THE REPUBLIC OF RWANDA

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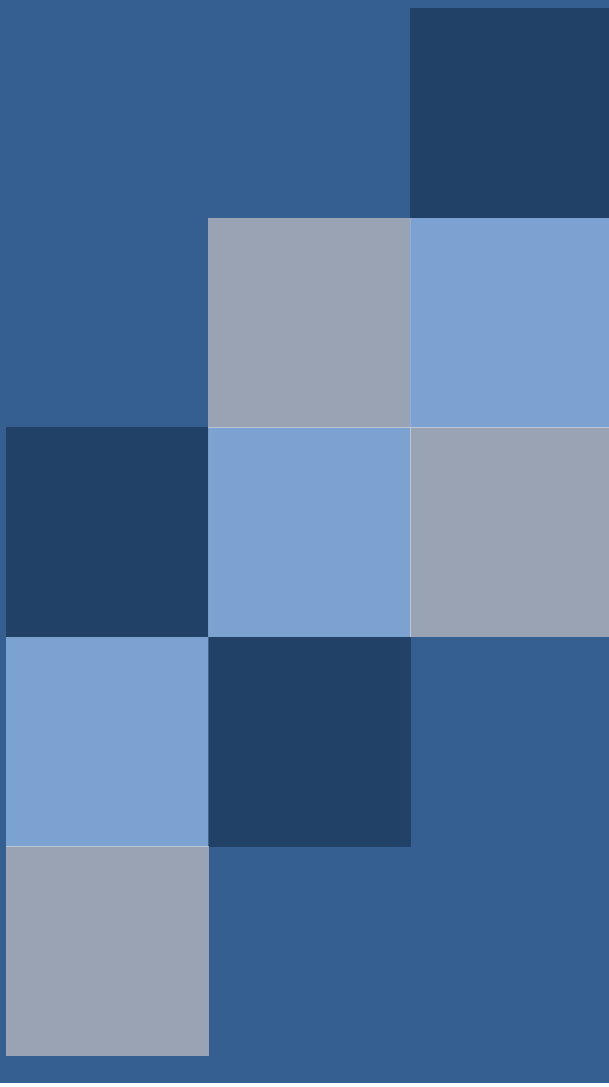
Fourth Population and Housing Census, Rwanda, 2012

Post Enumeration Survey Report

Post enumeration survey



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Ministry of Finance and Economic Planning
National Institute of Statistics of Rwanda

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January 2014

The Fourth Rwanda Population and Housing Census (2012 RPHC) was implemented by the National Institute of Statistics of Rwanda (NISR). Field work was conducted from August 16th to 30th, 2012. The funding for the RPHC was provided by the Government of Rwanda, World Bank (WB), the UKAID (Former DFID), European Union (EU), One UN, United Nations Population Fund (UNFPA), United Nations Development Programme (UNDP), United Nations Children's Fund (UNICEF) and UN Women.

Additional information about the 2012 RPHC may be obtained from the NISR:
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Post enumeration survey: **Post enumeration survey**

FOREWORD

It has been a long tradition in Rwanda to conduct a Post Enumeration Survey (PES) following the Population and Housing Census. The first of such surveys was conducted following 1991 Census, the methodology of which has been documented and widely disseminated internationally as an example of a successful PES in developing countries. The second PES was conducted following the 2002 Population and Housing Census. Similar to other PES conducted elsewhere, the sole objective of the Present PES is to evaluate coverage and content errors of the 2012 Population and Housing Census data.

The evaluation studies, which examine the results of and the procedures and operations used in undertaking the 2012 Census of Rwanda are necessary to provide both the producer and the users of the data with information needed to assess census quality. Such studies provide users with the basis for deciding either that the errors are relatively small and not likely to affect most conclusions drawn from the data or that the errors are relatively large and inferences should be made with caution.

In order to assess the extent of both types of errors in the 2012 Census of Rwanda, the National Institute of Statistics of Rwanda (NISR) has conducted a Post Enumeration Survey (PES), with specific objectives of measuring census coverage classified by individual sex, age and residence type (urban and rural); and measuring the contents errors pertinent to a number of selected important census variables, namely sex; age; the ability to read and write in different languages; marital status and the type of sanitation facilities available to the households.

Therefore, the NISR is pleased to present in this document the PES results pertinent to evaluating the coverage and content errors of the 2012 Population and Housing Census. A detailed description of the adopted survey methodology is also incorporated. All comments and enquires related to the PES results and/or methodology are greatly welcomed.

The NISR would also like to thank all, but especially the Government of Rwanda, for the invaluable contribution towards the completion of this report. I wish also to register our appreciation to the partner Ministries, Institutions and individuals for their respective great support and inputs throughout the process of implementing this survey.

I am also equally grateful to the staff of the NISR, and the Senior Adviser who tirelessly worked hard to ensure the survey is successfully implemented. Finally, my appreciation extends to survey interviewers, matchers and field reconciliation personnel, the full cooperation of PES households with the PES field staff is also acknowledged.

Yusuf Murangwa
Director General, NISR

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Executive Summary

First: Evaluation of Census Coverage

1- The net coverage rate for the whole country exceeds 99 percent (99.25). The level of net coverage is almost similar for urban and rural. Female's coverage rate is slightly higher than that of male.
2- The Census Omissions rate for the whole country is as low as 1.33 percent. The level of census omissions is almost similar for urban and rural. Nonetheless, Census omissions is higher among males (1.45 percent) compared with females (1.22 percent).
3- The match rate for the whole country exceeds 98 percent (98.66). The level of match rate is slightly higher in rural (98.77 percent) compared with urban (98.33 percent). Similarly, female's match rate (98.78 percent) exceeds, to a little extent, that of males (98.54 percent).
4- The erroneous inclusion rate for the whole country is as low as 0.58 percent. The level of erroneous inclusion is higher in rural areas (0.59 percent) compared with urban areas (0.55 percent). Analogously, the level of erroneous inclusion for males (0.6 percent) is slightly above that of females (0.56 percent).
5- The gross coverage error rate for the whole country is as low as 1.92 percent. The level of gross coverage error is higher in rural areas (1.93 percent) compared with urban areas (01.89 percent). Analogously, the level of gross coverage error for males (2.07 percent) is above that of females (1.79 percent.

Second: Evaluation of Census Content

6- The content error is absolutely trivial in the case of sex variable. The index of inconsistency for either sex, as well as the aggregated index of inconsistency is only 1.52 percent.
7- In general, the consistency level of age reporting in both the Census and the PES is very acceptable: Out of 14 age groups, eleven groups have a level of Inconsistency index below 10% and for the remaining three it is just above that level. The aggregated Inconsistency index is estimated as of 8.71 percent.
8- The level of inconsistency varies to large extent over marital status categories; while it is very low in the categories of "never married" and "married", low in the "widowed "category it is notably high in the "separated" and "divorced" categories. However, due to the lower relative weight of the "separated" and "divorced" populations, the aggregated inconsistency Index (6.29 percent) is in the low side, indicating overall good reporting of this variable.

9- There exists relatively large variability between the PES and the Census regarding the read and write variable. The aggregated index of inconsistency is as high as 39 percent placing the inconsistency level of this variable in the high-moderate zone.

10- The inconsistency between Census and PES data of the type of bathing facility is relatively high. The aggregated index of inconsistency (45.36 percent) approaches the upper bound of the ‘moderate’ inconsistency category.

Introduction

It is well known that an error-free census is impossible, errors inevitably occur. Nevertheless, census figures, which are subject to errors, are still valuable if the limitations of the data are understood by the users and if the errors do not adversely affect the major uses of the data.

In the field of survey sampling, sampling error is readily measurable and controllable, to the extent that sampling errors are probably less problematic relative to other types of errors known as non-sampling errors which affect both survey and census results. For censuses which the population is fully enumerated there is no sampling errors; however, similar to sample surveys census operations are exposed to various types of non-sampling errors. Some assessment of the magnitude and direction of these errors is necessary to respond to questions about the quality of census results. Census errors are generally categorized into coverage and content errors.

The evaluation studies, which examine the results of and the procedures and operations used in undertaking the 2012 Population and Housing Census of Rwanda are necessary to provide both the producer (NISR) and the users of the data with information needed to assess census quality. Such studies provide users with the basis for deciding either that the errors are relatively small and not likely to affect most conclusions drawn from the data or that the errors are relatively large and inferences should be made with caution.

There are different methods for the evaluation of a census which involve either a single source of data (the census itself) or multiple sources. The multiple- source studies in turn involve one of two types of studies: either a record- by- record matching or a comparison of aggregates. The post enumeration survey (PES) is the most common type of record-by-record matching studies. The post enumeration survey is a sample survey conducted shortly after a census for the primary purposes of evaluating the census. The PES typically combines two types of matching studies: a post-censal matching survey for the purpose of measuring census coverage errors and a reinterview survey for the purpose of evaluating the extent of content errors in the recoded census characteristics of the population.

In order to assess the extent of both types of errors in the 2012 Population and Housing Census of Rwanda, The National Institute of Statistics of Rwanda (NISR) has conducted a Post Enumeration Survey (PES), the specific objectives of which are: 1- to measure census coverage classified by individual sex, age and residence type (urban and rural); 2- to measure the contents errors pertinent to a number of selected important census variables, namely sex; age; the ability to read and write in different languages; marital status and the type of sanitation facilities available to the households.

