

1978 Census of Agriculture in Puerto Rico

INTRODUCTION

Historical Background

A census of the population of Puerto Rico was carried out in 1899, but there was no census of agriculture on the island taken until 1910. Thereafter, censuses of agriculture were conducted every 10 years in conjunction with the decennial population censuses.

Congress enacted legislation providing for quinquennial censuses of agriculture in the United States as early as 1915 (although because of the First World War the first such census was not carried out until 1925), but neither Puerto Rico nor the outlying areas were included in the mid-decade agricultural enumerations until 1964.¹ (A special census of agriculture in Puerto Rico was carried out by the Puerto Rico Reconstruction Administration in 1935, but this was the only nondecennial agricultural count taken.) The next agricultural census, covering the year 1969, was taken in 1970 in conjunction with the decennial census of population and housing, while the 1974 enumeration was once again an independent operation. In 1972, a decision was made to do the agricultural and other economic censuses at the same time (1983, for 1982), so as to provide data for the same reference year. (See chapter 1 for discussion.) In order to carry out this plan with a minimum disruption to census operations, the intercensal period between the 1974 agriculture census and the next census was shortened from 5 years to 4, so that the succeeding enumeration would be carried out for 1978, rather than 1979. (The economic censuses are conducted for years ending in "2" and "7", hence, with a second 4-year interval after the 1978 operation, the agriculture census would be carried out simultaneously with the economic enumeration for 1982.) However, the Bureau decided to take advantage of the presence in Puerto Rico in 1978 of the office staff and facilities of the 1977 Economic Censuses. The agricultural census schedule in the Commonwealth of Puerto Rico was advanced by nearly a year, so that the principal data-collection operations there would be carried out in the summer of 1978, rather than concurrently with the major enumeration in the 50 States, and would collect data for the 12-month period from July 1, 1977 through June 30, 1978.

¹In 1957 an amendment to title 13 provided that Alaska, Hawaii, the Virgin Islands, Guam, and the Commonwealth of Puerto Rico were to be included in the quinquennial enumeration for 1964.

Legal Authority and Special Agreement With the Commonwealth Government

The conduct of the 1978 Census of Agriculture in Puerto Rico was governed by the provisions of title 13, U.S. Code, and acts of the Legislature of Puerto Rico relating to censuses, to the extent that such acts were consistent with title 13. A special agreement between the Bureau of the Census and the Government of the Commonwealth of Puerto Rico, signed in August 1977, set forth the functions and responsibilities of the Bureau and of the Commonwealth Government in the census. The Bureau of the Census had final responsibility for planning and conducting the enumeration, including the operation of a temporary census office in Puerto Rico, the appointment of a supervisor of the census and of Bureau staff personnel as advisors and liaison to the census staff, and the maintenance of confidentiality. The Commonwealth Government agreed to make qualified personnel from the Puerto Rico agricultural agencies available to the Bureau on a reimbursable basis to work as "special farms" crew leaders. While the Census Bureau retained authority with regard to the final questionnaire content and tabulations to be published, it agreed to consult with the Commonwealth Government to determine if special data needs could be incorporated into the regular tabulation program. Any tabulations not included in the regular program were to be provided to the agencies at a nominal fee at the same time as the standard tabulations.

Definition of a Farm

The statistics collected in the 1978 Census of Agriculture in Puerto Rico relate to places with agricultural operations that qualified as farms according to the definition used by the Bureau of the Census. These included all places of three *cuerdas*² or more where agricultural products other than vegetables for home consumption were produced, or where any livestock or 15 or more chickens or other poultry were kept. Places of less than 3 *cuerdas* could qualify as farms if they had gross sales of agricultural products of \$100 or more during the 12 months from July 1, 1977 through June 30, 1978, or if they expected to have gross sales of \$100 or more during calendar year 1978.

²A *cuerda* is approximately .97 of an acre.

