

**Technical Report on the  
Cambodia Socio-Economic Survey 1997**

**National Institute of Statistics  
Ministry of Planning  
Phnom Penh, Cambodia**

*Sponsored by*  
**United Nations Development Programme,  
Swedish International Development Cooperation Agency  
and  
The World Bank**

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## FOREWORD

This report presents the results of the Cambodia Socio-Economic Survey (CSES) 1997. The survey was conducted by the National Institute of Statistics of the Ministry of Planning. The principal objective of the survey was to collect data needed for the measurement of living standards and information required for poverty monitoring and analysis. Provision of data and socio-economic indicators required by a variety of users and the strengthening of the survey taking capability of the National Institute of Statistics to regularly conduct multi-objective large scale household based surveys were the other important objectives. The survey was funded by UNDP and the Swedish International Development Agency (SIDA) through the Capacity Development for Socio- Economic Surveys and Planning Project CMB/96/ 019. The World Bank is the executing agency of the Project .

The survey was conducted as a collaborative effort of the Project and the National Institute of Statistics (NIS) of the Ministry of Planning. The survey was planned and designed by the project staff and the staff of the NIS. At the time we embarked on this survey it was accepted as an ambitious project. There were doubts with regard to the capacity of the National Institute of Statistics to undertake a complex multi-objective integrated household survey on living standards measurement sampling 6000 households with detailed household and village questionnaires. The successful completion of the CSES 1997 has provided good hands on experience to the staff of the National Institute of Statistics on aspects of planning, designing and implementing large scale surveys.

My Ministry gratefully acknowledges the technical assistance provided by UNDP and SIDA for sponsoring the project and the survey, and the World Bank for their participation from the project identification stage itself and sharing the responsibility for project implementation as the project executing agency. A special word of thanks are due to the UNDP Resident Representative Mr. Paul Matthews for extending technical assistance and for the interest he has taken on the project. We would like to record our deep appreciation of the assistance rendered by Mr. Andre Klap, former Deputy Resident Representative, UNDP who took a personal interest on this Project from the project identification stage and extended his support for its successful implementation.

I am grateful to Dr. Nicholas Prescott, Senior Economist, the World Bank, Washington, the Task Manager of the Project for the keen interest he has taken on the Project and the survey programme. His technical advise in addition to his administrative direction has been most helpful in the timely execution of project activities.

My sincere thanks are due to the statistical experts and consultants led by Mr. R. B. M. Korale, Senior Statistics Adviser, for providing technical direction and training Cambodian statisticians in survey taking and for preparing this survey report. I am also thankful to Mr. Mathew Varghese, Project Coordinator and project staff for providing administrative support.

I appreciate the dedication and enthusiasm of the staff of NIS, staff of provincial planning departments, and the Ministry of Planning who contributed to the successful completion of the survey. They have worked conscientiously to meet the project deadlines under difficult circumstances and stressful situations.

It is my pleasure and privilege to present this report on the Cambodia Socio-Economic Survey 1997. The government planners, policy makers and researchers will find in this report useful data and information and socio-economic indicators for monitoring and analysing poverty and planning and programming socio-economic development.

Chea Chanto  
Minister of Planning

Ministry of Planning,  
Phnom Penh.

## PREFACE

Cambodia Socio- Economic Survey (CSES) 1997 is the first of two surveys sponsored by the Capacity Development for Socio-Economic Surveys and Planning Project. The project is financed by United Nations Development Programme, and the Swedish International Development Agency. The World Bank is the project executing agency.

Survey programme sponsored by the Project aims at collecting data on the various facets of levels of living of the Cambodian people in order to obtain information required for monitoring and analysing poverty as well as for establishing and updating socio-economic indicators required by a number of users. The Cambodia Socio - Economic Survey 1997 is the first multi -objective national household survey conducted in Cambodia. This survey used four questionnaires to collect a variety of data concerning the living standards and socio - economic condition of the Cambodian population. A village questionnaire was used for the first time to collect community level information. CSES 97 focused on the social sector and collected detailed information on education and health aspects. The length of the comprehensive questionnaires and the magnitude of the survey which canvassed data from 6000 households and 470 villages made the survey a statistically complex undertaking. We had reservations about the adequacy of the available capacity of the national statistical system while having to undertake work connected with other programs. The staff of the NIS and provincial statistics bureaus responded positively and shared the burden to successfully meet the demands made on them. We are happy that it was possible to achieve the project dead lines of the survey at all stages. CSES 1997 was successfully implemented within a short period of 9 months from the commencement of the project in April 1997. It is understood that CSES 1997 is one of the LSMS surveys which was implemented in the shortest period of time.

We wish to acknowledge with thanks the technical assistance provided by UNDP and SIDA for sponsoring the project and the survey and the World Bank for their participation from the project identification stage itself and sharing the responsibility for project implementation as the project executing agency.

Special thanks are due to His Excellency Chea Chanto, Minister of Planning for his interest and personal attention on the survey from its inception which was a source of inspiration and encouragement for the project staff and national staff who had worked on the survey. Our thanks are also due to His Excellency Sang Ryvannak, Under Secretary of State Ministry of Planning and National Project Coordinator, who was always available to assist in resolving issues and problems.

We are grateful to Dr. Nicholas Prescott, Senior Economist, the World Bank, Washington, the Task Manager of the Project for the keen interest he has taken on the survey programme and his technical advise on survey design and implementation which made it possible to meet project dead lines and targets.

We would like to place on record our deep appreciation of the work undertaken by Project experts and consultants, and NIS staff and staff of the Ministry of Planning and the provincial planning departments who had worked with dedication and enthusiasm to successfully complete the survey. The success of the survey was mainly due to their keen interest and active participation to make the survey a success.

Hou Taing Eng  
Director  
National Institute of Statistics

R. B. M. Korale  
Senior Statistics Adviser

National Institute of Statistics  
Phnom Penh.

# **SURVEY DESIGN AND IMPLEMENTATION**

## **1. Introduction**

**Cambodia Socio-Economic Survey, 1997 (CSES-1997) was conducted by the National Institute of Statistics (NIS) of the Ministry of Planning. CSES 1997 is the first of two national surveys sponsored by the Capacity Development for Socio-Economic Surveys and Planning Project CMB/96/019 of the Royal Government of Cambodia. The Project is funded by UNDP and the Swedish International Development Agency and executed by the World Bank. The Ministry of Planning (MOP) is the government project implementation agency and NIS is responsible for the survey programme. The project expert staff in collaboration with the staff of NIS undertook the planning and designing of the survey. CSES 1997 is the first multi-subject household survey conducted in Cambodia, and it was designed as a multi-objective integrated survey, to obtain primarily, information for poverty monitoring and analysis.**

Poverty reduction and eventual eradication has been one of the major goals of the Royal Government of Cambodia and poverty reduction has been accepted as the central theme of the First Socio-Economic Development Plan 1996-2000. The Plan also refers to the fact that poverty and deprivation is widespread and takes many forms. Poverty monitoring and analysis require current, reliable and geographically disaggregatable data. The wide range of characteristics on which information is required demands the establishment of a data base much more detailed and timely than what the national statistics office could deliver without external support. Existing capacity for the collection and analysis of data on living standards is weak. During the past 4 years important groundwork has been laid by the conduct of two large-scale household surveys.

Current information on living standards and poverty is based on ad hoc specialized surveys which were conducted to meet urgent, specific statistical data needs such as the detailed consumer expenditure data required to derive weights to establish consumer price indices or establish base line socio-economic indicators required by different sectoral data users. These data sources were of insufficient detail both in subject matter coverage and geographical disaggregation to serve as a current database for measurement of living standards and poverty. They were inadequate to explore analytically important relationships concerning the incidence, magnitude, nature and causes of poverty.

The survey programme sponsored through the Project aims at collecting information on various facets of levels of living of the Cambodian people. CSES-1997 is the first household survey conducted in Cambodia which has used an integrated set of questionnaires to canvass data on a wide range of socio economic topics for measuring living standards, monitoring poverty and to also elicit data on sectoral and sub-sectoral subjects and topics. The survey was designed to adopt the core and module questionnaire approach. The purposes of the core questionnaire were to support monitoring of changes in key indicators over time and identification of priority areas for geographic targeting of development programmes. To serve these needs the subject matter coverage in the core questionnaire was fixed on a small number of key welfare indicators including per capita consumption expenditure, education enrollment, health care utilization rates, and basic demographic characteristics, housing characteristics and household assets. The core would be implemented without many modifications annually and a rotating sector module will supplement it. The purpose of the modules would be to support in-depth analysis of sectoral issues and policies. The module could be canvassed on a sub-sample of the sample selected for the core but in the CSES 1997 it was decided to admit it to all the sample households considering the spread of

items included in the social sector module. CSES 1997 social sector module focussed on education and schooling including education expenditure, and health and morbidity and amounts spent on health care. In addition to the collection of data from sample households, canvassing of a village questionnaire from sample villages was a new feature introduced with the survey. The village questionnaire was designed to collect data on variables which affect all households in the community such as public and private provision of economic infrastructure including roads, land, irrigation, markets and social services including the facilities of education and health and associated problems and on retail prices and wages prevailing in the sample villages.

The work on the survey formally started when the Project became operational at the beginning of April 1997. Some preliminary work relating to the development of draft questionnaires, sampling strategy of the survey was initiated earlier. The Project was scheduled to commence in January 1997, and despite project start up delays, very rapid progress was made in planning, designing and implementing the survey after mid April 1997. The draft questionnaires were reviewed and amended and translated into Khmer and instruction manuals for enumerators and supervisors were finalized. Consultation with the Government, donors and NGO's were held at the beginning of May 1997 followed by pretests and accordingly, survey instruments were further improved on the basis of these observations and findings. Training of enumerators and supervisors commenced in the third week of May and continued up to the first week of June 1997. Field work was begun at the end of May and concluded at the end of June 1997. Manual coding and editing was started at the beginning of August and computer processing began in September 1997.

