hand match to the previously labeled and sorted mailing packages for the first regular mail followup. When the corresponding followup package was located, it was removed from the file. After the first mail followup the manual match to followup packages was repeated. After this check-in procedure, the complete report forms and associated maps were sent to the editing staff for clerical and technical review.
2. **Postmaster returns (PMR's).** PMR's without address corrections were routed to the telephone unit, where calls were made to the appropriate Soil Conservation Service (SCS) office or post office for address corrections. If a new address was obtained, the PMR was sent to the typing unit for readdressing and remailing. If no new address information was obtained, the PMR was marked "No Address Located" and was referred to an analyst for disposition.
3. **Correspondence.** The category included all incoming letters unaccompanied by report forms. Letters requiring a reply were answered by standard form letters whenever possible. Otherwise, the letters were referred to the technical analysts for review and possible reply.

Clerical edit and technical review—A small staff of clerks at Suitland carried out the initial manual edit and review of report forms as they were referred from the check-in operation. This clerical edit was primarily concerned with preparing the data in the report forms for data keying. Analysts, assisted by the clerks, carried out the technical review, which involved a check of the report forms for accuracy and consistency.

The clerical edit staff received the A60 and A60A report forms from check-in and sorted them by State and CFN. Each report form was checked for obviously erroneous or illegible entries and for any other factors that could affect the keyability of the data. Specific instructions for a section-by-section edit of the single-basin report forms were provided to the edit clerks, and technical analysts were available to handle particular problems and to check the quality of the clerical edit.

Technical review of the report forms involved reviewing the corrections and changes made by the clerical staff, and a detailed check of each report form to (1) insure that the operation involved was in scope; (2) classify in-scope records by size and, if necessary, by type (i.e., single- or multi-basin); (3) check for possible evidence of other irrigation organizations not covered by the census (e.g., an entry showing exchange of water with an organization for which no report had been received and which was not on the Bureau's address list); (4) check for consistency in certain critical items, such as transfer of water (e.g., comparing one organization's report of water transferred to a second organization with the second organization's report of water received); and (5) separate data on A61 report forms for the several States and/or basins in which the respondent organization had operations and transcribe the data onto separate A60A forms.

As edit and review of the report forms were completed, they were sorted by State and CFN, batched into work units of approximately 100 forms each, and shipped to Jeffersonville for data keying.

Data keying—Once the forms were reviewed, edited, and coded, they were ready for data keying. Using the codes assigned to each data item during the clerical edit, the staff at Jeffersonville keyed the data from the report forms directly to disk, from which it was copied onto magnetic tape. Each data item on the report forms was uniquely identified, and only those that contained responses had to be keyed, in addition to the basic geographic and identification data for each report form.

Once the data were keyed and copied onto magnetic computer tape, they were transmitted via telephone datalink to Suitland for computer processing.

Computer Processing

General information—The computer processing phase of the census involved three principal operations: (1) a computer consistency edit, (2) analytical tabulations, and (3) data tabulations for publication. The computer consistency edit employed programs written specifically for editing the data from the irrigation organizations, while the analytical and data tabulations employed the Generalized Tabulation System (GTS) software program, adapted to produce the requisite tables for the census.

Computer batch edit—The batch edit program was designed to perform a series of tests and comparisons involving critical data/ or ratios within the data (particularly with respect to water transfer between organizations). These data or ratios were compared to tolerance limits developed using data from previous censuses, or were checked against each other for consistency. The edit program printed out lists of report forms in which errors or inconsistencies had been detected, together with the item codes of the errors.

The printouts of errors were reviewed and corrections made, after which the data were reedited in preparation for tabulation.

Tabulation of the data—After completion of the consistency edit and the correction of the data file, the data were ready for initial tabulation. The preliminary totals were produced and reviewed in December 1980 using previous census and other check data, and they showed aggregate data by State and by water resource region. A second, analytical tabulation, incorporating the corrections to the first set of tabulations, was reviewed in August. After final corrections were made, the final tables were produced and released to the publication preparation staff beginning in December 1981.

Publication

Data from the census of irrigation organizations were published in the *1978 Census of Agriculture, Volume 4, Irrigation*.

Volume 4 included data for irrigation organizations by State, water resource regions, and water resource subregions. The publication included not only the usual statistical tables, but a number of graphic tables and a series of maps showing the water resources regions and subregions.

1978 CENSUS OF DRAINAGE

Introduction

Purpose—Drainage of wetlands is one of the principal means by which more land has been brought into cultivation, and statistics on drainage are used in the estimation of agricultural production problems and of potential production capacity. Data collected on the organization and administration of public (i.e., local government-supported) drainage projects and organizations help in the assessment of total expenditures on agricultural ventures, and of the purposes for which funds are spent.

Historical information—Information on drainage of individual farms was collected as part of the censuses of agriculture for 1920, 1930, 1969, and 1974. For 1920 and 1930 these data were obtained for all farms in the 48 contiguous States (Alaska and Hawaii were added for 1969 and 1974), while for 1969 and 1974 data were collected only for farms with sales of \$2,500 or more.

Censuses of drainage covering publicly organized drainage projects and large private drainage projects were carried out in conjunction with the decennial censuses from 1920 to 1960 in all States in which such projects were reported. Beginning with the 1950 census, projects of fewer than 500 acres were excluded, while after 1960, those operations that were concerned solely with removing irrigation waste water were also

eliminated. (The reference years for all of these operations were generally the previous calendar years, i.e., the 1960 census collected data for 1959, but the 1978 Census of Drainage collected data for 1977 and 1978.) The scope of the census of drainage projects was further restricted in 1972, when it was limited to publicly organized projects (counties and special districts).

Planning and Preparation

Planning considerations—The two principal considerations in planning any census are (1) the need for the data, and (2) the collectability of the data desired. Planning for the 1978 Census of Drainage began in the spring of 1976 when arrangements were made to make available to the Agriculture Division staff certain data on drainage districts from the 1977 Census of Governments, and when the initial contacts with data users were made to investigate data needs.

From discussions with members of the Water Resources Council (which was also acting as the principal advisory and data-request coordinating body for the census of irrigation organizations) and other data users, it soon became evident that the USDA's Soil Conservation Service (SCS) would be the primary user of any drainage census data. Representatives of the Bureau and the SCS met several times to discuss data needs and data-collection methodology for the census of drainage. From these discussions it became obvious that there was no demand for drainage data for individual farms, and since farmers had always had great difficulty in supplying accurate drainage data anyway, the Bureau decided to reduce response burden by not collecting such data in the agriculture census itself.

Scope and data content—Data on drainage in the 50 States and the District of Columbia were collected and processed; the basic information was not, however, collected by the Bureau of the Census in a data-collection effort of its own, but was drawn from the data files of the 1977 Census of Governments. Additional data were collected for the Bureau by SCS field office personnel. The basic data and their sources, were as follows:

1. Total acres drained in 1978, by county, collected by the SCS.
2. Land-use data (for purposes of cross-tabulation with the SCS data) drawn from section 10 of the A1(S) and A1(N) census report forms.
3. Organizational and financial information on special drainage districts, drawn from the 1977 Census of Governments, and specially tabulated.