PLANNING AND PREPARATION

Planning

Preliminary plans—Planning for the 1978 census in Puerto Rico started in early 1977. By May of that year, Agriculture Division staff were beginning to draw up preliminary plans for the 1978 agriculture census in the Commonwealth, and in July, representatives of the Bureau met with the Commonwealth Government's Interagency Advisory Committee to request assistance and coordinate planning. Initial plans called for a conventional operation, with the principal data-collection effort being undertaken concurrently with the census in the 50 States. However, as explained above, it was noted that the 1977 Economic Censuses of Puerto Rico would be underway in the first half of 1978, with an office established and administrative and field staffs in place. Rather than carry out the economic censuses, close down the operation, and then duplicate the entire effort in 1979, the Bureau suggested bringing the agricultural census forward a year, to mid-1978, thus utilizing the economic censuses' facilities to the greatest extent possible. This would result in considerable economies in both money and personnel, as well as provide the agriculture census with a pool of enumerators, crew leaders, and so on with some experience in census activities. The Commonwealth Government agreed to the change, and announced it publicly in September 1977.

Census schedule—Once the new date of the census was set, Bureau staff and representatives of the Commonwealth Government drew up a tentative schedule of census activities, as follows:

1977

Plan the major census operations with the Puerto Rico Agriculture Advisory Committee and officials of the Commonwealth Government.

Prepare a memorandum of agreement between the Bureau of the Census and the Commonwealth of Puerto Rico regarding the conduct of the census.

Prepare drafts of report forms and other necessary census materials.

Develop a control file for special farms, to be used in 1978.

1978

Translate final drafts of report forms and other census materials into Spanish.

Print report forms and other materials.

Carry out a test of the feasibility of using Puerto Rico Department of Agriculture farm lists as quality control lists for the census.

Evaluate results of the feasibility test.

Recruit and train the enumerator staff (as necessary) for the agriculture census.

Carry out a Special Farm Identification Survey to locate "special" farms for the mail portion of the census.

Conduct the enumeration.

Check in, review, and correct the census returns.

Ship report forms to Data Preparation Division, Jeffersonville, Ind., for data keying.

1979

Prepare specifications for computer processing and computer programs.

Key the data to computer tape for processing.

Perform computer edits and correct records.

Tabulate the data.

1980

Publish the results of the enumeration.

Every effort was made to adhere to this timetable, but events, most notably water damage to the Suitland computer facilities and the resultant scheduling-priority conflicts with both the 1977 Economic Censuses and 1980 Census of Population and Housing programs, caused considerable revision in the Puerto Rico schedule.

General plan for the census—The principal data-collection effort for the census was to be a two-part operation: the first part included the enumeration of "special farms," i.e., farms identified in the 1974 census as having 200 *cuerdas* or more, or sales of \$20,000 or more; while the second part of the census was the field enumeration, which covered "regular farms." "Special farms" were to be identified in a survey carried out by mail early in 1978, and then enumerated by mail concurrently with the regular field enumeration. For regular operations, report forms were to be completed by enumerators, with information supplied by respondents during personal interviews. Completed report forms for both kinds of operations would be subject to certain review procedures in the Puerto Rico field office, after which they would be shipped to Suitland for pre-computer processing.

Preparatory Operations

Report forms—The standard report form for Puerto Rico was the 78-A1(PR)SP, used for all farms in the Commonwealth. This was an 8-page, 10½" x 16" booklet printed on white stock with blue ink and shading. The A1 report form used for "special farms" was identical, except that it was printed on salmon-colored stock. (The mailing to special farms and the field enumeration used Spanish-language forms (hence the "SP" in the form number), although an English-language version was available upon request.)

