Planning and Preparation for Sample Enumeration

2 PLANNING AND PREPARATION FOR SAMPLE ENUMERATION

Census 2010 adopted the register-based approach, similar to Census 2000. In addition to information obtained from merged administrative records in the national databases, more in-depth information was collected through a sample survey of some 200,000 households in Singapore. This represented about 18 per cent of the 1.1 million households in Singapore in 2010.

In order to ensure the smooth running of the Census, careful planning and preparations were made prior to the actual conduct of the Census. These included reviewing the sampling methodology, finalising the list of Census data items, updating the national standard classifications, managing the expected case load and conducting a pilot test before the start of the main Census operations.

2.1 SAMPLE DESIGN AND SELECTION

This section outlines the Census 2010 sample design and selection. A separate detailed write-up on the sampling variability and errors is included in Appendix R.

The sampling frame used for the selection of the sample for Census 2010 is based on the National Database of Dwellings (NDD) maintained by the Department of Statistics (DOS). The NDD is a register of all residential dwelling units in Singapore. As the sample survey of the Census 2010 covered only households in residential dwellings, institutions such as military camps, hostels and hotels were excluded from the frame.

The sample for Census 2010 was selected based on a stratified design with proportional allocation. The strata were defined based on the planning areas demarcated by the Urban Redevelopment Authority. Each dwelling unit in the frame was first placed into one of the strata based on its planning area. Within each stratum, the units were sorted into dwelling type groupings. A sample was selected using simple random sampling without replacement from each broad dwelling type grouping. The selected samples across the strata were combined to form the required sample of about 200,000 dwelling units.

2.2 CONDUCT OF THE LABOUR FORCE SURVEY AS A SUB-SAMPLE OF CENSUS 2010

A key improvement from Census 2000 was the design and conduct of the June Labour Force Survey (LFS) as a sub-sample of the Census 2010. Historically, the Ministry of Manpower (MOM) did not conduct the June LFS in years where the Census of Population was carried out. This was to prevent additional respondent burden resulting from an overlap in households selected for the two major surveys. This, however, led to data series breaks for selected labour statistics obtained from the LFS.

In view of rising demand for a continuous series of annual labour statistics from the LFS and the shift towards sample enumeration for the Census since 2000, DOS reviewed the sampling methodology needed to provide for the conduct of the June 2010 LFS as a sub-sample of the Census 2010. In the Census 2010, the LFS sub-sample constituted about one-sixth of the overall sample and covered the detailed labour-force related items as in other annual LFS as well as questions pertaining to the main sample for Census 2010. This meant that respondents selected for the overall sample in Census 2010 would only need to respond once to either the set of questions meant for the main sample or the LFS sub-sample. This provided for a continuous time series for annual data on key labour statistics while not increasing the response burden on the population.

As the June LFS was to be conducted concurrently with the Census 2010, effort was put in to ensure that a common understanding and treatment for all data items collected in the two surveys was applied. This was crucial to obtain meaningful consolidated results at the end of the surveys. In order to achieve this, a Census-LFS Workgroup was formed and many discussions were held to discuss details pertaining to data items to be collected, such as the phrasing of the questions and the concepts and definitions for the items collected.

2.3   DATA ITEMS COLLECTED IN THE CENSUS 2010

DOS undertook an extensive user consultation process with ministries and statutory boards from July to November 2008 to collate topics of interest proposed for collection in the Census 2010.

2.3.1 Selection Criteria

Multiple factors were taken into account when selecting the data items to be included in the Census enumeration. The final data items enumerated would have impact on the format of the questionnaire, the accuracy and quality of respondents' returns, the data processing phase, and the time schedule for Census releases.

In evaluating the list of data items to be included in Census 2010, DOS took into consideration the guidelines as recommended in the United Nations (UN) Principles and Recommendations for Population and Housing Censuses (2008), including the following:

a) Priority of National Needs

The Census should meet the needs of a broad range of data users in the country. The topics selected should be of relative importance for major national policy-making. The information to be collected must meet the current needs of the government for policy planning and decision making.

b) *Suitability of Topics*

In recommending the topics to be included, consideration was also given to the willingness and ability of the public to provide adequate information on the proposed items. The data items should not be too in-depth or specialised that they would require extensive probing. Topics of a sensitive or controversial nature that could potentially jeopardise the collection of other essential demographic and socio-economical data in the Census are not recommended.

c) *Resources Available*

Usage of resources should be within acceptable limits. The total national resources available for conducting the Census are taken into account. To ensure efficient use of resources, information that can be obtained from other sources should not be included in the Census, considering the extensive coverage and large population involved in the Census.

d) *Importance of International Comparability*

The Census adopts statistical concepts and methods from UN's recommendations on the planning and conduct of census, International Labour Organisation's guidelines on labour force, employment and unemployment and other international standards. These frameworks provide valuable insights accumulated from years of international experience as well as basis for data to be compared with other countries.

