



**KINGDOM OF CAMBODIA**  
**Nation-Religion-King**

# **General Population Census of Cambodia 2008**

## **Report on Post Enumeration Survey**



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Phnom Penh, Cambodia**

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## FOREWORD

In a huge operation like the population census, maintaining the quality both in the content and coverage is a challenging task. In keeping with the practice adopted in the 1998 Census, almost immediately following the census conducted in March 2008, a Post Enumeration Survey (PES) was carried out to evaluate the census. The main objective of this sample survey conducted in 100 selected Enumeration Areas is to quantify the omission and duplication and ultimately estimate the net error in the census count, and also to measure the response errors in respect of a few selected characteristics canvassed in the census.

Apart from evaluation, the PES provides a feed back on operational issues which will be useful while organizing future censuses. The results of the PES pertaining to the 2008 General Population census of Cambodia are presented in this report with a description of the organization of the survey.

On behalf of the Ministry of Planning, we gratefully acknowledge funding and technical assistance provided for the 2008 Census and the PES by the United Nations Population Fund (UNFPA), Japan International Cooperation Agency (JICA), the Government of Japan and the Government of the Federal Republic of Germany.

The PES was organized and supervised by the NIS staff under the overall guidance of H.E. San Sy Than, Director General of NIS, ably assisted by Deputy Director General: H.E. Ms. Hang Lina. The NIS staff mainly participated in training of field staff, matching, tabulation and field supervision. The Province Director and Deputy Director of Planning in each Province coordinated and supervised the PES operations in the respective province. In all about 200 enumerators and supervisors carried out the field task. Thanks are due to all these officers and staff for successfully conducting the PES, 2008.

Ministry of Planning  
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CHHAY THAN  
Senior Minister  
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# Chapter 1

## Introduction

### 1.1 Background

In a massive operation like the population census, carried out by a large number of enumerators and supervisors, it is almost inevitable that a certain amount of error creeps in despite best efforts to collect accurate data. The Post-enumeration Survey (PES) is conducted immediately after a census for the purpose of evaluating the census. Most countries in the world follow this practice, though the methodology adopted may vary from country to country. The PES forms an important part of the census operations in Cambodia. This report relates to the PES of the 2008 General Population Census of Cambodia.

### 1.2 Objectives of the PES

The PES aims primarily to quantify likely omission or duplication in enumeration (coverage error) and to measure response error of certain selected characteristics (content error). In other words the survey mainly answers the following two questions:

(a) How accurately persons were enumerated in the census?

(b) How precisely certain particulars of the individuals were recorded in the census?

The first question seeks to arrive at an estimate of the coverage error and the second question attempts to assess the content error.

Coverage error in a census occurs due to under-counting, though over-counting may also take place. The two main types of under-count in population census are (i) persons in households that were completely missed and (ii) missed persons in enumerated households. In addition there may also be omissions of special types of population living in institutions or the homeless. The present PES plan takes into account both types of omissions affecting the normal household population.

Over-counting in census generally occurs on a comparatively lesser scale. It happens most commonly in the case of visitors to census households who are mobile residentially. A net census undercount takes place when the number of omissions exceeds the sum of the number of duplications and number of persons erroneously enumerated. A net census over-count takes place when the sum of duplications and erroneous enumeration exceeds the number of omissions. Generally over-count in a census is smaller than under-count resulting in net under-count which is got by subtracting the over-count from the under-count.

The content error arises from the manner in which the enumerator canvasses the question or from the way the respondents understand the question or both. In a gigantic operation like the census; it is not always the concerned individual who provides the data. Errors may also arise because the respondent may not be aware of all the particulars of a person about whom the information is collected in the census. For example the head of the household may not know the correct age or place of birth of his brother-in-law or some body who stays with him at the time of census. Errors can also occur because of the difficulty in understanding the concepts. For example, one may give the grade in which his son is studying instead of the grade completed by him which is

what is required. A knowledge of such errors goes a long way in knowing the source of these errors. This helps in improving future census operations such as questionnaire design, census procedures and instructions to field staff.

The PES also provides a concrete statistical basis for adjustments in demographic analysis. It should, however, be pointed out here that the PES results will not be used to correct the census figures.

## Chapter 2

### Design and Implementation of the Post Enumeration Survey

**2.1** As an accurate recall of persons present in households on census night is of basic importance for the evaluation of a *de facto* coverage, the PES was conducted closely following the census from 25 March to 04 April, 2008. The census enumeration records were stored at the National Institute of Statistics (NIS) before the commencement of the PES. The list of selected EAs was kept confidential and was made known to the PES Staff concerned only when they were deployed to the field.

The universe covered was the household population as at the time of the 2008 census enumeration. This definition excluded from the scope of the PES, inmates of institutions like hotels, hospitals, prisons etc. and the homeless and transient population.

#### **2.2 Sample Design**

The sample plan for conducting the PES was very simple. It is a probability sample, selected in a single stage, using systematic random sampling.

##### ***(a) Sampling Frame***

The sampling frame for the PES was the final list of Enumeration Areas (EAs) in Cambodia that were to be covered by the 2008 General Population Census. This list was prepared during an extensive pre-census operation which included pre-census mapping of villages and EAs. There were about 28,000 EAs listed for the Census.

##### ***(b) Sample Size***

The sample selected consisted of 100 EAs. The selected EAs were re-enumerated for the PES. The overall size of the PES sample that was selected was about 9600 households with 46,000 persons.

The census net under coverage rate was presumed to be in the order of 3 percent or 0.03, for purposes of predicting the reliability of the PES. The design effect, DEFT, for the cluster design (that is, whole EAs) was assumed to be 3.0, which is probably reasonable, given that under coverage is not necessarily a highly clustered statistic even when the cluster is large. The level of precision desired was a coefficient of variation on the net under coverage rate of 10 percent (or 3/10 of one percentage point as the standard error) at the 95 percent level of confidence. Considering these parameters and taking into account the available resources, a sample of 100 EAs was considered adequate.

Estimates are provided at the national level only. The sample is quite small for the urban area, and the results of the PES are not likely to be sufficiently reliable to provide separate estimates for rural and urban areas.

### ***(c) Sample Selection***

It was decided to select EAs with equal probability. To achieve implicit stratification the EA file was sorted on three levels before sample selection. First, the provinces were numbered in a serpentine fashion to provide the geographic ordering; secondly, the EAs were sorted within province by urban and rural; finally, EAs were further arranged in order of their estimated sizes within each urban or rural sector. Arranging the EAs in this geographic order, combined with sample selection using systematic sampling, yielded implicit stratification, as well as automatic proportionate allocation by province and urban-rural areas. The geographic, serpentine ordering of provinces and the number of EAs selected in each province are given in Annex I.

After sorting the EAs in the sequence indicated the sample was selected at the rate of 1 in 282.6 using a random start. The sample was a systematic, equal probability selection (epsem) design as already mentioned.

### **2.3 Limitations of the PES**

Many countries undertake post-census studies by re-checking a sample of the census returns, in one way or another, to try to measure the degree of undercounting. But that re-check is more often than not dependent, in various ways, on the census enumeration itself. In the case of PES in Cambodia also this happens. For example, the re-check used the census enumeration areas as the basis for sample selection for conducting the PES. Such procedures are basically defective since there is no way to account for persons or households who may have been missed in both the census and the re-check. In fact, there is a very high probability that many of the same persons or households that are missed in the census will also be missed in the PES, whenever the latter is a dependent operation.

But even when the PES operation is dependent, there are some field procedures which are generally introduced to try improve the count in the post-census study over the census count. These include (1) using enumerators and/or supervisors that are more qualified and better trained than the census staff (or the best qualified of the census staff), (2) assigning the PES staff to areas in which they did not work during the census, and (3). using a questionnaire which asks more detailed and probing questions in the post-census study than can be reasonably utilized in the full census. Such procedures were in fact adopted for the PES of Cambodia.