The report form was divided into 28 sections that requested data on the following:

- Ownership, and/or renting/leasing of land from or to others
- Cuerdas* harvested and amount sold for selected crops
- Land use
- Irrigation
- Livestock and poultry inventory and sales, and sales of livestock and poultry products
- Products for home consumption
- Machinery, equipment, buildings, and facilities

Hired workers
 Use of chemicals (herbicides, fungicides, other pesticides,
 lime, etc.)
 Expenses
 Value of sales of selected products
 Farm-related income
 Farm business organization
 Operator characteristics

Farm listing pretest—The general acceleration of the schedule of the census in Puerto Rico precluded extensive pretesting of the report form, but the design developed was very similar to the successful 1974 form and no major problems were anticipated. However, the Bureau believed that a test of the proposed farm-listing screening questions was necessary. In addition, the Puerto Rico Department of Agriculture (PRDA) offered the Bureau the use of its own farm lists for each municipio as a quality control resource to check coverage—i.e., enumerators' lists of farms canvassed could be compared by census personnel to the PRDA lists to determine whether complete coverage of farms in each municipio had been achieved. To be of any use, the control lists had to be accurate and up-to-date, so the Bureau took the opportunity to test both its screening questions and the PRDA's lists in a small-scale prelisting operation. Six municipios in the southwestern part of Puerto Rico (the least urbanized area) were chosen for the test, and a small staff of enumerators was sent into the field to identify and list the agricultural operations in each municipio. The prelisting was carried out in January and February of 1978. The proposed screening questions provided adequate means of identifying farms, and the operations listed were matched to the PRDA lists. The comparison revealed that the PRDA lists were incomplete for census purposes and the idea of using them as coverage quality control resources was dropped. Instead it was decided that a number of farm operations in each crew leader district should be prelisted, and then matched to enumerators' lists during the enumeration to identify areas with coverage problems.

Special farm identification survey—There was no complete and up-to-date list of the "special," or large, farms in Puerto Rico when the Bureau decided to enumerate them by mail, so an address list had to be compiled. A preliminary list was assembled, primarily from the 1974 census farm list and from the records of the Puerto Rico Department of Agriculture, which necessarily included a substantial number of addresses whose status as "special" farms was questionable. To determine the current status of these addresses, a farm identification survey was carried out in the spring of 1978. A report form, the 78-A30(PR)SP, was prepared that asked whether the recipient operated a farm, raised any crops for sale, or had any livestock or poultry, and the location of the farm. Respondents not actively farming, or who had reduced the size of their operations, would be removed from the list, while the names and addresses of any new operators obtained from farms that had changed operators would be added.

The first mailout for the identification survey was to be made from Suitland in March 1978, with two followup mailings in April, but preparations for the main census operation delayed

the initial mailout until April. This was only 3 months prior to Census Day (July 1) in the Commonwealth, but it was decided to go on with the survey mailing in the hope of improving the quality of the address list, although the followups were dropped. Accordingly, approximately 2,000 A30(PR)SP report forms were mailed to addresses on the special farms list in the second week of April. By the end of the first week in June, 749 forms (about 37-percent response) had been received. Since the mailing list had to be finalized some time before the actual mail-out to the special farms, scheduled for June 12, the identification survey was closed down at this point.

Field Organization and Training

General organization—The Bureau of the Census opened its office in San Juan, Puerto Rico, in October 1977, to prepare for the 1977 Economic Censuses. The local census manager was selected from several candidates and served as the principal manager of census operations for both the economic and agricultural censuses. While the primary concern of the field office and the staff during their first several months of operations was the economic enumeration, which began in January 1978, certain preliminary work on the agriculture census, such as the quality control list pretest, was carried out simultaneously with economic census operations. By May 1978, the office was changing its principal focus from the economic to the agricultural operation.

The Bureau's Field Division had primary operational responsibility for the field enumeration (although Agriculture Division's Outlying Areas Branch carried out most of the mailing operation) and a member of its regular staff was assigned to the Puerto Rico office as liaison between the office and Bureau headquarters. The Agriculture Division assigned members of its staff as technical advisors and reviewers during the enumeration, followup, and processing. Space for the census office, located in San Juan, was contracted for by the General Services Administration (GSA), and office equipment was also provided by the GSA, or was rented locally.