Through this survey, several new procedures and international standard practices were introduced into the NIS household survey data collection and data processing operations including extensive documentation, use of core and module questionnaires in a fully integrated survey, village questionnaire for community information, checking error print out's after consistency edits, and computerized survey data processing in a network environment.

This report describes the methodology and implementation of CSES 1997. The survey sampled a total of 6010 sample households distributed in 474 villages. The survey provides statistically reliable estimates for the three domains Phnom Penh, other urban and rural areas. The survey design provides for the extraction of estimates for the four geographic zones viz. Plains, Tonle Sap Lake, Coastal and Plateau and Mountain regions of the country. In addition to the estimates based on the truncated frame used in the survey, a computation procedure for deriving extrapolated estimates for Cambodia as a whole including the areas omitted from the frame was prepared and extrapolated estimates for selected items were computed.

## 2. Objectives of CSES 1997

The immediate objective of the Project is the development of institutional capacity of the National Institute of Statistics (NIS) of the Ministry of Planning (MOP) to implement a demand driven multi-purpose living standards household survey based data collection system which produces regular, timely and relevant feed back to government policy makers. The project has provided technical assistance for the conduct of two large scale multi-objective national household surveys, the first one in 1997 and the second to be conducted in 1998/99. The primary objective of Cambodia Socio-Economic Survey (CSES) 1997 was to obtain data for the measurement of living standards in geographic stratification and different segments of the Cambodian society. The other objectives were to provide information needed by a variety of users such as government institutions, donor agencies, non- government organizations; to

assist NIS to train its staff in planning, designing and conducting a household based survey system and institutionalize survey taking capability. The expansion of the scope of the survey to meet the data needs of a wide variety of users and thus minimize the duplication of household surveys and promote the acceptance of CSES as the national household survey programme was also an important objective.

Specifically the survey had the following objectives:

- i) To provide data required for the measurement of living standards through a single source of data for a comprehensive and detailed analysis of living standards and poverty in Cambodia.**
- ii) To provide information on school facilities, schooling and enrollments, cost of education and related information.**
- iii) To provide information on health issues, utilization of health facilities and costs incurred in treating illnesses.**
- iv) To provide information on demographic and economic characteristics of the population such as age-sex distribution, marital status, fertility, mortality, literacy, employment incomes.
- v) To derive information on socio-economic conditions of villages including infrastructure and access to education and health facilities.**
- vi) To establish survey taking capability within NIS for the Institute to conduct multi-objective large scale household-based survey programmes.

### **3. Scope and coverage of the Survey**

The survey objectives described earlier have by and large determined the scope of the survey. In order to effectively meet the primary and secondary objectives, the survey had to be nation wide and provide statistically reliable estimates for the principal characteristics included in the survey for investigation. The multi-objective survey, which was specifically designed to collect information required for measuring living standards and monitoring poverty, was extensive in both subject matter terms and level of detail. The respondent burden which would result in a lowering of the quality of data and the skills background of

the field enumerators and supervisors to admit a set of long and detailed questionnaires were the main considerations that determined the eventual content of the topics canvassed in the CSES 1997.

The survey used four questionnaires, a house listing form, a village questionnaire, a core questionnaire and a social sector module. The questionnaires were prepared after extensive consultations with the users. The draft questionnaires were prepared in January and February 1997 and they were reviewed in March - May and pre-tested. The core questionnaire and the social sector module were canvassed with all of the sampled households and in that sense the CSES1997 is a fully “integrated” multi-objective survey. A novel feature of the survey was the canvassing of a village questionnaire for the 474 sample villages. Information on the economy and infrastructure of the villages, on the facilities of education and health care and associated problems and on prevailing retail prices and wages were topics canvassed through the village questionnaire.

The main or core questionnaire was designed to collect information on demographic characteristics of households, disabilities of members, their economic activities, education and health care, housing conditions, assets and liabilities, household consumption, and some aspects of fertility and child care. The social sector module collected further information on availability and utilization of education and health services, including costs of schooling and health care, and on dropouts in education, on mortality rates, on free collection of water, firewood and fodder and on breast-feeding, child immunization and nutrition.

The scope of the survey in terms of population groups was restricted to all private households including one person households. The practical problems involved in surveying persons living in collective living quarters such as military installations, hospitals, prisons, hostels, religious institutions required the exclusion of such institutional populations.

The need to extend the geographical scope of the survey to cover rural and urban areas and all the regions of the country to increase the usefulness of a survey canvassing data on consumption and expenditure, economic characteristics of villages and households and on health, education and nutrition was understood. However practical considerations made it essential to use a truncated frame that excluded areas that were considered not safe to undertake field work for security reasons. As a result Preah Vihar and Oddar Meanchey provinces and some communes from 15 other provinces were excluded from the frame and a truncated frame was used in the survey. Phnom Penh, which was treated as a separate domain, had 615 villages and they were entirely covered in the truncated frame. The other urban areas had 834 villages and of them 73 villages had to be excised and the coverage had to be restricted to 91.3 % of the villages. In the rural sector 86.3 % of the villages were covered in the truncated frame used in the survey. Details relating to villages excluded from the survey are shown in Table 1.

Table 1  
Number of Villages Excluded from Survey Coverage

No.	Prov. Code	Name of Province	Other Urban	Rural	Total
1	01	Banteay Meanchey	18	105	123
2	02	Battambang	-	100	100

3	03	Kampong Cham	-	130	130
4	04	Kampong Chhnang	-	92	92
5	05	Kampong Speu	-	429	429
6	06	Kampong Thom	-	99	99
7	07	Kampot	-	58	58
8	08	Kandal	-	7	7
9	09	Koh Kong	-	21	21
10	10	Kratie	3	26	29
11	13	Prea Vihear *	27	170	197
12	15	Pursat	4	118	122
13	17	Siem Reap	-	90	90
14	19	Stung Treng	-	3	3
15	20	Svay Rieng	-	27	27
16	21	Takeo	-	29	29
17	22	Oddar Meanchey *	21	67	88
		Total	73	1571	1644

\* Completely excluded from the frame.

#### 4. Topics

The scope of the survey with respect to items of information collected at village level and household level are as follows

##### I. Village level information

##### 1. Demographic Information

- a. Total number of households
- b. Population by broad age groups
- c. Ethnic composition
- d. Migration

##### 2. Economy and Infra-structure

- a. Income earning activities in order of importance
- b. Total area and irrigated area of agricultural lands and paddy lands
- c. Village amenities ( roads, electricity, piped water supply etc.)
- d. Availability of economic services (market, bank, agricultural services etc.)
- e. On going development projects

##### 3. Education

- a. Information on primary, lower and upper secondary schools
- b. Major problems with primary, lower and upper secondary schools

##### 4. Health and Immunization

- a. Type of health services
- b. Major health problems
- c. Maternity services
- d. Immunization services
- e. Community health

5. **Retail Prices and Wages**
  - a. Food prices
  - b. Non food prices
  - c. Medicine prices
  - d. Wage rates of agricultural and non-agricultural labor

6. **Natural Disasters**
  - a. Number and type

## II. **Household Information**

1. **Demographic Characteristics**
  - a. Relationship to household head
  - b. Sex
  - c. Age
  - d. Marital status
  - e. Disability
  - f. Internal migration
  - g. Ethnicity
  - h. Language fluency
2. **Education**
  - a. Literacy
  - b. Educational attainment
  - c. Current school attendance
  - d. Dropouts and reasons for dropping out
  - e. Costs of schooling
  - f. Distance to school
3. **Economic Characteristics**
  - a. Usual activity in the past 12 months
  - b. Current activity
  - c. Occupation
  - d. Industry
  - e. Employment status
  - f. Number of hours worked – past 7 days
  - g. Primary and secondary occupations
  - h. Employment Income
4. **Health**
  - a. Incidence of illness and symptoms
  - b. Consultation with health provider
  - c. Hospitalization
  - d. Impact of illness on a person's work
  - e. Expenses related to treatment

5. **Housing and Environment**
  - a. Area of housing unit/dwelling
  - b. Year of construction
  - c. Type of construction materials used (wall, floor, roof)
  - d. Source of lighting

- e. Distance to and source of drinking water
- f. Toilet facilities
- g. Fuel used for cooking

## 6. Household Consumption Expenditure

(Purchased, own produce, perquisites, gifts etc.)

