

Chapter 1 - Methodology

1.1 Introduction

The Central Statistics Office (CSO) conducted its fifth Census of Economic Activities (CEA) in Mauritius and Rodrigues from January 2007 to May 2009, with 2007 as reference year. The main objective of this exercise which is carried out every five years is to collect data on the operating characteristics and structure of all types of economic activities, except Agriculture.

The 2007 CEA was conducted in two phases - Phase I covered a sample of small production units that is, those engaging less than ten persons and Phase II covered all large establishments, that is, those engaging at least ten persons. Data collection for Phase I was carried out from January 2007 to December 2007 while that for Phase II started in July 2008 and was completed in May 2009. A comprehensive report for Phase I was published in June 2009.

This report presents the methodology and a detailed analysis of the results of the second phase of the Census.

1.2 Objectives

- The main objectives of the 2007 Census of Economic Activities are:
- (a) To collect up-to-date information on the operating characteristics and structure of all types of economic activities except Agriculture, carried out in the Republic of Mauritius.
 - (b) To assess the contribution of the various industry groups in the overall economy.
 - (c) To obtain benchmark data for computing national accounts estimates.
 - (d) To obtain detailed data for the construction of Input-Output tables and Social Accounting Matrices (SAM) for impact analysis.
 - (e) To obtain benchmark data and weights for the construction of volume and price indices.

1.3 Historical background

A census of production was first carried out by the Central Statistics Office in 1964 followed by another one in 1968. However, those two censuses were restricted to the manufacturing sector only. In 1985, following the need for comprehensive data on the characteristics and structure of production units in the different sectors of the economy, the census was extended to all sectors except agriculture. The 1985 Census was followed by another one in 1992. Since then, the census known as the Census of Economic Activities (CEA), has been conducted every five years. CEA 2007 is the fifth of the series.

1.4 Coverage

Phase II of the CEA 2007 aimed at covering all large establishments engaging ten or more persons, located in the Republic of Mauritius. However, the following were excluded for reasons stated below:

- (a) Agricultural activities: These activities have not been covered because of the difference in methodology and measurement techniques used in the collection and compilation of data pertaining to the agricultural sector as compared to other sectors of the economy.
- (b) Domestic services: These services cannot be appropriately covered by an establishment survey.
- (c) Concealed and illicit activities: These activities are difficult to measure.

It is to be noted that CEA 2007 did not cover sugar-milling industries and government units as data were readily available from administrative sources. However, “small” establishments operating in the “*Export Oriented Enterprises (EOE)*” and “*Freeport*” were covered in Phase II because their production structure are similar to those of “large” establishments and their set of accounts are usually available for a whole year.

1.5 Unit of enquiry

The unit of enquiry was the establishment, defined as a production unit engaged in one kind, or predominantly one kind of activity at a fixed physical location.

However, many large firms could not furnish separate set of data on an establishment basis, as their accounts are prepared at the enterprise level. Such multi-establishment units were classified in the industrial group of their main activity, determined by the product or service which accounted for the largest share of their turnover.

1.6 Construction of Frame

The list of large establishments was constructed from data available in the business register of the CSO. The final frame comprised of 2,337 establishments, of which 2,313 were in Mauritius and 24 in Rodrigues.

1.7 Reference period

The reference period was January to December 2007 (calendar year 2007). However, as all firms operating in the country did not have a common accounting year, data referring to any twelve-month period ranging from July 2006 and June 2008 were accepted.

1.8 Legal authority and confidentiality

CEA 2007 was conducted under the provisions of the Statistics Act 2000. The regulations were prepared with the assistance of the Solicitor General's office and approved by the Minister. These were published in the Government Gazette as GN No. 86 of 2008.

The Statistics Act provides for an obligation on the establishment to furnish the required information according to the approved questionnaires. It also lays down strict rules for the CSO and its employees to ensure that all information collected are kept strictly confidential. The release of individual information, or reports and documents that contain information arranged in such a way to enable identification of the particulars of any person, business or undertaking is prohibited. The data are therefore published in the form of statistical tables only.