Regional census offices were not established for the 1978 enumeration. Instead, the seven supervisory crew leaders ran their district enumerations from their homes. Local municipio governments were contacted by the census office and provided space, on a temporary basis, for such local activities as crew leader and enumerator training, payroll computation, and so on.

Recruiting and training—Recruiting for the field enumeration staff began April 24, 1978. A total of 58 crew leaders and nearly 600 enumerators were required for the census, many of whom were selected from among people who had taken part in the economic censuses. By the last week of May, the crew leaders and over 500 enumerators had been selected. In mid-May, the Field Division liaison began conducting training classes for the seven supervisory crew leaders. When their own training was completed, the supervisory crew leaders then held 3-day training classes for their crew leaders on May 31 and June 1-2. The crew leaders, in turn, were responsible for training their enumerators, and conducted their own training classes during the period June 13-16. By June 19, the recruiting and training effort was complete and the field enumeration began.

Enumeration materials—*The Enumerator's Manual* (form A10 (PR)SP) and the *Training Guide for Enumerators* (A11(PR)SP) were the basic procedural volumes used to instruct the field staff. The *Enumerator's Manual* was the principal reference source for enumerators in the field.

There were also training guides for crew leaders (the A8(PR)SP), a *Crew Leader's Manual* (A9(PR)SP), and training guides for special farms and quality-control enumerators (because so few were produced, no form numbers were assigned). In addition, an *Office Procedures Manual* (A46(PR)SP) and an *Administrative Manual* (250(PR)SP) were available for use at the census field office. All of these materials, the enumerator, crew leader, and supervisory crew leader guides and manuals, and the office procedures manual, were prepared in English at Suitland, translated into Spanish by Bureau personnel, and reproduced prior to shipment to Puerto Rico.

The field and office staffs required detailed maps of the Commonwealth to facilitate complete enumeration. The Bureau's Geography Division prepared 1:20,000-scale detailed maps of each enumerator's area of responsibility, using information from aerial maps and U.S. Geological Survey "quad" maps, and aerial photographs of each enumeration district (ED) were provided to enumerators to supplement their maps.

Publicity—The publicity campaign for the 1978 Census of Agriculture in Puerto Rico had two major functions: to publicize the census and encourage cooperation and response, and to help in recruiting the census staff. The Bureau's Public Information Office (PIO) designed and produced a poster to help in the staff recruitment effort, and in April, 700 copies, each with 50 job-application/reply cards attached, were shipped to the Commonwealth to advertise both the census operation and the opportunities for employment on the agricultural census staff. News releases announcing the commencement of hiring for the census staff and the beginning of the enumeration itself were also prepared and sent to the San Juan office for release to some 85 major media outlets across the island.

With relatively little time available for the campaign to have its effect, the Bureau concentrated its effort on the broadcast media as the likeliest method of reaching the greatest number of farm operators in the shortest period of time. A set of color slides on the census, together with a taped narration, was developed and five kits were made up (one with English narration and four with Spanish) for release to the five Puerto Rico television stations. In addition, a set of two 60-second, one 30-second, and three 15-second radio spots was prepared and sent to 75 radio stations in the Commonwealth. (As in the 50 States, these tapes, slides, etc. were broadcast on a public-service basis.) All of these materials, developed initially by the PIO, were translated and recorded at Department of Commerce facilities in Washington, D.C.

A request was also made to the Governor's office that the first week of the enumeration be proclaimed the "Week of the Census of Agriculture." The proclamation was prepared and issued, and responsibility for publicizing it was assumed by the census office.

The publicity campaign was of relatively short duration and, coming as it did so soon after the economic census, put a con-

siderable public service burden on the local news media. Nevertheless, the Bureau received substantial help from the local media and considered the publicity campaign successful.