In this context, it is important to point out that the Post Enumeration Survey of the 2012 Population and Housing Census has been designed and implemented by the Statistical Methods, Research and Publication (SMRP) Unit of NISR. It is also important to mention that SMRP unit is totally independent of the Census Unit which was entrusted with census undertaking. Nonetheless, for the sake of ensuring compatibility of PES applied concepts and

definitions with that adopted in the Census, senior Census officials were consulted in the design stage of the PES. Furthermore, the PES training manual has been reviewed by census officials who have also participated in the training program of PES field workers. However, the Census personnel were entirely kept unaware of PES sample areas until the Census field work was finalized and the completed census questionnaires were transmitted to NISR headquarters in Kigali. Similarly, the PES field workers had no information about the results of Census listing that carried out immediately prior to census data collection.

The various operations of PES (data collection; matching; field reconciliation visits; data processing and cleaning; results extraction and report writing were exclusively carried out by SMRP personnel.

The present report presents the results of the Post Enumeration Survey of the 2012 Population and Housing Census along with a description of the procedures and operations followed in undertaking the PES. Chapter One is devoted to the Survey Methodology, while Chapter Two deals with Evaluation of Census Coverage and Chapter three is designated to Evaluation of Census Content.

Chapter 1: Survey methodology

Chapter one provides details of several methodological issues relevant to the PES of the 2012 Population and Housing Census. Thes26e issues include: 1-Procedures for coverage analysis in a PES; 2- questionnaire design; 3- pilot survey; 4- sample design , weighting and estimation methods;5-training manual preparation; 6- recruitment and training of field personnel; 7- data collection; 8-matching operation; 9-reconciliation field visits and telephone contacts ;10- data entry, editing and result extraction.

1.1 Procedures of coverage analysis in a PES.

There are three procedures for evaluating census coverage in a PES (Design and Implementation of a Post Enumeration Survey: Developing Country Example, 1993). The three procedures are known as A, B and C respectively.

Procedure A: Procedure 'A' attempts to construct the households as they existed at the time of the Census; the respondent must identify all persons in the PES sample households as of the Census reference date. These persons are then matched to the census questionnaires. Based on this information, the number and percentage of non-movers and movers (out-movers) are estimated. In procedure A, the matching of non-movers and out-movers is relatively simple and inexpensive because the search is limited to the sample areas and their adjacent areas. The weakness of procedure A lies in the fact that it is very difficult and expensive to identify out-movers, especially out-mover households, given that they are no longer at the sample address and the information is reported by proxy respondents. Therefore there is strong possibility of underestimation of the number of out-movers, and since movers are more likely to be missed by the Census this leads to underestimation of the Census omissions.

Procedure B: This procedure tries to identify all persons currently in the PES sample household, that is as of the PES reference date. The respondent is asked to provide the addresses where the persons were living on census day. Since people respond for themselves, the field enumeration is more complete than in procedure A. The persons are later matched to the corresponding census records, based on this information the number and percentage of matched non-movers and movers (in-movers) are estimated. But even though procedure B provides better estimates of the number of movers than procedure A, the difficulties and costs of matching associated with it are far greater because it involves searching for in-movers in the areas where they were enumerated during the census. These areas are not necessarily in the PES sample so the match becomes very much extended. This is complicated by the fact that addresses in developing countries are often inadequate. One problem with procedure B is that one is not always sure whether a failure to match indicates an actually omitted persons or an incorrectly located persons.

Procedure C: The goal of this procedure is to identify all current members of the sample household, as of the PES date, and in addition, any other resident as of the census reference date. These persons are classified as non-mover, out-mover or in-mover with regard to household membership status as of the Census date. However, only residents as of the date of

the Census, that is non-movers and the out-movers, are matched to Census records. The estimates for the numbers of non-movers and movers are based on procedure B based on (in-movers); the matching rates of movers are estimated based on procedure A (based on out-movers). In sum procedure C is a combination of procedures A and B. It takes advantage of the features of each to reduce matching difficulties and, at the same time, improve the estimation of movers. For this reason, the recommended PES procedure is usually procedure C. Consequently, it is the procedure C which has been followed in the current PES Survey.

1.2 Questionnaire design

The PES questionnaire has been designed in conformity to procedure C of **coverage** analysis. It is also consistent with the *Dejure* enumeration basis of the 2012 Population and Housing Census. It includes information needed to estimate non-movers, in-movers, out-movers, correct enumeration and erroneous enumeration. Provisions are made to record the result of matching operation. Concerning **content** analysis, the questionnaire comprises several census data items that are compared with collected Census data in order to measure the extent of variability between PES responses and the corresponding census responses. These data items include sex, age, marital status and the ability to read and write in any or more of several languages. At the household level, information on the type of bathing facility has also been collected. It is worth noting that the definitions and categories of selected census variables used in the PES are identical to that applied in the Census. In addition to the cover page containing identification data, the questionnaire is organized into four sections: the first deals with non-movers and in-movers, while the second is devoted to out-movers, the third handles information on correct/erroneous enumeration. The last section is designated to the type of bathing facility available to the household. The questionnaire has been designed to be compatible with the recommendation of the UN Statistical Division: Post Enumeration Surveys, Operational guidelines- April 2010. Annex I presents the English version of the questionnaire.

It may be useful in this stage to define the key concepts pertinent to coverage investigation:

Non-movers: Those who belonged to the household, as usual residents, as of the Census date (16/8/2012) and as of the PES date (23/9/2012).

In-movers: Those who became usual residents in the household after the Census.

Out-movers: Those who are, on the PES date, no longer usual residents of the household though they were as such in the Census date.

Out-of-scope: Those are the persons who present in the household in the PES date though they were not eligible for being enumerated in the Census within this or any other private household in Rwanda: they comprise those who were non usual residents in the household in the Census date such as “born after”; “joining the household after a long residence-more than six months- in an institutional household such as a Prison or an hospital”; “joining the household after being abroad, for any reason except studying, for a period exceeds six months”. In view of the *dejure* nature of the Census, visitors in the PES and/or the Census were considered out-of-scope.

Correct/erroneous enumeration: Those are the persons enumerated in the Census but not in the PES. This information is filled out during the matching phase when Census-enumerated households and persons are found without corresponding entries in the PES questionnaire. These cases were followed up later during field reconciliation visits. Their follow-up status vis-à-vis the Census enumeration was then determined as correctly or erroneously enumerated. The different types of erroneous enumeration include: fabrications, duplications; out-of scope units, and geographically misallocated units.

1.3 Pilot Survey

Ideally, the PES pilot survey should have been incorporated in the Census Pilot Survey carried out in August 2011. Unfortunately, this has not been done because the PES questionnaire was not developed then. However, upon the development of the PES questionnaire it was tested on staff members of NISR who had been asked to complete the Census questionnaire one month earlier. Both completed census and PES questionnaires were utilized in the training on matching operation. The Pilot exercise has resulted in some improvements in the wording of some PES questions.

1.4 Sample design, weighting and estimation methods

The sample is a single stage stratified cluster one; the explanation of its different elements is presented subsequently.

a- Study population: The analysis unit is the member of private household. Table 1.1 presents the district distribution of household population, as estimated during the mapping operation prior to the 2012 Population and Housing Census, classified by the residence type (urban, semi-urban and rural).

b- The P Sample and the E sample: Conceptually, the PES involves two samples, named the “population” P sample and the “Enumeration” E sample. The P sample consists of the PES sample of segments (EA’s,) drawn from the same target population, but independently from the census, for the purpose of estimating census omissions when compared to Census records. The E sample is drawn from the cases already enumerated in the Census, but selected for independent re-enumeration for the purpose of estimating census erroneous inclusions when compared to the original Census records. Although the E sample may be separate from the p sample, in practice it is made to overlap completely with the P sample to reduce costs and improve the precision of the estimates. The E sample then consists of the same EA’s selected for the PES. A two-way match is conducted between the P sample and the E sample to identify both the omissions and erroneous inclusions. The matching also produces estimate of matched population required in the dual-system estimator of the true population.

c- Sampling units and sampling frame: The Enumeration Areas, as defined in the mapping operation implemented prior to the 2012Census, is the Primary Sampling Unit (PSU), while the private household is the Ultimate Sampling Unit (USU). As all

households included in the sample EA's are included in the sample with certainty, the selection probability of a household is exactly equivalent to the selection probability of the corresponding EA. The EA's list created during the mapping stage constitutes the frame of the EA's. Beside the geographic specification the frame includes estimates of the number of households and the number of the population in each EA. The total number of EA's in Rwanda is 16716 with an average size of 128.6 households each. The size dispersion of EA's is nearly moderate, the standard deviation is about 35.2 households and the coefficient of variation is 27.3 percent. About 80.1 percent of EA's are between 90 and 180 households, while only 1.9 percent of EA's are as small as 60 households or less, there exists about 1 percent of EA's sized 210 or more households. Table 1 shows the size distribution of EA's.

