

## CHAPTER 1 - ADMINISTRATION

### BACKGROUND TO THE CENSUS

Préparations for the 1980 Census began in a formal sense in December 1976 when the Minister of Finance approved a recommendation by the Chief Statistician that:

1. Bermuda agree to participate in the joint census effort of the Commonwealth Caribbean countries and,
2. Monies be allocated annually to cover Bermuda's contributions to that effort.

As an immediate result of this recommendation, the Chief Statistician attended a series of meetings in 1977 by the Regional Census Coordinating Committee (R.C.C.C.) held under the auspices of the Standing Committee of Commonwealth Caribbean Statisticians.

At these meetings it was agreed that all attempts would have to be made to improve timeliness in the processing of the 1980 Census. It was noted further that a joint effort of the scale carried out in 1970 was no longer feasible because of the following:

- a. Many countries had information requirements which would be difficult to fit into a joint processing programme.

- b. A few countries had sufficiently developed computer capability and were desirous of carrying out their own processing.

It was agreed ultimately that countries would agree to a common core of questions so that inter-territory comparability would be maintained while at the same time allowing scope for lines of investigation peculiar to particular countries.

Further, it was agreed that a mark-sensed document would again be used because of the great savings in time and increased accuracy. However, the use of a mark-sensed document posed severe restrictions on countries planning their own processing since the cost of the scanning equipment and the conditions of rental could not be met by all countries involved.

As a result of the information generated by these meetings, the Chief Statistician obtained permission from the Minister of Finance to investigate the possibility of processing the 1980 Census externally but joining the Caribbean in the overall planning of the 1980 Census, development of the Census Questionnaire, the preparation of training manuals, and the purchase of Census materials.

A difficulty faced by any small country is the availability of personnel experienced in all phases of census taking because the expertise required is considerable and the probability of retaining such local personnel after they have been trained is low. Realising this, a major objective of the statistical department has been to develop a part-time core staff which fully understood the fundamentals of conducting a major household survey such as a census.

The first real opportunity for developing such staff came with the 1970 census. Consequently, every attempt was made to involve persons utilised in the 1970 census in subsequent surveys.

A second step was to use all clerical and sub-professional staff in the statistical office in the actual enumeration. As a result of this strategy, it was possible in 1980 to produce a census supervisory staff with considerable experience in the taking of censuses, a factor which enabled the Bermuda government to launch the full operation in less than nine months.

Another important decision with respect to staffing concerned the number to be used and trained. During the meetings in the Carribean, all countries were concerned at the inordinate

delays in processing census results brought about by the need to engage in lengthy editing processes after the questionnaires were returned from the field.

Further, there was considerable doubt as to whether the dubious improvement affected by this procedure justified the time consumed, let alone the cost. A solution seemed to lie in making much more use of improved computer editing techniques and to make provision for more intensive staff training and of editing by supervisors.

The Bermuda government had already made speed of results a top priority; hence, the decision was taken to make provisions for editing in the field by supervisors. This decision had the effect of more than doubling the supervisory staff used in 1970.

Next to staffing, processing is a major problem for small countries. There is no processing problem in any country likely to be greater than that involved in the processing of a population census. This is particularly true if the tabulations required are of sufficient complexity to justify the exercise in the first place.

The Bermuda government rightly concerned itself about processing at the very outset of formal planning for the census by instructing the Chief Statistician to investigate the possibility of getting a computer firm which could deliver the census results in sufficient time to make possible publication of the results within 12 months.

After looking at the possibility of using the facilities offered by the regional census planning exercise, local resources including those provided by the Bermuda government, the United Nations and Educational Testing Service (ETS) of New Jersey, it was agreed to employ the services of Educational Testing Service.

This decision was not taken without considerable thought. While we appreciated the cost advantages of using the services of R.C.C.C., it was recognised that the difficulties they were experiencing in getting the necessary equipment would inordinately delay the processing of our census.

Surveys which had utilised local computer resources ran into difficulty at the systems and programming ends. This occurred not so much because of the difficulty of the work involved, but rather because of the lack of experience in the preparation of adequate consistency checks for economic and demographic data.

