

THE PAPERLESS CENSUS: A VIABLE OPTION FOR THE CARICOM COUNTRIES?

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Abstract

The paper will highlight the sub-regional experience in the Caribbean Community (CARICOM) in coordinating the conduct of Census by countries and specifically the role of the Regional Statistics Programme of the CARICOM Secretariat. Focus will be on the approaches and experiences by countries in Census Data Collection, Processing and Dissemination. Specifically, decisions by countries relative to the use of scanning in contrast to the use of handheld devices in Census data collection and processing will be explored based on the 2010 Census Round. Given the experience of some countries in the use of electronic data capture in surveys on an experimental basis or otherwise, the paper will explore the conditions under which countries would be in a position to use handheld devices in the 2020 Census Round and in particular the requirements, challenges and opportunities. Factors such as cost, training/skill sets and availability and use of technology will be discussed. Some conclusions would be drawn on the feasibility of a paperless 2020 Census in CARICOM.

Keywords: Conditions, Handheld-devices, feasibility

1. Introduction

Population and Housing Censuses in the Caribbean dates back to the early 1840s continuing at regular intervals except during the period of the Great Depression which saw the absence of census-taking in most countries and the World War II period when the census was postponed. From the very early period in the Caribbean up to the 2010 Census Round census-taking was characterized by a *coordinated* approach across countries and efforts at uniformity in the census questions. In the early period of colonial rule, while it was recognized that complete uniform practices for all countries were not possible, practical guidelines were provided to ensure uniformity in data collection.

The recommencement of censuses in the post World War II period in most countries in the Caribbean in 1946 exhibited significant regional collaboration with all participating member countries utilising a common approach. This period marked a defining moment in census-taking in the Caribbean and was the blueprint for the future. Jamaica had conducted its census in 1943 and for the countries that conducted their census in 1946 the unit established by Jamaica for the conduct of its census was extended and expanded to serve as a “regional body”, provided great assistance to other colonies in the undertaking of their census exercises.

Over time the regional coordination of census taking in the Caribbean region increased as well as efforts at uniformity in the content of the census questionnaires. In 1966, the Conference of Commonwealth Caribbean Government Statisticians recommended the establishment of a Census Co-ordinating Committee, comprising the Census Officer for each territory under the Professor of Demography at the University of the West Indies (Mona, Jamaica). The principal objectives of this Committee were to plan the 1970 regional census and to advise and assist local census organisations in the preparation and conduct of census and census-related activities. There was contribution to a budget that met the central cost of planning and support.

The Ninth Meeting of the Commonwealth Caribbean Government Statisticians in September, 1976 recommended that the CARICOM Secretariat and the Council of Ministers establish a Regional Census Coordinating Committee (RCCC). This decision marked another turning point with the Regional Statistics Programme (RSP) of the CARICOM Secretariat being charged with the responsibility of facilitating regional coordination and assistance supported by the RCCC in CARICOM from 1980 to the present time. The RCCC reports to the Standing Committee of Caribbean Statisticians (SCCS) which was established by the Common Market Council of Ministers as a vehicle for harmonising and improving the range and quality of statistics in CARICOM. The CARICOM Secretariat through the RSP plays a vital role in facilitating the conduct of the censuses through the convening of the RCCC, constant monitoring of the status of countries preparedness between RCCC meetings; sourcing donor funds for the application of technical assistance. For the 2010 Census Round given the financial situation of countries no effort was made through the Community Council of Ministers to have a central budget to which countries had to contribute to support activities in countries.

In fact, for the 2010 Census round in CARICOM there was more concerted efforts to achieve a greater degree of uniformity within the regionally coordinated approach. A Common Census Framework was executed which was jointly funded by the Inter-American Development Bank (IDB) and the United Nations Population Fund (UNFPA) and also with the support of the Department for International Development (DFID) of the Government of the United Kingdom of Great Britain and Northern Ireland. The Common Census Framework comprised three main components, the first being a Common Questionnaire which primarily was a common core of questions; common methodologies; and common system of data dissemination. Regional Training and in-country technical assistance were also provided in Mapping/GIS and in data processing at a level that exceeded previous census exercises. There were also activities that were funded by the UNFPA either jointly with the Secretariat or on their own through technical assistance to countries.

It should be understood that despite the support provided to countries and the efforts at uniformity which has been appreciable countries make the final decisions as to the instruments and methods that are used in the conduct of their censuses. For example the length of the questionnaire varied across countries. A review of the content of the questionnaire relative to the common questionnaire showed that on average over countries about 88 percent of the questions were identical/almost identical in the country questionnaires when a check of eighteen countries were conducted.