2.3.2 Data Items

After much deliberation, a finalised list comprising 58 data items was endorsed by the Census Planning Committee (CPC) in November 2008. The endorsed list included basic demographic and socio-economic characteristics, educational upgrading, job mobility, fertility, housing, transport and household information.

Of the 58 items, 9 items were obtained directly from the Household Registration Database (HRD) maintained by DOS. The remaining items not available from the HRD were collected from a large-scale sample survey.

Below is the finalised list of data items collected in Census 2010:

Personal Particulars and Demographic Characteristics
Name   (from administrative source)
Singapore National Registration Identity Card (NRIC) (from administrative source) or Foreign Identification Number (FIN)
Sex   (from administrative source)
Ethnic/Dialect Group   (from administrative source)
Date of Birth   (from administrative source)

Place of Birth	(from administrative source)
Citizenship	(from administrative source)
Identification Type	(from administrative source)
Marital Status	
Religion	
Number of Children Born Alive (for resident females)	
Whether Staying In/Outside Singapore - Country Currently In - Reason for Living Abroad	

Household Characteristics

Relationship to Head
Spouse Linkage
Parent-Child Linkage

Housing

Type of Present Dwelling	(from administrative source)
Tenancy of Present Dwelling	

Education

Level of Education Attending
Highest Qualification Attained
Major Field of Study (for Polytechnic/University graduates)
Country where Highest Qualification was Attained (for Polytechnic/University graduates)
Languages Literate In
Language/Dialect Most Frequently Spoken at Home

Educational Upgrading

Whether Acquired Vocational Qualification
Type of Vocational Qualification Acquired
Field of Study
Educational Institution

Employment

Current Activity Status
Employment Status
Occupation – Job Title
Occupation – Main Tasks and Duties
Industry – Name of Employer/Firm
Industry – Main Business Activity or Main Products/Services
Income from Work

Bonuses Received	
Nature of Employment	(new item)
Usual Number of Hours Worked Per Week	

Job Mobility

Duration of Present Job*	
Previous Occupation* – Job Title	
Previous Occupation* – Main Tasks and Duties	
Previous Industry* – Main Business Activity or Main Products/Services	

Underemployment

Willingness to Work for Additional Hours	(new item)
Availability for Additional Work	(new item)

Non-Working Persons

Whether Worked Before	
Whether Available to Start Work in the Next 2 Weeks	(new item)
Whether Any Action Taken to Look for Work in the Last 4 Weeks	(new item)
Duration of Unemployment*	(new item)
Action Taken to Look for Work	
Main Reason for Not Working	
When Left Last Job *	(new item)
Main Reason for Leaving Last Job *	(new item)

Transport

Usual Mode of Transport to School or Work	
Usual Travelling Time to School or Work	(new item)

Elderly Persons Aged 65 Years and Over

Main Source of Financial Support	
Ambulant Status	

Income from Non-Work Sources

Rental Income*	(new item)
Investment Income*	(new item)
Income from Other Sources*	(new item)

Item is covered in the Labour Force Survey sub-sample.

2.3.3 Enumeration of Foreigners through Employers

Foreigners working in Singapore form part of the total population. As the main Census 2010 covered residential dwellings, foreigners who hold employment passes, including their spouses and dependants, as well as Work Permit Holders (WPHs) who

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work as domestic maids were deemed to be adequately covered. However, non-maid WPHs who mostly live in non-residential dwellings such as labour quarters and construction sites (e.g. construction workers) would be potentially undercounted using household survey method of data collection.

Instead, a separate survey on establishments employing non-maid WPHs was carried out by DOS from May 2010 till August 2010. Employers, rather than the individual non-maid WPHs, were requested to provide the information required for the survey. The results of the survey were then merged with the main sample to provide the overall profile of the total population and working persons in Singapore for policy studies.

2.4   UPDATES TO SINGAPORE STANDARD STATISTICAL CLASSIFICATIONS

The adoption of a common framework for statistical information classification facilitates data sharing and analyses among data producers and users. In the run-up to the Census 2010, the national standards of statistical classifications for occupation, industry and education were updated. Revisions to the classifications adopted broadly international classifications with appropriate modifications to take into account Singapore's context while enhancing international comparability.

A working committee, comprising representatives from key ministries and agencies which produce and/or use the data, was formed to facilitate the review of each classification. Inputs were also obtained from relevant government ministries and statutory boards.

2.4.1   Occupational Classification

The Singapore Standard Occupational Classification (SSOC) 2010 adopts the basic framework of the International Standard Classification of Occupations 2008 (ISCO-08). It replaces the SSOC 2005 which was based on ISCO-88.

The SSOC is a classification of occupations according to the type of work performed. Its primary objective is to classify the occupations of the civilian working population, but with provisions for the collective classification of those in the armed services and the foreign diplomatic personnel. It is not applicable to the economically inactive population such as housewives, full-time students, retired persons and voluntary social workers.