The Bureau's principal responsibility in the census of drainage, therefore, was processing and tabulating the information.

Data Collection

The data-collection activities for the 1978 Census of Agriculture are described in detail in chapter 4. Land-use data were requested from all agricultural operations.

The SCS produced estimates of acreage drained in each of over 3,000 counties, using on-the-ground surveys conducted by USDA field staffs, data from soil surveys, Agricultural Stabilization and Conservation Service (ASCS) records, local and State data sources, etc. The county inventories were combined and

summarized at the SCS's State offices, which forwarded the data to USDA headquarters in Washington, D.C., for referral to the Bureau of the Census. By the end of June 1979, data for nearly all the States had been received by the Bureau.

The data on drainage obtained from the 1977 Census of Governments concerned the organization and administration of special drainage districts. That census was based on a directory card listing showing the name of each local governmental unit, the county in which it was located, its mailing address, and selected characteristics (primarily revenue, expenditures, debt, and employment). This list was updated every 5 years, prior to each census of governments, using appropriate Federal and State publications, by review of the lists for each county by the county clerks and by using data from prec canvass surveys.

For the purposes of the census of drainage, the major activity of the 1977 Census of Governments was the mailout of directory cards to special districts (i.e., soil conservation, drainage, flood control, sewerage, etc.). Two versions of the "Local Government Directory Cards (Special Districts)" were used in this operation; the G-29 for special districts with a 1972 revenue of \$20,000 or more, or with a debt of \$500,000 or more; and the G-30 for special districts with revenue and debt of less than \$20,000 and \$500,000 respectively.

Approximately 26,000 G-29 and G-30 cards were mailed in December 1977. Followup of nonrespondents by mail and telephone was carried out in January and February 1978.

Each completed report form was reviewed for evidence of serious error or inconsistency, and correspondence was used to clear up problems. Approximately 2,550 of the special districts enumerated in the December mailing were identified as drainage districts, and the address, location, and characteristics of each were extracted from the census of governments data file for use in processing and tabulating the census of drainage.

Processing the Data

The data required relatively little processing prior to tabulation since the data from the census of governments had been tabulated already as part of the processing phase of that operation and were provided to the Agriculture Division as State-level aggregates. These numbers were posted manually to the single table included in the drainage census publication that showed the characteristics of drainage districts.

The county and State aggregate acreages received from the SCS were reviewed clerically and keyed at Suitland. The data were added to the 1978 census master data matrix as cell corrections, in order to facilitate cross-tabulation with the land-use data from the regular agriculture census report forms. After review and correction, the tables were released for publication.

Publication

Data from the census of drainage were released only in the *1978 Census of Agriculture Volume 5, Special Reports, Part 5, Drainage of Agricultural Lands*. Volume 5, part 5 contained a table showing the number, revenue, and expenditures, long-term debt, and number of employees, of special drainage districts by State, in 1977. Approximate land area, acreage of land drained, and land use were shown by county, State, region, and the United States.

1979 CENSUS OF HORTICULTURAL SPECIALTIES

Introduction

Purpose and history—Horticultural specialty operations—greenhouses, nurseries, etc.—currently gross several billion dollars annually, and constitute an increasingly important part of the overall agricultural economy. The rapid growth of this sector of agriculture in recent years has spurred demands by both Government and private data users for more current and detailed data in order to make accurate projections of growth, maintain the quality and quantity of production, and promote efficient product distribution.

A certain amount of information on the production of flowers, bulbs, nursery products, and seeds has traditionally been collected from farms in the census of agriculture; the 1890 census was the first to include a survey directed specifically at nurseries, floricultural establishments, seed farms, and the like. Thereafter, special censuses of horticultural specialty operations were conducted in conjunction with the regular censuses of agriculture for 1930, 1950, 1959, and 1969.

Scope—The 1979 Census of Horticultural Specialties covered all 50 States, and requested data from producers of bedding plants, foliage plants, potted and/or cut flowers, sod, flower seed, bulbs, vegetable seed, nursery products, greenhouse vegetables, and mushrooms. Data were also requested from florists and nursery operators (i.e., growers of woody plants, including fruit trees and environmentals). All data collected in the census of horticultural specialties were requested for calendar year 1979.

Preparations

Planning—The general plan for the horticultural census called for the actual data collection to be done in cooperation with the SRS, which would be carrying out its annual floriculture survey of about 8,000 operations in 28 States at the same time the Bureau would be conducting its census. The two agencies agreed to use identical report forms, except that both agencies' names would appear on the form used by the SRS while the Census Bureau's report form would carry only its own name. The SRS survey would collect data for all the addresses on its mailing list, under its "voluntary" authority, except in California, where the county agriculture commissioners were to use their revolving panels of addresses to enumerate horticultural operations. The Bureau's data collection effort involved mailing report forms to names and addresses identified from the census of agriculture as having horticultural operations, but that were not on the SRS survey lists.

Mailing lists—The mailing list for the non-SRS portion of the census consisted of a list of growers compiled from the 1978 Census of Agriculture. The names selected included growers whose main source of income was from the sale of horticultural products and totaled at least \$2,000, and growers who sold \$4,000 or more of such products, whose main source of income was something else. This list was supplemented by lists from the Department of Agriculture for the 28 States in which the horticultural census was a cooperative effort, and from lists of growers provided by trade associations. These lists were copied

onto computer tape and, in November 1979, were matched against SRS's and California county commissioners' lists. Duplicate names and addresses were deleted from the census file and the resultant list of some 24,000 cases became the Bureau's mail-address universe for the horticultural census.

Report forms—The standard report form for the horticultural census, the 79-A19, was developed using the 1969 form as a base, with the advice and suggestions of data users. The A19 was a 17 x 31½" sheet, folded to 17" x 10½", making six pages, with printing on both sides in black ink and shading in a yellow wash. The form requested data on type of horticultural operation; whether any flowering plants or plants to produce cut flowers or greens were grown; gross area used to produce selected cut flowers, flowering potted plants, bedding plants, etc.; quantity and sales of bedding plants, foliage plants, sod, bulbs, mushrooms, nursery products, vegetables grown under protection, or vegetable or flower seeds; land, structures, equipment, and irrigation; sales and purchases; selected production expenses; labor; and, for Hawaii only, cut and lei flowers.

A test of the proposed report form was carried out in August and September of 1979. A preliminary listing of horticultural operations was used to select a random national sample of 570 addresses for the test. Mailing packages, consisting of a test form 79-A19-T1, an A19(I) instruction sheet, a return envelope, and a cover letter explaining the need for the test, were assembled at Bureau headquarters in Suitland and were mailed on August 23. Three weeks later, a followup mailing, consisting only of a reminder letter requesting response and thanking those who had responded, was sent to the addresses on the test mailing list. Response was relatively low (about 47 percent, excluding postmaster returns), but the report forms received and analyzed indicated respondents had little difficulty completing them, and no significant changes in content were considered necessary.