- a. Food beverages and tobacco
- b. Clothing and foot wear
- c. Housing and utilities
- d. House furnishing and household operation
- e. Medical care
- f. Transport and communication
- g. Recreation and entertainment
- h. Education
- i. Personal care and effects
- j. Miscellaneous
- k. Change in household consumption expenditure

## 7. Household Assets and Liabilities

- a. Area and value of residential lands/buildings by occupancy status.
- b. Area and value of farm lands by occupancy status.
- c. Livestock owned
- d. Consumer durables
- e. Capital items owned by households
- f. Outstanding loans

## 8. Fertility, Mortality and Child care

- a. Age at marriage
- b. Number of children ever born
- c. Death by sex and cause
- d. Breast-feeding practices
- e. Infant-foods and other supplementary foods
- f. Immunization

## 9. Household's access to water, firewood, and fodder

- a. Distance to source of water and firewood
- b. Time taken to collect water and firewood
- c. Source of fodder

## 5. Survey Design

### 5.1 Sampling Frame

The sampling frame used in the Cambodia Socio-Economic Survey 1997 was based on the frame developed for the Socio-Economic Survey of Cambodia 1996. The household surveys conducted by NIS had used the nationwide population data file compiled by the United Nations Transitional Authority in Cambodia (UNTAC) prior to holding the general elections in 1993. The initial list contained data on the total number of households, estimated total population, and population 18 years and over broken down by sex together with information on facilities and amenities in each village. This list was updated incorporating data gathered by several agencies including the Municipality of Phnom Penh, reports obtained from the Ministry of Interior, data collected by the Population Census Project of

NIS and information obtained from the UNHCR on re-settlement of refugees. Despite these efforts at updating the frame, it must be recorded that the frame would require substantial revision to make it complete. The lack of data from a recent population census or population registers; frequent revision of village level boundaries; and population mobility as a result of unsettled conditions have all contributed to weaknesses in the current village-based data on household population. The conduct of the national population census scheduled for March 1998 will make it possible to compile a reliable frame at least in respect of the areas in which field enumeration can be undertaken and reduce the degree of incompleteness in the frame. Until then there is no alternative but to use the available list of villages together with the reported number of households compiled from earlier mentioned sources as the sampling frame, which was in fact the frame that was used in three large scale household surveys conducted during the past 5 years.

## 5.2 Sampling Design

The sampling design for the CSES 1997 considered several factors including the precision of data required by the users, the capacity of the national statistics office to conduct the survey, and most importantly the time constraint imposed to complete survey field work before the end of July 1997. Taking into account these factors, and specially the experience gained from the two socio-economic surveys conducted in 1993/94 and 1996, including estimates of feasible work loads, a sample of 6000 households to be selected from 474 villages was considered to be sufficient and manageable.

The design also took into consideration the need for separate analyses of three geographical domains, namely Phnom Penh, other urban areas aggregated together, and the rural area. In deciding the sample allocation to the three domains, it was decided that a size of around 1000 households would be adequate for the first two domains and the rest should be allocated to Domain 3 – Rural area, since it was envisaged that more detailed analysis of the poverty groups in this domain would be undertaken. The final allocation of sample is shown in Table 2 .

The design had provided for sampling 10 households from each village in urban villages and 15 households from rural villages. Logistical considerations made it necessary to increase.

Table 2

### Sample Allocation

Domain	Villages	Households
Phnom Penh	120	1,200
Other Urban	100	1,000
Rural	254	3,810
Cambodia	474	6,010

the cluster size to 15 for rural villages, in order to reduce the number of survey teams sent to the rural areas where travel was more difficult.

The stratification adopted would lead to a reduction of sampling errors. In the design both explicit geographical stratification in the form of the three domains and implicit stratification in the form of ordering the villages by region, province, district and commune before systematic sampling are used.

## **6. Concepts and Definitions**

In order to ensure comparability of data, most of the basic concepts and definitions that were developed for the two socio-economic surveys conducted by the National Institute of Statistics in 1993 and 1996 were used in the CSES 1997 to the extent feasible. These surveys had adopted international standard definitions and concepts as recommended by the United Nations with appropriate modifications to suit local conditions.

A detailed explanation of the terms used in the CSES 1997 can be found in the Manual of Instructions for Field Operation. Only selected concepts and definitions are included in the report.

### **Housing Unit**

A housing unit is a structurally separated and independent place of abode. It may have been constructed, built, converted or arranged for human habitation, such as commercial, industrial, and agricultural buildings, or natural and man-made shelters such as caves, boats, abandoned trucks, culverts and similar structures which are used as living quarters.

### **Household**

The household is the basic unit of enumeration and analysis. For the purpose of this survey a household is a social unit consisting of either

- a) one person who makes provision for his or her own food or other essentials for living without combining with any other person; or
- b) a group of persons living together who make common provision for food or other essentials for living. The persons in a group may pool their incomes and have a common budget to a greater or lesser extent. They may be related or unrelated persons or a combination of both.

### **Head of Household**

The head of household is the adult member of the household who is accepted and recognized by the other household members as head.

### **Disability**

A restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being is defined as disability. It describes functional limitation or activity restriction caused by an impairment. The survey ascertained information by inquiring whether the person had any major problem with his/her body, mind or behavior that limited the persons ability to participate in work, school, or ordinary social life, which is a permanent or long-term condition but not temporary illness.

### **Illness**

For the purpose of this survey, any short-term or long-term health problem such as a sickness, injury, or a pregnancy related problem was defined as illness.

### **Literacy**

Literacy is the ability to read and write a simple message. A person is considered literate if he or she can both read and write a simple message in any language or dialect. A person capable of reading only his own name or numbers, or can read but not writes and vice versa, is not considered literate.

**Work**

Work is defined as an economic activity that a person does for pay, in cash or in kind, in any establishment, office, farm, private house, or for profit or without pay on a household operated farm or enterprise.

**Labor Force or Economically Active Population**

The labor force or economically active population refers to persons who contribute or are available to contribute to the production of goods and services in the country. They are either employed or unemployed.

**Employed**

Employed persons are those who are in the labor force who were reported to be either at work or with a job or business although not at work during the reference week. Persons at work are those who did some work at all, even for an hour, during the reference period (past week). Persons are also considered employed if they are with a job or business even though not at work during the reference period because of temporary illness/injury, vacation or other leave of absence, bad weather, strike/labor disputes or other reason.

**Unemployed**

Unemployed persons are persons in the labor force who did not work or had no job or business during the reference week but were reported available and actively looking for work. Also, considered as unemployed are persons without job or business who were reported as available for work but were not looking for work because of their belief that no work was available or because of temporary illness/disability, bad weather, pending job application or waiting for job interview.

**Occupation**

Occupation refers to the type of work, trade or profession performed by the individual during the reference period. If the person is not at work but with a job, occupation refers to the kind of work that the person will be doing when he reports for work.

**Principal Occupation**

If a person has more than one occupation, the one in which the person spends most of his working time is considered as the principal occupation. If the person is engaged in only one occupation, then that will be his/her principal occupation.

**Secondary Occupation**

Secondary occupation is any kind of work or job that a person does for pay, profit or family gain in addition to the principal occupation.

**Industry or Kind of Economic Activity**

Industry or kind of economic activity refers to the nature of work done (the goods and services produced) by the institution or the workplace or enterprise where the person works.

**Household Expenditure**

Household Expenditure refers to the expenses or disbursements made by the household purely for personal consumption. Durable furniture and equipment (e.g. tables and chairs, cars, motor cycles, and appliances) purchased during the reference period mainly for household use is treated as household consumption. It excludes expenses in relation to farm or business operations, investment ventures, purchase of real property and other disbursements that do not involve personal consumption.

**Household Consumption**

Household Consumption consists of the following:

- a) Household expenditure;
- b) Value of goods and services received as gifts;
- c) Value of goods and services consumed from the output of agricultural and non-agricultural activities of the household;
- d) Imputed value of owned/rent free house;
- e) Imputed value of goods/services received as fringe benefits from the employer or part of the salaries and wages of employed household members during the reference period which were also consumed during the reference period.

### **Consumer Durables**

Any household items which last for more than a year such as television, radio, refrigerator, bicycle, motor bicycles, car etc. and which are mainly for household use and not for business or other production purposes are defined as consumer durables.

### **Household assets**

Any consumer durables or capital items, which usually last for more than a year, owned by a household and used either for household consumption or business purpose including land and buildings are defined as household assets.

### **Schooling**

The term schooling includes attendance at a kindergarten, primary, lower or upper secondary school, technical or professional school, college or university.

### **Wages**

Wages include remuneration received as cash wages, tips, commissions, piece rate earnings, overtime payments, and imputed value of benefits in kind, such as meals or accommodation provided by the employer.

## **7. Survey Organization**

At the commencement of the Project in April 1997, considering the extremely tight time schedule within which the survey programme will have to be designed and implemented and the importance of the survey data from national planning perspectives, Minister of Planning approved the appointment of a nuclear staff of senior professionals from the National Institute of Statistics as a Core Group to work with the Project staff. The members of the core group were identified to cover essential aspects of survey planning and design, survey implementation and coordination, and survey processing so that the counterpart staff could work with the Project expert staff to immediately operationalise the survey and also simultaneously receive on the job training in household survey design and implementation. The core group comprised the Deputy Director responsible for industrial and trade statistics, the Deputy Director in charge of agriculture statistics, the bureau chiefs responsible for social statistics, and national accounts and prices and the vice bureau chiefs of the sample survey and data processing bureaus. The Director, National Institute of Statistics functioned as the survey director and reported to the Under Secretary of State, MOP under whom the NIS functioned who was also the National Project Coordinator. The survey director was responsible for the management and supervision of NIS staff as well as the staff engaged from the Ministry of Planning and provincial planning and statistics departments who worked on the survey as enumerators and supervisors.

The Senior Statistics Adviser of the Project provided technical direction and overall guidance in the organization and implementation of the survey including preparation of cost estimates, survey design, preparation and review of survey implementation plan, review of survey instruments, as well as in the establishment of the survey project office and processing centre and in the preparation of tabulation plan and the survey report. The project consultants and experts recruited for the survey were responsible for the sampling design, preparation and review of survey instruments, design systems and programs for data processing, technical training of field staff and survey processing staff, technical supervision of all aspects of the survey, preparation of tabulation plan, extraction of tables, data validation and preparation of survey report.