1.9 Office organisation

The planning, organisation and execution of the second phase of CEA 2007 rested with the Economic and Financial Division of the Office. The CEA unit, which was set up on a temporary basis, was headed by a Statistician working under the supervision of a Principal Statistician. The Statistician had the support of one Senior Statistical Officer, two Statistical Officers and two Clerical Officers to carry out the various activities of Phase II.

However, following structural changes at CSO, some activities of Phase II of CEA 2007 were delegated to the following Units:

(i) The Economic Census and Survey (ECS) Unit which was set up to collect and process economic data needed by the CSO performed the tasks relating to monitoring of response rate, data collection, editing and coding of questionnaires.

(ii) The Analysis and Integration Unit (Economic Division) was responsible for the tasks relating to imputation, tabulation and analysis of CEA data.

An advisory panel led by the Deputy Director of the Economic and Financial Statistics Division and comprising Statisticians involved in the compilation of National Accounts looked into the technical aspects of Phase II of the Census.

1.10 Census documents

Questionnaire design is one of the most important aspects of any survey because only through carefully formulated questions within a properly structured questionnaire that relevant data can be collected to meet the objectives of the survey.

Activities in connection with questionnaire design for Phase II started in May 2007. A technical team comprising staff with relevant experience was involved in the

elaboration of the questionnaires. The final questionnaires were approved by Cabinet and published in the Government Gazette on 24 May 2008 in GN No. 86 of 2008.

1.10.1 Users' needs

At the initial stage of the questionnaire design, a set of questionnaires, that were used to collect data at the previous round of the CEA in 2002, was sent to heads of ministries. They were requested to submit proposals on new data relevant for them, which could be collected in the 2007 round of the CEA. The proposals received covered a wide range of economic issues including information on emerging sectors such as ICT and environment. These were discussed with ministries concerned and the list of topics to be included in the questionnaire was based on the following criteria:

- (a) The importance of the topic at national level
- (b) The relevance of the topic to the survey
- (c) The willingness and ability of respondents to give adequate answers.
- (d) The additional burden put on respondents

Requirements of other units of the CSO, mainly the Analysis and Integration Unit were also considered. Proposals were made to collect 'output' and 'consumption of goods and services' at lower level (5-digit level CPC instead of 3-digit level at CEA 2002) for more advance analysis (e.g. computation of an input and output table).

1.10.2 Questionnaires

The methodology used for compiling economic aggregates, such as output, input, value added, etc., varies from activity to activity. It was therefore not possible to use a unique questionnaire for all sectors. Ultimately seven different questionnaires had to be designed to meet the requirements of the CEA. The activities covered by each questionnaire were as follows:

CEAL 1: Mining and quarrying, and manufacturing

CEAL 2: Construction

CEAL 3: Wholesale and retail trade

CEAL 4: Hotels and restaurants

CEAL 5: Insurance

CEAL 6: Banking and other financial intermediation

CEAL 7: Services (Other)

The list of topics included in CEAL 2007 questionnaires was:

- (a) Characteristics of establishment
- (b) Employment and hours of work
- (c) Labour cost
- (d) Expenditure on goods and services excluding ICT related services
- (e) Other disbursements (taxes, rates, insurance, interest, etc)

- (f) Information and communication technology (ICT) related services
- (g) Receipts
- (h) Other receipts (interest, insurance claims, dividends, etc)
- (i) Fixed assets