However there remains a portion of the population that will be missed in both enumeration. This group may include, for example, isolated household on the fringes of enumeration areas. It might include households that maintain more than one residence. It might include other individuals who, for whatever reason, may not wish to be counted and manage to avoid the census process altogether. There is considerable number of cases in modern times when some residents could not be contacted even with repeated visits. If such persons are missed by the census enumerator they are likely to be missed also by PES enumerator. The problem is that it is not possible to estimate the extent of undercounting in these cases.

Although there is a methodology which can be applied to design a post-census study to obtain an estimate of total under-coverage, including persons missed in both the census and the post-census study, it is too complex to consider, given the budget constraints..

## 2.4 Training and Fieldwork

There were three distinct stages of operation in the PES as mentioned below:-

- (i) Listing and enumeration of persons in all households in buildings situated within the allotted Enumeration Area (EA).
- (ii) Desk matching of particulars collected during listing with those contained in the corresponding census schedule, Form B (Household Questionnaire).
- (iii) Field reconciliation of particulars, where necessary

The NIS and the provincial staff were first trained for conducting the survey. PES enumerators were selected by the Province Census Officers from those who did a good job as enumerators. Supervisors were selected from Province and District Census Offices who had a background of the census operations.

Emphasis was laid on making PES as independent as possible, operationally, from the main census. The following measures were adopted to ensure this:-

- (i) Care was taken in the choice of enumerators and their training. It was ensured that the enumerator who did PES in an EA was different from the enumerator who did census enumeration in that EA.
- (ii) PES enumerators had no access to information obtained in the census in their respective areas.
- (iii) The location of the selected EAs for PES was not disclosed to the census field staff before hand.
- (iv) PES did not begin until all census enumeration records were collected from the Provincial Census Offices and arranged in the record room of the National Institute of Statistics.

Three forms called PES Part 1, PES Part 2 and PES Part 3 were used during the survey. These are reproduced in Annex II to IV. PES Part 1 was used for initial listing, PES Part 2 was filled in after desk matching in the office and PES Part 3 was used for reconciliation of differences noticed in matching if any, in respect of particulars regarding age, marital status mother tongue, literacy, physical / mental disability, main activity, secondary economic activities and fertility in the case of women aged 15 years and more. However the field reconciliation of unmatched entries could not be undertaken as matching operations were completed late (June, 2008) and general elections were held that month which made it impossible to carry out a field survey. Further, no useful feed back on information pertaining to census date four or five months later. It was assumed that the answers recorded by PES enumerators who were of a better quality than



census enumerators were valid and could be relied upon, The instructions issued to the PES staff for the conduct of the survey are reproduced in Annex V so as to give the reader an idea of the concepts used and the procedure followed in filling the forms.

The quality of field work was controlled by arranging close field supervision. Apart from specially trained supervisors, work was supervised by Provisional Census Officers and Officers of NIS.

The purpose of the matching operation was to classify each person listed in the PES and the census according to whether he or she was correctly enumerated in the census (a matched person) or missed in the census (a PES unmatched person with the census). This required a person by person match between PES and the census records. For this activity matching rules were provided to the staff (see Section 3 of Annex V).

## **2.5 Some Important Aspects of PES Procedure**

In order to minimize the non-sampling error in conducting PES field operations the following situations that occurred during the PES re-enumeration were reconciled with the census in order to determine true census misses:-

### ***Births***

In the case of infants in a household, care was taken by enumerators to ascertain whether they were born before or after census night. In the former case the new born should have been counted in the census and, if not, this case constituted a census miss.

### ***Deaths***

While recording (in Part 1 Section 3 of the PES Questionnaire) the particulars of persons who were present on March 3, 2008 the census reference date but who were not usual members or visitors of the household in the PES, care was taken to ascertain discreetly whether anybody unfortunately died after the census reference date. This helped in verifying whether the person concerned was counted in the census.

### ***In-movers and Out-movers***

Persons who moved either into the household, or in the case of whole households, into the PES EA after the census were carefully interviewed during the PES. An in-mover to the household was not considered as a census miss if he or she moved in after the census date and was enumerated somewhere else on the census date. Likewise a complete household was not a census miss if enumerated elsewhere, either in the same EA or a different one.

If a person in a household moved after the census but before the PES (out-mover), the case was recorded in PES questionnaire Part 1 Section 3 and matched with census records.

## Chapter 3

### Coverage Error

#### 3.1 Procedure for estimation of coverage error

The coverage error as revealed by the PES is presented in this chapter.

The estimation procedure adopted is as follows:

The estimate of  $N' = N_1 + U'_2 - O'_2$ , where

$N'$  is the estimate of total population,

$N_1$  is the census count, (provisional population),

$U'_2$  is the estimate of the number of people that are in the PES but not in the census (that is, the gross undercount), and

$O'_2$  is the estimate of people over-counted in the census, as determined by the PES.

The census (net) missed rate,  $R_m$ , is given by  $(U'_2 - O'_2) N'$ .

The estimates for  $O'_2$  and  $U'_2$  were obtained by matching the PES to the census and weighting the resulting over-counts or misses by the weight (282.6) times an adjustment for non-interview. For the non-interview adjustment, two cells were used: urban and rural.

The estimate of  $U'_2$  is then

$$U'_2 = \sum W (NI)_a M_a, \text{ where}$$

$W$  is the weight, which equals 282.6,

$(NI)_a$  is the non-interview adjustment factor for the  $a^{\text{th}}$  non-interview cell, that is, either the urban group or the rural group

$M_a$  is the number of PES sample missed persons (after matching) in the  $a^{\text{th}}$  non-interview cell.

The summation is over the two non-interview groups – urban and rural.

The non-interview adjustment factor,  $(NI)_a$ , is computed as

$$(NI)_a = n_a / n'_a, \text{ where}$$

$n_a$  is the number of *households* selected in the PES sample in the  $a^{\text{th}}$  non-interview cell and

$n'_a$  is the number of *interviewed* households in the PES sample in the  $a^{\text{th}}$  non-interview cell.

The estimate of the over-count,  $O'_2$ , is given by

$O'_2 = \sum W (NI)_a D_a$  where the terms are defined as above, except that  $D_a$  is equal to the number of persons over counted in the census in the  $a^{\text{th}}$  non-interview cell, according to the PES interview and match.

Note: The census net missed rate  $R_m$  will not-include the category “missed both in the census and in the PES”.

### 3.2 Estimates of coverage error

The main census coverage estimates for the 2008 Census of Cambodia are summarized in Table 3.1. The completion rate for Cambodia as a whole was about 2.8 per cent less than a full count.

The PES enumerators covered all households in each building. However, in some cases, a household at the time of census was recorded as two households in PES and vice versa. This was because the household members of a single household chose to be treated as two households subsequently. Such cases were carefully investigated to rule out omission or erroneous inclusion of households. Missed persons mainly belonged to households that were enumerated in the census. The number of omissions of whole households was comparatively smaller. This might be due to the fact that buildings were distinctly identified and numbered during house-listing preceding the census.

The over-counting of persons mainly related to erroneous inclusion of persons in a household on census night when in fact, they were not actually present in the household at that time. This error included usual members who were either temporarily or permanently living away from the household. The duplication of persons by a census enumerator within the same household or within the same EA formed a negligible proportion among over-counted persons.