The core group in collaboration with the project expert staff took all major decisions relating to the survey. The Under Secretary of State, MOP responsible for NIS was available for consultation and assistance to resolve administrative issues. As the survey activities gathered momentum, additional staff was co-opted, as required for the different survey activities. Recognizing the importance of provincial staff for the successful implementation of field data collection operations especially in the local context, the staff of provincial statistics bureaus were identified on a need basis which depended on the sample selected from the province. NIS was under pressure to assign both NIS personnel and staff of provincial statistics bureaus to two on-going projects having responsibilities for the population census scheduled for March 1998 and data collection for national accounts compilation, and NIS was unable to allocate an adequate number of trained staff for field operations and the staff of the MOP was co-opted for survey enumeration. Although staff was trained for survey enumeration, their inadequate experience and skills in surveys affected data quality and data editing and cleaning became more complex in a survey, which used an integrated set of long questionnaires. One of the most important and valuable results of the survey from a capacity building point of view is the exposure and hands on experience gained by statistical staff at all levels in several aspects of designing and conducting large scale multi-objective surveys.

## **8. Field Operations**

The need to complete survey field operations before the end of July 1997 and release the NIS and provincial statistical staff was a major critical factor which determined many of the decisions relating to the timing and scheduling of survey operations. The population census project financed by UNFPA had scheduled the training of field staff to commence in July 1997. The census project was keen to have the services of all senior and middle level staff of NIS and provincial statistics bureaus.

The security situation has by and large determined the organization of fieldwork in household surveys conducted in Cambodia. As often attempted elsewhere in the conduct of field work on large scale surveys, deployment of centrally trained teams of enumerators with supervisory staff in motor vehicles is not a feasible option at the present time primarily because of security and logistical issues including the safety of personnel and transport. Alternatively, provincial staffs who are familiar with local conditions, along with staff from NIS are assigned to work as teams arranging private transport on their own. Majority of enumerators use their own motor bicycles and others procure them from their friends and relatives. The provision of incentive allowances to meet the cost of travel and subsistence has made this arrangement operationally satisfactory and cost effective.

Accurate assessment of staff requirements, and staff deployment on the basis of work load assessments and careful monitoring and co-ordinatory arrangements that were instituted made it possible to conclude field work by the end of June 1997 and thus meeting the target date for this critical activity. In retrospect the decision imposed to finalise fieldwork before

July 1997 turned out to be fortunate. The events and incidents that erupted in early July 1997 would have certainly prevented the conduct of field work in many areas and in addition resulted in the misplacement and loss of completed survey documents where field work had been completed by that time.

## **8.1 Field Test of Survey Instruments**

Before finalizing the survey instruments, two pre-tests of listing form, village, core and module questionnaires and instructions for field operation were conducted in Kampong Speu Province and in Phnom Penh Municipality on 5th and 6th May 1997 by the staff of the National Institute of Statistics. A team comprising ten enumerators and two supervisors were selected and trained to conduct these tests and they functioned in two groups. In the selected villages households were randomly selected and interviewed. The Project staff, senior staff of NIS, and the Under Secretary of State, Ministry of Planning participated and observed the conduct of these interviews. The tests were useful in identifying a number of deficiencies in the questionnaires as well as in the enumerator's instructions manual. The survey instruments were modified on the basis of these tests, and these modifications related to the wording of questions, space provided for responses, recording of totals, recording of animal sign according to the Cambodian calendar to improve age data, changes in skip instructions, changes in response categories and codes among other changes made to finalize the questionnaires.

## **8.2 Training of Field Staff**

CSES 97 is the first multi-objective national survey, which attempted to collect data on a wide range of socio-economic issues using a set of long questionnaires. The questionnaire was in four parts, Listing sheet, Village questionnaire, Core questionnaire and Social sector module. To completely fill the set of questionnaires, an interviewer had to admit 8 questions included in the listing form, 212 questions in the village questionnaire, and 192 questions included in the Core questionnaire, and 134 questions in the social sector module. A village questionnaire has not been admitted in the household surveys conducted earlier in Cambodia. The pretests had shown that a household interview would take one to two hours to obtain a complete and satisfactory response from the household. This relative complexity of the data collection task through household interviews was known and they were taken into account in planning and implementing a training program for enumerators and supervisors. However, time constraints already referred to, made it infeasible to extend the training duration and training schedule, although the need to do so was apparent.

The core group of NIS senior staff and other staff who participated in the pretest had been actively involved in the survey design and in the preparation of survey instruments and they had also been trained to conduct the pretest. They had participated in drafting, reviewing and translating the field operations manual into Khmer. These officers assisted in training enumerators and supervisors taking on the dual role of resource person and interpreter.

NIS had two other ongoing activities referred to earlier, which were being conducted concurrently and it was unable to release its full complement of staff and could detail only 71 officers for the survey. Staff of provincial statistical bureaus were identified on a need basis that depended on the sample selected for the province. Even here the staff requirements for census mapping program reduced the staff that could be released from the provincial statistics bureaus. These limiting factors made it necessary to engage 78 officers of the Ministry of Planning for field work. In all 210 staff were deployed on field operations including 156 enumerators, 48 supervisors and 6 coordinators. Supervisors were selected on the basis of their seniority, aptitude and experience of having conducted supervisory work in previous

surveys. They were trained in two batches in order to complete training by the end of May 1997. The first batch of 118 staff were trained for six days from 19<sup>th</sup> to 24<sup>th</sup> May 1997 and the second batch of 97 staff were trained from 28<sup>th</sup> May to 3<sup>rd</sup> June 1997.

The training program was started on 19<sup>th</sup> May through an opening ceremony presided over by the Minister of Planning, and attended by Under Secretary of State of Planning, Deputy Resident, Representative, UNDP among others. The Minister of Planning and also the other speakers emphasized the importance of CSES 1997 and exhorted the staff to do their best to collect complete and high quality information from respondents. The Minister of Planning gave a similar address to the outgoing participants of the second training program. The opening ceremony was televised and reported by Cambodian radio. A press release explaining the aims and objectives of the survey and seeking the cooperation from the public in general and from leaders and representative of the village was issued from the Ministry of Planning.

The project expert staff conducted training with the assistance of NIS core group members. The training was conducted in English and Khmer. The aims and objectives of the survey, scope and coverage, and broad features of the sampling design were described. The different questionnaires were taken up and explained in detail. The training was conducted more as a seminar where participants raised questions and sought clarifications relating to both the questions included in the questionnaires and explanatory notes provided in the manual of instructions. These training sessions had highlighted several issues in the survey instruments and in the process the manual got clarified and expanded. A role playing exercise was not attempted because the training had to be restricted to six days to cover four questionnaires and also explaining the systematic sampling procedures which enumerators and supervisors had to adopt in the field. The questions were directed at the enumerators to elicit responses from them to test whether the trainees had really understood the concepts, definitions and procedures to be followed by them in the field, and know the extent of the information and knowledge they were able to acquire specially on complex questions and topics and skip patterns, such as those that were included in the village and core questionnaires. Further, the participants were given test data to work out exercises for the selection of sample households based on systematic sampling procedures explained to them.

A special effort was required in explaining some topics such as those on economic activity which involved a number of deep and complex concepts on gainful work, employment, and income questions; health problems and treatment used and the amount spent on hospitalization and treatment; and the collection of data on household expenditures where expenditure had been aggregated to a limited number of questions.

In order to ensure that the training imparted will still be fresh in their mind they were deployed on fieldwork immediately after the conclusion of training. In most instances, the fieldwork commenced on the second or third day after the training ended.

### **8.3 Data Collection**

Each interviewer was assigned selected villages based on the sampling procedure. In order to complete the data collection activity within the planned time frame, each enumerator was assigned about 30/ 45 households in three or four villages. The questionnaires were filled by the method of personal interview.

A pre-listing of households was undertaken by the enumerator to generate the current list of households, which was essential to select the sample households based on the systematic sampling procedure. In addition to preparing a current list of buildings, housing

units and households certain additional information such as the number of household members, principal economic activity of the household was also collected.

After the selection of sample households, the selected households were revisited to interview one or more responsible members of the household to fill in the core and social sector questionnaires. Before or after the household interviews, the enumerator interviewed the head of the village and other key informants to canvass information for the village questionnaire.

The field control procedures provided for the supervisors to inspect and make on the spot checks while the interview was being conducted and they were also required to re-interview a sub-sample of the households already interviewed by the enumerators under his supervision. To ensure effective supervision through inspections and re-interviews, adequate funds were allocated for the payment of honoraria to supervisors for their supervisory duties. Some of the core group staff functioned as area coordinators and they were in over all charge of supervision as well as the coordination of the areas assigned to them. There was also a visit of the Minister of Planning and the Under Secretary of State MOP, Project Staff and Senior NIS Staff in Mid June 1997 to encourage the field staff and to study the operational issues and problems encountered in field work.

Despite the length of the questionnaire, the respondents cooperated with the survey staff and provided answers to both questionnaires and it was possible to achieve a 100% response rate. At this stage it is not possible to comment on item non-response, and completeness of information provided by the respondents, and the respondent's fatigue arising from the length of the interviews which may have had a bearing on these issues.

## **9. Data Processing**

### **9.1 Manual Processing**

All completed questionnaires were brought to NIS for processing. Although completed questionnaires were checked and edited by supervisors in the field, specially because of the length of questionnaires and the complexity of the topics covered the need for manual editing and coding by trained staff was accepted as an essential priority activity to produce a cleaned data file without delay. In all 39 staff comprising 35 processing staff and 4 supervisors were trained for three days by the project staff. An instruction manual for manual editing and coding was prepared and translated into Khmer for the guidance of processing staff. Manual processing of questionnaires commenced in mid August 1997.