1.10.3 Instructions to respondents

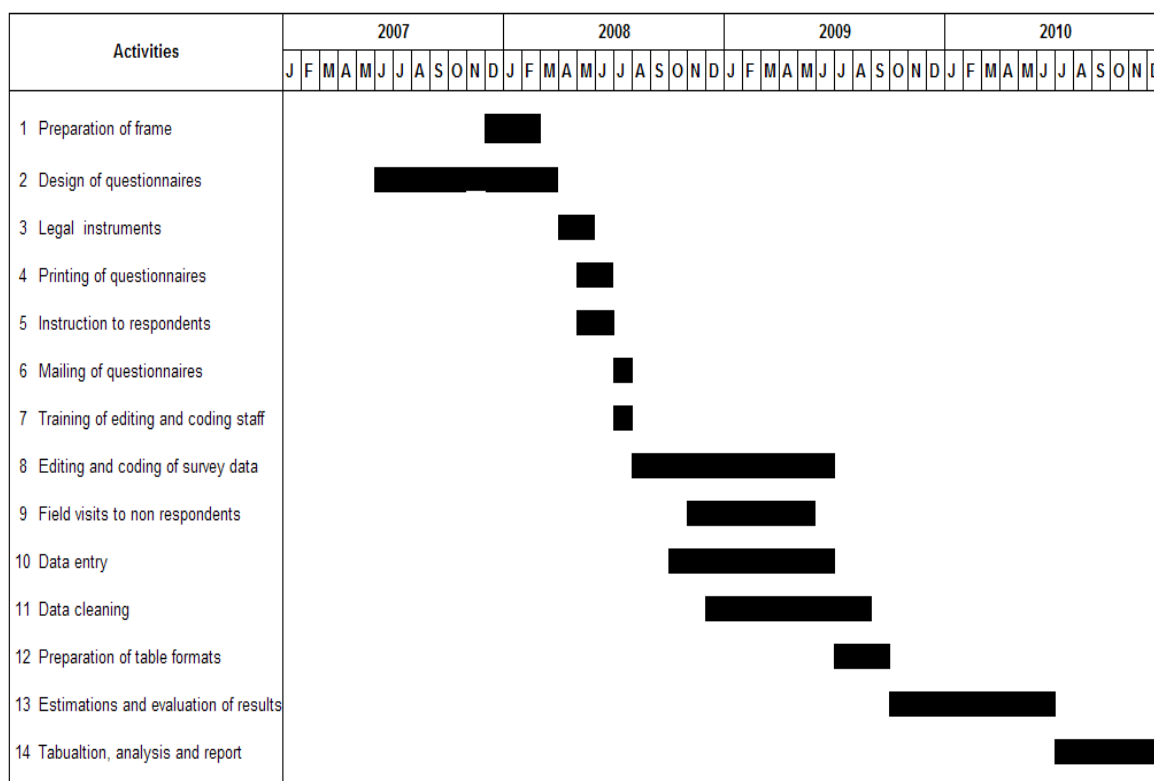
With a view to helping respondents to understand and record properly the relevant information required, a set of explanatory notes was prepared and mailed together with the questionnaire to the establishments.

A specimen copy of the questionnaire used is at Annex B. The complete set of questionnaires is on the website CSO of the office at <http://statsmauritius.gov.mu>.

1.11 Calendar of activities

Work in connection with the Phase II of CEA 2007 started in May 2007. The time table of the various activities involved in the second phase of CEA is shown below.

Figure 1.1: Time frame of activities in connection with Phase II of CEA 2007



1.12 Data collection and response rate

Unlike the small establishments, which were requested to record their monthly transactions in a diary specific to the CEA, data were collected from the large establishments through mail questionnaires, since they are usually well-structured and keep records of their transactions.

In July 2008, two copies of the relevant questionnaires with a covering letter and an instruction sheet were mailed to all the 2,337 large establishments. Following a low response rate at the date limit fixed for end of November, two reminders were sent during the following two months. Field visits were also organised and intensified during the period November 2008 to May 2009 for contacting non-respondents as well as for settling queries.

By the end of May 2009, the response rate was around 42% in terms of establishments, 55% in terms of employment and 57 % in terms of gross output. A summary of the final response rate is given below.

Table 1.1: Response rate by industry group, CEA 2007

Industry group	Response rate (%)		
	Number of establishments	Number of persons engaged	Gross output
All industry groups	42	55	57
Mining and quarrying	40	43	44
Manufacturing	34	55	60
Electricity, gas and water supply	86	98	97
Construction	35	23	23
Wholesale and retail trade, and repairs	40	60	65
Hotels and restaurants	37	49	51
Transport, storage and communications	49	58	40
Financial intermediation	66	89	76
Real estate, renting and business activities	34	40	40
Education	68	81	64
Health and social work	79	88	85
Other services	36	43	48

1.13 Editing and Coding

The editing and coding exercise was carried out in the office and also as home assignment. In office, a team of around eight officers (two Clerical Officers and six Statistical Officers) were involved in the exercise under the supervision of two Senior Statistical Officers (one part-time and one full-time). Sample of the coded questionnaires were verified by a Statistician. In addition to an instruction document "Editing and Coding Instructions" provided to the coders, training sessions were carried out by the Statistician together with the Principal Statistician for a clear understanding of the tasks expected from them.