Finalization of the report forms—The basic A19 report form was finalized in October 1979. The two versions to be used, the 79-A19.1 for the Bureau of the Census and the 79-A19.2 for the SRS floriculture survey, were sent to the printers in late October.

Data Collection

Preparation for the mailout—The printed materials for the Bureau and USDA mailings—report forms, record copies (the A19.1 and A19.2 "grey"), instruction sheets, brochures, etc.—were received in Jeffersonville, Ind., in the first week of December. The mailing packages were assembled by the clerical staff during December.

In the meantime, the final preparation of the Bureau's mailing list was underway at Suitland. It was originally planned to mail the horticultural census forms in early January 1980, but delays in the computer processing of the 1978 Census of Agriculture resulted in first, a postponement of the initial mailout, and then the adoption of a two-phase mailing. By early January, the address lists for 31 States were complete and had been unduplicated. The Bureau decided to prepare address labels for these cases and mail report forms to them imme-

diately, and then carry out a second mailing to the remaining 19 States as soon as possible thereafter. Accordingly, pressure-sensitive address labels for the 31 "completed" States were prepared, delivered to Jeffersonville, and applied to the mailing packages.

Initial mailout and followup—The first phase of the initial mailing was undertaken on January 22, 1980, when 14,239 census packages were mailed to horticultural operations in 31 States. Four weeks later, on February 25, the second phase took place, and 9,694 packages were mailed to operations in the remaining 19 States.

Three followup mailings to nonrespondents were carried out, broken down into mailings to phase 1 and phase 2 States to conform to the initial mailout. A new file of nonrespondent addresses was created for each followup, and address labels were prepared in the usual way. The followup packages consisted of letters requesting response and reminding operators that response was legally required. The characteristics of the mail followups were as follows:

Followup	Letter	1st phase		2nd phase	
		Date	No. mailed	Date	No. mailed
1	79-A19.1-L2	2/25/80	6,623	3/20/80	7,214
2	79-A19.1-L3	3/20/80	5,165	4/11/80	4,022
3	79-A19.1-L5	4/11/80	3,415	5/07/80	2,650

Supplemental mailings—Two small mailouts of complete census packages were made to addresses that were identified after the mailing list was finalized in February—424 on April 24 and 201 more on May 5. Inasmuch as these cases were mailed so late, there was no mail followup; delinquent cases were referred for telephone enumeration together with the nonrespondent address list used for the third mail followup.

Telephone followup—Immediately following the mailing of the third followup, *all* of the addresses in the delinquent file—some 5,000 in all (including the supplemental mailing cases)—were referred to the telephone unit for followup. Calls were made to nonrespondent operators from both the Bureau's Suitland and Jeffersonville facilities, using WATS and FTS lines. The telephone followup continued through the summer, and approximately 1,500 report forms were completed in this manner. Report forms continued to be received by mail for some time after the referral of these cases to the telephone staff, and as these were checked in, they were deleted from the telephone followup list.

Results—Overall response to the horticultural census was very good. By the end of August, the Bureau had achieved a 94.4-percent response rate.

The SRS data-collection effort—The SRS floriculture survey involved a sample of over 8,000 operations in 28 States (including the county commissioners' panels in California). The enumeration was a field interview operation, carried out by

USDA field staff during February, March, and April 1980. A total of 8,001 horticultural operations were enumerated and, after SRS had extracted the data necessary for its operations, the complete report forms were turned over to the Bureau of the Census for processing and incorporation into the census data file.

Data Processing

Check-in—Check-in of census report forms began in Jeffersonville in February, as soon as the first responses were received. The check-in unit was primarily concerned with removal of respondents' addresses from the followup lists, referral of correspondence, and the handling of postmaster returns (PMR's). All receipts with correspondence attached were referred to the agriculture census correspondence unit. First-time PMR's were remailed, as were second-time PMR's with address corrections. Second-time PMR's without address corrections were referred to Suitland for review and disposition by Agriculture Division analysts.

Clerical edit—Clerical editing of the report forms began in March 1980. Out-of-scope and blank report forms, and refusals, were sorted for special handling. Completed in-scope forms were subjected to a detailed clerical review to ensure internal consistency, completeness, and the readability of individual items (to make certain each form was keyable). Questionable or illegible items were verified by telephone whenever necessary. The form 79-A19.2 report forms received from SRS were processed in exactly the same fashion as the regular horticulture census returns.

Data keying and computer edit—In March 1981, after the clerical edit was completed, the report forms were sent to have the data keyed to disk and transferred to magnetic computer tape. The data then were transmitted to Suitland for computer editing. The latter included further internal consistency checks to detect unreasonable dollar values and/or questionable large entries. Inconsistent data cells were displayed for review and subject-matter specialists made necessary corrections.

Tabulation—The data from the horticultural census were tabulated using the GTS software package. Summary data were reviewed for consistency and were compared to historical data, and to current USDA estimates where available. After corrections were made, the data were submitted to disclosure review and the final tabulations were done.

Publication

State and county-level data on the number, size, value of sales, etc., of horticultural specialty establishments were published in the *1978 Census of Agriculture, Volume 5, Special Reports, Part 7, Horticultural Specialties*.

1979 FARM AND RANCH IRRIGATION SURVEY

Preparations

Purpose and Scope—The 1979 Farm and Ranch Irrigation Survey was planned to supplement the basic irrigation data

collected in the 1978 Census of Agriculture. A sample of agricultural operations could provide detailed information on irrigation practices, quantity of water applied, equipment utilization, expenditures, and crop production for irrigated farms, while keeping overall respondent burden as low as possible. By combining data from such a survey with information from the census proper and from the 1978 Census of Irrigation Organizations, a comparatively complete and detailed picture of agricultural irrigation in the United States could be assembled. Accordingly, the survey was designed to collect data from farms and ranches that had reported irrigation activities on their 1978 census forms. The sample was so structured that farms in the 17 Western States covered in the census of irrigation organizations, Florida, Louisiana, and Arkansas, were sampled heavily enough to provide data for "aggregated areas," for groups of counties called "aggregated subareas," and for States.⁴ Aggregate data were collected for the remaining 28 contiguous States (Alaska and Hawaii were excluded from the survey).