The United Nations were prepared to consider offering assistance but were not prepared to enter into an arrangement which required the use of scanning equipment.

Educational Testing Service was already operating in Bermuda under the auspices of the Ministry of Education. Talks with their officials revealed that they could enter into a variety of arrangements with the Bermuda government to process the 1980 census data. For instance, they were prepared to allow the information to be read to a disc or tape in Barbados and to prepare the tabulations, or they were prepared to carry out all aspects of the processing.

We had an opportunity to study their work during the Census of Persons Qualified to be Electors. On that occasion, they designed the census questionnaire, carried out the scanning and produced the tabulations. The turn-around time for the results was six weeks. It was therefore decided to engage that firm.

The remaining decisions to be made during this early preparatory period were the hiring of a Census Officer and agreement on the date of the Census.

During the fall of 1978, the Minister of Finance agreed to a recommendation by the Chief Statistician that the posts of Census

Officer and Assistant Census Officer be created in order to commence the considerable preparatory work involved in the carrying out of the 1980 Census. Subsequently, during the summer and fall of 1979 these two officers were appointed and the Census preparation went into full gear.

#### PRE-ENUMERATION PERIOD

The pre-enumeration activities may be viewed conveniently under the headings of organisation, recruitment and training, and publicity. Organisation refers to the delegation of powers and assignment of tasks necessary for the efficient carrying out of the Census. Recruitment and training involves the whole process of assembling staff and preparing them for this massive, complex, administrative exercise. Publicity relates to activities which had to be performed via mass communications media to ensure maximum cooperation of the general public.

#### Census Organisation

A fundamental task in any census is the preparation of census maps, which are necessary to ensure no overlapping of districts, to enable enumerators to locate residents easily and

to provide supervisors with a ready means to check enumerators' progress.

Bermuda's census exercise was blessed with being able to use the same census districts as in 1970 because these had been officially designated as postal zones subsequently by the Bermuda government. Further, the descriptions of these maps - developed by Mr. Gladstone Bassett in his role as Census Organiser during the 1970 Census - had been incorporated by the Bermuda Post Office as the official description of the postal zones. In addition, there was available a set of reference codes for all Bermuda dwellings which had been incorporated onto maps by the Land Valuation Officer, Mr. Frank Lund. These reference numbers were also available in a parish-by-parish listing also provided by that same office.

To further assist us in our efforts, the Director of Public Works instructed his staff to mark out postal zones on the Bermuda aerial survey maps prepared in the early seventies. To these prepared maps were added buildings recently erected as determined from the land valuation records.

The postal zones on the updated maps were then reproduced by Xerox copiers. Four copies of these were prepared for each census district to be used by the enumerator, supervisor, central staff and as a reserve.

As a consequence of this time-consuming but necessary work, Bermuda's enumerators went into the field with probably the best maps used anywhere for census purposes.

#### Creation of Administrative Areas

To facilitate the administration of the census, the island was divided into regions, supervisory areas, and census districts. Since it had been decided to make supervisors more responsible for the quality of the data, it was necessary to increase their number from 20 in 1970 to 53 for 1980. It was also necessary to increase the number of regional supervisors from 3 to 9. One of the regional supervisors and three of the area supervisors were assigned the enumeration of group dwellings, institutions and other special areas.

Every attempt was made to divide regions evenly in terms of postal zones and numbers of households. Thus Region One included all of St. George's and Census Districts (postal

zones) 1-10 in Hamilton Parish. Region Two included the remaining zones in Hamilton Parish plus all of Smith's and Census Districts 1-4 and 7 in Devonshire. Region Three included the rest of Devonshire and postal zones 4-9 in Pembroke. Region Four included postal zones 1-3 and 10-37 all in Pembroke. Region Five consisted of postal zones 38-63 in Pembroke. Region Six included all of Paget and postal zones 8-18 in Warwick. Region Seven included postal zones 1-7 and 19-29 in Warwick and postal zones 1-5 and 11-18 in Southampton. Region Eight consisted of postal zones 6-10 in Southampton and all of Sandys.