<b>Estimate</b>	<b>Percent</b>
Completion rate	97.23
Missed rate	3.39
Over-count rate	0.62
Net missed rate	2.77

### 3.3 Evaluation of the error estimates

The sample was selected using systematic sampling with arrangement of the EAs. Only the standard errors and coefficients of variation are considered in evaluating the estimates of missed, over-counted and net missed persons. Consequently the reliability of the survey estimates is only

evaluated and not their accuracy. For evaluating accuracy, aspects of non-sampling error have to be investigated. This analysis is confined to estimates of variance (the square of the standard error) which do not take into account non-sampling errors such as erroneous response, or processing mistakes all of which may be present in varying degrees. Standard errors for missed, over-counted and net missed persons as well as for net missed rate are shown in Table 3.2.

<b>Item statistic</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>Coefficient of variation %</b>
Cross under-count (Missed persons)	466,597	62,619	13.42
Cross over-count (Over counted persons)	84,795	14,468	17.06
Net under-count (Net missed persons)	381,802	62,450	16.36
Net missed rate	0.0277	0.0045	16.25

Each of the estimates shown is for national level which was the main measurement objective of the survey. These estimates show a fair degree of stability as confirmed by the coefficient of variation (CV) or percentage relative standard error. In general, an estimate is considered fairly stable or reliable if its CV is not more than 20 per cent. Given the small size of the sample and the sampling error, the estimate of undercount has to be interpreted with caution.

The net undercount rate in Cambodia has increased by one percent from 1.8 percent in 1998 to 2.8 percent in 2008. This may be due to several reasons such as increased movement of population which gives rise to omissions in a *de facto* census.

Table 3.3 gives the net undercount in the census in a few countries. Due to different methodologies adopted in census taking and the post enumeration evaluation methods, as well as differences in sample size for evaluation, the rates are not strictly comparable internationally. However they may serve the purpose of providing a general idea of the rates of undercount.

<b>Country</b>	<b>Year</b>	<b>Net undercount rate (%)</b>
Australia	1996	1.6
Bangladesh	1991	4.6
Canada	1991	2.9
	1996	2.4
Cambodia	1998	1.8
	2008	2.8
China	2000	1.8
India	1991	1.7
	2001	2.3
New Zealand	2001	2.2
United Kingdom	2001	2.2

## Chapter 4 Content Error

### 4.1 Levels of Agreement

The content error, or response error was estimated only for desk-matched persons and for the following selected variables:- age, marital status mother tongue, literacy, physical / mental disability, main activity, secondary economic activities, children ever born and children surviving.

The content error was measured by the level of agreement in reporting the selected items between the original census enumeration and the independent re-interview by PES enumerator in respect of matched persons.

Low levels of agreement would indicate a high degree of response variability while high levels of agreement would indicate a low degree of response variability. The level of agreement between the recorded response of the census enumerator and PES enumerator should give indications of the stability or quality of information for the selected items for the PES.

Rate of agreement and aggregate index of inconsistency were worked out for each of the above mentioned characteristics. These are presented in Table 3.1 and the formulas used are explained below:-

$$\text{Rate of agreement} = \frac{\sum_{i=1}^c y_{ii}}{n} * 100$$

Where  $Y_{ii}$  = number of cases where category  $i$  was given as a response in both the census and PES;  $c$  is the total number of response categories for characteristic “ $y$ ” and  $n$  = un-weighted number of matched cases.

The aggregate index of inconsistency is the index of inconsistency for all the response categories of the characteristic as a whole and is given by

$$I_{AG} = \frac{n - \sum_{i=1}^c y_{ii}}{n - \frac{1}{n} \sum_{i=1}^c y_i \cdot y_i} * 100$$

where the terms are as defined above except that  $y_i$  is the unweighted census number of cases in

the i-th category and  $y_i$  is the unweighted PES number of cases in the i-th category.

<b>Table 4.1 Rate of Agreement and Aggregate Index of Inconsistency for selected characteristics</b>		
<b>Characteristics</b>	<b>Aggregate Index of Inconsistency (I<sub>AG</sub>)</b>	<b>Rate of Agreement</b>
Age	5.6	94.8
Mother tongue	13.3	99.4
Marital status	7.1	95.9
Literacy	7.7	97.0
Physical / Mental Disability	14.1	98.9
Main Activity	19.0	89.5
Secondary Activity	43.2	75.1
Children ever born	16.0	90.3
Children surviving	19.0	86.5

In general, aggregate index of inconsistency is considered low if less than 20, moderate if it ranges between 20 and 50 and high if it is more than 50. Among the characteristics mentioned above secondary activity reported in the census is moderately inconsistent Other characteristics have each a low level of inconsistency only.

There was no systematic bias associated with either the group of census enumerators or that of PES enumerators in respect of the above characteristics. The degree of agreement in reporting between the original census enumeration and the independent re-interview by PES enumerator for each of the characteristics is reviewed below:-

#### 4.2 Age

The rate of agreement between the census and the PES in respect of age reported has increased from 89.1 per cent in 1998 to 94.8 in 2008. The aggregate index of inconsistency was low in both the censuses (12.1 percent in 1998 and 6 percent in 2008). According to the census instructions both in 1998 and 2008, the age of every person must be ascertained in completed years as on March 2008. It was observed in 2008 that most of the households in urban and rural areas have each a household book or family book showing the date of birth of each member of household which was not the case ten years ago. Further with improvement in literacy and educational level, people especially the youth, have better awareness of their age.

Table 4.2 gives the net difference rate and index of inconsistency of persons by age group. The net difference rate is given by the following formula:

$$\text{NDR} = \frac{y_i - y_i}{n} * 100 \text{ where } y_i \text{ and } y_i \text{ are as defined previously.}$$

The index of inconsistency is calculated for each response category i as follows:

$$I = \frac{(y_i + y_i - 2y_{ii})}{1/n\{(y_i(n - y_i) + y_i(n - y_i))\}}$$

<b>Table 4.2 Net Difference Rate and Index of Inconsistency for persons enumerated by Age</b>		
<b>Age Group</b>	<b>Net Difference Rate %</b>	<b>Index of Inconsistency</b>
0-4	-0.2	7.4
5-9	0.2	7.8
10-14	-0.1	5.9
15-19	-0.1	2.9
20-24	0.1	3.2
25-29	0.1	3.2
30-34	0.1	8.4
35-39	N	5.3
40-44	-0.2	4.6
45-49	0.1	4.9
50-54	N	9.5
55-59	-0.1	6.3
60-64	N	6.8
65-69	N	15.6
70+	N	5.1

Note: N stands for negligible.

It is observed that there has been an under enumeration in ages 0-4,10-14,15-19,40-44 and 55-59. The level of the index of inconsistency is low for all the age groups though it is higher in the age group 65-69 comparatively. These results suggest the effect of response errors on age distribution which will be useful in further analysis of age data.

### 4.3 Marital status

<b>Table 4.3 Net difference rate and Index of Inconsistency for persons enumerated by marital status-Cambodia</b>		
<b>Marital status category</b>	<b>Net Difference Rate %</b>	<b>Index of Inconsistency</b>
1. Never married	0.6	3.2
2. Married (i.e. currently married)	0.3	5.3
3. Widowed	-0.7	14.3
4. Divorced	-0.3	24.5
5. Separated	0.1	14.3

The level of agreement for this characteristic was not ascertained in the 1998 census. However, the rate of agreement is fairly high (about 96 percent) in 2008. The aggregate index of inconsistency is low (7). The slight disagreement might be mainly due to differences in recording the marital status in the census and the PES in respect of code 3 widowed, 4 divorced and code 5 separated. A woman divorced or separated from her husband might say “Mimai” in Khmer language which means “widowed”. Only after probing questions he might say she was divorced or separated. The answer in such cases could have been obtained differently in the census and the PES in some cases..