The basic principle used in the classification of occupations in the SSOC 2010 is the main type of work performed. Persons who perform the same principal tasks are considered as doing the same type of work and classified under the same occupational group irrespective of work experience, skills and qualifications. The basic concept of skill, or the ability to carry out the tasks and duties of an occupation, is used in defining the broad types of work in the SSOC 2010.

The SSOC 2010 comprises five levels of aggregation, namely Major Group, Sub-major Group, Minor Group, Unit Group and Occupation. A numerical five-digit coding system is used to distinguish the different levels of classification. The numbering system is hierarchical in nature, showing progressively finer details in skill specialisation from the highest level of aggregation (one-digit) to the lowest level (five-digit). This allows users the flexibility to tabulate, analyse and publish data according to the level of detail required.

2.4.2 Industrial Classification

The Singapore Standard Industrial Classification (SSIC) 2010 adopts the basic framework of the International Standard Industrial Classification Revision 4 (ISIC Rev. 4). The classification incorporates recent changes in economic activities to better reflect the current structure of Singapore's economy.

The SSIC is a classification of economic activities undertaken by economic units. It does not draw distinction according to the type of ownership, type of legal organisation or mode of operation. Economic units which engage in the same kind of economic activity are classified in the same category of SSIC, irrespective of whether they are corporate entities or government units, or operate in the formal or informal sector.

Like the SSOC, the SSIC 2010 is a classification with a hierarchical structure and uses a numerical five-digit coding system to distinguish the different levels of classification. At the highest level of aggregation, there are 22 broad categories known as "sections".

2.4.3 Educational Classification

The Singapore Standard Educational Classification (SSEC) 2010 makes reference to and is consistent with the basic framework and principles of the International Standard Classification of Education 1997 (ISCED 97). It is developed to take into account changes in the Singapore education landscape. The SSEC 2010 comprises of three sub-classifications:

- Classification of Level of Education Attending

- Classification of Educational Qualification Attained

- Classification of Field of Study

The hierarchical structure of the SSEC is defined by aggregation levels and groups which use Singapore's present education system and the formal educational qualifications currently awarded in Singapore as the basis. For educational programmes offered in Singapore based on foreign education systems, and qualifications which were awarded in Singapore in the past or those awarded overseas, the approximate equivalence to the current system and qualifications in Singapore are used to facilitate the appropriate classification.

The SSEC is revised to maintain relevance with developments in the area of education in Singapore such as the evolution of the full-time education system and vocational certification system. In addition, development of the continuing education and training programmes in recent years, in terms of recognition and rigor compared to the mainstream formal education system, has also been taken into consideration when revising the SSEC.

2.5 PILOT TEST

2.5.1 Objectives and Key Features

Pilot tests are commonly conducted prior to a major survey to rehearse the operational demands of the actual operations. Such tests help to detect and rectify potential operational difficulties and bottlenecks before the actual survey. These smaller scale operations are particularly useful if the data collection methods and operational flow to be adopted for the main survey have never been tried before.

As the conduct of Census 2010 is largely similar to that of Census 2000, a full pilot test covering all aspects of the Census was evaluated to be not essential. Instead, the Department conducted a pilot test that focused on the newly introduced Ultra-Mobile Personal Computers (UMPCs) to be deployed in collection at fieldwork. This allowed better utilisation of the resources and minimised the impact on the public as only a small number of households were required to be involved.

The main objectives of the pilot test were to:

a) Test the robustness of the UMPC application in actual field conditions;

b) Gauge the public response to the use of UMPCs for enumeration in Census for better respondent management in the actual survey;

c) Test the questionnaire flow, phrasing and response options; and

d) Fine-tune operational procedures, logistics support and progress management.

The pilot test was conducted over a period of two weeks in November 2009. Some 500 dwelling units in the Central region of Singapore were selected to take part. Prior to the conduct of the test, the UMPC application was thoroughly tested during the application development phase. Detailed briefings were conducted to help the officers familiarise with the work procedures, as well as the concepts and definitions of the data items to be collected. The selected households were informed in advance by post.

To simulate the batching of the actual Census 2010 operations (20 batches spread over 3 to 4 months), 3 batches were implemented in the pilot test. As turnover of field interviewers in the actual survey was expected, the functions and work

processes involved in the transfer of cases from one officer to another during the test was simulated.

The pilot test also tested on the data transfer between the UMPCs, the Fieldwork Management system as well as the synchronisation with the database.

2.5.2 Refinements following the Pilot Test

Overall, the pilot test achieved its objectives. Learning from the experiences of the pilot test, refinements were made to improve the systems and operational flows. These included:

a) Enhancing the UMPC application to:
   i. Reduce loading time for each screen;
   ii. Refine the backup procedures for data; and
   iii. Overcome the issue of the software hanging after re-activation from standby mode.

b) Providing an additional UMPC battery to field interviewers to allow them to work without interruption due to their batteries being exhausted.

c) Adding more detailed illustrations on the concepts and definitions, as well as specific scenarios/examples, into the fieldwork training manuals and materials.