Each region was divided into supervisory areas. These contained not less than four nor more than seven Census Districts (postal zones). The decision as to the number of Census Districts per supervisory district depended upon the household/persons count as determined by the 1977 Census of Persons Qualified to be Electors.

It was noted earlier that there were nine regional supervisors. The ninth was used to supervise the enumeration of group dwellings, institutions and other special areas. For this purpose the island was divided into three supervisory areas, designated Eastern, Central and Western. The Eastern included

all parishes east of Pembroke. The Central included Pembroke and the Western consisted of parishes west of Pembroke. All staffs in the Special Region (Region Nine) were also used as back-up to the other eight regions. This provision turned out to be more than justified given the drop-out rate after the enumeration began.

#### Census Administrative Structure

The administrative structure of the 1970 Census consisted of persons in both line and staff functions. Authority emanated from the Minister of Finance, who was responsible for the supervision of the census operation and of keeping Parliament informed of its progress.

The Census Superintendent was responsible for originating policy, the organisation of the Census, liaison with the Caribbean Census Coordinating Committee, the general direction of the Census programme, and the submission of a Census Report. The Census Officer was responsible for the coordination of the whole Census programme and the day-to-day management and supervision of the office and field staffs.

The office staff consisted of typists and clerks whose responsibilities included the creation of Census maps, the

assembly and distribution of supplies, the editing of census returns, as well as typing, filing and other office routines. Five persons were involved during the pre-enumeration and enumeration stages; however, this number rose to twenty during the post-enumeration period.

The field staff consisted of Regional Supervisors, Area Supervisors and Enumerators. Regional Supervisors were primarily responsible for the enumeration of households in a region, which included liaison with head office staff as well as directing and coordinating the activities of supervisors. In addition, Regional Supervisors were responsible for recruiting enumerators, supervising training centres and the final selection of enumerators.

The supervisors were primarily responsible for the enumeration of households in a supervisory district as well as the editing of completed questionnaires. In addition, they carried out the actual training of enumerators and advised on the final selection.

The enumerators carried out the house-to-house interviews. Their role was to ensure that members of all households were contacted and that a census return was completed for each member of the household.

Staff functions were carried out by the Census Committee headed by Parliamentary Secretary, Mr. Cyril Rance M.P., and Mrs. Joy White, Demographic Statistician.

The Census Committee was appointed by the Minister of Finance on November 13, 1979 to oversee the taking of the 1980 Census. The committee was to ensure that there was sufficient liaison between government - the Census Office - to allow for maximum public cooperation. The committee was also to ensure that members of the general public understood the objectives of the census and that they appreciated the need for full cooperation. The committee consisted of the following persons:

Parliamentary Secretary for Finance, Chairman -

Mr. Cyril Rance M.P.

Financial Secretary - Dr. David Saul

Shadow Minister of Finance - Mr. L. Frederick Wade M.P.

Census Superintendent - Mr. Calvin Smith

Census Officer - Ms. Rena Henry

Director of Public Relations - Mr. Leopold Mills

Controller of Data Processing - Mr. A. Rainsborough

Bermuda Industrial Union, President - Mr. Ottiwell Simmons

Chamber of Commerce, President - Mr. J. J. Outerbridge

Bermuda Ministerial Association, President -

Rev. Dr. Lewis Davidson

Bermuda Employers Council, President - Mr. John Burland

The Demographic Statistician, Mrs. Joy White, had a key role in the whole operation since it was her responsibility to ensure that the statistical goals of the census were met. This involved preparation of training manuals, enumeration manuals, coding and editing manuals. It also included organising the training sessions and carrying out the lion's share of 36 lecture hours during the training of supervisors and enumerators.

The entire staff involved in carrying out the enumeration numbered 322. These included the central staff of five, nine regional supervisors, 53 area supervisors, and 255 enumerators.