Report form pretest—Planning for the survey was carried on concurrently with that for the census of irrigation organizations. Drafts of test versions of the respective forms were prepared in early 1978, and a content pretest for the farm and ranch irrigation form was carried out at the same time as the irrigation organizations' test, also in early 1978. The test form 77-A62-T1, "Farm and Ranch Irrigation Survey," was a 16" x 21" sheet of white stock folded to 16" x 10-1/2" to form 4 pages. Printing was in black ink with shading in a salmon wash. The form requested data on irrigation in 1977, acreage, land use, comparison of acres irrigated in 1977 to those irrigated 1974-1976, irrigated and nonirrigated crop yields (for selected crops), method of irrigation, estimated quantity of water used, selected irrigation facilities, maintenance and repair costs for irrigation equipment and facilities, energy use for irrigation pumping (by power source), water received from irrigation water suppliers, any discontinuation of water supply affecting crop yields, irrigation uses (application of chemicals, land disposal of liquid livestock waste, etc.), and irrigation intentions for the next 3 years.

The pretest sample was chosen from the list of in-scope agricultural operations with irrigation of land reported in the 1974 census. A total of 600 addresses were chosen at random from these lists for the same 10 States used for the irrigation organizations pretest (Arizona, California, Colorado, Idaho, Louisiana, Montana, Nebraska, South Dakota, Texas, and Washington) and for one county each in North Carolina and Florida. Report forms were mailed to the pretest sample on March 13, 1978. There was no mail followup, but in the last week of April, personnel from the Bureau and the U.S. Geological Survey (USGS) began a field followup on non-respondents. This field operation was intended to obtain information on operators' reporting problems with the form rather

than complete the report forms, hence overall response rates remained relatively low. By mid-May, 303 completed A62-T1 questionnaires and approximately 25 PMR's had been received.

Finalization of the report form content—After the March pretest, the content of the report form was finalized. Overall content changes were relatively slight; sections on the time needed to complete the form (employed in the test version to aid in later forms design) and on irrigation intentions over the next 3 years were deleted, while the section on irrigated and nonirrigated yields was expanded to list more crops. There were also a number of changes in the format of certain sections to improve clarity. The general specifications for the form (i.e., size, ink used, shading, etc.) remained unchanged except that the sheet stock was 17" x 21" rather than 16" x 21."

Sample selection—The farm and ranch irrigation survey used a sample, stratified by acres irrigated, drawn from the 1978 Census of Agriculture list of in-scope operations reporting irrigation activities. The sample was designed to provide data for "irrigation regions," which were identical to USGS drainage regions, and for specified smaller areas, called aggregated areas, within the "heavy irrigation" States of the West, Florida, Louisiana, and Arkansas. All large irrigation operations (i.e., those in the 17 Western States and Louisiana with 1,000 acres irrigated or more, and in the East with 200 acres irrigated or more) were selected as "certainty" cases. Sampling of farms of smaller acreage irrigated varied, depending upon the stratum (e.g., farms with 500 to 1,000 acres irrigated might be sampled at a 1-in-3 rate, farms with 100 to 500 acres irrigated in a 1-in-10 rate, and so on). Further, while only irrigation regions were sampled in the Eastern States, irrigation subregions were sampled for the 17 Western "heavy irrigation" States, plus Louisiana, Arkansas, and Florida. Thus the sample could provide data for the groups of counties defined as irrigation subregions, and for States in the heavy irrigation areas, but only aggregate statistics would be produced for the "light irrigation" States. The sample selected constituted an approximate 10-percent sample of operations, some 31,000 in all, whose 1978 census returns reported using irrigation.

Data Collection

Preparations for mailout—The report form 79-A62 and the other materials for the initial mailing went to print in October 1979, and were delivered to Jeffersonville in December for mailing-package assembly. Each package consisted of the A62 report form, a copy of the A62 for the respondents records, a pamphlet explaining why the survey was being taken, an instruction sheet, return envelope, and a transmittal letter from the Director of the Bureau requesting prompt response. Assembly of the packages was completed in late February and early March, but delays in the computer processing of the 1978 census reports resulted, as with the other follow-on surveys, in a delay in completing the address list for the mailout. Accordingly, a similar multi-phase mailout plan was adopted. The characteristics of the initial mailout of the farm and ranch irrigation survey were as follows:

⁴ An aggregated area was identical to the USGS drainage basin, while "aggregated subareas" were groups of counties comprising a local irrigation area. Such a "subarea" would consist of complete counties, but might include counties in more than one State.

Mailing	Date	Quantity
Total		31,337
Single unit, single form (SUSF)		
Wave 1	3/2/80 - 4/4/80	10,114
Wave 2	4/28/80 - 5/13/80	19,033
Wave 3	6/17/80	465
Single unit, multiform (SUMF)	4/18/80 - 4/25/80	925
Census of agriculture area sample survey (CAAS)	6/25/80 - 6/27/80	175
Multiunits (MU)	6/6/80 - /11/80	625

Mail followup—The mail followup for the irrigation survey consisted of a reminder letter mailed to 6,249 wave-1 SUSF, and 522 SUMF cases between April 28 and May 9. Response to the irrigation survey was comparatively slow, and between the last week of May and the second week in August, the Bureau carried out four mail followups: The first and third involved complete survey packages, while the second and fourth consisted only of letters (the A62-L4 and A62-L6A or -L6B, respectively). The dates and the quantities mailed in these operations (all on a "flow" basis similar to the initial mailing) are given below:

Followup Mailings		
Mailing	Date	Quantity
1st followup		
TOTAL		17,968
SUSF		
Wave 1	5/23/80 - 5/28/80	5,844
Wave 2	6/17/80 - 6/25/80	10,987
Wave 3	6/21/80	322
SUMF	5/28/80 - 6/4/80	436
CAAS	9/9/80 - 9/11/80	108
MU	7/23/80 - 7/28/80	271
2nd followup		
Total		14,299
SUSF:		
Wave 1	6/18/80	4,897
Wave 2	7/19/80	8,613
Wave 3	8/19/80	225
SUMF ¹	9/2/80 - 9/5/80	383
CAAS	N/A	N/A
MU ¹	9/11/80 - 9/15/80	181
3rd followup		
Total		10,561
SUSF:		
Wave 1	7/17/80 - 7/21/80	3,433
Wave 2	8/11/80 - 8/13/80	7,072
Wave 3	9/16/80	56
4th followup		
Total		2,947
SUSF:		
Wave 1	8/12/80	2,947

¹ SUMF and MU cases were subject to two followup mailings in each of the follow-on surveys.

By the end of August, a total of about 21,400 report forms had been received at Jeffersonville, yielding an overall mail response rate of almost 71 percent.

Telephone followup—A telephone followup to nonrespondent cases was inaugurated from the telephone unit in Jeffersonville during the last week of August 1980. All nonresponse "certainty" cases and a sample of 1-in-6 noncertainty addresses (the latter selected at random from nonrespondents in each irrigation region or subregion), 3,648 cases in all, were selected for followup by telephone. Calls were made from Jeffersonville through October 1980, and 2,047 (about 56 percent) of the cases referred were resolved.

Results—Data collection for the irrigation survey was not closed out completely until November 1980, by which time nearly 26,000 report forms, or slightly more than 80 percent of the initial mailing, had been received.