2. Census Data Processing in CARICOM – Method of Data Capture

The decisions by countries relative to how the census data are processed are directly related to the data collection approaches and have implications. Specifically the method of Census Data Capture influences the data collection procedures such as the quality of the paper used in preparing and printing the questionnaire and training on the need for legible handwriting. In the 2010 Census Round countries received considerable support in the area of data processing through the regionally coordinated strategy executed by the CARICOM Secretariat. This support was transmitted through regional workshops, in-country technical assistance and the production of a number of manuals. Additionally the United Nations Population Fund also conducted training workshops and in-country assistance particularly in the area of data editing.

While manual data entry was the approach that was used by most countries in the data capture operations up to the 1990 Census Round, a perusal of the literature on the history of census-taking in the Caribbean showed that the processing was done “mechanically” way back in 1946 under a “regional body” that was established in Jamaica to assist other countries of the Region post the World

War II. In the 1970 Census Round in which a Census Coordinating Committee was formally established arising out of a decision of the conference of the Commonwealth Caribbean Government Statisticians under the Professor of Demography, University of the West Indies, Jamaica, showed the following:¹

“The data for households was captured on Questionnaires utilising “Mark Sensing” and processed in Jamaica utilising a “Mark Optical Reader”. This was facilitated by a gift of an IBM 360 from Statistics Canada and was utilised to capture and process the regional census data for each territory.”

In the 1990 Round, products like Optical Mark Reading (OMR) scanners were used in the CARICOM Region. There were strict requirements in terms of the specifications for paper quality, colour and printing precision. The 2000 Census Round however saw the introduction of new technology which was image scanning with the use of Intelligent Character Recognition (ICR). Software produced by companies such as Cardiff’s Teleform and Readsoft’s Eyes and Hands were used with the choice of scanner coming from a fair range of popular brands. The advantage in using the digital scanners was that they did not require the strict specifications as for the OMR scanners. However The Bahamas, Montserrat, Suriname and Trinidad and Tobago used keyboard entry for their data capture. Antigua and Barbuda, Barbados, Belize Dominica and Bermuda used the OMR technology and the ICR was used by the remaining Member States. In fact through the regional coordination the CARICOM Secretariat was able to facilitate the loaning of the OMR scanning equipment from Belize to Antigua and Barbuda.

The experience in using the image scanning varied among Member States. Most Member States seemed able to manage the new technology even though there were some challenges which included:

- Data Capture challenges;
- Costly nature of the equipment and software resulting in the ability to purchase only one scanner that was inadequate;
- Using the software for the first time in the Census was challenging;
- Difficulties in installing the software and in maintenance of the scanners; and verifiers.

From the experience of the 2000 Round it was concluded that the use of image scanning technology in the region can be cost-effective if the following holds:

- The National Statistical Offices have Information Technology (IT) staff on board that can be trained to be fully independent in designing, operating and maintaining the software and hardware;
- Use can be made of the technology during the inter-censal years to capture data from household surveys, agriculture censuses and other data collection activities.

The procurement of scanners and the software would then be a capital investment rather than a once off purchase that will no longer be used.

In the 2010 Census Round the majority of the countries used the ICR technology and a couple used manual data entry. There were data processing challenges that impacted the efficiency of the use of the ICR scanning technology. In some cases these challenges were external to the scanning technology. For example The Bahamas had intended (and started) the use of scanning for their data capture operations. Initially there were hardware and software issues but these were resolved with the aid of the

¹ Evolution of Population and Housing Censuses in the Caribbean from a DFID-funded workshop executed by the CARICOM Secretariat on Census Organisation and Administration in preparation for the 2010 Census Round-2009

Consultant that was hired under the regionally coordinated census strategy. Unreliable power supply in the office resulted in network problems such that the decision was taken to abandon the use of scanners and to commence manual data entry.

Apart from The Bahamas Suriname also used manual data entry. Other countries experienced the following challenges using the ICR scanning technology:

- the readers would shut down or become idle for long periods of time;
- errors occurring in the verifiers led to workstations shutting down without the work being saved;
- there was need to rewrite questionnaires and to strip and batch the questionnaires prior to scanning.

Jamaica outsourced its data capture in both the 2000 and 2010 Round to a private company engaged in the business of scanning and which used the same scanning software as the countries who did the scanning in-house. In the 2010 Census Round the NSO in Jamaica had access to the database with the scanned data unlike in the 2000 Round when it was delivered on flat files. The access to the database proved to be very helpful in correcting the errors. There was an error-correction team placed at the private firm. However there were still challenges such as illegible handwriting. Lessons learnt from the Jamaica experience included the need to prepare the forms before sending them to the scanner; the incorporation of more edits in the verification process; proper training of the verifiers; the ability to have very good images out of the scanning operation and the need for a competent and experienced IT Staff. With respect to the private firm and outsourcing due care and attention must be paid to the selection of the firm and the nature of the agreement to ensure that it captures all possible issues including confidentiality and problem solving

Some of the recommendations emanating from the experiences with the use of scanning included the following:

- The scanning software system should be placed on a private network;
- There should be adequate number of readers to meet the needs of the census;
- Badly scanned/written questionnaires should be isolated/queried;
- Purchase adequate equipment and licenses.