Table 1: Approximate distribution of the number of household population in Rwanda by district and residence type

District	Urban		Semi Urban		Rural		Total	
	No.	% Total	No.	% Total	No.	% Total	No.	% Total
Narugenge	203725	2.1	53431	0.5	.	.	257156	2.6
Gasabo	336680	3.4	148220	1.5	.	.	484900	5.0
Kicukiro	261994	2.7	40657	0.4	.	.	302651	3.1
Nyanza	22112	0.2	25960	0.3	229924	2.3	277996	2.8
Gisagara	1863	0.0	41708	0.4	267361	2.7	310932	3.2
Naruguru	3203	0.0	10213	0.1	257551	2.6	270967	2.8
Huye	36267	0.4	12763	0.1	258528	2.6	307558	3.1
Nyamagabe	11756	0.1	11380	0.1	306370	3.1	329506	3.4
Ruhango	16641	0.2	14657	0.1	274235	2.8	305533	3.1
Muhanga	35416	0.4	18527	0.2	255907	2.6	309850	3.2
Kamonyi	6944	0.1	44046	0.4	263910	2.7	314900	3.2
Karongi	19073	0.2	3668	0.0	294717	3.0	317458	3.2
Rutsiro	2508	0.0	19485	0.2	295908	3.0	317901	3.2
Rabavu	122845	1.3	17724	0.2	211610	2.2	352179	3.6
Nyabihu	13795	0.1	4381	0.0	274233	2.8	292409	3.0
Ngororero	5632	0.1	21470	0.2	304590	3.1	331692	3.4
Rusizi	25054	0.3	30286	0.3	326046	3.3	381386	3.9
Nyamasheke	5706	0.1	28400	0.3	331038	3.4	365144	3.7
Rulindo	2900	0.0	26768	0.3	255908	2.6	285576	2.9
Gakenke	4447	0.0	30134	0.3	307011	3.1	341592	3.5
Musanze	55911	0.6	28290	0.3	260886	2.7	345087	3.5
Burera	1894	0.0	48696	0.5	286588	2.9	337178	3.4
Gicumbi	34826	0.4	26237	0.3	329723	3.4	390786	4.0
Rwamagana	16233	0.2	23982	0.2	227831	2.3	268046	2.7

District	Urban		Semi Urban		Rural		Total	
	No.	% Total	No.	% Total	No.	% Total	No.	% Total
Nyagatare	11310	0.1	11573	0.1	347665	3.5	370548	3.8
Gatsibo	7025	0.1	14326	0.1	367234	3.7	388585	4.0
Kayonza	10524	0.1	6055	0.1	269185	2.7	285764	2.9
Kirebe	7785	0.1	7817	0.1	297362	3.0	312964	3.2
Ngoma	8954	0.1	25098	0.3	271482	2.8	305534	3.1
Bugesera	12088	0.1	5947	0.1	315428	3.2	333463	3.4
Total	1305111	13.3	801899	8.2	7688231	78.5	9795241	100.0

Source: Census Mapping Operation, 2012

Table 2: Approximate distribution of EA'S by number of households

Size category	No.	Percent
less than 60	311	1.9
60-	1695	10.1
90-	5107	30.6
120-	5095	30.5
150-	3180	19.0
180-	1165	7.0
210+	162	1.0
Total	16715	100.0

Source: Census Mapping Operation, 2012

d- Stratification: The normal choice of stratifying variable is the type of residence place (urban, semi-urban, and rural), previous PES surveys in Rwanda (1991 and 2002) exhibit disparity of net coverage error rate between urban and rural. In addition to such explicit stratification of the sampling frame, an implicit stratification based on geographic proximity is also introduced during the sampling selection operation

e- Sample size and allocation: The literature review of previous Post Enumeration Surveys carried out in Rwanda (1991, 2002) has revealed that the adopted sample size was 120 EA's for both indicated surveys. As such it was deemed appropriate and logical to maintain this size of the sample for the present PES. Nonetheless, the sample size was independently calculated based on anticipated coverage rate of 97%, deff =2, confidence coefficient of 95%, relative error margin within 10%, and average size of EA of about 128.6 households and about 600 persons and the number of strata is 3, the resulting sample is about 124 EA's which is only 4 EA's greater than the adopted sample size for the present PES. In case of higher coverage rate the relative error margin would be slightly greater than the assumed level of 10%. The sample was allocated over the strata in such a way that:

1- Urban sample is 40 EA's

2- Semi-urban sample is 35 EA's

3- Rural sample is 45 EA's

f- Sample selection: For each mentioned stratum, the EA sample was selected following the method of Probability Proportionate to Size (PPS) considering the number of households in EA'S as the Measure of Size (MOS). The systematic selection of the sample has been utilized to introduce implicit stratification through sorting the frame by geographic proximity before selection. The explicit stratification has resulted in the representation of the whole thirty districts in the sample. Table 3 presents the stratum distribution of the Sample and the Universe.

Table 3: Stratum distribution of the Sample and Universe EA's

Stratum	Sample	Universe
Urban	40	2,252
Semi Urban	35	1,393
Rural	45	13,070
Total	120	16,715

Source: Census Mapping Operation, 2012

g- Weighting and Estimation Procedures: To obtain unbiased estimates from the PES data it will be necessary to apply appropriate weights to the sample data based on the probabilities of selection. It is also important to calculate measures of sampling variability for Census coverage and content estimates. The procedures for calculating the weights and variances are specified in this section.

In order to avoid producing biased sample estimates, it is necessary to multiply the data by a sampling weight, or expansion factor. The basic weight for each sample household member is equal to the inverse of his/her probability of selection. As indicated before, since all households and household members are included in the PES Sample with certainty, the selection probability of a certain EA is exactly equivalent to the selection probability of a certain household and a household member within this EA. The selection probability of a certain EA is:

$$p_{\alpha h} = \frac{\lambda_h M_{\alpha h}}{\sum_{\alpha} M_{\alpha h}}$$, where

$P_{\alpha h}$ = Probability of selection of the α^{th} EA in the sample of Stratum h

$M_{\alpha h}$ = Number of households in the α^{th} EA in stratum h.

λ_h = Number of EA's to be selected from stratum h

The estimates of Census coverage are calculated as ratios of two total estimates. Thus if we let $\hat{R}$ denotes the estimate of net coverage rate, then the ratio estimate $\hat{R}$ is defined as:

$\hat{R} = \frac{\hat{Y}}{\hat{X}}$, where

$\hat{Y}$ and $\hat{X}$ are estimates of totals for Census population 'y' and True population 'x', respectively calculated as:

$\hat{Y} = \sum_{\forall i} w_i \, y_i$, Where the summation is over all elements (household members)

w_i is the weight assigned to the i^{th} element.

y_i is the value of variable y for the i^{th} element.

$\hat{X}$ is estimated similarly.

In the publication of the results of the PES it is important to include a statement on the accuracy of the survey data. In addition to presenting tables with calculated sampling errors for coverage and content estimates, the different procedures followed to control the non-sampling errors should be described.

The standard error, or square root of the variance, is used to measure the sampling error. The variance estimator should take into account the different aspects of the sample design, such as the stratification and clustering. In order to avoid the time and effort it would require to develop custom variance program, it would be ideal to use an available software package to tabulate the sampling errors. One such software package available for calculating the sampling errors for survey data from stratified cluster sample design such as the present survey is Complex Sample module of SPSS, which is menu-driven and user-friendly. It can be used to calculate sampling errors of totals, means, proportions, and other ratios. It produces subpopulation estimates for each category of a classification variable, and these variables can be cross-classified. For each estimate, Complex Sample calculates the standard error, coefficient of variation (CV), a 95 percent confidence interval and the design effect (*deff*). This software package uses an ultimate cluster variance estimator.

The ultimate cluster variance estimator for a total used by Complex Sample can be expressed as follows:

$$V(\hat{Y}) = \sum_{h=1}^{H}\left[\frac{n_h}{n_h - 1}\sum_{i=1}^{n_h}\left(\hat{Y}_{hi} - \frac{\hat{Y}_h}{n_h}\right)^2\right],$$

Where:

$\hat{Y}_{hi}$ = the estimate of the total of variable y in the i^{th} EA of the h^{th} stratum,

$\hat{Y}_h$ = the estimate of the total of variably y in the stratum h.

n_h = the number of sample EA's in the h^{th} stratum.

Variance Estimator of a Ratio

The approximation of variance estimation of a ratio ($\hat{R}$), based on Taylor Linearization method is:

$$V(\hat{R}) = \frac{1}{\hat{X}^2}\left[V(\hat{Y}) + \hat{R}^2 V(\hat{X}) - 2\hat{R}\,COV(\hat{X}, \hat{Y})\right]$$

Where:

$$COV(\hat{X}, \hat{Y}) = \sum_{h=1}^{H}\left[\frac{n_h}{n_h - 1}\sum_{i=1}^{n_h}\left(\hat{X}_{hi} - \frac{\hat{X}_h}{n_h}\right)\left(\hat{Y}_{hi} - \frac{\hat{Y}_h}{n_h}\right)\right]$$

$V(\hat{Y})$ and $V(\hat{X})$ are calculated according to the formula for the variance of a total.

The Sampling errors of Estimates of Census coverage are presented in Annex II, While Annex III Presents the formulas used to estimate 95% Confidence Interval of several estimates of content errors.

1.5 Training Manual Preparation

The field interviewer/supervisor manual has been prepared to be a reference to all field workers. The roles and functions of enumerators and supervisors at all levels have been specified in detail. The manual includes in addition to definitions of relevant concepts and data items to be collected, a description of the operational processes that must be followed in listing roads, housing units and households have been included. The method of defining the EA boundaries on the ground as well as its compatibility with the pre-prepared map has also been explained. The census authority has reviewed the manual with regard to the definitions of census data items that are included in the PES questionnaire.