Data Processing

Receipt and check-in—Receipts for the irrigation survey were sorted by type as they arrived in Jeffersonville. Correspondence without report forms attached, report forms (with and without correspondence), and PMR's were sent to the batching unit for check-in. After check-in keying, report forms with correspondence attached, or correspondence alone, were sent to the correspondence unit; PMR's were referred for remailing; and report forms were batched into work units of about 100 forms each before shipment to Suitland for precomputer editing.

Precomputer edit—The purpose of the precomputer edit was to identify report forms that were incomplete or covered out-of-scope operations, and to ensure the keyability of the in-scope forms. Editing began in April 1980, as soon as the first work units of forms were received in Suitland. As the work units arrived, they were opened and the report forms were sorted by State for the "heavy irrigation" States, and as "all other States" for the remaining 28 States. A detailed clerical review of each report form was carried out by Agriculture Division personnel to ensure the completeness of each form and the legibility of each data item. Problem cases (i.e., those with inconsistent or obviously incorrect entries, blank or partially blank forms, etc.) and "certainty" cases were referred to technical analysts for review and/or correction. The clerical staff made minor corrections, transcribed illegible entries, etc. Verification of each clerk's work was carried out by a technical analyst, who reviewed the first 300 forms edited by each clerk and spot-checked the work thereafter.

After all of the report forms in a work unit had been edited and corrected, the work unit was returned to Jeffersonville for keying. Data keying to magnetic tape began in the second week of June 1980.

Computer edit—The data keyed to tape in Jeffersonville were transmitted to Suitland by telephone datalink and, starting in July 1980, were subjected to a series of consistency and completeness computer edits. Problem items were "flagged" by the computer and were displayed for review and correction by technical analysts. Once all the data files produced in the collec-

tion effort had been edited, data for the remaining nonrespondent cases were imputed, using estimates of the characteristics of nonrespondent operations derived from the results of the telephone followup.

Tabulation—Data from the irrigation survey, identified by reported county and State, were tabulated, using the GTS software package, by State and by aggregated areas and subareas for the “heavy irrigation” States and for “all other States” (excluding Alaska and Hawaii). Analytical tabulations were displayed for review and correction by Agriculture Division technical analysts before the final tabulations were run.

Publication

Data from the irrigation survey were published in the *1978 Census of Agriculture, Volume 5, Special Reports, Part 8, 1979 Farm and Ranch Irrigation Survey*. Some additional unpublished data on irrigation are available.

1979 FARM FINANCE SURVEY

Introduction

Background and purpose—A certain amount of data on the various elements of farm finance has been collected since the first agriculture census was taken in the United States. Initially, the principal points of interest were the value of farm land and sales of agricultural products; in later censuses the data collection effort was expanded to include farm taxes as well as mortgage debt.

In 1979, a farm finance survey was carried out as part of the 1978 Census of Agriculture program. Data were collected on land in farms, value of land and buildings, rents, capital and operating expenditures, credit used for purchasing specific items, debts outstanding by kind and source, taxes, value of farm products sold, farm related income, off-farm income, land acquisition, off-farm work, and household characteristics.

One of the primary purposes of any of the Bureau's operations is to improve the quality of national and State statistics. Data on farm finances and debt are of interest to policy planners, legislators, and lending institutions. The USDA relies heavily on the survey data for preparing and benchmarking its annual farm sector accounts, as well as for numerous other statistical reviews. The survey is the only source of data on level of debt by farm size and type currently available. It is also unique in that it relates off-farm work and household characteristics to size and type of farm.

Planning and Preparation

General plan—Planning for the 1979 Farm Finance Survey began during the period of preparation for the 1978 census; several meetings were held during 1978 between Bureau staff and representatives of various data-user Government agencies to discuss plans and the content of the report form. The finance survey was planned as a two-stage operation: a sample of farm operators from the census proper would be selected and sent a

finance survey operator's report form and, thereafter, landlords identified by respondents would be sent a landlord's report form. A pretest of the operator and landlord forms was carried out in the fall of 1978, using addresses drawn from the 1974 census farm operator lists and landlord addresses from the operators' pretest responses.

Report form pretest—Test versions of the report forms, 77-A9A-T1 (operator) and 77-A9B-T1 (landlord) were prepared in the summer of 1978. The A9A-T1 was a 14" x 21" sheet of white stock, folded to 14" x 10-1/2", with printing on both sides in black ink, and with purple shading. It requested data on acreage and current value of land and buildings; purchases, expenditures, and credit used during 1977 for agricultural operations; debts; market value of agricultural products sold; off-farm income; taxes; assets owned by farm operator; net cash farm income of partnerships; income and expense from farm-related sources; off-farm work and education; and leased machinery and investor capital.

The A9B-T1, was a 14" x 21" sheet, folded to 14" x 10-1/2", with printing in black ink, and orange shading. It requested data on acreage and current value of land and buildings; purchases, expenditures, and credit used during 1977; debts; taxes; assets owned by landlord; rental income; total agricultural land ownership and sales; participation in management decisions; type of ownership; and characteristics and occupation of landlord.

Pretest packages, containing a report form, instruction sheet, cover letter, and return envelope, were mailed to a sample consisting of 1,470 operators on November 13, 1978. Only one followup was made; a letter requesting prompt response and thanking the addressee if he or she had already responded was mailed to all the addresses on the pretest mailing list 2 weeks after the initial mailout. Response was a little over 55 percent (812 forms were returned).

The mailout to landlords was made after a listing of addresses was compiled from the operators' report forms. On December 22, 698 pretest packages were mailed to landlords (the contents were virtually the same as for operators, except the A9B-T1 form and instruction sheet were used). A single followup letter was sent to all addresses on the pretest list on January 10, 1979. Response to the landlord pretest was a little over 56 percent (393 report forms were returned).

Finalization of report form content—The data collected from the pretest mailings were used in the design of the final report forms. The landlords had little apparent difficulty in completing the A9B-T1 and, except for a few minor format changes and the deletion of a separate cash expenditures column, the A9B was changed only slightly. Adjustments to the A9A were rather more extensive, including the deletion of the cash expenditures column and the entire section on machinery and investor capital. However, new sections on land acquisition, household characteristics, and production contracts were added, and the section on off-farm work was expanded.

Sample selection—The sample design for the finance survey called for a stratified systematic sample of the in-scope respond-

ents to the 1978 census, excluding abnormal farms, to provide State-level estimates. Approximately 45,000 single and multi-unit operations were selected nationwide.

Stratification was by size indication (i.e., total value of agricultural products sold) taken from respondents' census report forms. The characteristics of the sample strata and the number of operations selected in each stratum were as follows:

Number	Description	Number in sample
	Total sample	¹ 44,968
1-3	Total value of sales of \$0 to \$2,499	5,983
4	Total value of sales of \$2,500 to \$9,999	9,907
5-9	Total value of sales of \$10,000 to \$99,999	12,110
10-11	Total value of sales of \$100,000 to \$499,999	10,352
23-26	Total value of sale of \$500,000 or more	6,616

¹ Counts include multiunits selected for sample.