In order to produce an unedited data file, keying in the data as recorded by field enumerators and supervisors, (without subjecting data to manual edit as required by the Analysis Component Project staff), it was necessary to structure manual editing as a two-phase operation. Thus in the first phase, the processing staff coded the questions such as those on migration, industry, and occupation which required coding. Editing was restricted to selected structural edits and some error corrections. These edits were restricted to checking the completeness and consistency of responses, legibility, and totaling of selected questions. Error corrections were made without canceling or obliterating the original entry made by the enumerator, by inserting the correction close to the original entry.

Much of the manual editing was carried out in the second phase, after key entry and one hundred percent verification and extraction of error print outs. A wide range of errors had to be corrected which was expected in view of the complexity of the survey and the skill background of the enumeration and processing staff. The manual edits involved the correction of errors arising from incorrect key entry, in-correct/ failure to include identification, miss-coding of answers, failure to follow skip patterns, misinterpretation of measures, range errors, and other consistency errors.

## **9.2 Computer Data Processing**

An in-house survey processing centre was established at the NIS to process the CSES 1997. A net work of 12 PC's with 2 high capacity PC's as servers was installed and NIS staff were trained to use the network system. The network can be strengthened with additional workstations to process a survey sampling of 15,000 households referred to in the project document.

Entire data processing was done on microcomputers and data entry and editing was carried out using Integrated Micro-Computer Processing System(IMPS) package developed by the US Bureau of the Census. Statistical Package for Social Sciences (SPSS) was used to obtain tabulations.

At the end of August 1997, the keyers and verifiers were trained for three days and key entry operations commenced. In all 30 key entry and verification staff and 3 supervisors were trained by the Data Processing Specialist to use the data entry screens prepared using IMPS software.

Four data entry systems were created to input the data from the four questionnaires. The data entry system for the listing form contains one record type with a maximum length of 49. The system for the village questionnaire contains 15 record types with a maximum record length of 105. The system designed for the core questionnaire contains 17 record types with a maximum record length of 116. The data entry system designed for the social sector module contains 12 record types with a maximum record length of 94. After keying in the data one hundred percent verification was done on all card types. In spite of this safeguard to minimize errors it was found that verifiers had not only failed to detect errors but had introduced errors during verification. The set of consistency edit checks prepared for the survey when applied for a sample of three villages, the error printouts were so voluminous that it was decided to clean the files in stages, selecting a single record, question or a topic at a time. The first computer edit was applied to check the basic structure of the data and to check the skipping patterns. The errors were corrected manually and the data file was updated using IMPS programs. After completing the structural edit, the data file was re-edited for validity of records. Consistency edits were designed to detect responses that appeared to be inconsistent with other responses or in conflict with definitions and processing rules. It was necessary to run several edit checks to clean some data items. For tabulation several sub-master files were created for most data items. The inflation factors that should be assigned to each village were applied to the data at the tabulation stage.

## **10. Limitations of Data**

The results obtained from the survey are subject to sampling errors. Sampling errors in surveys occur as a result of limiting the survey observations to a subset rather than the whole population. These errors are related to the sample size selected and sampling design adopted in the survey. In order to maintain these errors within acceptable levels, the efficient sampling design with the sample allocation described earlier was adopted.

In addition to sampling errors, the estimates are also subject to non-sampling errors that arise in different stages of any survey operation. These include

- errors that are introduced at the preparatory stage
- errors committed during data collection including those committed by interviewers and respondents
- processing errors

The first item includes errors arising from questionnaire design, preparation of definitions and instructions, preparation of table formats etc. The other two categories are clear from the terminology used. The use of trained enumerators and processing staff and careful organization and thorough supervision are essential to control and minimize these errors.

As already referred to, it was possible to obtain responses from all the villages and households that were sampled, and thus it was not necessary to adjust the data for non-response. Thus the bias that is introduced into the estimates as a result of non-response was avoided.

## SAMPLE SELECTION AND ESTIMATION

### 1. Sample Selection

#### 1.1 First Stage Selection

In the first stage the villages or primary sampling units ( PSU's ) were drawn from each domain. Within the three domains the villages were arranged by geographic codes with the villages grouped within communes and the communes within districts and districts within the provinces providing for some implicit stratification. The villages that had geographic codes also had the reported number of households based on the frame. The latter was used as the measure of size (MOS) in deriving the cumulated list for sampling. The sample villages were selected using the systematic sampling method with a random start with probability proportional to size method (PPS). The selection of sample villages was carried out through the use of a computer program. The procedure adopted is described below.

The selection probability for village  $i$  in domain  $h$  is given by the formula

$$p_h^{(i)} = a_h M_{hi} / M_h \quad (\text{Eq. 1})$$

where

$a_h$  = number of villages or PSU's drawn from the domain

$M_{hi}$  = number of households in village  $i$  as reported in the frame

$M_h = \sum M_{hi}$   
= total number of households in domain as recorded in the frame

The selection of PSU's was performed by arranging the villages in the  $h$  th domain according to region, province, district and commune and the estimated number of households was used as the measure of size  $M_{hi}$ . The values of  $M_{hi}$  were then cumulated and  $\sum M_{hi}$  was recorded against each PSU. The sampling interval  $I_{h1}$  was computed which is given by

$$I_{h1} = M_h / a_h$$

The list of PSU's was examined to determine if any  $M_{hi}$  was greater than or equal to  $I_{h1}$ . Such overlarge PSU's which are termed self-representing PSU's which will be certainly selected if allowed to remain as in their normal form, were divided into blocks of equal size, generally below 300 households and each block was treated as a separate PSU. The number of blocks into which the original PSU was divided was recorded.

Linear systematic sampling with a decimal interval was used to select the PSU's. The sampling interval  $I_{h1}$  was computed to 3 decimal places and a random number from 1 to  $1000 \times I_{h1}$  was selected. When the decimal point is placed before its last 3 digits it becomes  $R$ . The sequence of sampling numbers were computed as

$R, R + I_{hl}, R + 2I_{hl}, R + 3I_{hl}, \dots, R + (a_h - 1) I_{hl}$  as

*specified for the particular stratum.*

## 1.2 The Second Stage Selection

For each selected village (PSU) a field listing was undertaken and let the actual number of households listed in the PSU be  $M_{hi}^*$ , then the probability of selecting a household in the  $i$  th PSU in the  $h$  th domain is

$$p_h^{(j/i)} = n_h / M_{hi}^* \quad (\text{Eq. 2})$$

where  $n_h$  is equal to 10 in domains 1 and 2 and 15 for domain 3. Circular systematic random sampling with a random start was used to select households. The sampling interval would be equal to the current estimate of households in the PSU ascertained through the listing operation divided by 10 in the urban domains and 15 in the rural domain..

## 2. Design Weights

The design weights are used to compensate for differences in the selection probabilities. The weight for the PSU is inversely proportional to its selection probability.

The probability of selection of  $j$  th household in normal size PSU's and blocks in the  $h$  th domain is

$$p_h^{(i)} \times p_h^{(j/i)} = p_h^{(ij)} \quad (\text{Eq. 3})$$

$$\text{where } p_h^{(i)} = a_h M_{hi} / M_h$$

$$\text{and } p_h^{(j/i)} = n_h / M_{hi}^*$$

Thus the design weights  $w_{hij}$  for these units are

$$\begin{aligned} w_{hij} &= 1 / p_h^{(ij)} \\ &= \frac{M_h \times M_{hi}^*}{a_h \times M_{hi} \times n_h} \end{aligned} \quad (\text{Eq. 4})$$

For the large PSU's which were segmented, the probability of selection of the  $j$  th household in the  $s$  th segment in the  $i$  th PSU in the  $h$  th domain is

$$p_h^{(i)} \times p_h^{(s/i)} \times p_h^{(j/is)} = p_h^{(isj)} \quad (\text{Eq. 5})$$

$$\text{where } p_h^{(i)} = a_h M_{hi} / M_h$$

$$p_h^{(s/i)} = 1 / s_i$$

$$\text{and } p_h^{(j/is)} = n_h / M_{his}^* \quad (\text{Eq. 6})$$

The design weight for such large PSU is

$$\begin{aligned}
w_{hisj} &= 1 / p_h^{(isj)} \\
&= \frac{M_h \times M_{his}^* \times S_i}{a_h \times M_{hi} \times n_h} \quad (\text{Eq. 7})
\end{aligned}$$

The design for CSES is not self weighting and therefore it is necessary to compute weight for each PSU, block or segment selected in the sample and these weights have to be used in the estimation procedure.

### 3. Estimation Procedure

The design provides for estimators to be computed for the three domains, namely Phnom Penh, Other Urban and rural areas and for Cambodia. These estimates are in respect of the truncated frame used in the survey. However, as in the two preceding surveys estimates for the nation as a whole were also prepared in view of the need expressed for those estimates. The extrapolation procedure used in the estimation for the un-truncated frame is described later.

Most of the estimators that will be computed from the survey will be ratio estimates but frequently estimates of stratum totals are required for use by policy makers and administrators, accordingly estimators of stratum totals were prepared. The estimation procedure for these estimators are set out in the paragraphs that follow.