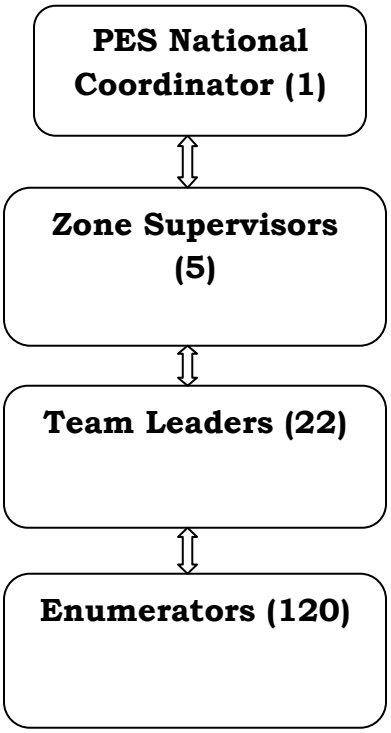
1.6 Recruitment and training of field personnel

About 180 persons were recruited for the PES fieldwork: 10 percent more than the required number. A Four-day training program was administered to all potential field personnel. In the end of the training a True/False test was given to the trainees, based on its results, a selection of interviewers and supervisors was made. In addition to PES senior officials, some Census senior staffs have acted as trainers in this program. The Senior Adviser of Statistics at NISR has offered the trainees with an explanation of the PES purposes and definitions of non-movers and movers. An especial consideration was given to the concept of usual residence with its both components (present resident and absent resident). The training has included a practical part, where trainees were divided into groups of about 10 persons each. An EA, different from the PES sample, was assigned to each group so that they could be trained on how to locate the EA with the help of relevant maps, conduct the listing operations and fill out some PES questionnaires. Difficulties and problems encountered in such practical exercise were discussed and illuminated in the class room.

1.7 Data collection

Just following the training, the field work started where each interviewer was assigned an EA. Interviewers were organized in teams, each consist of 5 interviewers, a team leader, a field editor and a driver. The hierarchical structure of the field work organization is exhibited in the following diagram:

PES Field Work organizational structure



For the purpose of ensuring close supervision of the field work, the country has been divided into five zones, each coincide with the whole province, a big segment of one province or several segments of neighboring provinces. The Country has been segmented into above zones depending on the sample size and its spread inside the zone. The field work started with listing operation where two lists were completed: a list of EA boundaries and roads and list of housing units and households, the later list was considered a basis for monitoring the fieldwork on a daily basis. The listing operation was finalized in the first three days, while the entire fieldwork period extended to slightly more than two weeks. The PES reference date is the night of 22/23 of September 2012. Quality checks of completed questionnaires have been performed on a continuous basis and by different levels of field personnel including field editor, team leader and zonal supervisor. On the basis of the household list, the response rate of listed households exceeds 99 percent at the national level

1.8 Matching operations

After the process of data collection was finalized, the next step was to match the PES results with the corresponding census results. The matching was done manually by the staff of SMRP Unit of NISR who had participated in the PES fieldwork as supervisors, assisted by some external team leaders whose field performance was judged to be outstanding. The matching process involved gathering material needed to perform the matching successfully. Such material included: a- address list from both the PES and Census; b- Census questionnaire for the

selected EA's; c- PES completed questionnaires for the EA's and d- Maps for the EA's used during the census and the PES.

The matching was carried out in two phases. In the first phase strict matching rules were used resulting in obvious matches and possible matches. If a particular household was not found in a particular EA, the search was done in the neighboring EA as it was possible that some households may have been enumerated as part of the neighboring EA's both during the census and PES. After the initial or preliminary match, field reconciliation and/or telephone calls was done to obtain additional information to help resolve suspicious cases. During the final phase of matching, the possible matches were re-examined at times more following subjective or relaxed rules to determine additional matches. Reconciliation visits were arranged in order to minimize the net matching error defined as the difference between erroneous matches and erroneous non-matches.

The matching staffs were organized into teams of two matchers each supervised by a statistician from SMRP Unit who has been involved in the PES design and field work. The matching exercise started with matching the households by comparing names of villages and the EA code, census household members and names of household members. One matcher of the team was responsible for the Census questionnaires and the other matcher for the PES questionnaires, where the first matcher read loudly the census number and names of household members. Households were declared as matching if the name(s) of the census questionnaire were the same as the name(s) in the PES questionnaire while tolerating minor differences in both the spelling and the sequencing of first and family names. The name of the household head and/or that of spouse were adequate to declare whether the household matched or not. The supervisor has helped to resolve suspicious cases.

After matching households in a particular EA, each team member was assigned PES and census questionnaires to match individuals. The person names and four characteristics were used to determine the matching status, the characteristics were the relationship to head of household, age, sex and marital status. People in marriageable ages (12 years or more) having at least three of above characteristics the similar were considered matched. For persons below 12 years old, relationship to the head of household, age and sex were the variables considered in matching. If two of them were the same the individual was considered a match. A varying age tolerances were taken into account in the matching process. The table below gives the tolerance limits.

Table 4: Tolerance limits used in matching persons

Age	Tolerance in years
Less than 10	± 1
10-19	± 2
20-40	± 3
More than 40	± 4

Matching personnel then transcribed information from the census questionnaires to the PES questionnaires and assigned the moving and matching status codes for individuals who appeared in both questionnaires.

With reference to the *dejure* basis of the 2012 Census, no attempt was made to match visitors in the PES and/or the Census. This means that only usual residents in both sources were matched. Nonetheless, if a person was reported as a usual resident in the PES, while he/she was reported as a visitor in the Census, matching was done in view of the proposition that the residence status data in the PES is more accurate than the corresponding data of the Census.

1.9 Field reconciliation visits and telephone contacts

After the initial matching phase for the EA's in each province has been completed, the reconciliation visits were made to verify non-matched or possibly matched persons and households. Such visits were also necessary to identify erroneous census enumeration cases. During the initial matching phases several doubtful cases were resolved through telephone communications with the concerned households.

Specifically, the reconciliation visits were directed to settle down two major issues:

- Concerning households and/or persons who appeared in the Census but not in PES questionnaires, reconciliation visits aimed at determining whether such households/persons were usual residents as of the Census reference date (16/8/2012).

- With regard to households or persons appeared in the PES sample but not in the census records, the reconciliation visits aimed at confirming whether such households/persons were usual residents as of the Census reference date, i.e. Non-movers or out-movers. On the other hand whether they arrived after the Census reference date, i.e. in-movers, or they were out-of scope during the Census date.

- In both above situations, additional information was secured so as to determine the final match status for persons appeared in either source but his/her presence in the other source was in doubt.

1.10 Data entry, editing and result extraction

Based on the questionnaire design a CSPRO Computer Program has been designed to capture the PES data. Data entry was carried out in two personal computers where questionnaires for different provinces were entered subsequently. Data entry were performed in parallel with the matching operation where the questionnaires for which the matching status of all household members has been judged as 'Matched' were entered before starting the reconciliation visits , otherwise data entry was performed after contacting the household through phone calls and/or reconciliation visits to settle down the suspicious cases.

Upon the completion of data entry for each province, a SPSS file was created for the purpose of result extraction. However, an intensive data editing was carried out on the SPSS file prior to result extraction. Range as well as consistency checks were carefully performed with special

consideration given to the residence status at the time of the Census as well as matching status variables.

The province-specific clean data files were concatenated so as to produce a single data file for the whole country, on which basis the results of census coverage and content errors have been generated.

Chapter 2: Evaluation of census coverage

It is useful in the beginning to provide a concise definition of the various quantities involved in measuring census coverage and relevant coverage indices as well. It is also important to point out that those data ingredients are generated after applying the sample weights. Following the definition section, the results of coverage measures are presented while the precision estimates of these measures are given in Annex II.

2.1 Definitions of relevant concepts

1- Census population estimate: measured as-- matched non-movers+ matched out-movers+ population erroneously included in the census+ population correctly enumerated in the census but missed in the PES.

2- PES population: Measured as: Non-movers+ in-movers

3- True population estimate: The dual system estimate of true population is measured as:

$$\frac{PES\ \ population\ \ x\ \ (census\ \ population\ -\ erroneous\ inclusion)}{matched\ \ non-movers + matched\ \ in-movers}$$

4- Net coverage error: measured as: True population – census population.

5- Net coverage error rate : measured as : $\frac{net\ \text{cov}\ erage\ error}{true\ \ population}$

6- Net coverage rate= 1- net coverage error rate

7- Census omissions: measured as : True population- census population+ erroneous inclusion

8- Census omissions rate: $\frac{Omissions}{True\ population}$

9- Match rate: $\frac{Matched\ \ population}{PES\ \ population}$

10- Erroneous inclusion rate: Measured as: $\frac{Erroneous\ inclusions}{Census\ \ population}$

11- Gross coverage error: Measured as: Omissions+ Erroneous inclusions

12- Gross coverage error rate per unit enumerated: Measured as :

$$\frac{Gross\ coverage\ error}{Census\ population}$$

Five measures of census coverage error are presented in this Chapter in a tabular format, where sex, age (broad age interval) and residence type (urban/rural) are used as classifying variables. These measures are: Net Coverage Rate; Census Omissions Rate; Match Rate; Rate of Erroneous Inclusion and Gross Coverage Error Rate. Annex IV presents the various PES data ingredients incorporated in estimating different measures of coverage error classified by residence type, sex and age.