Data Collection

Preparations for mailout—The final versions of the report forms and all other materials for the initial mailouts to both operators and landlords were sent to the printer in October and November 1979 and, upon receipt at Jeffersonville, were assembled into mailing packages. The operator's package contained the 79-A9A "Farm Finance Survey—1979 Operator's Report," a form A9A "pink" copy for the respondent's records, the form A9A(l) instruction sheet, a brochure "Why a Farm Finance Survey," a form 79-A9A-L1B cover letter, and a return envelope. The landlord's package was similar in content, with the appropriate report forms, brochure, and cover letter A9B-L1 enclosed.

Address labels for the operators' mailout were produced in January and February 1980. Delays in completing the computer edit of 1978 census report forms for all the States led the Bureau to carry out the mailing to operators in three phases, as the sample lists and labels became available for each State. As the labels were produced, they were shipped to Jeffersonville for application.

Mailout and mail followup—The initial mailout to farm operators began in March 1980. Mailings had to be made on a modified flow basis not only because of the census processing delays, but also because a small percentage of addresses in the sample were in the samples for one or more of the other follow-on surveys as well. Therefore, it was decided to carry out a single initial mailout to include all of these cases. The initial mailout for landlords took place in September and October 1980 and followed the basic modified-flow pattern of the operator mailout. The primary mailing for each phase was carried out in three "waves" of irregular volume. The dates and counts for the initial operator and landlord mailout were as follows:

INITIAL MAILOUT				
Mailing	Operators		Landlords	
	Date	Quantity	Date	Quantity
Total . . .		44,968		34,202 mailed ² 3,400 not mailed
Single unit, single form (SUSF)				
Wave 1	3/21/80	38,054	9/2/80-9/4/80	21,512
Wave 2	5/6/80	224	9/25/80-10/1/80	3,968
Wave 3	6/18/80	1,317	12/16/80	8,722
Single unit, multi-form (SUMF) . . .	¹ 4/18/80-4/25/80	3,117	NA	NA
Census of Agriculture Area sample cases (CAAS) . . .	6/25/80-6/27/80	810		
Multiunits (MU) . . .	6/6/80-6/11/80	1,446		

¹ The cases involved operations that had been selected for inclusion in the samples of two or more followup surveys.

² Report forms were not mailed to landlords identified as Governmental agencies, railroads, oil and utility companies; or to churches, Indian reservations, schools, or other tax-free institutions.

Followup mailings were carried out in the same sequence as the initial mailouts (i.e., "waves" 1, 2, and 3; SUMF; CAAS). The first and third followup mailings involved complete survey packages—report form, records form, instruction sheet, cover letter, and return envelope—while the second followup consisted of a form letter requesting prompt response.

Immediately following the cut-off date for each mailout, a file of delinquent cases was created. Address labels were produced for each followup mailing, and the mailing packages were assembled, labeled, and mailed. The dates and counts for the various followup mailings were as shown on the following page.

Telephone followup—At the end of the August, after the completion of the SUSF mailings for the second followup to operators, the Bureau began a telephone followup of a random sample of nonrespondents, made up of 3,536 "certainty" and 1,932 "noncertainty" cases. Most of this enumeration was done by the telephone staff at Jeffersonville. Very large cases and special problem cases and refusals were called by members of the Agriculture Division staff at Suitland. The Jeffersonville telephone operation lasted until the end of December 1980, while a few calls continued to be made from Suitland during January and February 1981.

No telephone followup on nonrespondent landlord cases was done.

FOLLOWUP MAILINGS

Mailing	Operators		Landlords	
	Date	Quantity	Date	Quantity
Reminder letter (Wave 1 only) . . .	4/20/80	20,849		
1st followup				
Total		23,220		18,646
SUSF				
Wave 1	5/23/80- 5/28/80	19,430	9/25/80- 10/1/80	11,631
Wave 2	6/23/80	207	10/20/80- 10/22/80	3,165
Wave 3	7/21/80	979	1/28/80	3,850
SUMF	5/28/80- 6/4/80	1,469		
CAAS.	9/9/80-	509		
MU	7/23/80- 7/28/80	626		
2nd followup				
Total		14,512		13,577
SUSF				
Wave 1	6/23/80	11,964	10/16/80- 10/20/80	9,390
Wave 2	7/18/80	159	11/19/80	1,614
Wave 3	8/19/80	683	2/24/81	2,573
SUMF	9/2/80- 9/5/80	1,290		
CAAS.	NA	NA		
MU	9/11/80- 9/15/80	416		
3rd followup				
Total		12,745		6,835
SUSF				
Wave 1	7/17/80- 7/22/80	12,196	11/12/80	5,601
Wave 2	8/12/80	141	12/8/80	1,234
Wave 3	9/16/80	408		
4th followup				
Total		10,386		
SUSF	8/12/80	10,386		

report forms each for check-in keying, after which the receipts were resorted into batches for further processing. PMR's were referred for remailing, correspondence and report forms with correspondence attached were sent to the correspondence unit, and respondent report forms (including blank ones) were referred to the clerical edit staff.

Precomputer edit—When the report forms from operators were received, a number of processing steps were carried out prior to the precomputer edit: Landlord names and addresses were taken from the forms for the landlords' mailing list, previously identified out-of-scope cases were withdrawn, "must" cases (large farms) were pulled from the batches, and blank or largely incomplete cases were sent to the correspondence or telephone units for further contact with respondents.

The remaining forms were sent to the precomputer edit unit. The purposes of the precomputer edit were to identify and delete out-of-scope report forms, identify incomplete forms for additional followup, review the data on each report form for consistency, and ensure the keyability of each item on each report form.

Both operator and landlord report forms were edited on a State basis. Each data entry was examined for completeness and legibility, and the contents of each form were cross-checked for internal consistency. Problem cases or very large operations were referred to technical analysts for review. In some cases (e.g., if major portions of a form were left blank) the report forms were sent to the correspondence or telephone units for additional followup. Once completed by telephone, the report forms were cycled back through the precomputer edit. Any corrections necessary were made to the forms before they left the edit unit.

Report forms from "must," multiunit, and multiform cases were referred to technical analysts for review and disposition.

All operator report forms specifying off-farm work were coded for occupation and industry by the Current Population Surveys Branch of the Demographic Surveys Division. Approximately 12,000 reports were given three-digit codes indicating the occupation and type of industry of the operator and his or her spouse. The coding system was based on the industrial and occupational classification system used by the Bureau for the 1970 Census of Population and Housing.

After the initial edit, a sample of report forms was checked by a clerk other than the original editor, to verify the editing. The forms used in the verification edit were batched into work units of 100 each and were sent for data keying to magnetic tape.