#### 3.1 Estimation Procedure for Household Information

The estimate of the stratum total of a characteristic  $y$  is given by the following formula.

$$\hat{Y}_h = \sum_{i=1}^{a_h} \sum_{j=1}^{n_{hi}} w_{hij} y_{hij} \quad \text{for } i = 1, 2, 3, \dots, a_h$$

(Eq. 8)

where

$\hat{Y}_h$  = estimate of characteristic  $y$  for stratum  $h$

$y_{hij}$  = any characteristic of household  $j$  in sample village  $i$  in stratum  $h$

$n_{hi}$  = number of sample households in village  $i$

$a_h$  = number of sample villages in stratum  $h$

$w_{hij} = 1 / f_h$

$f_h = 1 / w_{hij}$

The estimate for the total for all three domains  $\hat{Y}$  was computed as the sum of the estimates for each domain viz.

$$Y = \sum Y_h \quad h = 1, 2, 3. \quad (\text{Eq. 9})$$

Most of the estimators to be computed from the survey are in the form of averages and proportions. In general these estimators are combined ratio estimators which take the form set out below. The estimated stratum mean is a ratio and it is given by

$$r_h = \frac{\hat{Y}_h}{\hat{X}_h} = \frac{\sum_i \sum_j w_{hij} y_{hij}}{\sum_i \sum_j w_{hij} x_{hij}} \quad (\text{Eq. 10})$$

where

$y_{hij}$ ,  $a_h$ ,  $n_{hi}$ ,  $w_{hij}$  are as defined in Eq. 8

$$x_{hij} = 1 \quad \text{for } j = 1, 2, 3, \dots, n_{hi} \\ i = 1, 2, 3, \dots, a_h$$

The population mean is also a ratio, say  $r$ , which was estimated using the following formula.

$$r = \frac{\sum_h \sum_i \sum_j w_{hij} y_{hij}}{\sum_h \sum_i \sum_j w_{hij} x_{hij}} \quad (\text{Eq. 11})$$

where

$y_{hij}$ ,  $a_h$ ,  $n_{hi}$ ,  $w_{hij}$  are as defined in Eq. 8

$X_{hij}$  is as defined in Eq. xx 10

### 3.2 Estimation Procedure for Sector and National Level Estimates

As stated earlier, it was necessary to use a truncated frame that excluded areas where survey field operations could not be undertaken for security considerations. As a result two provinces and some districts and communes in the provinces that were covered had to be excluded because of the unsettled conditions which prevented survey teams from operating in those areas. It is noted that there is no sound basis for providing estimates for Cambodia as a whole or sectoral or regional estimates through household sample surveys or even censuses due to these reasons.

However, in view of the interest of a wide range of users who desire to even have approximate national level estimates, it was decided to prepare estimates for areas and regions excluded in the truncated frame. The procedure developed for the SESC 1993/94 to derive national level estimates was modified for use in this survey and the method adopted is set out in the paragraphs that follow.

### 3.3 Excluded Villages in Partly Covered Provinces.

Estimated totals for the excluded rural or urban villages were derived using the following formula:

$$\hat{Y}_{2h} = \hat{P}_h \hat{Y}_h^* \quad (\text{Eq. 12})$$

where

$$\hat{Y}_h^* = \frac{(M_h \bar{Y}_h)}{(M_h + P_h)} + \frac{(P_h \bar{Y}_h)}{(M_h + P_h)} \quad (\text{Eq. 13})$$

= weighted mean for characteristic  $y$  for areas in the truncated frame and excluded villages in the partly covered provinces.

$$\hat{\bar{Y}}_h = \frac{\sum_i \sum_j w_{hij} y_{hij}}{\sum_i \sum_j w_{hij} x_{hij}} \quad (\text{Eq. 14})$$

= mean for characteristic  $y$  for villages in domain  $h$  that are included in the truncated frame

$$\bar{Y}_h = \sum_g \frac{P_{hg}}{P_h} x y_{hg}$$

= weighted mean of characteristic  $y$  in the excluded urban or rural villages

$P_{hg}$  = number of households based on the frame in province  $g$  in the excluded rural/ urban villages.

$P_h$  = total number of households based on the frame in excluded rural/ urban villages

$$\bar{y}_{hg} = \frac{\sum_i \bar{y}_{hgi}}{a_{hg}}$$

= mean of province  $g$  in domain  $h$  in excluded rural/ urban villages.

$$\bar{y}_{hgi} = \frac{\sum_j y_{hgij}}{j}$$

$$= \sum_j x_{hgij} \text{ village sample mean}$$

The estimate for characteristic  $y$  in the excluded rural and urban villages in the provinces from which villages have been excluded in the truncated frame were estimated by summing up for the domains.

$$\hat{Y}_2 = \sum_h \hat{Y}_{2h} \quad (\text{Eq. 15})$$

### 3.4 For Totally Excluded Provinces

The estimate for characteristic  $y$  in the excluded urban or rural villages in provinces that were totally excluded in the truncated frame was computed as follows.

$$\hat{Y}_{3h} = E_h \times \bar{Y}_h^* \quad (\text{Eq. 16})$$

where

$E_h$  = number of households in the excluded urban/  
rural villages in totally excluded provinces  
based on the frame

### 3.5 Extrapolated Estimate for Cambodia

The estimates for the nation as a whole were derived by adding the estimates based on the truncated frame and the extrapolated data for the villages excluded from the frame as set out below.

$$\hat{Y}^\alpha = \hat{Y} + \hat{Y}_2 + \hat{Y}_3 \quad (\text{Eq. 17})$$

where

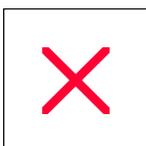
$\hat{Y}$  = estimate for villages included in the frame

$\hat{Y}_2$  = estimate for excluded villages in the truncated frame  
in the partly excluded provinces

$\hat{Y}_3$  = estimate for excluded villages in the truncated frame in  
totally excluded provinces.

## 4. Estimation of Variances and Standard Errors

The computation procedure will be incomplete without establishing the procedure for assessing the precision or reliability of the survey estimates. The variances of the ratio estimates will be of the form



$$\text{var}(r) = \frac{1}{g^2} \sum (1-f_h) (a_h / a_h - 1) \sum (z_{hi}^2 - z_h^2 / a_h) \quad (\text{Eq. 18})$$

where

$$r = y / x$$

$$y_{hi} = \sum_j w_{hij} y_{hij}$$

$$x_{hi} = \sum_j w_{hij} x_{hij}$$

$$r = \frac{\sum_h \sum_i \sum_j w_{hij} y_{hij}}{\sum_h \sum_i \sum_j w_{hij} x_{hij}}$$

$$\hat{x}^2 = X^2 = \left( \sum_h \sum_i \sum_j w_{hij} x_{hij} \right)^2$$

$$z_{hi} = y_{hi} - r x_{hi}$$

$a_h$  = number of sample villages from stratum  $h$

$w_{hij}$  = weight for each individual in the sample household

#### 4.1 Variance of Ratio of $r_h$ in Stratum $h$

The variance of ratio estimate  $r_h$  in stratum  $h$  is of the form:

$$\text{var}(r_h) = (1 / x_h^2) (1-f_h) (a_h / a_h - 1) \sum (z_{hi}^2 - z_h^2 / a_h) \quad (\text{Eq. 19})$$

where

$$\hat{X}_h = x_h = \sum_i \sum_j w_{hij} x_{hij}$$

and  $f_h$ ,  $a_h$ , and  $z_{hi}$  are as defined earlier.

#### 4.2 Standard Error and Coefficient of Variation

The standard error of a survey estimate provides a measure of how far the survey estimate is likely to vary from the true population value (i.e. parameter) as a result of having collected the data on a sample basis rather through a complete census. The standard error  $se(r)$  of a survey estimate is by definition

$$se(r) = \text{var}(r)^{1/2}$$

The relative standard error or coefficient of variation ( $cv$ ), on the other hand provides a measure of the relative variance of a survey estimate; that is the magnitude of the estimated sampling error relative to the magnitude of the estimate itself. The  $cv$  that is expressed as a proportional error enables the data user to compare the relative reliability or precision with which different types of survey characteristics have been measured eg. Means versus proportions, where direct comparisons of standard errors are uninformative since the magnitude of the standard error is dependent upon the magnitude of the estimate.

Computationally, the coefficient of variation is calculated as

$$cv(R) = se(r)/r.$$

### 4.3 Computation Details

Stratum Level Estimates

$$\hat{Y}_h = y_h = \sum \sum w_{hij} y_{hij}$$

$$\hat{X}_h = x_h = \sum \sum w_{hij} x_{hij}$$

Ratio ( $r_h$ )

$$\begin{aligned} r_h &= y_h / x_h \\ &= \sum \sum w_{hij} y_{hij} / \sum \sum w_{hij} x_{hij} \end{aligned}$$

**CAMBODIA SOCIO-ECONOMIC SURVEY ( CSES ) 1997**

**LIST OF INSTRUCTION MANUALS AND  
TECHNICAL PAPERS**

The following documents were prepared as instruction manuals and technical papers to serve as training material. The documents are available at the National Institute of Statistics.

1. CSES 1997 Manual of Instructions for Field Operation
2. CSES 1997 Instructions for Manual Processing ( Coding and Editing )
3. CSES 1997 Data Entry Procedures
4. CSES 1997 Range Edit Checks
5. CSES 1997 Consistency Edit Checks
6. CSES 1997 List of Sample Villages and Sample Weights ( Annex B )

## ANNEX D

### Cambodia Socio-Economic Survey 1997 (CSES 1997)

#### SURVEY DATA FILES

Cambodia Socio-Economic Survey(CSES) 1997 used a Village questionnaire, a Core questionnaire and a Social Sector module. The data entry programs were prepared using Integrated Microcomputer Processing System (IMPS) and data files were created for each questionnaire. In the record design 15 record types were created for the Village questionnaire, 17 record types were created for the Core questionnaire and 12 record types were created for the Social Sector module. In order to facilitate data processing and also to assist the users, inter relatedness of questions and their location on a given page or pages were the principal guidelines used in the creation of record types. Data entry and verification and data cleaning were undertaken in-house at the Survey Processing Center of the National Institute of Statistics, Phnom Penh. The original set of survey data files that were generated is in ASCII(American National Standard Code for Information Interchange) code.