2.2. Net Coverage Rate

From Table 5 to Table 7 present the estimate of Net Coverage Rate classified by residence type and sex, by residence type and broad age groups and finally by Sex and age groups. The net coverage rate for the whole country exceeds 99 percent (99.25). The level of net coverage is almost similar for urban and rural. Female's coverage rate is slightly higher than that of male. With regard to age, coverage rate is lowest (98.65) in the age group 5-14 and highest in the age group 60+ where full completeness has been attained. Apart from the first age group, it is noticed that the Coverage level increases with age.

Table 5: Net Coverage Rate (%) by sex and residence type

SEX	Residence type		
	Urban	Rural	Total
Male	99.09	99.15	99.14
Female	99.32	99.35	99.34
N.S.	98.66	102.97	102.23
Total	99.20	99.26	99.25

Table 6: Net Coverage Rate (%) by Age group and residence type

Age Group	Residence Type		
	Urban	Rural	Total
0-4	99.10	99.49	99.44
5-14	98.64	98.66	98.65
15-29	99.17	99.13	99.13
30-44	99.73	99.8	99.78
45-59	99.9	99.79	99.8
60+	100.02	100.02	100.02
N.S	98.66	98.66	98.66
Total	99.20	99.26	99.25

Table 7: Net Coverage Rate (%) by Age group and sex

Age Group	Male	Female	N.S.	Total
0-4	99.39	99.49	98.66	99.44
5-14	98.63	98.67	98.66	98.65
15-29	98.95	99.3	159.44	99.13
30-44	99.68	99.88	--	99.78
45-59	99.69	99.88	--	99.8
60+	100.14	99.94	--	100.02
N.S	--	--	98.66	98.66
Total	99.14	99.34	102.23	99.25

2.3 Census Omissions Rate

From Table 8 to Table 10 present the estimate of Census Omissions Rate classified by residence type and sex, by residence type and broad age groups and finally by Sex and age groups. The Census Omissions rate for the whole country is as low as 1.33 percent. The level of census omissions is almost similar for urban and rural. Nonetheless, Census omissions is higher among males (1.45 percent) compared with females (1.22 percent). With regard to age, census omissions rate is highest (1.84 percent) in the second age group (5-14). Yet, it is remarkably low in the older age groups where it amounts to 0.64 percent in the age group 30-34 and 0.66 percent afterwards.

Table 8: Census Omissions Rate (%) by sex and residence type

SEX	Residence type		
	Urban	Rural	Total
Male	1.44	1.46	1.45
Female	1.24	1.21	1.22
N.S.	1.34	1.34	1.34
Total	1.34	1.33	1.33

Table 9: Census Omissions Rate (%) by Age group and residence type

Age Group	Residence Type		
	Urban	Rural	Total
0-4	1.2	1.2	1.2
5-14	1.84	1.84	1.84
15-29	1.59	1.59	1.59
30-44	0.66	0.64	0.64
45-59	0.61	0.66	0.66
60+	0.69	0.66	0.66
N.S	1.34	1.34	1.34
Total	1.34	1.33	1.33

Table 10: Census Omissions Rate (%) by Age group and sex

Age Group	Male	Female	N.S.	Total
0-4	1.28	1.13	1.34	1.2
5-14	1.82	1.86	1.34	1.84
15-29	1.82	1.38	1.34	1.59
30-44	0.75	0.56	--	0.64
45-59	0.73	0.6	--	0.66
60+	0.92	0.49	--	0.66
N.S	--	--	1.34	1.34
Total	1.45	1.22	1.34	1.33

2.4 Match Rate

Tables from 2.4.1 to 2.4.3 present the estimate of Match rate classified by residence type and sex, by residence type and broad age group and finally by Sex and age group. The match rate for the whole country exceeds 98 percent (98.66). The level of match rate is slightly higher in rural (98.77 percent) compared with urban (98.33 percent). Similarly, female's match rate (98.78 percent) exceeds, to a little extent, that of males (98.54 percent). With regard to age, match rate is lowest (98.16 percent) in the age group 5-14 whereas it is beyond 99 percent in older age groups. The match rate for the first age group 0-4 (98.8 percent) is in the vicinity of the national average.

Table 11: Match Rate (%) by sex and residence type

Sex	Residence type		
	Urban	**Rural**	**Total**
Male	98.25	98.59	98.54
Female	98.45	98.84	98.78
Total	98.33	98.72	98.66

Table 12: Match Rate (%) by Age group and residence type

Age Group			Residence Type
	Urban	**Rural**	**Total**
0-4	98.32	98.88	98.8
5-14	98.16	98.16	98.16
15-29	97.87	98.51	98.39
30-44	98.98	99.44	99.35
45-59	99.49	99.33	99.34
60+	99.25	99.34	99.33
N.S	84.69	79.51	81.64
Total	98.33	98.72	98.66

Table 13: Match Rate (%) by Age group and sex

Age Group	Male	Female	Total
0-4	98.72	98.87	98.8
5-14	98.18	98.14	98.16
15-29	98.18	98.62	98.39
30-44	99.25	99.44	99.35
45-59	99.27	99.4	99.34
60+	99.08	99.51	99.33
N.S	80.14	89.41	81.64
Total	98.54	98.78	98.66

2.5 Rate of Erroneous Inclusions

From Table 14 to Table 16 present the estimate of the rate of erroneous inclusion classified by residence type and sex, by residence type and broad age groups and finally by Sex and age groups. The erroneous inclusion rate for the whole country is as low as 0.58 percent. The level of erroneous inclusion is higher in rural areas (0.59 percent) compared with urban areas (0.55 percent). Analogously, the level of erroneous inclusion for males (0.6 percent) is slightly above that of females (0.56 percent). With regard to age, erroneous inclusion rate is highest (0.73 percent) for the third age group (15-29). Yet, it is remarkably lower in the older two age groups. In the same time, the erroneous inclusion rates are above the national average for both the youngest age group (0.64 percent) and the oldest one (0.68 percent).

Table 14: Rate of Erroneous Inclusions (%) by sex and residence type

Sex	Residence type		
	Urban	Rural	Total
Male	0.53	0.61	0.6
Female	0.56	0.56	0.56
N.S.	0	4.19	3.5
Total	0.55	0.59	0.58

Table 15: Rate of Erroneous Inclusions (%) by Age group and residence type

Age Group	Residence Type		
	Urban	Rural	Total
0-4	0.3	0.7	0.64
5-14	0.49	0.5	0.5
15-29	0.76	0.73	0.73
30-44	0.39	0.44	0.43
45-59	0.5	0.45	0.46
60+	0.71	0.68	0.68
N.S	0	0	0
Total	0.55	0.59	0.58

Table 16: Rate of Erroneous Inclusions (%) by Age group and Sex

Age Group	Male	Female	N.S.	Total
0-4	0.67	0.62	0	0.64
5-14	0.45	0.54	0	0.5
15-29	0.77	0.68	38.12	0.73
30-44	0.42	0.44	--	0.43
45-59	0.42	0.48	--	0.46
60+	1.06	0.44	--	0.68
N.S	0	0	0	0
Total	0.6	0.56	3.5	0.58

2.6 Gross Coverage Error Rate per Unit Enumeration

Tables from Table 17 to Table 19 present the estimate of Gross Coverage error rate per unit enumeration classified by residence type and sex, by residence type and broad age groups and finally by Sex and age groups. The gross coverage error rate for the whole country is as low as 1.92 percent. The level of gross coverage error is higher in rural areas (1.93 percent) compared with urban areas (01.89 percent). Analogously, the level of gross coverage error for males (2.07 percent) is above that of females (1.79 percent). With regard to age, gross coverage error rate is highest (2.36 percent) for the second age group (5-14). Yet, the level of gross coverage error is remarkably lower than the national average for people beyond age 30. Generally speaking gross coverage error is inversely associated with age.

Table 17: Gross Coverage Error Rate per unit enumeration (%) by sex and residence type

Sex	Residence type		
	Urban	**Rural**	**Total**
Male	1.98	2.08	2.07
Female	1.81	1.78	1.79
N.S.	1.36	5.5	4.81
Total	1.89	1.93	1.92

Table 18: Gross Coverage Error Rate per unit enumeration (%) by Age group and residence type

Age Group	Residence Type		
	Urban	**Rural**	**Total**
0-4	1.52	1.91	1.85
5-14	2.35	2.36	2.36
15-29	2.36	2.34	2.34
30-44	1.06	1.08	1.08
45-59	1.11	1.11	1.11
60+	1.39	1.33	1.34
N.S	1.36	1.36	1.36
Total	1.89	1.93	1.92

Table 19: Gross Coverage Error Rate per unit enumeration (%) by Age group and sex

Age Group	Male	Female	N.S.	Total
0-4	1.95	1.75	1.36	1.85
5-14	2.3	2.42	1.36	2.36
15-29	2.61	2.07	38.97	2.34
30-44	1.17	1	--	1.08
45-59	1.15	1.08	--	1.11
60+	1.97	0.93	--	1.34
N.S	--	--	1.36	1.36
Total	2.07	1.79	4.81	1.92

Chapter 3: Evaluation of content error

Content error is estimated only for matched persons/households and for some selected variables, which are Sex, Age, and Ability to Read and write in different languages, Marital status and type of bathing available to the household. Clearly, the unit of analysis for the first four variables is the household member, while it is the household itself say for the last variable. As such analysis of content error of type of bathing facility is confined to matched households, i.e. households having at least one matched member.