ENUMERATION

Special Farms Enumeration

Mailout—The enumeration of special farms in Puerto Rico was a two-stage operation, consisting of a mailout of report forms to addresses on the Bureau's special-farms list, followed within a month or so by a field followup of nonrespondent cases. The mailing packages for special farms, each containing a 78-A1(PR)SP report form, a return envelope, a form 78-A1(PR)-L1 cover letter, and an instruction sheet, were assembled and had address labels applied at Jeffersonville. Some 3,000 packages were prepared in mid-June and were shipped to San Juan, arriving there on June 23. The packages were immediately delivered to the post office and mailed to farm operators.

Field followup—By the third week of July, 335 responses to the special farms mailing had been received and the census office was preparing for the field followup of nonrespondents. Seven crew leaders assigned to the special farm enumeration, one for each of seven special crew leader districts, were employees of the Puerto Rico agricultural agencies. Their duties and responsibilities were similar to those assigned to crew leaders in the regular field operation (see below for details). Some of the enumerators selected from the field staff already involved in carrying out the census of small and medium-sized farms were given a special 3-day training session between July 19 and 22, primarily to familiarize them with the special-farms control lists, the Special Farm Identification Survey form 78-A30(PR)SP, etc. Each enumerator was given a kit containing the control list of special farms in his or her assigned area (one enumerator was generally responsible for the special farms in several regular enumerators' districts), a supply of A1(PR)SP report forms, and the A30(PR)SP's for special farms in the area, as well as the necessary manuals and maps. The field followup of special farms began the next day, July 23.

Special-farms enumerators visited every address on their Special Farms Control List and completed an A1(PR)SP report form for every operation, unless the land had been idle or retained for nonagricultural purposes during the 12 months preceding the enumeration.

Work on the enumeration of special farms continued for nearly 10 weeks, until the end of the first week of September 1978. Approximately 500 A1(PR)SP report forms were received by mail, while over 2,500 were completed by the field staff. An attempt was made, early in the census, to follow up selected large nonrespondents by telephone, but only a handful of cases were successfully resolved in this way and the use of the telephone for this purpose was discontinued at the end of July. A total of 3,052 agricultural operations were enumerated by the special-farms data-collection effort.

Field Enumeration

Taking the census—For the purposes of the field enumeration, Puerto Rico was divided into seven supervisory crew leader

districts (SCLD's). Each SCLD, in turn, contained between 6 and 10 crew leader districts (CLD's)—58 in all—which were made up of individual enumeration districts (ED's). Each enumerator was assigned a specific geographic area (his or her ED) to canvass and was provided with a census kit that included a supply of form A1(PR)SP questionnaires to be filled out for each farm operator interviewed, a map (to be updated as the canvassing proceeded) and an aerial photograph of the ED, a "skip list" of special farms not to be enumerated, and a record book for the ED. The record book had a cover (form A-5(PR)SP) that identified the enumerator and the supervisor, the ED, municipio, and barrio involved (each ED *usually* encompassed an entire barrio), and the enumeration procedure code (see below). It also contained a supply of form A3(PR)SP Listing Pages and A4(PR)SP Nonresident Operator Cards. The A3(PR)SP contained the screening questions asked for each respondent in order to determine whether his or her place was a farm, while the A4(PR)SP cards were used to record basic information about nonresident farm operators and their farms. (A4(PR)SP's were also completed at closeout time for callback failures.)

In predominantly rural ED's, the canvassing was done using "procedure A." Procedure A involved door-to-door canvassing, except in built-up residential areas called "clusters," where there were 50 or more buildings, each on half a *cuerda* or less of land. Enumerators could "spot check" households in clusters to inquire among the residents as to whether anyone operated a farm, and enumerate any operators so identified in the usual way. Clusters were shown on the ED maps as shaded areas, but if an enumerator found an area qualifying as a cluster but not shown as such on the ED map, he or she outlined the area on the map and assigned a cluster letter to it. Such "new" clusters were canvassed after the crew leader had reviewed the map or area involved and decided which method (door-to-door, or spot-check) was to be used.