#### Recruitment and Training

Recruitment was in two stages. Stage One included recruitment and training of the Regional and Area Supervisors and Stage Two included recruitment and training of enumerators.

Following the recruitment of the Regional and Area Supervisors, training sessions were held at the Berkeley Institute

from February 18 through March 3, 1980, under the direction of the Demographic Statistician and the Census Officer. During this period the census supervisory staff were familiarised with the questionnaire and with interviewing techniques. Following this training the island was visited by a training officer from the R.C.C.C., Mr. Trevor Sheppard of Barbados, who spent nine hours with the supervisory group to reinforce training already received and to explain the more subtle aspects of the questionnaire.

Following this training period, the regional and area supervisors interviewed some 300 households selected by random process. This enabled the supervisory staff to become thoroughly familiar with the questionnaire and with interviewing techniques and provided advance knowledge of problems to be faced in the enumeration.

Of equal importance, the survey was used to test edit programmes developed by Educational Testing Service. This was accomplished by sending the coded but unedited questionnaires directly to ETS after coding but no correction for errors or omissions. The results indicated that at least the supervisory staff had experienced no difficulty with the questionnaire and that the error rate was well within a tolerable range. This

meant that our plan to limit editing to an intensive review of questionnaires by supervisory staff had a high probability of success.

Upon completion of training, regional and area supervisors were employed in training the enumerators. Unlike 1970 when three centres were used it was decided in 1980 to use only one centre - the Berkeley Institute. This final training period was completed between March 31 and April 16 and 255 enumerators were almost ready for action.

Complete readiness involved learning the boundaries of the enumeration districts and ensuring that the dwellings shown on the map corresponded with those actually on site. This phase required that supervisors meet with enumerators to point out the boundaries of their districts and that enumerators check each dwelling to determine whether or not it was inhabited and/or habitable.

#### Publicity

It was decided to use the services of a private agency to carry out the publicity. Tenders were offered, bids received and the firm of Scott Crafts Ltd. was ultimately selected. The



Census Office worked in close cooperation with this firm from the date of its hiring early in January 1980 until the end of its contract on Census Day, May 12, 1980.

The publicity, which was low-keyed and informal, aimed at involving the total population. In 1970 this had been achieved successfully by centering the whole campaign around youth with the slogan "Help the people who count". Central to this theme was a picture of two young boys playing in a nursery. Ten years later these same two young men were again shown with the slogan "We've Grown". Both pictures are on the cover of the present publication.

This theme, which aimed at encouraging a sense of national well-being, was articulated by the Bermuda Regiment Band marching across the Southampton Princess Golf Course, by well-known public figures voicing their support on radio, television, in newspapers and by posters which included pictures of the same young men in 1970 and 1980 and the slogan "We've Grown".

It is the view of the Census Office and the Census Committee that the publicity campaign was a resounding success.

### Organisation

In the main, the Census organisation was designed to enumerate persons in private households. However, such persons, though numerous, do not constitute the entire de facto population, hence it was necessary to make special arrangements to enumerate persons in institutions, group dwellings, hotels and those on ships and on the foreign bases located in Bermuda. As noted earlier, the island was divided into nine regions with a Regional Supervisor responsible for the supervision of the enumeration in each region. Assisting the regional supervisors were fifty-three area supervisors. The regional supervisors were responsible for 255 enumerators distributed as follows: 32 in Region One, 30 in Region Two, 27 in Region Three, 31 in Region Four, 26 in Region Five, 35 in Region Six, 31 in Region Seven, 30 in Region Eight and 13 in Region Nine for special enumerators.

Except for the special enumeration districts, the average number of enumerators per supervisor was five. Where census districts contained many people as in many instances in the more densely populated parishes, the number of enumerators per supervisors was as low as four. In more sparsely populated areas

it rose to as high as seven. The work-load per enumerator varied substantially from as low as 50 to over 100 households and from 90 to over 500 persons. As far as was feasible, inexperienced enumerators were assigned the smaller districts and only the more experienced enumerators were assigned the large districts. There was also an attempt made to assign enumerators to the areas of their choice. In this way the important familiarisation programme was simplified.