It is important to point out that content error is evaluated in terms of response variability of PES data from the corresponding Census data. Such variability can be measured by four indicators: 1- Net Difference Rate (NDR), 2- Index of Inconsistency, 3- Gross Difference Rate and 4- The Rate of Agreement. The definition of such measures is presented subsequently. The values of content error measures as well as 95% Confidence Interval are presented in section 3.2, whereas the formulae applied to calculate the 95% Confidence Interval are presented in Annex III.

3.1 Measures of Content Error

a- Net Difference Rate: The Net Difference Rate (NDR) is the difference between the number of cases in the census and the number of cases in the PES that fall under each response category relative to the total number of reported persons/households in both the census and the PES in all response categories combined. As such:

$$MDR_i = \frac{x_{.i} - x_{i.}}{n} \text{ X } 100, \text{ for i= 1,2,3,…,s where:}$$

$x_{.i}$ = Unweighted census number of cases in the i^{th} category,

$x_{i.}$ = Unweighted PES number of cases in the i^{th} category,

n= Unweighted total number of reported cases in both census and PES.

s= total number of response categories for characteristic x.

b- Index of Inconsistency $(\hat{I}_i)$**:** It is the relative number of cases for which the response varied between the census and PES. Similar to NDR, this index is calculated for each response category. $\hat{I}_i = \frac{(x_{.i} + x_{i.} - 2x_{ii})}{1/n\{x_{.i}(n - x_{i.}) + x_{i.}(n - x_{.i})\}}$ x 100

Where x_{ii} = number of cases where category i was given as response in both the census and the PES.

c- Aggregate Index of Inconsistency ($\hat{I}$):

$$\hat{I} = \frac{n - \sum_{i}^{s} x_{ii}}{n - 1/n \sum_{i}^{s} x_{.i} x_{i.}} \text{ x } 100$$

d- Gross Difference Rate (GDR)

The GDR is calculated for the variable as a whole, it is the number of discrepancies between the census responses and PES responses relative to the total number of matched cases

$$\text{GDR} = \frac{n - \sum_{i}^{s} x_{ii}}{n} * 100$$

e- Rate of Agreement:

It is the complement of GDR, i.e. Rate of Agreement = $\frac{\sum_{i}^{s} x_{ii}}{n} * 100$

The following table provides standards for the interpretation of different content error measures (Marjorie Dauphin and Anne Canamucio, August 1993):

Table 20: Interpretation of different Content error measures

Measure	Low	Moderate	High
Index of Inconsistency	<20	20-50	>50
Aggregate Index of Inconsistency	<20	20-50	>50
Absolute value of NDR relative to the mean of the Proportion(NDR/P)	<.01	.01-.05	>.05

3.2 Main findings of Content error evaluation

3.2.1 Sex

Expectedly, content error is absolutely trivial in the case of sex variable. The index of inconsistency for either sex, as well as the aggregated index of inconsistency is only 1.52 percent; the ratio of the absolute value of NDR to the average of population proportion (p) |NDR|/P is .001 for males and almost zero for females. These low values of content error measures suggest that the inconsistency of sex reporting between the Census and PES is extremely low. In harmony with this finding, the rate of agreement is as high as 99.24 percent (Tables 3.1a and 3.1b).

3.2.2 Age

On the basis of the standard five year age groups, the level of content error has been assessed (Tables 3.2a and 3.2b). In general, the consistency level of age reporting in both the Census and the PES is very acceptable: Out of 14 age groups, eleven groups have a level of Inconsistency index below 10% and for the remaining three it is just above that level. The aggregated Inconsistency index is estimated as of 8.71 percent. Analogously, the level of |NDR|/P is remarkably small for all categories; six of the age groups have a level of this indicator distantly below .01, and for the remaining three age groups it is above but very close to this point. Finally and in consistency with these findings the rate of agreement is as high as 92.15 percent.

3.2.3 Marital status:

Information on marital status has been collected in the Census and the PES for all household members aged 12 years and above. The categories of this variable are never married, married, separated, widowed and divorced. The level of inconsistency varies to large extent over marital status categories; while it is very low in the first two categories, low in the "widowed "category it is notably high in the "separated" and "divorced" categories (Tables 3.3a and 3.3b). However, due to the lower relative weight of the "separated" and "divorced" populations, the aggregated inconsistency Index (6.29 percent) is in the low side, indicating overall good reporting of this variable. In addition, the value of |NDR|/P measure confirms such variability in the inconsistency index of marital status categories.

In view of this result, it is recommended, when collecting information on marital status in future censuses and surveys, to lay more emphasis on the definitions of the statuses of separated and divorced.

3.2.4 The ability to read and write in different languages:

This information was secured for all persons aged 3 years and above in both the Census and PES following exactly the same approach. In case if the person cannot read and write or can read and write in only one language the pre-coding system was designed in such a way as :1 for Kinyarwanda, 2 for French, 4 for English, 8 for other languages and 0 for non. In case of multiple language people, the interviewers were instructed to add up the codes indicating these languages and report the result on the designated box. In fact, above mentioned coding system for each language ensures unique codes in multiple language situations. As such, the overall number of categories amounts to 16. Table 3.4a shows the cross-tabulation of matched people aged 3+ according to the reported ability to read and write in different languages in the Census and the PES. Evidently, the inconsistency level is relatively high (Table 27). Out of the 16 categories, the index of inconsistency is "moderate" in 5 and "high" in the remaining categories. The aggregated index of inconsistency is as high as 39 percent placing the inconsistency level of this variable in the high-moderate zone. As far as |NDR|/P is concerned, the estimates show than only 2 categories are in the "low", 5 in the "moderate" and 9 in the "high" sides. The rate of agreement is quite modest (74.28 percent).

This relatively large variability between the PES and the Census suggests that it may be more appropriate, in future censuses, to secure the ability to read and write data following a direct approach, in which a certain code is pre-specified to a limited number of languages. Information on multiple languages speakers could be left to sample surveys.

3.2.5 Type of bathing facility available to household:

This is the only variable at the household level which has been incorporated in the evaluation of content error of Census data. There are five categories for the type of bathing facility: 1- 'Flush toilet/Water Closet system (WC)', 2- 'private pit latrine', 3- 'public latrine', 4- 'bush' and 5- 'others'. The disparity between Census and PES data of the type of bathing facility is relatively high. The index of inconsistency of the first three categories is beyond 40 percent, while it is above 85 percent for the last two categories. The aggregated index of inconsistency (45.36 percent) approaches the upper bound of the 'moderate' inconsistency category, whereas the value of as |NDR|/P for all categories suggests high level of inconsistency particularly for the last two categories. Consistent with these results, the rate of agreement (80.5 percent) is relatively low.

Table 21: Distribution of Matched persons by their reported sex in the Census and in PES

		SEX (Census)		
		Male	Female	Total
SEX(PES)	Male	38905	297	39202
	Female	317	41136	41453
	Total	39222	41433	80655

Table 22: Measures of content errors for Sex

SEX	Consistency	census total	PES total	NDR	95%CI		Index of Inconsistency	95%CI		|NDR|/P
					Lower	Upper		Lower	Upper	
MALE	38,905	39,222	39,202	0.02	-0.04	0.09	1.52	1.40	1.65	0.001
FEMALE	41,136	41,433	41,453	-0.02	-0.09	0.04	1.52	1.40	1.65	0.000

Table 22 (continued)

Aggregated Index of Inconsistency	95%CI	
	Lower	Upper
1.52	1.41	1.65

Rate of agreement	99.24

Table: Distribution of matched persons by their reported Age in the Census and in PES

PES reporting	Census reporting														Total
	0-4	41,768	41,926	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	
0-4	11,249	308	15	2	2	0	1	0	1	0	1	0	0	5	**11,584**
5-9	462	10,424	405	8	1	0	2	0	0	0	1	0	3	8	**11,314**
10-14	10	396	8,528	327	14	1	1	0	0	0	0	0	0	3	**9,280**
15-19	1	9	419	7,872	313	6	2	0	2	2	1	0	0	3	**8,630**
20-24	2	1	22	408	7,647	340	27	5	2	1	1	0	0	4	**8,460**
25-29	0	0	1	12	457	7,074	254	16	1	1	2	0	0	10	**7,828**
30-34	2	0	0	1	23	305	5,672	171	25	1	0	1	0	2	**6,203**
35-39	0	0	0	1	3	10	192	3,831	143	13	2	2	0	5	**4,202**
40-44	2	0	0	1	1	2	8	135	3,001	127	19	1	1	2	**3,300**
45-49	0	0	0	0	0	0	3	11	108	2,287	77	12	2	5	**2,505**
50-54	0	1	0	1	1	0	0	9	22	96	2,111	78	19	5	**2,343**
55-59	0	1	2	0	0	0	1	3	1	21	66	1,453	35	23	**1,606**
60-64	0	0	0	0	2	0	0	0	2	3	22	54	1,029	63	**1,175**
65+	3	0	2	1	1	1	1	1	1	3	5	9	49	2,148	**2,225**
Total	**11,731**	**11,140**	**9,394**	**8,634**	**8,465**	**7,739**	**6,164**	**4,182**	**3,309**	**2,555**	**2,308**	**1,610**	**1,138**	**2,286**	**80,655**