#### **4.4 Mother Tongue**

The agreement rate of mother tongue returns remains very high in 2008 (99.4) as it was in 1998 at the same level. The aggregate index of inconsistency has, however, increased from about 5 in 1998 to 13 in 2008. However it is low being less than 20.

#### **4.5 Literacy**

From 91 percent in 1998, the level of agreement in respect of literacy has increased to 97 percent in 2008. The aggregate index of inconsistency was low in both the censuses (16.3 in 1998 and 7.7 in 2008). The definition of literacy is the ability to read and write with understanding in any language. A person is a literate when he/she can both read and write a simple message in any language or dialect.

A person who cannot both read and write a simple message was considered illiterate.

The category illiterate also included a person who was capable of reading only his/her own name or numbers, as well as persons who could read but not write or vice versa. In the 2008 census of Cambodia Children of the age of 6 or less was treated as illiterate even if the child was going to a school and writing a few picked up reading and writing a few words in a language. A person who knew how to read and write, but at the time of the census or PES could no longer read and write due to some physical defects or illness was still considered literate.

The enumerators both in the census and the PES were not asked to check whether a person was literate or illiterate by asking him/her to read or write except in cases of doubt. Generally the answers given by the respondent or as observed by the enumerator was recorded as code 1 (yes) or code 2 (no) as the case may be. The disparity of about seven percent in agreement between the census and the PES may be due to the way the respective enumerators canvassed the question, or from the way the respondents understood the definition of literacy as adopted in the census, or both.



#### 4.6 Physical/Mental Disability

Type of Disability	Net Difference Rate%	Index of Inconsistency
None	1.3	16.3
In seeing	-0.4	2.0
In speech	0.1	11.2
In hearing	N	N
In movement	-0.5	10.0
Mental	-0.3	5.8

This is a new topic added in the 2008 census. The rate of agreement is high (98.9 percent) and the aggregate index of inconsistency is low (14.1) for this characteristic as a whole.

#### 4.7 Main Activity

The rate of agreement of this characteristic has increased from 88 percent in 1998 to 89.5 in 2008. The index of inconsistency has increased from 17.5 in 1998 to about 19.8 in 2008. This index falls under the low category as it is slightly below 20.

#### 4.8 Secondary Activity

This is also a new question canvassed in the 2008 census. The rate of agreement in the 2008 census is only 75 percent.. The aggregate index of inconsistency of this characteristic (43.2) is much higher than that of other characteristics. As it falls in the range of 20 to 50, it has to be categorized as Moderate This has to be taken into account while analyzing the secondary activities reported in the census.

#### 4.9 Fertility

Number of mothers in the category of children born	Net Difference Rate%	Index of Inconsistency
None	1.3	7.3
1	0.2	16.7
2	0.6	16.7
3	0.6	14.8
4	-0.3	15.4
5+	-2.3	9.6

The response to the two questions, the number of children ever born and number of children surviving to females aged 15 and above were studied. Mothers were classified according to these two characteristics. This was done in the 1998 census also.. As regards mothers classified by

children ever born the agreement rate has been the same both in 1998 and 2008 at the level of about 86 percent. The index of inconsistency has also been the same (16 ) in both the censuses. The rate of agreement in respect of children surviving has decreased from 91 percent in 1998 to about 83 percent in 2008. The index of inconsistency which was about 10 in 1998 has also increased to about 19. Yet it is considered low being less than 20. These observations relating to these characteristics may be useful in fertility analysis.

<b>Table 4.6 Net difference rate and Index of Inconsistency for Mothers classified by children surviving</b>		
<b>Number of mothers in the category of children surviving</b>	<b>Net Difference Rate%</b>	<b>Index of Inconsistency</b>
None	2.3	13.2
1	-0.9	18.4
2	-0.9	16.9
3	1.6	22.5
4	-0.3	21.8
5+	-1.8	12.2

## **Chapter 5**

### **Summary and Conclusions**

The PES achieved its objective and its findings help evaluate the 2008 General Population Census of Cambodia. It has also thrown light on the potential sources of under-count and over-counts in the census which should be taken into account while organizing future censuses.

The PES like any other sample survey was subject to both sampling and nonsampling errors. Sampling error arises because information is not collected from the total population but only from a portion of the population. It is possible to estimate from the sample data the range within which the error is likely to be with a known probability. This has been done. Non-sampling error is the residual category of errors such as those made by respondents, enumerators, supervisors, desk matching staff etc. Efforts were taken to minimize non-sampling errors by proper training of field staff, supervision, close monitoring of desk matching etc. Independence between PES and census operations were attempted by (i) appointing better enumerators for PES than in the census (ii) not appointing the enumerator or supervisor of an EA in the census for the same EA in the PES and (iii) keeping the details of the PES sample areas confidential till the commencement of the survey. However, census enumeration areas were used as the basis of selecting the sample for the PES and the census EA maps were used for guidance of PES enumerators. In this procedure there is no way to account for persons or households who may have been missed in both the census and the PES. Consequently the estimate of net under-count may be an under estimate. This limitation has to be noted by the census data user.

It has been observed that the major error in the census is the incomplete count of household members. Cases of omission of households as such were minimal. Erroneous enumeration of persons not actually present in the household on the census reference date can occur in a *de facto* census. The estimated over-count (duplicate plus erroneously counted) is only 0.62 percent in the 2008 Census of Cambodia.

The quality of enumeration was generally good as revealed by the level of response variance in selected characteristics, age, marital status, mother tongue, literacy physical / mental disability, main activity, secondary economic activity and fertility. In the case of secondary economic activity, the aggregate level of inconsistency is moderate. In respect of other selected characteristics the level of inconsistency is low. These observations will be useful while analyzing the data relating to each characteristic concerned.

The net coverage error of missed persons (2.77 percent) and the level of response variance. of selected characteristics as estimated by PES show that in general the 2008 General Population Census of Cambodia was conducted satisfactorily.