Persons dwelling in institutions and those in group/dwellings were enumerated by 13 special enumerators who reported to area supervisors. Visitors residing in hotels and guest houses were enumerated by the management. The enumeration of Armed Forces Personnel resident on bases was carried out in the main by the resident commanding officers who conveyed information obtained directly to the regional supervisor. Information concerning persons on ships was obtained from shipping agents.

Of the groups mentioned above, only those in staff quarters, orphanages and homes for the aged were required to complete the entire questionnaire. Visitors residing in small guest houses and private dwellings as well as inmates of hospitals and prisons

answered the first twelve questions only. All other visitors and persons resident on foreign bases were not required to complete the Census Questionnaire. For such persons only a head count by sex was recorded.

#### THE ENUMERATION

The enumeration began on April 18, 1980, at which time some 255 enumerators began visiting households and institutions seeking demographic, social and economic information required by the Government of Bermuda (Appendix 1). Although a document had to be completed for every member of a household, it was agreed that persons who were in full-time attendance at primary/secondary school or had not reached the age of 16 would not be required to answer the section on Economic Activity. Similarly it was agreed that females under 15 years of age would not be required to answer the questions on fertility.

The response was excellent and by Census Day, 12th May, virtually the only persons not enumerated were those who had never been located or who were out of the country. Outright refusals were minimal.

The Supervisors and a few of the more experienced enumerators spent three more weeks in the field, clearing up the above categories of persons. When the enumeration was officially closed, the census staff could happily report few outright refusals, and less than one percent under-coverage through our inability to locate missing residents.

#### The Remuneration

Payment for the enumeration was as follows:

Regional Supervisors were paid a flat fee of \$850 plus \$5.00 for each training session attended. Area Supervisors were paid \$650 plus \$5.00 for training sessions attended. The flat fee paid Regional and Area Supervisors made allowance for assistance in the recruitment and training of enumerators.

Enumerators were paid a flat fee of \$100 plus \$1.25 per questionnaire completed, 50 cents for each business listed, 50 cents for each student questionnaire completed, 15 cents for partially completed student questionnaires and \$3.00 for each training session attended. Payment to enumerators ranged from \$300 to as much as \$700 for the few ending up with districts including over 450 persons.

#### POST-ENUMERATION

The post-enumeration phase covers the period immediately following the enumeration. It includes processing, evaluation, analysis and the dissemination of the results. Although these phases will be reviewed in the order listed, in practice they may occur either in sequence or simultaneously. What is important is that although two or three phases may be going on at once, usually only one is receiving the major emphasis at a particular time.

Processing involved the preparation of the data for tabulation and the actual tabulation. Preparation of the data began in Bermuda on June 1st, while some supervisors and enumerators were still in the field. It was completed in eight weeks. Preparation involved coding and examination of the completed questionnaires for multiple marks, defacing and key data omissions such as for age and sex.

Training for this phase was provided by Mrs. Joy White and Mrs. Annette Lowe of the Bermuda Census Staff. These two also supervised the subsequent coding and editing operation. Since the census strategy involved an intensive review of completed

questionnaires by supervisors while in the field followed by a detailed computer edit, the editing phase of the operation was not required to be as intensive as in 1970.

Coding was required for only three questions: training received, occupation, and business of employer.

Work on the computer edit had begun in July 1979, at which time ETS had been formally contracted to process the 1980 census. Final development of the edit involved two visits by ETS computer staffs, visits by Bermuda staffs to ETS, continuous communication by phone and a pre-testing on actual data produced by the pilot census. As a result of this highly coordinated activity, all edit programmes and a significant number of the tabulation programmes were ready when the census results were carried to ETS in mid-August.

Coding and editing was carried out by 15 coders including eleven summer students. This phase was completed on schedule thanks to an outstanding effort by coding staff and their supervisors.