1.14 Home Assignment

Due to the shortage of human resource in the editing and coding exercise, the office had recourse to home assignment undertaken by the same team of coders in order to complete the work in time. This practice was also adopted for phase I of the census.

1.15 Data Processing

Data capture was performed by the Central Information Systems Division (CISD) of the Ministry of Information and Communication Technology using the Integrated Microcomputer Processing System (IMPS) software. Data validation and cleaning were done by the CEA unit using IMPS. The clean data files were then transferred to the STATA software for tabulation. Summary tables and charts were prepared in EXCEL.

1.16 Imputation for non-response

Figures in this report include estimates for non-respondents. Production data from other annual and quarterly surveys as well as from various administrative sources have been used to work out the estimates. Employment data from the annual Survey of Employment and Earnings, carried out by the office have also been extensively used.

Gross output of non-respondents were based on the average gross output per person engaged obtained from information supplied by respondents in the same industry group and of approximately the same size in terms of employment and the employment figures of the non-respondents. Technical coefficients for respondents were then used to impute corresponding estimates of intermediate consumption, compensation of employees, etc., for the non-respondents. This was based on the assumption that respondents and non-respondents of similar characteristics (type of activity, employment size) have similar operating characteristics.

1.17 Reporting of results

The census results, after estimation for non response have been examined and cross checked with aggregate data from other sources to ensure consistency. Adjustments were made where necessary and estimates worked out for sectors not covered by the census.

This report provides some analysis of the main results as well as a series of detailed tables at Annex. To show changes that have occurred during the period 2002 to 2007, the main aggregates have been compared with those of CEA 2002.

1.18 Classifications

Classifications, concepts and definitions used are according to latest recommendations of the United Nations. These are:

- (a) National Standard Industrial Classification of all Economic Activities (NSIC) for the classification of economic activities. NSIC is an adapted version of the International Standard Industrial Classification of all Economic Activities (ISIC - Rev.3).
- (b) Central Product Classification (CPC) Rev 1.1 for the classification of products

1.19 Concepts and definitions

Concepts and definitions used were mostly based on those of the UN System of National Accounts 1993 (SNA93).

- (a) An **establishment** is defined as a production unit engaged in one kind, or predominantly one kind of activity at a fixed physical location.
- (b) **'Large'** establishments are those engaging 10 persons or more, including working proprietors.
- (c) **Persons engaged** in an establishment refer to the total number of persons who work in or for the establishment. It includes employers, own account workers, contributing family workers and employees.
- (d) An **employee** is a person who works in a paid employment job and receives remuneration as wages, salary, commissions, tips, piece rates, bonuses or payments in kind such as food and housing.
- (e) An **employer** is a person who, working on his or her own economic account or with one or a few partners, holds a self-employment job, and, in this capacity, has engaged on a continuous basis one or more persons to work for him/her as employees.
- (f) **Own-account worker** is a person who, working on his or her own economic account or with one or a few partners, holds a self-employment job, and, in this capacity, has not engaged on a continuous basis any employees.
- (g) **Contributing family worker** is a person forming part of the household of any of the proprietors or related to them, who is actively engaged in the business, without any remuneration.