## Annex-I

## List of Selected EAs for PES 2008 by Province

Serpentine Order No of Province	Province	District	Commune	Village	U/R	EA No
<b>Urban Sample EAs</b>						
6	01	Banteay Meanchey	05 Ou Chrov	08 Paoy Paet	01 Kbal Spean	1 22
23	02	Battambang	02 Thma Koul	08 Kouk Khmum	06 Kandal Tboundg	1 02
16	05	Kampong Speu	02 Chbar Mon	01 Chbar Mon	04 Pech Sangvar	1 01
8	06	Kampong Thom	03 Stueng Saen	08 Prey Ta Hu	03 Prey Ta Hu	1 02
13	08	Kandal	08 Angk Snuol	06 Kantaok	13 Kamrieng	1 01
13	08	Kandal	02 Kien Svay	09 Preaek Aeng	03 Mitakpheap	1 03
9	10	Kratie	02 Kracheh	11 Roka Kandal	11 Ti Muoy	1 02
14	12	Phnom Penh	04 Tuol Kouk	10 Boeng Salang	01 Phum 11	1 01
14	12	Phnom Penh	02 Doun Penh	09 Phsar Chas	07 Phum 7	1 01
14	12	Phnom Penh	01 Chamkar Mon	03 Boeng Keng Kang Pir	02 Phum 2	1 03
14	12	Phnom Penh	07 Ruessei Kaev	10 Chrouy Changva	01 Phum 1	1 08
14	12	Phnom Penh	06 Mean Chey	02 Boeng Tumpun	04 Phum Kbal Tumnuh	1 10
14	12	Phnom Penh	06 Mean Chey	01 Stueng Mean chey	04 Phum Mean Chey	1 09
22	15	Pursat	05 Sampov Meas	04 Phteah Prey	02 Peal Nheak Pir	1 03
7	17	Siemreap	10 Siem Reab	01 Sla Kram	02 Boeng Doun Pa	1 08
20	18	Sihanoukville	01 Mittapheap	03 Sangkat Bei	02 Phum Pir	1 04
11	20	Svay Rieng	06 Svay Rieng	01 Svay Rieng	02 Veal Yon	1 04
<b>Rural Sample EAs</b>						
6	01	Banteay Meanchey	06 Serei Saophoan	01 Bos Sbov	17 Tbaeng	2 01
6	01	Banteay Meanchey	06 Serei Saophoan	01 Bos Sbov	14 Khnhaer	2 02
6	01	Banteay Meanchey	07 Thma Puok	01 Banteay Chhmar	06 Banteay Chhmar Tboundg	2 02
6	01	Banteay Meanchey	03 Phnum Srok	06 Phnum Dei	07 Kamping Puoy	2 05
23	02	Battambang	02 Thma Koul	05 Anlong Run	03 Chab Kab	2 02
23	02	Battambang	05 Aek Phnum	06 Prey Chas	05 Bak Prea	2 01
23	02	Battambang	02 Thma Koul	07 Boeng Pring	02 Ou Nhor	2 01
23	02	Battambang	08 Sangkae	06 Kampong Prieng	05 Os Tuk	2 03
23	02	Battambang	12 Kamrieng	05 Ta Saen	01 Dei Kraham	2 01
23	02	Battambang	06 Moug Ruessei	06 Ta Loas	01 Ma Naok	2 03
10	03	Kampong Cham	11 Ou Reang Ov	08 Tuol Sophi	02 Kbal Peae	2 01
10	03	Kampong Cham	16 Tboundg Khmum	02 Boeng Pruol	11 Boeng Preah	2 01
10	03	Kampong Cham	07 Kang Meas	01 Angkor Ban	07 Angkor Ban Ti Prampir	2 03
10	03	Kampong Cham	11 Ou Reang Ov	01 Ampil Ta Pok	08 Mitt Ta Rach	2 02
10	03	Kampong Cham	10 Memot	13 Tramung	16 Khnoang Krapeu Lech	2 05
10	03	Kampong Cham	07 Kang Meas	10 Sdau	06 Anlong Kokir	2 01
10	03	Kampong Cham	14 Srei Santhor	05 Mean Chey	04 Kaoh Kou	2 01
10	03	Kampong Cham	16 Tboundg Khmum	18 Sralab	20 Trapeang Sangkae	2 01
10	03	Kampong Cham	13 Prey Chhor	07 Lvea	07 Me Meang	2 02
10	03	Kampong Cham	09 Krouch Chhmar	09 Roka Khnaor	03 Phum Ti Bei	2 03
10	03	Kampong Cham	07 Kang Meas	07 Reay Pay	05 Reay Pay Leu	2 02
10	03	Kampong Cham	03 Cheung Prey	05 Pring Chrum	05 Kaoh Champa	2 03
15	04	Kampong Chhnang	05 Kampong Tralach	01 Ampil Tuek	01 Stueng Snguot	2 05
15	04	Kampong Chhnang	02 Chol Kiri	03 Kampong Ous	01 Kampong Os	2 02
15	04	Kampong Chhnang	04 Kampong Leaeng	03 Kampong Hau	01 Kampong Boeng	2 02
16	05	Kampong Speu	07 Samraong Tong	07 Samraong Tong	11 Samraong Tong Leu	2 01
16	05	Kampong Speu	07 Samraong Tong	13 Trapeang Kong	05 Ou Krang Ambel	2 02
16	05	Kampong Speu	05 Odongk	05 Krang Chek	10 Kruos	2 01
16	05	Kampong Speu	03 Kong Pisei	02 Chongruk	25 Krabei Tram	2 02
16	05	Kampong Speu	08 Thpong	04 Prambei Mom	09 Trapeang Traeunh	2 01
16	05	Kampong Speu	05 Odongk	05 Krang Chek	20 Trapeang Kak	2 02
8	06	Kampong Thom	04 Prasat Ballangk	05 Sala Visai	02 Bos Veang	2 01
8	06	Kampong Thom	01 Baray	15 Sralau	05 Neak Veang	2 02
8	06	Kampong Thom	01 Baray	17 Tnaot Chum	09 Kang Meas	2 02
8	06	Kampong Thom	02 Kampong Svay	02 Damrei Slab	01 Sangkum	2 01
18	07	Kampot	07 Kampot	04 Kampong Samraong	02 Kampong Samraong Khang Cheung	2 01
18	07	Kampot	01 Angkor Chey	01 Angk Phnum Touch	03 Trapeang Veang	2 01
18	07	Kampot	03 Chhuk	12 Satr Pong	04 Chrey	2 01
18	07	Kampot	04 Chum Kiri	03 Snay Anhchit	04 Prey Khcheay	2 01

13	08	Kandal	03	Khsach Kandal	18	Vihear Suork	07	Ta Kaev Ti Muoy	2	01
13	08	Kandal	07	Mukh Kampul	10	Sambuor Meas	06	Kraol Kou	2	03
13	08	Kandal	07	Mukh Kampul	03	Preaek Anhchanh	07	Chheu Teal	2	01
13	08	Kandal	09	Ponhea Lueu	14	Vihear Luong	07	Thyung	2	01
13	08	Kandal	06	Lvea Aem	08	Phum Thum	02	Preaek Krouch	2	03
13	08	Kandal	05	Leuk Daek	04	Pea Reang	03	Thmei	2	01
13	08	Kandal	04	Kaoh Thum	10	Preaek Sdei	06	Preaek Ta Mem	2	03
13	08	Kandal	04	Kaoh Thum	11	Preaek Thmei	01	Preaek Ta Duong	2	04
21	09	Koh Kong	07	Thma Bang	02	Pralay	01	Chamnar	2	01
9	10	Kratie	02	Kracheh	03	Dar	04	Khngang Pos	2	02
9	10	Kratie	03	Preaek Prasab	04	Kaoh Ta Suy	02	Kandal Kaoh	2	01
1	11	Mondul Kiri	04	Pech Chreada	01	Krang Teh	01	Krang Teh	2	01
14	12	Phnom Penh	07	Ruessei Kaev	09	Preaek Ta Sek	02	Phum Preaek Ta Kong	2	05
4	13	Preah Vihear	05	Rovieng	01	Robieb	02	Tnaot Mlu	2	01
12	14	Prey Veng	11	Kampong Leav	08	Ta Kao	02	Kok Trom Kha	2	02
12	14	Prey Veng	01	Ba Phnum	04	Reaks Chey	03	Traeuy Ngor	2	01
12	14	Prey Veng	08	Pea Reang	09	Prey Sralet	06	Krang	2	01
12	14	Prey Veng	03	Kampong Trabae	10	Pratheat	02	Roluos	2	01
12	14	Prey Veng	08	Pea Reang	08	Prey Sniet	01	Prey Sniet	2	07
12	14	Prey Veng	01	Ba Phnum	03	Chheu Kach	01	Chheu Kach	2	04
12	14	Prey Veng	09	Preah Sdach	09	Reathor	03	Ta Mau	2	04
12	14	Prey Veng	03	Kampong Trabae	11	Prey Chhor	03	Tbaeng	2	02
22	15	Pursat	02	Kandieng	08	Sya	02	Anlong Vil	2	02
22	15	Pursat	02	Kandieng	06	Srae Sdok	16	Pou Pir	2	01
22	15	Pursat	04	Phnum Kravanh	02	Leach	05	Paen	2	01
2	16	Ratanak Kiri	01	Andoung Meas	01	Malik	03	Ka Hal	2	01
7	17	Siemreap	01	Angkor Chum	07	Ta Saom	06	Tumpung	2	02
7	17	Siemreap	11	Soutr Nikom	04	Kampong Khleang	03	Ta Uor Sa	2	01
7	17	Siemreap	14	Varin	04	Svay Sa	05	Kambaor	2	01
7	17	Siemreap	09	Prasat Bakong	09	Trapeang Thum	04	Roka Kambot	2	01
7	17	Siemreap	04	Chi Kraeng	05	Kouk Thlok Kraom	14	Bak Angrut	2	01
3	19	Stung Treng	02	Siem Bouk	05	Ou Ruessei Kandal	01	Ou Ruessei Kandal	2	01
11	20	Svay Rieng	07	Svay Teab	03	Kandieng Reay	06	Kbal Thnal	2	01
11	20	Svay Rieng	05	Svay Chrum	15	Svay Thum	12	Krang Leav	2	02
11	20	Svay Rieng	05	Svay Chrum	05	Ta Suos	08	Ta Pa	2	01
11	20	Svay Rieng	05	Svay Chrum	09	Kouk Pring	01	Kdompi	2	02
17	21	Takeo	09	Tram Kak	06	Ou Saray	10	Stueng	2	02
17	21	Takeo	04	Kiri Vong	01	Angk Prasat	05	Phngeas	2	01
17	21	Takeo	04	Kiri Vong	08	Prey Ampok	04	Amrae	2	01
17	21	Takeo	09	Tram Kak	03	Kus	27	Chamkar Angk Khang Tbound	2	01
17	21	Takeo	09	Tram Kak	02	Cheang Tong	10	Moeang Char	2	03
17	21	Takeo	09	Tram Kak	06	Ou Saray	08	Trapeang Khchau	2	01
17	21	Takeo	07	Samraong	10	Sla	02	Sla Khang Kaeut	2	01
5	22	Oddar Meanchey	03	Chong Kal	02	Chong Kal	03	Ka	2	03