There was some tension as the edit results were awaited. The census strategy had been based upon the assumption that intensive training and good supervision would ensure a level of

accuracy which would not be significantly improved by a tedious, time-consuming manual edit. This followed from the fact that editing occurred long after the enumerators were out of the field and hence the possibility of obtaining corrections via this source would be difficult if not impossible. Thus editors would have to rely upon a set of logical inferences to correct inconsistent responses. It was believed that such logic could be programmed on a computer which would perform the tasks many times faster. This procedure was therefore adopted and had proven successful during the pilot census. However, the pilot census was conducted by highly motivated supervisors and it was not certain what enumerators would do.

The results were gratifying. Only 0.6 percent of the questionnaires did not report age and sex. These were therefore not included in the tabulations although they were noted in the count. Of the remaining questions, most errors were less than one percent except for the section on economic activity and fertility in which it rose to as high as 3% in some instances.

Only one section had an error rate higher than 3% and that was the question on rent for which 8% of respondents either refused to give this information or enumerators recorded it inaccurately. Since the errors in the questions noted cannot affect the distributions by more than one or two percent, the accuracy level of the census was very high.

#### The Census Report

During its early meetings, the Census Committee had agreed upon a priority set of tabulations to be included in the first census report. This list included sets of tabulations based upon those produced by the University of West-Indies plus some specific Bermuda requirements. Foremost among these was the capability to produce tabulations not only by postal zone and planning zone but also by housing density. In addition many of the main census topics such as education, economic activity and fertility were to be run by race, nativity, citizenship and religion. Finally additional household tabulations were to be produced which depicted households by type: nuclear, related, non-related, single person and mixed.

All of these reports were estimated to result in some 6,000

pages of computer printout. It was therefore agreed to restrict the first tabulation to the tabulations at the country level and that all census topics would be covered in detail at that level. This strategy still resulted in a somewhat larger than expected final report since the textual material was greater than anticipated.

The report was a joint effort by the census staff and the staff of ETS who had undertaken the responsibility for printing the report. The Bermuda staff were responsible for putting the report in its final form. ETS provided staff for the vital roles of typing, editing and reviewing.

On September 25, the Census Superintendent visited ETS to write the important chapter on the analysis of findings literally as the tabulations were coming off the computer. While Chapter Four was in progress ETS staff edited and retyped Chapters Two and Three and the appendices in preparation for printing. Chapter Four was completed and in final draft form by October 3rd and Chapter One, the chapter on administration, was put together on the weekend of October 4th and 5th. By October 8th the report was ready for printing subject to review by officials of the Ministry of Finance and the Census Committee.

## Problems

Census 80 was not without problems but, unlike Census 70 when processing was a major problem, the problems were limited to recruiting sufficient numbers of intelligent, dedicated enumerators and motivating them to produce the considerable effort required by a census enumeration.

Knowing that we would have this difficulty we recruited some 400 persons to train for the 255 jobs required as well as the 20 or so persons we intended to be used as reserves. However, by census night we had obtained a bare minimum by additional recruiting and retraining of enumerators who had failed the rigid training requirements.

There were two obvious reasons for the heavy drop-out rate. First a census is demanding of time and patience, and second there is intense competition for the leisure time of Bermudians with the capability to perform census tasks.

A future solution may be to utilise students more fully in the enumeration process. Our experience with Bermuda's youngsters is that they quickly adapt to the demands of advanced computer technology and so are more comfortable than their elders with the use of census maps and the utilisation of

complex manuals. Besides, for them the money is a considerable motivating factor.

There is also the need for a permanent post of survey administrator. Most of the success of the 1980 exercise was due to the fact that the Census Officer and her assistant had been groomed on previous household surveys as had all the other staff in the statistical office. Retention of this expertise will require additional compensation for the availability of these skills.

## The Budget

The budgeted cost of the census was \$356,000, which at the time of writing was overspent by \$50,000 for computer processing which had been underestimated and for printing which had not previously been included. Cost over-runs on processing, printing and staff are to be expected during a survey of this nature. However, the fact that Bermuda will have a fully articulated census report within 6 months of the taking of the census is good value for the money spent.

Calvin J. M. Smith  
Census Superintendent

October 22, 1980