Computer edit—The keyed operator data were subjected to a series of computer checks to determine whether all required entries had been made and were internally consistent. Problem items were "flagged" by the computer, and printouts displayed these items for review and correction by statistical analysts; the same procedures were followed later for the landlord survey data. Once all the data had been edited, a second, reconciliation, edit was carried out to assure that the data reported by operators and their landlords were consistent. Inconsistent items were displayed for review and correction. When operators reported data for a landlord, but no corre-

Results—Overall response to both the operator and landlord phases of the finance survey was somewhat lower than for the census proper, a not unexpected result in view of the detail of data requested and the sensitivity of a few of the items. Nonetheless the operators' mail and telephone response was 73 percent, while that from landlords was 76 percent.

Data Processing

Receipt and check-in—All receipts from both the operators and landlords were opened and sorted into work units of about 100

sponding landlord report had been received, it was necessary to impute data for the latter. Data on acreage and value of rented land were derived from the operators' report. Other items (except taxes) were imputed from the reports of comparable landlords in the same State. For nonmailed landlord reports only (1) the acreage and value of rented land and (2) cash rent were imputed, because most of these lands were essentially free of debt or taxes.

A total of 33,065 operator report forms and 40,835 landlord report forms were used in the preparation of the farm finance data for publication. Some 1,922 operator forms were found to be from operations that did not qualify as farms in 1979. A subsample of the approximately 10,000 nonrespondents was included in the telephone followup, and data collected from them were expanded to represent all nonrespondent cases. The difference between the 34,200 landlord forms mailed and the 40,835 included in the published tables resulted from the inclusion in the final tabulations of data for landlord report forms that were imputed. Some landlord forms that had been included in the mail operation were also eliminated because they did not meet the census definition of a landlord.

Tabulation—After the computer edits were completed, the data were tabulated. The tables were reviewed by statisticians and corrections were made before the final tables were generated. Data from the farm finance survey were tabulated by State, divisions, regions, and for the United States as a whole. Tabulations by USDA geographic regions were also prepared.

Publication

Data were published for States, divisions, regions, and the United States as a whole. Reliability estimates for selected items are provided in the publication.

The data from the finance survey were published in the *1978 Census of Agriculture*, Volume 5, *Special Reports*, Part 6, *1979 Farm Finance Survey*. Unpublished data were supplied to the USDA (which had provided partial funding for the survey) for its analysis and use in revising benchmark figures for its annual estimates.

1979 FARM ENERGY SURVEY

Preparations

Purpose and scope—The increasing importance of data on the use of various forms of energy in the United States led the Bureau of the Census to consider, during the planning stages of the 1978 Census of Agriculture, collecting information from farmers on the cost, volume, and kinds of energy used in their agricultural operations. The U.S. Department of Energy (DOE) and USDA both demonstrated considerable interest in obtaining as much detailed data of this nature as possible.

While the Census Bureau planned to include a section (25) in its standard census report forms requesting data on expenditures for selected types of energy (gasoline, LP gas, various fuels, etc.), gallons purchased and storage capacity, collection of all the detailed data desired was thought to be impractical in

the census itself. However, the importance of the information prompted the Bureau to design a follow-on sample survey to obtain at least some of these data from a sample of farm operators.

The 1979 Farm Energy Survey provided State- and national-level statistics on energy expenditures, volume of energy purchased (i.e., of gasoline, electricity, diesel fuel, etc.) and fuel-type and size of equipment. A sample consisting of 33,800 agricultural operations (excluding farms in Alaska and Hawaii, abnormal farms (i.e., institutional operations, etc.), and horticultural specialty operations) was selected from the list of in-scope respondents to the 1978 Census of Agriculture. The survey was carried out beginning in March 1980, and all data were collected for calendar year 1979.

General planning—The farm energy survey was the final sample survey to be selected for inclusion in the 1978 census program and planning was begun in August 1978. The Bureau held several meetings during the last quarter of the year with representatives of various data users to discuss the general plans for the survey and to consider data content of the report forms. A pretest of the proposed form was carried out from July through September 1979, and the survey itself was scheduled to begin in March 1980.

Content pretest—A test version of the farm energy survey report form, the 78-A35(T), was prepared by the Bureau in cooperation with a USDA work group that had been established to review energy data needs. The A35(T) was a 21" x 14" sheet of buff stock, folded to 10-1/2" x 14", with printing on both sides in black ink; there was no shading. The form was divided into 20 sections and requested data on acreage; estimated gross value of products sold; energy expenditure and usage; fuel storage facilities and amount of fuel stored; type of delivery service for fuels; custom work; tractors and other motorized vehicles and equipment; irrigation pumps and other electric motors, crop drying or tobacco curing facilities; air-conditioning, heating, and water heating facilities; acres of selected crops and gross value of sales of crops and livestock; time required to complete the report form; and the usual identification information.

The sample selected for the pretest consisted of a random sample of approximately 1,250 in-scope addresses drawn from the respondent lists from the 1978 census for 10 States⁵, plus cluster samples of about 100 respondent in-scope farms each in Lancaster Co., Pa., and Duplin Co., N.C.

Accordingly, 1,470 pretest packages, consisting of a report form, cover letter, instruction sheet, and return envelope, were assembled at Suitland and were mailed on July 9, 1979. Three weeks later, a second mailing was made to all pretest addresses. This mailing involved a complete pretest package, except that the cover letter was replaced with a "second request" letter. By the end of August, a response rate of 40 percent (approximately 600 report forms, including 20 PMR's) had been achieved. In early September, members of the Agriculture Division staff undertook field interviews of all the addresses in the cluster

⁵ Alabama, Delaware, Illinois, Iowa, Maine, Maryland, Pennsylvania, Washington, West Virginia, and Wisconsin.

samples. The purpose of this field followup was not to obtain complete report forms per se, although forms could be completed, but to get operators' reactions to the report form. By the end of September 1979, when mail receipts for the pretest were closed out and the field followup had been completed, 1,063 report forms had been filled out and returned to the Bureau.

Finalization of the report form—Significant changes were made to the energy survey report form as the result of responses obtained from the pretest. Most obviously, the size and general format of the form was changed to a 21" x 17" sheet of white stock, folded to 10-1/2" x 17", with printing on both sides in black ink, and shading in buff over the entire face of each page except for response boxes. Sections 2 (on gross value of all agricultural products sold) and 19 (time required for filing report) were deleted from the final design. A new section 2, requesting information on whether selected energy conservation measures were being used, was added to the form. In section 3 (energy expenditures and usage) the test form's request for "estimated amount used" of selected energy sources was changed to "estimated amount purchased," and in section 8, the year of manufacture was requested for wheel tractors instead of model year. The final version of the A35 energy survey form was approved and sent for printing in December 1979.

Sample selection—As was the case with the other follow-on surveys, the selection of a sample for the farm energy survey was held up by delays in processing the report forms for the 1978 Census of Agriculture. Nevertheless, sample selection began in December 1979. The result was a stratified sample of all agricultural operations (excluding abnormal farms and horticultural specialties) in the 48 contiguous States. All "certainty" cases⁶ and a random sample of all other agricultural operations were selected for enumeration. Selection frequency varied among the strata, which were established on the basis of 1978 census reported sales, and was set so as to provide reliable State-level estimates. The total number of cases selected, including all "certainty" and multiunit operations, was 33,810.