Note :

1. Abbreviations used: U/R - urban or rural ; E.A- Enumeration Area .

2. The numbers given with names of province,district,commune and village are their respective geographic codes

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 Post-Enumeration Survey- Part 1



section 1 : Identification Particulars

Name Code	Khet/Krong		Srok/Kand		Khum/Sangkat		Phum		Enumeration Area No.		Building No.		Household No.	

Note on this survey

The 2008 General Population Census was conducted to enumerate people at the place they stayed on the Census Night, i.e. at 00:00 hours of Monday, March 3, 2008. It is proposed to determine through this Post-Enumeration Survey(PES), how well people have been counted in the Census. PES is, therefore, conducted soon after the Census, in selected areas. This Survey is intended to estimate the error in the count and in information collected, which is inevitable in a large scale operation like the Census. In the first visit to household by PES Enumerator, a re-count will be made in the Survey and this will be followed by desk matching with census records at the office and a second visit to the field to reconcile discrepancies.

		Name	Signature	Date
_____ Name of Head of Household	_____ Relationship of present Head to Head of Household at Census time(Write "Same " if there is no change)	PES Enumerator _____	_____	____/____/ 2008
		PES Supervisor _____	_____	____/____/ 2008

Post-Enumeration Survey- Part 1 ( Continued)

Section 2: List of Usual Members and Visitors in Household

Sl. No.	Names of Usual Members of the household (both present and absent on the day of interview) and Visitors present on the day of interview. Give Code 1 for Usual Member and Code 2 for Visitors.		Relationship to Head of Household	Sex	Age	Marital Status	Mother Tongue	Literacy		Physical/ Mental Disability if any	Main Activity in the one year preceding the Census Night (March 3, 2008)	Secondary Economic Activity	
								Khmer	Any Other Language				
1	2		3	4	5	6	7	8		9	10	11	
	Name	Code											
1													
2													
3													
4													
5													
6													
7													
8													
9													
0													

**Annex II**

SL. No.	Fertility Information for Females 15 years and above (Give the particulars against the same SL. No. of the woman as given in section 2)								Where was the person on Census Night (March 3,2008)? If "in this household " give Code 1 and stop. If "elsewhere "give Code 2 and go to col.15	Complete address ( Building No., Street, Village,Commune, District or Prvince) or description of location of place of stay on Census Night (March 3 , 2008)	What is the name of Head of Household or of another occupant of the address given in col.15.
	12				13				14	15	16
	How many Children have been born alive to the woman ?		How many of them are living?		How many of them have died ?		Any Children born alive to the woman during the last 12 mounths ? (Give actual number like 1, 2, ...if none, write 0)				
	(a) Male	(b) Female	(a) Male	(b) Female	(a) Male	(b) Female	(a) Male	(b) Female			
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											



Post-Enumeration Survey- Part 1 ( Continued)

Section 3: List of Persons( other than those listed in section 2 who stayed in the household on Census Night (March 3, 2008)

Sl. No.	Names of persons other than those listed in Column 2 of section 2 who stayed with this household on Census Night (March 3, 2008) . Give Code 1 for Usual Members and Code 2 for Visitors.		Relationship to Head of Household	Sex	Age	Marital Status	Mother Tongue	Literacy	Physical/ Mental Disability if any	Main Activity in the one year preceding the Census Night (March 3, 2008)	Secondary Economic Activity	
1	2		3	4	5	6	7	8		9	10	11
	Name	Code						Khmer	Any Other Language			
1												
2												
3												
4												
5												
6												
7												
8												
9												
0												

**Annex II**

SL. No.	Fertility Information for Females 15 years and above (Give the particulars against the same SL. No. of the woman as given in section 3)								Is there any other place the person could have been staying on March 3, 08 ? If no, give Code 1 and stop.If yes,give Code 2 and go to col.15	Complete address ( Building No., Street, Village,Commune, District or Prvince) or description of location of place of stay on Census Night (March 3 , 2008)	What is the name of Head of Household or of a nother occupant of the address given in col.15.
	12				13						
	How many Children have been born alive to the woman ?		How many of them are living?		How many of them have died ?		Any Children born alive to the woman during the last 12 mounths ? (Give actual number like 1, 2, ...if none, write 0)				
	(a) Male	(b) Female	(a) Male	(b) Female	(a) Male	(b) Female	(a) Male	(b) Female			
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

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 Post-Enumeration Survey- Part 2



Annex III

section 1 : Identification Particulars

	Khet/Krong	Srok/Kand	Khum/Sangkat	Phum	Enumeration Area No.	Building No.	Household No.

Section 2: Particulars of Matched Persons

Sl. NO.	Name	Sex	Relationship to Head	Marital Status	Remarks
1	2	3	4	5	6
1					
2					
3					
4					
5					
6					
7					
8					
9					
0					

	Name	Signature	Date
PES Enumerator	_____	_____	___/___/2008
PES Supervisor	_____	_____	___/___/2008

Part 2 (continued)

Section 3: Particulars of Non-Matched Persons

1	2	3	4	5	6	7
Sl. No.	Name	Sex	Relationship to Head	Is this person known by any other name. If so write that name. If not, write "No".	Did this person spend the Census Night (March3) in this Household or in another place? If here give Code 1 . If elsewhere give Code 2.	Remarks
1						
2						
3						
4						
5						
6						
7						
8						
9						
0						

	Name	Signature	Date
PES Enumerator	_____	_____	___/___/2008
PES Supervisor	_____	_____	___/___/2008



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 Post-Enumeration Survey- Part 3



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Section 1 : Identification Particulars

	Khet/Krong	Srok/Kand	Khum/Sangkat	Phum	Enumeration Area No.	Building No.	Household No.
Name							
Code							

	Name	Signature	Date
PES Enumerator	_____	_____	___/___/2008
PES Supervisor	_____	_____	___/___/2008