As a consequence of all of the above, with the exception of a few countries such as Jamaica that outsourced, Saint Lucia that has tremendous expertise in this area and Suriname that did manual data entry and processed the census data in record time many countries experienced delays in delivering final clean data sets which therefore impacted the timeliness and usability of the census results.

As indicated earlier, the regional census strategy as executed by the CARICOM Secretariat provided appreciable support to countries in the 2010 Census Round due to funding received from key donors which allowed for the hiring of a consultant (firm) in this area. In all approximately four data processing workshops were conducted, several in-country technical assistance visits; support provided remotely and several manuals that have been prepared on the use of the scanning. Countries therefore now have considerable experience with the scanning technology through the use in the 2000 and 2010 Census Rounds in most cases. They have also acquired a lot of competencies in this area through the use of the technology, intensive training, technical assistance and manuals and have also benefitted from sharing the lessons learnt and the regional level of the RCCC.

What then of moving to Personal Digital Assistant Devices (PDAs) for the 2020 Round?

Some of the efficiency gains are that the data entry is directly on the PDA implying that there is no need for a number of tasks to do with the preparation of the questionnaire, printing etc; the batching of

the questionnaires; document flow with regard to the questionnaire; preparing the questionnaire for scanning; ineligibility of the handwriting; poor images and a number of the other challenges highlighted earlier relative to the CARICOM experience. The data captured on the device are transmitted electronically to a database in the NSO. The data coding stage can be undertaken simultaneously with the data entry. Some aspects of the editing verification can be done in real time to enable timelier processing of the census data and therefore timeliness in the availability of the census results.

In the CARICOM Census Symposium 2014 which reviewed the experience of the 2010 Round relative to the planning for the 2020 Census Round, some views expressed pertained to the decisions that countries would have to make in the 2020 Round. Countries were urged to consider the use of PDAs. It was posited that some countries were already using PDAs in their surveys and that it was a great opportunity to commence using this technology in the 2020 Round. PDAs were in fact provided by the UNFPA to a number of countries in CARICOM for the use in surveys with the view that they could have been used in the 2010 Census Round. Feedback from countries indicated that the provision of the PDAs was not in time to enable a thorough testing of the technology. There was also slowness experienced in the loading of the PDAs.

Jamaica however has commenced the use of tablets in the household surveys. Recent feedback has indicated the need for an effective quality assurance system to be integrated in the process. Some of these quality issues might have been due to inadequate adaptability of the staff that traditionally used the paper questionnaire to the use of the tablets. The skill set of the interviewers is a critical factor to be taken on board in the use of the PDAs.

Two countries that attend as observers in the CARICOM Statistics Meetings used tablet computers in the 2010 Census Round. Among some of the issues they observed were:

- a significant amount of the tablet computers remained unused after the Census which may not be cost-effective;

- a cost-benefit analysis should be undertaken of the different options in order to determine the best possible one or combination of options.

Some of the challenges with the use of the PDAs include that the setting up of the process of using PDAs for data collection may take some time and countries would have to start preparation prior to the census exercise so that extensive pilot-testing can occur; The interviewers should have the ability to use the device so as to ensure that the quality of the input data is not poor. Intensive training of the interviewers is therefore required. Editing /verification programme must be at a high level to enable good quality data and the interviewers need to be trained relative to the output errors that may occur in real-time. In addition equipment failure may occur such as the need to recharge the battery in the middle of an interview.

3. Conclusions

The decision to move to PDAs should be taken in an adequate time frame prior to the 2020 Census Round such that there is sufficient testing and knowledge acquisition to mitigate the pitfalls and the challenges that can result in using a new approach to data collection in what is the largest statistical activity of a country. CARICOM countries would have had this experience in moving from manual data entry to scanning and are now at a stage in which the use of scanning in the 2020 Census Round should be a more positive experience given the competencies gained that hopefully has been retained as well as the manuals that have been produced and documented, lessons learnt, information exchange at

the regional forum that can act as a knowledge base along with potential support that can be provided through the 2020 Regional Census Strategy

There is need to ascertain the preparation time required by other countries prior to using such a technology in the 2020 Census Round. Further, the adaptability and openness of the field staff and potential interviewers to training in the collection of data using PDAs is an important issue.

It can be posited that given the acquisition of knowledge and skills on the scanning technology there is no need to move towards using PDAs. However the technology is changing fast – mobile telephones are rapidly outstripping the use of landlines. Therefore the 2020 Census presents an opportunity for countries to utilise PDAs with one major factor being small size which makes this transition feasible. If this is to be the case the transitioning to a paperless census should be formalised immediately for it to be viable.

REFERENCES

Several reports from the Regional Census Coordinating Committee Meetings for several years;

Reports from the conduct of Data Processing and other Workshops for the 2010 Census Round;

Other Material on the past census rounds.