In order to assist data users, the survey data files were re-formatted in dBase format. The file names were defined with the first two letters of the questionnaires and the record type code. Information relating to record type codes, reference to the questionnaire, the record length used, file name and the total number of records in each file are listed below.

#### Village Questionnaire Data Files.

<b>Record Type</b> Code	Page Number of Questionnaire	Question Numbers Included in the Record	Column Numbers Included	Record Length	Data File Name	Number of Records in the File
B01	Page 2 of 12	1 to 5		79	<b>VITYPE0 1.DBF</b>	474
B02	Page 2 of 12	6 to 10				
	Page 3 of 12	11 to 22				
	Page 4 of 12	23 to 24		90	<b>VITYPE02.DBF</b>	474
B03	Page 4 of 12	25 to 28		26	<b>VITYPE03.DBF</b>	474
B04	Page 4 of 12	29 to 38		40	<b>VITYPE04.DBF</b>	228
B05	Page 5 of 12	39 to 43		32	<b>VITYPE05.DBF</b>	474
B06	Page 5 of 12	44 to 53		40	<b>VITYPE06.DBF</b>	35
B07	Page 6 of 12	54 to 58		32	<b>VITYPE07.DBF</b>	474

### Village Questionnaire Data Files.

Continued.....

<b>Record Type</b>	<b>Page Number of Questionnaire</b>	<b>Question Numbers included in the Record</b>	<b>Column Numbers Included</b>	<b>Record Length</b>	<b>Data File Name</b>	<b>Number of Records in the File</b>
Code						
B08	Page 6 of 12	59 to 68		40	<b>VITYPE08.DBF</b>	50
B09	Page 7 of 12	69 to 71		24	<b>VITYPE09.DBF</b>	474
B10	Page 7 of 12	72 to 75				
	Page 8 of 12	76 to 82		95	<b>VITYPE10.DBF</b>	474
B11	Page 9 of 12	83				
	Page 10 of 12	83		37	<b>VITYPE11.DBF</b>	7646
B12	Page 10 of 12	84				
	Page 11 of 12	84		37	<b>VITYPE12.DBF</b>	3868
B13	Page 11 of 12	85		37	<b>VITYPE13.DBF</b>	1688
B14	Page 12 of 12	86		105	<b>VITYPE14.DBF</b>	474
B15	Page 12 of 12	87 to 89		22	<b>VITYPE15.DBF</b>	474

### Core Questionnaire Data Files.

<b>Record Type</b>	<b>Page Number of Questionnaire</b>	<b>Question Numbers included in the Record</b>	<b>Column Numbers Included</b>	<b>Record Length</b>	<b>Data File Name</b>	<b>Number of Records in the File</b>
Code						
C01	Page 2 of 16	1	1 & 3 to 10	33	<b>COTYPE01.DBF</b>	29931
C02	Page 3 of 16	1	1, 11 to 13,15 &17	28	<b>COTYPE02.DBF</b>	29931
C03	Page 3 of 16	2	-			
	Page 4 of 16	3	1 to 7	26	<b>COTYPE03.DBF</b>	6010
C04	Page 4 of 16	4	1 & 3 to 10	31	<b>COTYPE04.DBF</b>	26675
C05	Page 5 of 16	5	1 & 3 to 10	36	<b>COTYPE05.DBF</b>	22349
C06	Page 6 of 16	5	11 to 18	35	<b>COTYPE06.DBF</b>	22336
C07	Page 7 of 16	5	19 to 29	74	<b>COTYPE07.DBF</b>	15445
C08	Page 8 of 16	6	1 & 3 to 14	39	<b>COTYPE08.DBF</b>	29931
C09	Page 10 of 16	7 to 16	-	37	<b>COTYPE09.DBF</b>	6010
C10	Page 11 of 16	17	1 & 3 to 5	46	<b>COTYPE10.DBF</b>	66380
C11	Page 12 of 16	18	1 & 3 to 6	54	<b>COTYPE11.DBF</b>	52544
C12	Page 13 of 16	19 to 22	-	22	<b>COTYPE12.DBF</b>	6010
C13	Page 13 of 16	23				
	Page 13 of 16	24	1 to 4 for 3 Rows	116	<b>COTYPE13.DBF</b>	6010
C14	Page 14 of 16	25	1 to 5			
	Page 14 of 16	26	1 to 9			
	Page 14 of 16	27 & 28	-	41	<b>COTYPE14.DBF</b>	6010
C15	Page 14 of 16	28	1 to 6	46	<b>COTYPE15.DBF</b>	2303
C16	Page 15 of 16	29	1 & 3 to 12	40	<b>COTYPE16.DBF</b>	7849
C17	Page 16 of 16	30	2 to 20	51	<b>COTYPE17.DBF</b>	1467

### Social Questionnaire Data Files.

<b>Record Type</b>	<b>Page Number of Questionnaire</b>	<b>Question Numbers included in</b>	<b>Column Numbers Included</b>	<b>Record Length</b>	<b>Data File Name</b>	<b>Number of Records in the File</b>
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Code		the Record				
D01	Page 2 of 14	1	1 & 3 to 13	37	<b>SOTYPE</b>	13947
					<b>01.DBF</b>	
D02	Page 3 of 14	2	2 to 15	94	<b>SOTYPE02.DBF</b>	6994
D03	Page 4 of 14	3	2 to 7 for 4 Rows	87	<b>SOTYPE03.DBF</b>	3669
D04	Page 5 of 14	4	1a & 3 to 13	57	<b>SOTYPE04.DBF</b>	29853
D05	Page 7 of 14	4	14a to 27	65	<b>SOTYPE05.DBF</b>	2136
D06	Page 9 of 14	Before 6	-	19	<b>SOTYPE06.DBF</b>	5994
D07	Page 9 of 14	6	2 to 7	48	<b>SOTYPE07.DBF</b>	250
D08	Page 10 of 14	7	1 to 5 for 5 Rows	59	<b>SOTYPE08.DBF</b>	5994
D09	Page 11 of 14	8	-	19	<b>SOTYPE09.DBF</b>	5994
D10	Page 11 of 14	9	Line no & 2 to 9	41	<b>SOTYPE10.DBF</b>	371
D11	Page 12 of 14	10	-			
	Page 12 of 14	11	2 to 8 for 2 Rows			
	Page 12 of 14	12	3 for Columns			
	Page 13 of 14	13 to 19	-	67	<b>SOTYPE11.DBF</b>	5994
D12	Page 14 of 14	20	2 to 10	32	<b>SOTYPE12.DBF</b>	3082

The sampling design is not self-weighting. The weighting factors required to produce stratum and national level estimates were incorporated in the core questionnaire and social sector questionnaire data files. In these two questionnaires, the last field in each record type contains the weight assigned to the household data.

In view of the size of the survey data, ZIP files were created and the diskette identification and file descriptions are given below.

Type of Questionnaire	Name of ZIP File	Number of files	File Identification	Diskette Identification
Village	<b>VIT01D15.ZIP</b>	15	Type B01 to B15	Disk-1/4
Core	<b>COT01D09.ZIP</b>	09	Type C01 to C09	Disk-2/4
Core	<b>COT10D17.ZIP</b>	08	Type C10 to C17	Disk-3/4
Social	<b>SOT01D15.ZIP</b>	12	Type D01 to D12	Disk-4/4

As stated earlier, the original survey data files were created in ASCII code, and they are available at the NIS. The ASCII data files were given the same file names as the dBase data files except that the extension of ASCII files will have TXT as the extension. The record design for the ASCII data files were prepared and they are also available for users who are interested in using ASCII files.

**SURVEY PERSONNEL  
NIS STAFF**

**I. NIS Core Group Staff ( 8 Persons )**

Mr. Hou Taing Eng	Director of NIS
Mr. San Sy Than	Vice Director of NIS
Mr. Khieu Sary	Director of Department
Mr. Heang Kanol	Deputy Director of Department
Ms. Hang Lina	Deputy Director of Department
Ms. Tong Chay Rine	Deputy Director of Department
Mr. Saint Lundy	Vice Bureau Chief
Mr. Kang Siphonara	Bureau Chief

**II. Field Staff**

**1. NIS Staff ( 65 Persons )**

Mr. Sarin Prasith	Mr. Sim Sam Ath
Mr. Phok Sophea	Mr. Nguon Vanna
Mr. Lach Chhoeum	Mr. Seung Kear
Mr. Chhoy Sokha	Mr. Tan Kantol
Mr. Mak Huch	Mr. Preab Yorn
Mr. Reun Sothea	Mr. Chey Nath
Ms. Chun Phally	Mr. Hor Sarin
Mr. Khin Bunna	Mr. Khem Khy
Ms. Sok Chanthet	Mrs. Tho Sam Chin
Mr. Bun Tha	Mr. Vann Khan
Mr. Sok Kosal	Mr. Tun Eau
Mr. Yi Sophal	Mr. Yip Thavrin
Mr. Hem Rak Sa	Ms. Pol Sophea
Mr. Yi Sophany	Mr. Seung Heng
Mr. Lay Sopheat	Ms. Chuon Serey Rath
Ms. Ty Chan Kanha	Mr. Mao Saron
Ms. Khieu Madary	Ms. Kong Srey Ny
Ms. San Sokhamal	Ms. Nuth Srey Touch
Mr. Sum Vansan	Mr. Khuon Sithana
Mr. Savang Savannarith	Mr. Louk Sam Phis
Mr. Hun Chan Diner	Mr. Yuos Samrith
Mr. Men Sam On	Mr. Khin Song
Ms. Chhin Phearum	MRs. Ouk Samasathy
Mr. Em Sam Nga	Mr. Vong Sina