Section 2 : Particulars of Matched Persons

Annex IV

Sl. No.	Name	Sex	Marital Status	Stage of Operation	Age	Mother Tongue	Literacy	Disability	Main Activity in the one year preceding the Census Night (March 3, 2008).	Secondary Economic Activity
1	2	3	4	5	6	7	8	9	10	11
(Note: PES: Post Enumeration Survey CEN : Census FR : Field Reconciliation during follow-up interview)										
1				PES						
				CEN						
				FR						
2				PES						
				CEN						
				FR						
3				PES						
				CEN						
				FR						
4				PES						
				CEN						
				FR						
5				PES						
				CEN						
				FR						
6				PES						
				CEN						
				FR						
7				PES						
				CEN						
				FR						
8				PES						
				CEN						
				FR						
9				PES						
				CEN						
				FR						
10				PES						
				CEN						
				FR						
11				PES						
				CEN						
				FR						
12				PES						
				CEN						
				FR						

**Annex IV**

		Fertility Information for Females 15 years and above										Remarks			
SL No.		How many children have been born alive to the woman ?				How many of them are living ?				How many of them have died ?		Any children born alive to the woman during the last 12 months ?(Give actual number like 1, 2,...If none, write 0 )			
		(a) Male	(b) Female	(a) Male	(b) Female	(a) Male	(b) Female	(a) Male	(b) Female	Male	Female				
P E S															
	C														
	FR														
P E S															
	C														
	FR														
P E S															
	C														
	FR														
P E S															
	C														
	FR														
P E S															
	C														
	FR														

## PES SUMMARY

<b>2008 Census Data for EA</b>		
No. of Households: _____		
Population: Male: _____	Female: _____	Persons _____

	Khet/Krong	Srok/Kand	Khum/Sangkat	Phum	EA No.
Name					
Code					

Sl. No.	Building No.	Household No.	PES Population with Code 1 in Column 14 of Section 2 PES I			Population in Section 3 PES I			Total			Remarks
			Male	Female	Persons	Male	Female	Persons	Female	Female	Persons	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
Page total:												
Grand Total												



## Instructions on Post Enumeration Survey

### 1- General

The 2008 General Population Census was conducted to enumerate people at the place they stayed on the Census Night, 00:00 hours of Monday, March 3, 2008. It is proposed to determine through this Post Enumeration Survey (PES), how well people have been enumerated in the Census. PES is, therefore, conducted soon after the Census, in selected areas. This Survey is intended to estimate the error in the count and in information collected, which is inevitable in a large scale operation like the Census.

There are three distinct stages of operation in the PES. These are

- (I) Listing and enumeration of persons in all households falling within the allotted Enumeration (EA).
- (II) Desk matching of particulars in (I) with those contained in Form B Household Questionnaire, filled in during the Census.
- (III) Field reconciliation, if necessary.

#### 1.1 - Instruction to Enumerators for listing and Enumeration.

When you go to the field, you should carry with you

- (i) EA MAp.
- (II) Sufficient number of Forms, PES Part 1.

Utmost care has to be exercised in filling the schedule as some of the items may require careful probing. Please read out the brief note on this survey given on the first page of the schedule to anyone who wants to know why this enquiry is made. The concept, definition and codes of all items included remain the same as in the Census. You should study them once again to refresh your memory. You may also carry with you a copy of the Census instructions for reference purposes in the field.

You should start the listing from the first building and proceed to the next and so on. It is expected that building Nos. given during Census will still be there. If you find a building with one or more households which has not been given a number during census, you should not omit it. For example, give number 006A, using sticker or chalk piece, to a new building between original building No. 006 and 007 and enumerate. You may also suitably record it in the EA map. PES will not include institutional households, homeless households, boat population and transient population.

### 2 - Form PES-Part 1. Enumeration

#### 2.1 - Section 1

Fill in the Identification Particulars as in the Census. Write the name of Head of Household on the line indicate at the left hand bottom of the first page. Check whether the person whom you are enumerating as head of the household is the same as the one who was head at census time. If it is a different person, note the relationship of the present head to the head enumerated in the census, next to the name of Head of Household, as indicated. If there is no change, write ' Same ' on the line.

## 2.2 - Section 2

In this section, enumerate all persons who are currently living (or staying) in this household. This will include usual members present and absent and visitors present on the day of interview. First write down in Col. 2 the names of usual members present followed by usual members absent and visitors on the day of interview. This is a crucial stage in the survey. You should, therefore, make every effort to enumerate all persons mentioned above. In the sub-column, Code, give 1 for usual member (both present and absent) and 2 for visitor present. Each person will have fresh Sl. No. (eg. 1,2,3,.....) in col. 1.

### Column 3 to 13

The particulars to be collected in each of these columns are the same as for corresponding Columns 3 to 7, 13, 15, 16 and 22 of Form B Household Questionnaire Part 2 and Columns 4 5, 6 and 7 of Part 3, Form B used in the census. You may please refresh your memory by referring to the census instructions for filling the corresponding columns in PES. You have to collect the information (especially fertility information) from the person concerned. If the person is not available collect the information from any responsible member of the household.

### Column 14

This Column has to be filled in for all person listed in Col. 2. In this column you have to ascertain where each person was on the census night i.e. March 3, 2008. If the answer is "here" (i. e. in this household) give code 1 and stop. If elsewhere give code 2 and go to column 15.

In the case of an infant born after March 3, 2008, give Code 2 and go to column 15.

### Column 15

If the person had not stayed here on census night you would have given code 2 in column 14. Ascertain the complete address or description of the location of the place of stay of the person on the census night and record it here.

For example:-

- (i) House No. 450, Street 501, Sangkat Boeng Keng Kang I, Kand Chamkar Mon, Phnom Penh.
- (ii) Group 5, Phum Thlok Bei, Khum Kaat Phluk, Srock Basedth, Khet Kampong Speu.

In the case of infant born after 00:00 hours of March 3, 2008 for whom Code 2 has been given in Column 14, write "Born after Census Night "in column 15.

### Column 16

For purpose of identification and reference, ascertain the name of the Head of Household or of another occupant in the address given in column 15. Put dash in the case of infant born after Census Night..

## 2.3 - Section 3

### Column 2

Ask the respondent a probing question: Were there any person or persons (other than those listed in Column 2, Section 2) who stayed with the household on Census Night (March 3, 2008). For example

(i) a brother of the household head might have stayed with the household on March 3, but later he might have gone to his village to settle down there.

(ii) The household head's uncle might have been a visitor in the household on March 3, but not at present. If the person concerned was a usual member of the household at the time of the census, give code 1 in the sub-column. If he/she was only a visitor at the time of the census, give code 2. In column 1 each person will have a fresh serial number (e. g. 1, 2,...).

It is possible that a person who was present on March 3, 2008 might have unfortunately died after that day. For this person write "Died after March 3, 2008 " in bracket after the name. Give Code 1 or 2 if he/she was a usual member or visitor at census time respectively.

#### Columns 3 to 13

Same instructions as for corresponding columns in Section 2. The particulars of a person, who had died, may be obtained from the informant.

#### Column 14

It is possible, especially in the case of a visitor to the household at the time of the census, that the person could have been staying in another place. For example, the household head's uncle from village who was staying in this household on the census night might have stayed in his own village ( or any other place ) but for coming to this household on some urgent purpose. If there is such possibility of the person staying in some other place on census night, give code 2 in this column and go to column 15. If there is no such place, give code 1 and stop.

#### Column 15

For a person for whom code 2 is given in column 14, ascertain and write down the address of the place of probable stay on census night (or alternative address on census night) in column 15 .The procedure for writing address is the same as for column 15 of section 2.