"Procedure B" canvassing was used in ED's that were in mostly urban areas, or that had 10 or fewer farms listed in the 1974 Census of Agriculture of Puerto Rico. For procedure B ED's, the names and addresses of known farms (drawn from 1974 census lists) were entered on the A-3(PR)SP Listing Pages in the record book for the ED, and the enumerator visited each address.

In both procedures, the enumerator began the interview by asking the respondent the name of the head of the household and a screening question as follows:

Did you in the last 12 months raise, produce or sell any crops, vegetables for sale, ornamental or flowering plants, or have—

1 or more cattle?

1 or more pigs?

15 or more poultry?

If the respondent answered "yes" to any part of this inquiry, the enumerator then asked if the place had three or more *cuerdas*. If so, a completed questionnaire was required. Places of less than 3 *cuerdas* qualified as farms if the gross sales from

agricultural products from July 1, 1977 through June 30, 1978, or the expected gross sales during the calendar year 1978, were \$100 or more.

When a place qualified as a farm but contained no housing unit, or the operator did not live in any housing unit on the place, the enumerator completed an A4(PR)SP Nonresident Operator Card for the farm and assigned the first unused A4(PR)SP serial number to the operation. Enumerators consulted neighbors, or any other likely source, to obtain the addresses of nonresidential operators. If the operator lived in the same ED as the farm in question, the enumerator completed a report form when visiting the operator's residence. If the operator lived outside the ED containing his or her farm, the case (with the appropriate A4 card) was referred by the enumerator to his or her crew leader, who then referred it to the crew leader in whose district the farm operator lived.

Callbacks—When an enumerator found no one at home, neighbors were contacted to try to determine whether or not the household was engaged in agricultural operations. If it could be established that no one in the household was involved in farming, no callback was required, but if this could not be confirmed the enumerator was to find out the best time to call back and note it in the A3(PR)SP listing for the address. Any additional information regarding the address was included in the "Remarks" section of the listing book. Enumerators were to try to make callback visits as soon as possible after the initial one, so as to avoid an accumulation of delayed work.

Field Review and Quality Control

The quality control plan for the 1978 census involved three distinct phases: an observation period for enumerators, a field review of the enumerators' completed work, and a match of enumerators' farm listings to quality-control prelists to check for coverage.

The observation period involved the selection by each crew leader of the four enumerators who, in the crew leader's judgment, had the most difficulty in performing their required duties. The crew leaders accompanied the enumerators selected when the latter began canvassing. Any difficulties the enumerators might have were noted and they were retrained if necessary. No enumerator chosen for observation was permitted to begin canvassing without supervision until he or she had demonstrated a satisfactory capacity to the crew leader.

As early in the enumeration as possible, the crew leaders carried out a review of the work of their other enumerators. This review covered all aspects of the enumeration—field canvassing techniques, completion of forms, listing, etc. Those passing this review continued working, while those who failed it were either retrained or released, depending on the nature of their problem.

A second review of all of the materials for each ED—listing pages, report forms, map, etc.—was done by the crew leader or supervisory crew leader responsible before those materials were accepted as complete.

A coverage check of each CLD was also carried out by a staff of quality-control enumerators. Prior to the start of the field

enumeration, 30 quality-control enumerators selected four addresses at random within each CLD and prelisted those places and the five consecutive addresses immediately following them that should be visited by an enumerator. This prelist then was compared to the enumerators' listing pages during the crew leaders' review of their enumerators' work to determine whether or not complete coverage was being obtained. It was found that, in general, very good coverage was being achieved by field enumerators.

Enumeration Results

By the end of July approximately 24,000 A1(PR)SP report forms had been filled out for places identified as having agricultural activities. The enumeration continued until September 9, when the canvass of the last outstanding ED was completed. While some 33,700 report forms were filled out during the enumeration, those that were identified as representing places that were considered out of scope (i.e., not meeting the farm definition), or were found to be duplicates, were deleted from the census file. A total of 31,983 in-scope forms were identified and contributed data for tabulation and publication.