Table 23: Measures of content errors for Age

Age	Consistency	Census	PES	NDR	95%CI		Index of Inconsistency	95%CI		|NDR|/P
					LOWER	UPPER		Lower	Upper	
0-4	11,249	11,731	11,584	0.18	0.11	0.25	4.10	3.81	4.38	0.013
5-9	10,424	11,140	11,314	-0.22	-0.57	0.14	8.31	7.89	8.72	0.015
10-14	8,528	9,394	9,280	0.14	0.04	0.24	9.80	9.31	10.29	0.012
15-19	7,872	8,634	8,630	0.00	-0.09	0.10	9.86	9.35	10.37	0.000
20-24	7,647	8,465	8,460	0.01	-0.09	0.11	10.77	10.23	11.30	0.001
25-29	7,074	7,739	7,828	-0.11	-0.20	-0.02	10.09	9.55	10.62	0.011
30-34	5,672	6,164	6,203	-0.05	-0.13	0.03	8.96	8.40	9.52	0.006
35-39	3,831	4,182	4,202	-0.02	-0.09	0.04	9.08	8.41	9.76	0.005
40-44	3,001	3,309	3,300	0.01	-0.05	0.07	9.58	8.80	10.35	0.003
45-49	2,287	2,555	2,505	0.06	0.01	0.12	9.92	9.02	10.82	0.020
50-54	2,111	2,308	2,343	-0.04	-0.09	0.01	9.50	8.58	10.42	0.015
55-59	1,453	1,610	1,606	0.00	-0.04	0.05	9.84	8.72	10.95	0.002
60-64	1,029	1,138	1,175	-0.05	-0.09	-0.01	11.18	9.78	12.59	0.032
65+	2,148	2,286	2,225	0.08	0.04	0.11	4.90	4.23	5.57	0.027

Aggregated Index of Inconsistency	95%CI	
	Lower	Upper
8.71	8.49	8.93

Rate of agreement	92.15

Table 24: Distribution of Matched persons according to their Marital Status reported in the Census and in the PES

PES reporting	Census reporting					Total
	Never married	Married	Separated	Widowed	Divorced	
Never married	23,445	112	24	31	58	**23,670**
Married	346	22,935	42	119	74	**23,516**
Separated	33	60	67	8	43	**211**
Widowed	67	290	11	2916	81	**3,365**
Divorced	131	200	58	88	502	**979**
Total	**24,022**	**23,597**	**202**	**3162**	**758**	**51,741**

Table 25: Measures of content errors for Marital Status

Marital Status	Consistency	Census total	PES total	NDR	95% CI		Index of Inconsistency (I)	95%CI		|NDR|/P
					Lower	UPPER		LOWER	UPPER	
Never married	23,445	24,022	23,670	1	1	1	3	3	3	0
Married	22,935	23,597	23,516	0	0	0	5	5	5	0
Separated	67	202	211	0	0	0	68	60	76	0
Widowed	2,916	3,162	3,365	0	0	0	11	11	12	0
Divorced	502	758	979	0	-1	0	43	40	46	0

Table 25 (Continued)

Aggregated Index of Inconsistency	95%CI	
	Lower	Upper
6.29	6.01	6.59

Rate of agreement	96.37

Table 26: Distribution of Matched persons (3years +) according to their ability to read and write different languages as reported in the census and the PES

	Census reporting															
PES reporting	**Kinyarwanda**	**French**	**Kinya and French**	**English**	**Kinya and English**	**French and English**	**Kinya, French and English**	**Other**	**Kinya and Other**	**French and Other**	**Kinya, French and Other**	**English and Other**	**Kinya, English and Other**	**French, English and Other**	**Kinya, French, English and Other**	**Total**
Non	3,882	4	35	6	168	2	17	16	30	4	21	2	3	0	1	**26,201**
Kinyarwanda	23,473	27	779	14	1,852	19	453	18	243	11	70	4	54	2	69	**30,489**
French	6	3	2	0	3	0	1	0	0	0	1	0	0	0	0	**20**
Kinya and French	658	4	627	4	99	4	229	3	19	2	101	1	16	0	80	**1,887**
English	19	1	1	8	13	0	10	2	1	0	0	1	2	0	0	**62**
Kinya and English	1,044	6	61	7	1,588	18	431	2	14	0	6	1	69	2	53	**3,441**
French and English	6	0	1	2	0	7	9	1	0	0	1	0	0	0	1	**30**
Kinya, French and English	353	3	151	8	646	9	2,128	5	10	0	36	0	41	1	316	**3,728**
Other	2	0	1	0	1	0	4	23	5	2	2	1	2	0	2	**60**
Kinya and Other	273	0	36	2	23	0	17	5	326	3	24	1	24	0	8	**796**
French and Other	10	0	0	0	3	0	0	2	3	36	12	2	0	0	2	**75**
Kinya, French and Other	86	1	62	2	17	1	37	3	24	8	201	0	12	0	70	**533**
English and Other	1	0	0	3	4	0	3	0	0	0	1	33	4	0	2	**52**
Kinya, English and Other	38	0	5	3	50	0	31	2	15	1	8	7	92	1	33	**290**
French, English and Other	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	**13**
Kinya, French, English and Other	58	1	38	2	112	3	325	3	8	0	42	5	35	4	715	**1,352**
Total	**29,909**	**50**	**1,799**	**61**	**4,579**	**63**	**3,695**	**85**	**698**	**67**	**526**	**58**	**354**	**17**	**1,358**	**69,029**

Table 27: Measures of content errors for the ability to read and write different languages as reported in the census and the PES

Category	Consistent	Census total	PES total	NDR	95%CI		Index of Inconsistency	95% CI		|NDR|/P
					LOWER	UPPER		LOWER	UPPER	
Non	22,010	25,710	26,201	-0.71	-0.97	-0.45	24.36	23.85	24.88	0.02
Kinyarwanda	23,473	29,909	30,489	-0.84	-1.18	-0.50	39.59	38.98	40.21	0.02
French	3	50	20	0.04	0.02	0.07	91.47	71.28	117.37	0.86
Kinya and French	627	1,799	1,887	-0.13	-0.27	0.02	67.79	65.09	70.59	0.05
English	8	61	62	0.00	-0.03	0.03	87.07	71.78	105.61	0.02
Kinya and English	1,588	4,579	3,441	1.65	1.45	1.85	64.04	62.23	65.91	0.28
French and English	7	63	30	0.05	0.02	0.07	85.00	67.90	106.39	0.71
Kinya, French and English	2,128	3,695	3,728	-0.05	-0.21	0.12	45.09	43.51	46.72	0.01
Other	23	85	60	0.04	0.01	0.07	68.35	55.92	83.53	0.35
Kinya and Other	326	698	796	-0.14	-0.23	-0.06	56.97	53.18	61.04	0.13
French and Other	36	67	75	-0.01	-0.04	0.01	49.35	38.88	62.64	0.11
Kinya, French and Other	201	526	533	-0.01	-0.08	0.06	62.52	57.83	67.59	0.01
English and Other	33	58	52	0.01	-0.01	0.03	40.03	29.64	54.06	0.11
Kinya, English and Other	92	354	290	0.09	0.03	0.15	71.76	65.37	78.77	0.20
French, English and Other	7	17	13	0.01	-0.01	0.02	53.34	32.52	87.51	0.27
Kinya, French, English and Other	715	1,358	1,352	0.01	-0.10	0.11	48.18	45.56	50.95	0.00

Table 28: Distribution of Matched persons according to the reported bathing facility available to household

TYPE OF TOILET FACILITY	TYPE OF TOILET FACILITY					Total
	Flush toilet/water closet (wc)	Private pit latrine	Public latrine	Bush	Other	
Flush toilet/water closet(WC)system	302	216	25	1	0	**544**
Private pit latrine	156	9,935	761	67	68	**10,987**
Public latrine	44	1,219	2362	24	28	**3,677**
Bush	0	84	12	18	3	**117**
Other	4	232	84	33	27	**380**
Total	**506**	**11,686**	**3,244**	**143**	**126**	**15,705**

Table 29: Measures of content errors for Types of toilet facility

Category	Consistent	Census total	PES total	NDR	95%CI		Index of Inconsistency	95%CI		|NDR|/P
					LOWER	UPPER		LOWER	UPPER	
Flush toilet/water closet (WC) system	302	506	544	-0.24	-0.51	0.03	43.94	39.97	48.31	0.072
Private pit latrine	9,935	11,686	10,987	4.45	3.78	5.13	44.34	42.85	45.88	0.062
Public latrine	2,362	3,244	3,677	-2.76	-3.35	-2.16	40.67	39.10	42.32	0.125
Bush	18	143	117	0.17	-0.03	0.36	86.87	76.01	99.28	0.200
Other	27	126	380	-1.62	-1.89	-1.35	90.42	82.30	99.33	1.004

Table 29 (continued)