Mr. Sim Ly  
Mr. Tuy Nareth  
Mr. Lenh Heang  
Mr. Lmot Samkol  
Mr. Yim Sothea  
Mr. Lay Chhan  
Mr. Chan Sarim  
Mr. Mech Kanthul  
Mr. Uch Soeurn

Mr. Tea Vanna  
Mr. Nuth Sok Saoroeun  
Mr. Hy Kimkry  
Mr. Sou Kim Prithy  
Mr. Nim Sao Mony  
Mr. Vann Men  
Mr. Oeur Sophal  
Mr. Lean Eang

## **2. Ministry of Planning Staff ( 67 Persons )**

Mr. Phan Nang  
Mr. Chen Sao  
Mr. Mam Chhor Vireak  
Mr. Samreth Leakhena  
Mr. Mr. Cheng Ratha  
Mr. Tith Sovann  
Mr. Kim Chantharith  
Mr. Mam Borath  
Mr. Kem Vibol  
Mr. Mean Thavreak  
Mr. Loun Savuth  
Mr. Ying Chim  
Mr. Kruoch Say  
Mr. Lay Pharin  
Mr. Keo Ouly  
Ms. Ang Kanika  
Ms. Seoung Sorsocheatta  
Mr. Neth Saroeun  
Mr. Lay Sarith  
Mr. Sith Chea Ay  
Mr. Sim Lay  
Mr. Ly Sam Aun  
Ms. Soth Sithon  
Ms. Hun Phany  
Ms. Nhem Srey  
Ms. Hor Meakear  
Ms. Um Phary  
Mr. Pen Sam On  
Mr. Hoeung Sophal  
Mr. Nuth Chea  
Mr. Kheng Sam Bath  
Mr. Chap Polvath  
Mr. Pal Muon  
Mr. Sum Serey Vuth

Mr. Suon Chuon  
Mr. Eang Ritheany  
Mr. Ky Long  
Mr. Leng Kheang  
Mr. Yem Sophearum  
Mr. Sem Veasna  
Mr. Ith Chhonly  
Mr. Leang Visal  
Mr. Yan Chum Nith  
Mr. Nim Sitha  
Mr. Vy Heang  
Mr. Teang Rann  
Mr. Pao Cheang An  
Ms. Chou Putheany  
Ms. Chun Chhavy  
Mr. Ly Soley  
Mr. Sum Neang  
Mr. Lim Vutha  
Mr. Hum Pisal  
Mr. Thvi Tevin  
Mr. Min thy  
Mr. Long Sareth  
Ms. Mao Sophon  
Ms. Sar Putheany  
Mr. Chin Ouch  
Ms. Long Forsavy  
Mr. Han Danin  
Mr. Sar Phuong  
Mr. Keo Mony Angkea  
Mr. Ly Vuthy  
Mr. Po Mao  
Mr. Duch Chanroeun  
Mr. Chuon Nearin

## **3. Provincial Staff ( 79 Persons )**

Mr. Som Sokhann  
Ms. Throeung Sothy  
Mr. Sek Samon  
Mr. Chan Leng

Mr. Yim Rath  
Mr. San Sophat  
Mr. Tith Sarath  
Ms. Lam Roskunthea

Mr. Mak Phearum  
Mr. Heng Vibol  
Mr. Mak Kim San  
Mr. Im Thearith  
Mr. Chhuon Navy  
Mr. Mey Sophon  
Mr. Phall Bon  
Mr. Svay Sam Nang  
Mr. Neang Saroeun  
Mr. Sam Lors  
Mr. Som Sam Ol  
Mr. Sok Teang  
Mr. Um Ry  
Mr. Choerng Sarath  
Mr. Mr. Sek Yorn  
Ms. Say Phally  
Mr. Sem Saroeun  
Mr. Muong Sopheap  
Mr. Hou Nhim  
Mr. Puong Nakry  
Mr. Mr. Ma Saroeun  
Mr. In Vannorin  
Mr. Mr. Yim Kosal  
Mr. In Kim Sear  
Mr. Men Rith  
Mr. Sin Sam Nang  
Mr. Tun Sovanny  
Mr. Kong Savatha  
Mr. Mam Sothy  
Mr. Ou Chheng Loch  
Mr. Ou Sinay  
Mr. Eng Nareth  
Mr. Mao Chorn  
Mr. Gnek On  
Mr. Sy Ve  
Mr. Yim Oeun

Mr. Mao Vantheoun  
Mr. Nop Pinly  
Mr. Soeun Vithya  
Mr. Kim Chan Dina  
Mr. Long Sary  
Mr. Han Sam Ath  
Mr. So Sary  
Mr. Chhim Sam Ath  
Mr. Em Vichet  
Mr. Chorn Saphon  
Mr. Ka Den  
Mr. Kong Meng  
Mr. Chum Oeurn  
Mr. Heng Sovann  
Mr. Mean Samuon  
Ms. Som Sariem  
Mr. Lay Borith  
Mr. Nob Chan Than  
Mr. Pov Setha  
Mr. Iv Kosal  
Mr. Mr. Hee Sross  
Mr. Chuon Chamroeun  
Mr. So Kim Tan  
Mr. Kim Phalla  
Mr. Phauk Chan Setha  
Mr. Thong Sam Ath  
Mr. Kong Vansotha  
Mr. Sar Saroeun  
Mr. Tun Chantha  
Mr. Tep Tha  
Mr. Khim Sophearoun  
Mr. Prak Tith  
Mr. Chheang Chhay  
Mr. Len Dara  
Mr. Tes Phuoth

#### **4. Manual Processors ( 39 Persons )**

##### **a. Manual Processing Supervisors ( 4 Persons )**

**Mr. Khieu Sary**

**Ms. Tong Chhay Rine**

**Mr. Heang Kanol**

**Mrs. Hang Lina**

##### **b. Manual Processors ( 35 Persons )**

Mrs. Ouk Samasathy  
Ms. Chhin Phearum  
Mr. Chhe Bo  
Ms. Tho Sam Chine  
Mr. Yuos Samrith  
Mr. Tea Vanna  
Mr. Oeur Sophal  
Mr. Khin Bunna  
Mr. Reun Sothea

Mrs. Um Phary  
Ms. Hor Meakear  
Mr. Nuth Sok Saoreoun  
Mr. Men Sam Onn  
Mr. Louk Sam Phis  
Mr. Yip Thavarin  
Mr. Ouch Soeurn  
Mr. Khuon Sithana  
Mr. Him Kim Kry

Mrs. Long Forsevy  
Ms. Nhem Srey  
Mr. Khin Song  
Mr. Tuy Nareth  
Mr. Em Samnga  
Mr. Chan Sarim  
Ms. San Sokhamal  
Mr. Chheang Vantha  
Mr. Lenh Heang

Ms. Sar Putheavy  
Mr. Vann Khan  
Ms. Hun Phany  
Mr. Lay Chhan  
Mr. Chey Nath  
Mr. Vong Sina  
Mr. Lay Sophat  
Mr. Mak Huch

**5. Data Processors ( 33 Persons )**

**a. Data Processing Supervisors ( 3 Persons )**

Mr. Saint Lundy  
Mr. Ker Bopha

Mr. Kang Siphana

**b. Data Processors ( 30 Persons )**

Mr. Sim Ly  
Mr. Lean Eang  
Mr. Sok Kosal  
Mrs. Uon Len  
Mr. Hok Narin  
Mr. Bun Tha  
Mr. Meng Kim Hor  
Mr. Sin Serey Vuth  
Ms. Chuon Sereyroth  
Mrs. Nuth Srey Touch  
Mr. Mech Kanthul  
Ms. Sok Chanthet  
Mr. Sum Vansan  
Ms. Kong Srey Ny  
Mr. Tun Eau

Mr. Sou Kim Prithy  
Mr. Yim Sothea  
Mr. Chhuon Sothy  
Ms. Khieu Madary  
Mr. Sok Borith  
Ms. Ty Vuthy  
Mr. Oum Det  
Mr. Nim Sao Mony  
Mr. Mao Saron  
Mrs. Ty Chankanha  
Mr. Lim Penh  
Ms. Chun Phally  
Mr. Khem Khy  
Ms. Pol Sophea  
Mr. Tan Kantol

## **SURVEY PERSONNEL PROJECT STAFF**

Mr. R. B. M. Korale	Senior Statistics Adviser
Prof. Nikhilesh Bhattacharya	Social Statistics Consultant
Prof. Anil Deolalikar	Questionnaire Consultant
Mr. Jerrold Huguet	Social Statistics Consultant
Mr. Kwok Kwan Kit	Sampling Consultant
Mr. D. Amarasinghe	Field Operation Specialist
Mr. S. A. S. Bandulasena	Computer Programming Specialist
Mr. D. C. A. Gunawardena	Survey Data Analysis Specialist
Mr. Tan Sam Bon	Computer Programming Specialist
Mr. Uttam N. Malla	Social Statistics Specialist
Mr. E. A. G. S. Perera	Computer Programming Specialist
Mr. Nhem Sam Ol	Administrative Assistant
Mr. Em Pon Nara	Project Driver