POST-ENUMERATION EVALUATION SURVEY

While a general evaluation of the agricultural census in Puerto Rico was not carried out, the Bureau conducted a post-enumeration evaluation survey in an attempt to determine how thoroughly enumerators had completed census report forms, and the effect, if any, of editing and processing procedures (particularly imputation for missing data) on the accuracy of the statistical summaries drawn from the census data. The survey design called for the selection of a sample of completed special and regular farm cases. Photocopies of the report forms for the sample cases were to be made and any changes made by the editing staff were to be marked out; each report form was then to be closely reedited for consistency of reported data—no imputation for missing items was to be done. Report forms that failed this edit, that is, those with missing data or incomplete or inconsistent entries, were to be subjects of a field followup, with an enumerator visiting each subject operation in an attempt to obtain the necessary data. Once the followup operation was completed, the report forms would be reedited, and the data from the sample would be processed and tabulated for comparison to the data from the same operations as processed by the regular census procedures.

Plans for the evaluation survey were completed and approved in August and September 1978. The sample was to consist of approximately 1,500 cases: a stratified (by estimated value of sales) sample of 500 special farms and a systematic sample of 1,000 "other" farms selected on an island-wide basis.

The reedit of the sample report forms began in late September, and the first cases for field followup were sent to the enumeration staff early in October. (This enumeration staff consisted of former crew leaders and supervisory crew leaders.) The field followup phase of the survey was completed by the

end of October, and the editing of the report forms from the followup was finished in November. Thereafter, all of the report forms, including those that had passed the first reedit, were packed and shipped to Suitland.

The original plans for the survey had called for the data from the sample report forms to be processed and tabulated for comparison between the data from (a) the same report forms *before* the normal field-office edit, and (b) the data from the report forms *after* the edit, to determine the degree of change caused by the edit, or the improvement of coverage and completeness of data collected presumably achieved in the survey. However, by the time the sample data arrived in Suitland, budget and personnel constraints on the Bureau's computer facilities and staff precluded immediate processing. It was decided, therefore, to defer completion of the evaluation survey until resources could be more easily spared from other work.

DATA PROCESSING

General Information

The processing of the data collected in the 1978 Census of Agriculture in Puerto Rico involved the following operations:

Operation	Dates
Clerical editing of the report forms in Puerto Rico and Suitland	7/78-12/78
Data keying and verification at Jeffersonville	11/78-2/79
Format and consistency edit by computer	2/79-3/79
Technical review of format and consistency edit rejects	2/79-3/79
Correction of data rejects	2/79-4/79
Tabulation of the data	9/79-9/80

Editing

The report forms for Puerto Rico were first reviewed clerically in the San Juan field office on a flow basis as the completed documents were submitted from the field enumeration staff. The preliminary edit was concerned with such functions as rewriting unreadable entries, deleting unnecessary entries, moving misplaced entries to the correct location, converting fractional or decimal *cuerda* entries into *centesimos* (hundredths), coding specified entries, and so on. Subject-matter specialists in Suitland were consulted when specific technical problems were encountered.

Upon completion of the field enumeration and the field office edit, the report forms were shipped via air freight to the Outlying Areas Branch of the Agriculture Division, in Suitland, where they were reviewed for completeness and consistency to insure keyability. These clerically edited forms then were shipped to the Data Preparation Division in Jeffersonville where they were keyed directly onto disk, using the key codes pre-

printed on the report forms, and then copied onto magnetic tape.

After keying, the data were ready for computer processing and were transmitted via datalink to the Bureau's computer facilities at Suitland for execution of the format and consistency edit programs. The specifications for these programs were furnished in decision logic tables (DLT's) by the subject-matter specialists in the Agriculture Division. The format edit program arrayed the data into a workable record format and carried out checks for a number of items, using parameters established in the DLT's from which the programs were written. The format edit checked for illegal items (data-keying errors), nonresponse to required items, items reported or keyed as negative values, out-of-scope records, and the correct check digit (identification number) for each record.