#### Column 16

For the purpose of identification, ascertain the name of the Head of Household or of another occupant of the address given in Column 15. Put a dash for a person who had died after the census date.

Fill in your name and record your signature with date on the first page in the space allotted. Repeat the enumeration for all households in all buildings with households (except institutional, homeless, and transient households) in the EA.

### **3 - Form PES Part 2. Desk Matching of PES and Census Records**

#### 3.1- Records needed for Desk Matching.

During the Desk matching for a EA you should have before you the following:-

- (i) Blank PES Part 2 with Section 1 filled in.
- (ii) Filled-in PES Part 1.
- (iii) The Corresponding Census Records, namely filled-in Form B.
- (iv) Blank PES Part 3 with Section 1 filled in.

You have to match particulars like name, sex, relationship, to head and marital status in both PES and census records. In PES Part 1 Section 2 you have to consider matching only with code 1 in col. 14.

### 3.2 - Desk Matching Process

The Desk Match should be carried out entry by entry. First check whether name of head of household is the same in both Census and PES. It is possible that there might have been a change between Census and PES (see the first page of PES Part 1 Section 1). Take note of any such change while verifying relationship.

#### a. Agreement regarding name and sex.

Check whether the name and sex of first person in PES form (i. e. PES Part 1 Section 2). tallies with an entry in Form B. ignore minor variations in spelling of name. If it tallies, put a tick mark over the name and sex in PES form. If not put a cross.

#### b. Agreement regarding relationship.

For persons for whom name and sex tally, in both the records, tick over name and sex and check if the relationship to head tallies in both. As already mentioned take in to account change in head, if any, while doing this matching. If the relationship tallies put a tick over it in PES Form. Otherwise put a cross.

#### c. Agreement regarding Marital Status.

For persons whose name and sex and relationship to head tally, check if the marital status also tallies. If it tallies put a tick over marital status in PES Form. If not put a cross.

If you have recorded tick over all the four items mentioned above for the person in PES Form, tick the serial number in PES Form and in Form B for the corresponding entry. If even one item has a cross mark put a cross over the Serial No. in PES Form and Form B. Repeat this matching procedure for persons listed in PES Part 1 Section 2 ( with code 1 in Col. 14) and all persons listed Section 3 (with code 1 or 2 in Col. 2).

If after checking all the entries in the household in PES Part 1 Section 2 ( with code 1 in Col. 14) and all entries in Part 1 Section 3, you may find unticked entries in Form B and PES Part 1 Section 2 and Section 3. Please note that persons with code 2 in Col. 14 of PES Part 1 Section 2 need not be considered at all for matching purpose as they were not there on census night.

For matched persons (with tick (✓) mark in Form B copy out particulars from Form B in Part 2 Section 2. Give fresh serial numbers in Col 1.

There may be non-matched persons (with cross (x) mark) both in Form B and PES Part 1 Section 2 and Section 3. For non-matched persons in Form B, copy out particulars from Form B, in Col 2 to 4 in Part 2 Section 3 and write “Census “ in the remarks column. After this, copy out particulars of non-matched persons from PES Part 1 Section 2 and Section 3 and write “PES “ in the remarks column. Give in Col 1 fresh serial numbers. Col 5 and 6 of PES Part 2 Section 3 will be filled in during field reconciliation.

#### d. Matching of Other Characteristics

Now take up one by one the matched persons in Part 1 Section 2. Match other particulars regarding age, mother tongue, literacy, disability, main activity, secondary economic activity and fertility( for

women aged 15 and more) with Form B in the same way you matched earlier, name, sex etc. If these entries completely match for a person(i.e. all items ticked in PES Part 1 Section 2 and Part 1 Section 3 ) no further action regarding this person is called for. If even one does not agree, put a cross and record all these particulars for that person in Part 3 Section 2 from Census record and PES record in the space against CEN and PES. The SL. No. to be given in Part 3 section 2 will be the same as in Part 2 section 2. After completing desk match in the manner detailed above for all households in EA, you are ready for field reconciliation (FR) using Forms PES Part 2 and Part 3.

#### **4. Field Reconciliation**

Identification particulars should have been filled in during matching stage.

4.1 You will have with you at this stage, when you have finished matching and you are ready for field reconciliation, Form PES Part 2 with following entries.

(a) Section 1

(b) Section 2

The matched persons (e.g. person for whom name, sex relationship to head and marital status agree) would have been listed at Desk Matching stage and this should be used for reference purposes in the field.

(b) Section 3

Columns 2 to 4 relating to non-matched persons would have been filled during Desk Matching stage.

Columns 5 to 7 would have been left blank

It is pointed out that, the persons listed in this section are those for whom some or all particulars (i.e. name, sex, relationship to head and marital status), differ in the two records. For all such persons you will fill in these two columns in the field reconciliation stage( second visit to the field). For filling column 5 find out whether the person is known by any other name. If so, write that name. If there is no other name, write “No”. For column 6 you have to ascertain whether the person had spent the Census Night(March 3) in this household or any other place. If the answer is here in this household, give Code 1, If elsewhere is the answer, give Code 2.

Column 7

This is for recording any special observation about each case.

4.2 You will also have at this stage, PES Form Part 3 relating to field reconciliation of errors, if any, in respect of particulars regarding age mother tongue, literacy, disability ,main activity, secondary economic activity and fertility (for women aged 15 and more).

For the matched persons listed in Part 2 Section 2, these particulars would have also been Desk-matched between PES and Census. Cases of non-match of these particulars (for matched persons) would have been listed in PES Part 3 Section 2. In this Form also Section1 relates to identification particulars which would have also been filled in during Desk Match. During field reconciliation (FR) you should ascertain (only when PES and CEN are different) which information ( PES or CEN) is correct for each person and record it against FR. If both are wrong, write the correct information as ascertained in FR.

At the end return to you supervisor all forms- PES parts 1, 2 and 3.

### **5 - Duties of Supervisor**

Supervisor is in overall charge of the work of his/her enumerators. Supervisor should thoroughly read the above instruction. He/she should help enumerators in identifying the selected EA's and give general guidance. Supervisor should also test check in the field a few households and give a report about the results of the check to NIS.

## General Population Census of Cambodia, 2008 PES Estimation of Coverage Errors

**For urban and rural non-interview cells, estimate of weight (W) and Non-interview (NI) factors are:**

W= 282.6

Urban: 1770 households selected,  
1750 Interviewed.  
NI for the urban group is  
 $\frac{1770}{1750}$

Rural: 7831 households selected  
7575 interviewed  
NI for the rural groups  
 $\frac{7831}{7575}$

### Estimation of errors using PES results

The number of missed persons after matching and reconciliation in the two groups is as follows:-

Urban: 457  
Rural: 1150

The estimate of the gross undercount of persons is:

$$\left[ 282.6 \times \left( \frac{1770}{1750} \right) \times 457 \right] +$$

$$\left[ 282.6 \times \left( \frac{7831}{7575} \right) \times 1150 \right] = 130,624 + 335,973$$

$$= 466,597$$

The number of over counted (i.e. duplicated plus erroneously counted) persons after matching and reconciliation in the two groups are as follows:-

Urban: 35  
Rural: 256

The estimate of the gross over count of persons is:

$$\left[ 282.6 \times \left( \frac{1770}{1750} \right) \times 35 \right] + \left[ 282.6 \times \left( \frac{7831}{7575} \right) \times 256 \right] = 10,004 + 74,791$$

$$= 84,795$$

The provisional population of Cambodia according to the 2008 census is 13,388,910

The estimate of true population N' would be 13,388,910 + 466,597 – 84,795 = 13,770,712

Estimate of missed net rate is  $(466,597 - 84,795) / 13,770,712 = 0.0277$  (or) **2.77 %**