- (h) **Outworker** is a person who works at home on materials normally supplied by the establishment and according to the specifications provided by the employer.
- (i) **Part-time** workers are those persons who work less than half of the usual working hours.
- (j) **Basic Price** is the amount receivable by the producer exclusive of taxes on products (e.g. excise duty and Value Added Tax) and inclusive of subsidies on products. The equivalent of imported products is the C.I.F value at the border of the importing country.
- (k) **Purchasers' Price** is the amount payable by the purchaser exclusive of deductible taxes on products (e.g. deductible VAT).
- (l) **Gross output** is the value on the market of goods and services produced, including work in progress and products for own use. For distributive trade, output is measured by the trade margin which is obtained as the difference between sales value and cost of goods sold. Gross Output is valued at basic prices.
- (m) **Intermediate consumption** of industries covers non-durable goods and services used up in production, including repairs and maintenance of the capital stock. Intermediate consumption is valued at purchasers' prices.
- (n) **Value added** at basic prices is equal to the gross output at basic prices less the value of intermediate consumption at purchasers' prices.
- (o) **Wages and salaries** comprise all payments in cash, which employees receive in respect of their work before deduction of employees' contribution to social security schemes.
- (p) **Payments in kind** are goods and services provided to employees free of charge or at markedly reduced costs, which are clearly of direct benefit to the employees as consumers. Examples are food, drinks, clothing, accommodation or other commodities. The value of these commodities is estimated at their market prices.
- (q) **Earnings** comprise payments in cash and in kind made to employees. They include wages and salaries, overtime payments, refund of travelling, payments in kind and other benefits, but exclude employers' contributions to the National Pension Fund (NPF) and other pension schemes.
- (r) **Compensation of employees** comprises earnings and employers' contributions to the NPF and private pension funds, and casualty insurance and similar schemes.
- (s) **Taxes on production and imports** include all taxes that enterprises incur by engaging in production. There are two categories of taxes, namely 'Taxes on products' and 'Other taxes on production'.

- (i) **'Taxes on products'** are payable on goods and services when they are produced, sold or used. Examples are Excise Duties, Import Duties and Value Added Taxes (VAT).
- (ii) **'Other taxes on production'** are taxes payable out of the value added of producers. This category of taxes includes taxes levied on property, fixed assets and labour employed. Examples are municipal rates, motor vehicle licences and business licences.
- (t) **Gross operating surplus** is defined as the excess of value added over compensation of employees and 'Other taxes on production'.
- (u) **Financial intermediation services indirectly measured (FISIM)** is defined as the difference between interest received and interest paid by banks. It is an intermediation consumption of the various industries.
- (v) **Goods-producing industries** include "Agriculture", "Mining and quarrying", "Manufacturing", "Electricity, gas and water supply" and "Construction".
- (w) **Services-producing industries** include "Wholesale and retail trade, and repairs", "Hotels and restaurants", "Transport, storage and communications", "Financial intermediation", "Real estate, renting and business activities", "Education" "Health and social work" and "Other services".

1.20 Problems and limitations

1.20.1 Response rate

In spite of the considerable effort made to persuade managers/proprietors of establishments to complete the questionnaires, the response rate in terms of number of establishments reached only 42%.

1.20.2 Reporting period

Large establishments usually have different accounting periods. Although the reference period was calendar year 2007, the respondents provided data according to their accounting periods, which could be any 12-months period between July 2006 and June 2008. Data have not been adjusted for different reporting periods.

1.20.3 Activities of establishments

The unit of enquiry was the establishment, defined as a production unit engaged in one kind, or predominantly one kind of activity at a fixed physical location. Large enterprises often consist of more than one production unit, located at different places and may be engaged in different activities. Such multi-establishments units have been classified in the industry group corresponding to their main activity. For example,

manufacturing companies may also be involved in transport and distributive trade activities.

1.20.4 Data limitations

It is to be noted that the estimates published in this report are not strictly comparable with official estimates of economic variables such as employment and national accounts aggregates regularly published by this office in issues of economic and social indicators and reports. The objective of the CEA was to collect information from production units in view of having up-to-date data on the structure of the economy for the computation of National Accounts estimates. The sum of the aggregates worked out from the CEA will not tally with the official estimates since not all activities have been covered by the CEA as mentioned at paragraph 1.4 above, and also because of reporting differences.

An overall picture of the economy taking into consideration the results of Phases I and II of CEA 2007 and data from other sources is given in Chapter 5.