Data and/or out-of-scope records rejected by the format edit program then were displayed for subject-matter specialists' review and correction. Records "passing" the format edit, or corrected and returned to the file, were subjected to a second, more complex edit program, which—

1. Made consistency checks (a procedure in which the computer matched totals of data reported to the sum of the data detail).
2. Set "flags" (i.e., indicators, recognizable by the computer program and human reviewers, that a particular piece of information was incorrect or inconsistent with other data elsewhere in the same report).
3. Imputed missing or incorrect entries using values derived from data supplied by the Puerto Rico Department of Agriculture and/or from local farm and marketing associations.
4. Coded each record for size, by the number of *cuerdas*; economic class, by the value of sales; for type of farm (whether dairy farm, sugarcane farm, etc.); for tenure of the operator (owner, part owner, tenant, manager, etc.); for type of organization (individual, partnership, corporation, etc.); and age and main occupation of the operator (i.e., agricultural or nonagricultural).

Upon completion of the first edit pass, a listing of "flagged" cases was printed. These cases were reviewed by subject-matter specialists in Suitland and necessary corrections were coded and keyed using key-to-tape encoders, after which the records were edited again by the computer and were inserted into the data records on tape. (A flagged case might undergo several computer edits, since changing any one item could cause related items to be inconsistent with the corrected data, thus requiring additional consistency checks.)

The edited and corrected data file was then ready for tabulation.

Tabulation

Table layouts and specifications were furnished by the Bureau's subject-matter specialists, and the General Tabulation System (GTS) software package was used to produce the data

tabulations. Three major sets of tabulations were prepared, one each for all farms in Puerto Rico, all farms in each of the five agricultural regions of the island (as delineated by the Commonwealth Government), and all farms by municipio. These sets also were cross-tabulated by type of farm, class, size, tenure of operator, etc., for farms with a total annual value of production of \$1,200 or more.

The tables produced were reviewed in Suitland for consistency and accuracy, and corrections to any errors were carried to the data tapes before the final tables were released for print.

COMPARABILITY OF THE DATA

The data produced by the 1978 Census of Agriculture in Puerto Rico were, in general, comparable to those produced in earlier censuses. The change of procedures for 1978, from a purely field-interview operation to one combining data from field interviews and mail enumeration, had no significant effect on the comparability of the data, but the inclusion in the censuses from 1969 onward of some places of less than 3 *cuerdas* and the difference in the reference periods of the censuses did affect some of the data.

The 1978 data are most directly comparable to those of 1974, inasmuch as most of the items requested in 1974 were also requested in 1978, with the exception of additional information requested in 1978 on selected crops under cultivation and on products for home consumption. For 1969, operations with sales of more than \$1,200 were asked additional questions on irrigation; ornamental and flowering plants; machinery, buildings, and equipment; hired workers; insecticides, herbicides, and fungicides; other farm-related income; and type of farm organization. The 1964 census requested data on equipment and facilities, off-farm work, and expenses, of all farms with sales of more than \$1,200, but of only one-fifth of farms with sales of less than that amount.

PUBLICATION PROGRAM

No preliminary report was published for Puerto Rico. The census data for Puerto Rico were published in the *1978 Census of Agriculture, Volume 1, State and County Data, Part 52, Puerto Rico*. Data were presented for all farms for the island as a whole, for the five agricultural regions, and for each of the 78 municipios. The data include land in farms; major uses of farm land; size of farms; tenure and characteristics of operators; organization; inventory of selected machinery, equipment, buildings, and facilities; agricultural chemicals purchased; irrigation; selected production expenses; income from sales of agricultural products; farm-related income; crops harvested and sold; inventory and sale of livestock and poultry and their products; ornamental and flowering plants and lawn grass; selected crops under cultivation; and products for home consumption. Summary data were also presented for farms with sales of \$1,200 or more, by tenure and characteristics of operator, type of organization, size of farm, value of sales, and type of farm.

No unpublished data are available from the 1978 census in Puerto Rico.