Data Collection

The initial mailout—The report forms and other materials for the initial mailout for the energy survey were shipped to Jeffersonville in December 1979, where they were assembled into mailing packages. Each package contained an A35 report form, a form A35 "gray" file copy for the respondent's records, a form A35(I) instruction sheet, an A36 information brochure, a form A8A outgoing envelope, and either a form A35-L1A or A-35-L1B transmittal letter.⁷

⁶Status as a "certainty" case was determined by the total value of agricultural products sold as reported in the 1978 Census of Agriculture. The minimum sales required varied among States; the smallest that would qualify an operation as a "certainty" case was \$250,000. In States with more extensive agricultural operations, the minimum sales requirement was as high as \$500,000.

⁷The L1B letter included a toll-free telephone number at the Bureau that respondents could call for assistance.

Address labels for the survey began to arrive in Jeffersonville in March and the energy survey mailout was done on the same flow basis used for the other follow-on surveys. The dates and totals for the initial mailout were as follows:

Initial Mailout		
Mailing	Date	Quantity
Total		33,810
Single unit, single form (SUSF)		
Wave 1	3/21/80 - 4/4/80	27,651
Wave 2	5/6/80	87
Wave 3	6/18/80	1,039
Single unit, multiform (SUMF)		
Regular	3/18/80 - 4/25/80	2,941
Census of agriculture area sample (CAAS) cases	6/25/80 - 6/27/80	769
Multiunit (MU)	6/6/80 - 6/11/80	1,323

Mail followup—Mail followup of the farm energy survey consisted of a reminder mailing to addresses sent survey packages in the earliest initial mailings and four regular followup mailings. Reminder letters were mailed on April 28 to 11,463 nonrespondent SUSF "wave 1" addresses and, in the second week of May, to 1,661 nonrespondent SUMF cases. The first and third of the regular followup mailings consisted of a survey package including a report form, instruction sheet, information brochure and return envelope. The second and fourth followups involved letters requesting response.

The address lists for each followup were compiled in the usual way (i.e., by matching respondent lists to the address list immediately following the return cutoff date for each mailing), and address labels were delivered to Jeffersonville for application to the preassembled mailing packages. All the followup mailings were carried out on the same flow basis as the initial mailout, although there was only one followup to area sample survey multiform cases and only two followup mailings were carried out for the regular multiform (SUMF) and multiunit (MU) cases. The dates and counts for the various phases of the followup mailings were as shown on the following page.

Telephone followup—At the end of August all nonrespondent "certainty" cases and a 1-in-6 random sample of nonrespondent noncertainty cases, approximately 2,900 in all, were referred to the telephone unit at Jeffersonville for possible followup. Calls to nonrespondents were made through September and October. When an operator was contacted, an attempt was made to collect the required data by telephone interview, or, if that was not possible, the farm operator was asked to complete the report form on his or her own and mail it back to the Bureau. By the time the telephone followup was closed down at the end of October, 2,000 additional cases had been resolved by telephone or by mail. The telephone followup included a subsample of nonrespondents that was expanded in the tabulations to represent all nonrespondent cases.

Followup Mailings		
	Date	Quantity
1st followup		
Total		14,064
SUSF		
Wave 1	5/21/80 - 5/26/80	10,855
Wave 2	6/19/80	64
Wave 3	7/21/80	702
SUMF, regular	5/28/80 - 6/4/80	1,386
SUMF, CAAS	9/9/80 - 9/11/80	482
MU	7/23/80 - 7/28/80	575
2nd followup		
Total		11,208
SUSF		
Wave 1	6/19/80	9,027
Wave 2	7/18/80	52
Wave 3	8/19/80	530
SUMF, regular	9/2/80 - 9/5/80	1,217
MU	9/11/80 - 9/15/80	382
3rd followup		
Total		8,230
SUSF		
Wave 1	7/17/80 - 7/22/80	7,863
Wave 2	8/11/80	47
Wave 3	9/16/80	320
4th followup		
Total		6,564
SUSF		
Wave 1	8/12/80	6,564

Results—Overall response to the farm energy survey was somewhat lower than for the census itself, but was comparable to the response rate attained for the other follow-on surveys. Approximately 27,400 A35 report forms (about 81 percent of the mail-out) were in hand before the closeout of the data-collection phase of the operation.

Data Processing

Receipt and check-in—As the mail returns began arriving in early April at Jeffersonville, they were opened and batched into work units of about 100 report forms each for check-in keying. After this, PMR's were referred for remailing and correspondence or report forms with correspondence attached were referred to the correspondence unit, while respondents' report forms were sorted by State, rebatched into work units of approximately 100 forms, and sent to the clerical edit staff. All clerical pro-

cessing of the report forms, except for special cases referred to analysts in Suitland, was done at Jeffersonville.

Precomputer edit and data-keying—The purposes of the precomputer, or clerical, edit were to (1) make certain the report forms could be keyed for computer processing, (2) identify and delete out-of-scope report forms, (3) determine which report forms required additional followup, and (4) review the data on each report form for accuracy and consistency. The clerical staff examined each data entry for eligibility, completeness, and consistency with other relevant items. Problem and multiunit cases, and report forms from very large operations were referred to technical analysts in Suitland for their review or, in cases where major portions of the forms had been left blank, to the correspondence or telephone units for additional followup. Corrections were made to each form as necessary before it was released from the clerical edit unit.

The edited report forms were sent on for data keying to magnetic tape beginning in the last week of April. After keying was completed, the data were transmitted to Suitland by telephone datalink for computer processing.

Computer edit—Beginning in December 1980, the keyed data were subjected to a series of computer checks at the Bureau's main computer facility at Suitland. These checks were similar, in general procedure and objective, to those carried out for the other follow-on surveys. Data for each operation were checked for completeness and internal consistency and problem items were "flagged" by computer for review by technical analysts. In some cases, data items left blank by respondents were imputed by computer, using values derived from similar operations. After analysts' corrections had been made, each case was reedited to ensure that the new data were consistent with other data.

Tabulation—The data were tabulated using the GTS software package. Tabulations were produced for the United States, divisions, regions, and States. A detailed review of the summary data was made to check consistency and reasonableness compared to the 1978 census and other related check data. Corrections were carried to the data file prior to the final tabulations. A series of special statistical tabulations were also generated specifically for research use by the Bureau and by USDA. (These special tabulations were not included in the publication for the survey, but are available to data users on a reimbursable basis.)

Publication

The data from the energy survey were published in the 1978 *Census of Agriculture*, Volume 5, *Special Reports*, Part 9, 1979 *Farm Energy Survey*. Estimates of the reliability of the sample data at national, division, region, and State levels, were provided in the publication.