Aggregated Index of Inconsistency	95%CI	
	Lower	Upper
45.36	43.92	46.86

Rate of agreement	80.51

ANNEX I: Survey Questionnaire

REPUBLIC OF RWANDA

MINISTRY OF FINANCE AND ECONOMIC PLANNING

NATIONAL CENSUS COMMISSION

NATIONAL INSTITUTE OF STATISTICS OF RWANDA
NATIONAL CENSUS SERVICE
P.O. Box 6139 Kigali. Tel.: (+250)571035
Fax: (+250)570705 *E-mail :info@statistics.gov.rw*

POST ENUMERATION SURVEY
16 – 30 SEPTEMBER 2012

***Legal Basis**: Presidential decree No, 02/01 of 28/02/2011*

2012 POPULATION AND HOUSING CENSUS

I. SECTION L - LOCALIZATION AND IDENTIFICATION OF HOUSEHOLD

L01. PROVINCE / KIGALI CITY: .....|___|
L02. DISTRICT: .....|___|
L03. SECTOR: .....|___|___|
L04. CELL: .....|___|___|
L05. VILLAGE: .....|___|___|
L06. ENUMERATION AREA (N° EA): .....|___|___|___|___|___|___|___|___|___|___|___|
L07. AREA OF RESIDENCE: (Urban = 1, Semi-urban= 2, Rural=3): .....|___|
L08. CENSUS STRUCTURE NUMBER: .....|___|___|___|
L09. CENSUS HOUSEHOLD NUMBER: .....|___|___|___|
L10. P.E.S STRUCTURE NUMBER: .....|___|___|___|
L11. P.E.S HOUSEHOLD NUMBER: .....|___|___|___|
L12. SERIAL NUMBER AND THE NUMBER OF QUESTIONNAIRES FILLED IN THIS HOUSEHOLD:.....|___|/|___|
L13. NAME AND TELEPHONE NUMBER OF THE RESPONDENT----------/../../../../../../../../../../../../

II. SECTION S - HOUSEHOLD SUMMARY TABLE TO BE FILLED IN AFTER INTERVIEW

	MALE	FEMALE	TOTAL
PRESENT RESIDENTS (PR)			
ABSENT RESIDENTS (AR)			
TOTAL RESIDENTS (PR + AR)			
VISITORS (VIS)			
TOTAL ENUMERATED			

CONTROL SHEET

ENUMERATOR	TEAM LEADER
Enumeration date:	Date of verification: .....
Observations	Observations
Name of Enumerator: ..... Signature	Name of Team Leader: ..... Signature

EDITING STAFF

Name:.....
Date: .....
Signature

DATA ENTRY STAFF

Name :.....
Date: .....
Signature ID: |__|__|

FOR ALL PERSONS-GENERAL CHARACTERISTICS

N°	HOUSEHOLD MEMBERS(NAME & FIRST NAME) (P-O1)	RELATIONSHIP (P-O2)	SEX (P-03)	Month and Year of Birth (P-04)	AGE AT LAST BIRTHDAY (P-05)	RESIDENCE STATUS (P-06)	WRITING AND READING (P-16) (FOR RESIDENTS AGED 3 YEARS or OLDER)	MARITAL STATUS (P-29) (FOR RESIDENTS AGED 12 YEARS or OLDER)	RESIDENCE ON CENSUS DAY (P-30)	MOVING STATUS (P-31) (FOR SURVEY OFFICERS)	MATCH STATUS (P-32) (FOR SURVEY OFFICERS)
SERIAL NUMBER	***1. Resident household members*** *Write the names of all resident members who were present or absent during the PES night: (15-16/09/2012) according to the following order:* *- The Head of the Household;* *- Unmarried resident children of the head of the household whose mothers /fathers are not resident in the same household beginning with the eldest;* *-The first Spouse, followed by her unmarried children resident in the household beginning with the eldest ;* *-The second, third … .Spouses, followed by their unmarried children resident in the household beginning with the eldest;* *- Married resident children of the head of the household followed by their resident spouses and children;* *- Children unrelated to the head being brought up within the household;* *- Other resident persons who are related either to the head of the household or to his spouse or spouses;* *- Other resident persons who are unrelated either to the head of the household or to his spouse or spouses;* *- Names of all other residents who did not spend the census night within the household;* ***2. Visitors*** *Record the names of all visitors who spent the census night within the household (if any).*	What is (name)'s realationship to the head of household? *1.Head* *2. Spouse* *3. Son/Daughter* *4. Unrelated Child* *5.Father/Mother* *6.Brother/Sister* *7. Grand Child* *8.Other Relative* *9.Non Relative*	Is [name] Male /female? *1.Male* *2.Female*	In which month and year was [NAME] born? ***(Record the month first and then the year)***	How old was [NAME] at his/her Last Birthday? ***(If respondent doesn't know the exact age; use the historical calendar provided to estimate his/her age).***	What is residence status of [NAME]? *1. Present Resident-PR* *2. Absent Resident-AR* *3.Visitor-VIS*	Can [NAME] read and write with understanding in the following languages? *1.kinyarwanda* *2.French* *4.English* *8.Other* *0.Non* *9.N/A* ***(Record the SUM of the codes reported)***	What is [NAME]'s marital status? *1. Never Married* *2. Married* *3.Separated* *4.Widowed* *5.Divorced* *9.N/A*	Was (Name) a usual resident of this household at census night? *1 .Yes* *2. No-was a usual resident of another household in Rwanda* *3.No- coming from a long residence abroad(>6 month for non-students)* *4.No-coming from a long stay in hospital/prison (>6 month)* *5. No- born after census*	*1. Non movers* *2 .In-movers* *3 N/A*	*1 .Match* *2 .Possible match* *3 .Non-match* *4 .N/A*
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

FOR THOSE PERSONS WHO HAVE MOVED OR DIED AFTER THE CENSUS (OUT MOVERS)

ARE THERE ANY PERSONS WHO WERE USUALLY RESIDENTS OF THE HOUSEHOLD AT CENSUS TIME WHO ARE NO LONGER USUAL RESIDENTS OF THIS HOUSEHOLD (INCLUDING THOSE WHO DIED AFTER THE CENSUS)?

1.YES (List the names of those who have moved since census day) ☐
2.NO (End Interview)

N°	LIST OF NAMES OF OUT-MOVERS (O-01)	RELATIONSHIP (O-02)	SEX (O-03)	Month and Year of Birth (O-04)	AGE (O-05)	WRITING AND READING (O-16) (FOR RESIDENTS AGED 3 YEARS OR OLDER)	MARITAL STATUS (O-29) (ASK PERSONS AGED 12 YEARS OR OLDER)	MATCH STATUS (O-32) (TO BE FILLED BY SURVEY OFFICERS)
SERIAL NUMBER		What is (name)'s relationship to the head of household? *1.Head* *2. Spouse* *3. Son/Daughter* *4. Unrelated Child* *5.Father/Mother* *6.Brother/Sister* *7. Grand Child* *8.Other Relative* *9.Non Relative*	Is [NAME] Male or Female? *1.Male* *2.Female*	In which month and year was [NAME] born? ***(Record the month first and then the year)***	How old is (NAME)? ***(If respondent doesn't know the exact age; use the historical calendar provided to estimate his/her age).***	Can [NAME] read and write with understanding in the following languages? *1.kinyarwanda* *2.French* *4.English* *8.Other* *0.Non* *9.N/A* ***(Record the SUM of the codes reported)***	What is [NAME]'s marital status? *1. Never Married* *2.Married* *3.Separated* *4.Widowed* *5.Divorced* *9.N/A*	*1 .Match* *2 .Possible match* *3 .Non-match* *4 .N/A*
1		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
2		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
3		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
4		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
5		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
6		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
7		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
8		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
9		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
10		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
11		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐
12		☐	☐	☐☐☐☐	☐☐☐	☐☐	☐	☐

TYPE OF TOILET FACILITY (H-11)	
What is the main type of toilet facility used by the members of the household? *1.Flush toilet/Water Closet (WC) system* *2.Private pit latrine* *3.Public latrine* *4.Bush* *5.Other*	☐

STATUS OF QUESTIONNAIRE				
Interview Status *1.Interview Completed (Occupied)* *2.Non-Contact (Occupied)* *3.Not Interviewed (Vacant)* *4.Non-Residential*	Visit 1	Visit 2	Visit 3	Last Visit
	☐	☐	☐	☐

FOR OFFICE USE AND REVISIT ONLY

PERSONS ENUMERATED IN THE CENSUS BUT NOT IN THE POST ENUMERATION (NON MATCHERS)

N°	NAMES (E-01)	RELATIONSHIP (E-02)	SEX (E-03)	Month and Year of Birth (E-04)	AGE (E-05)	WRITING AND READING (E-16) (FOR RESIDENTS AGED 3 YEARS or OLDER)	MARITAL STATUS (E-29) (FOR RESIDENTS AGED 12 YEARS or OLDER)	MEMBERSHIP-STATUS (PAST) (E-30)	MEMBERSHIP-STATUS (PRESENT) (E-31)	MATCH STATUS (E-32)	CENSUS ENUMERATION STATUS (E-33)
SERIAL NUMBER	*INDICATE NAMES OF USUAL MEMBERS OF THIS HOUSEHOLD ENUMERATED IN THE CENSUS BUT NOT IN THE POST ENUMERATION SURVEY*	What is (name)'s realationship to the head of household? *1.Head 2. Spouse 3.Son/Daughter 4. Unrelated Child 5.Father/Mother 6.Brother/Sister 7. Grand Child 8.Other Relative 9.Non Relative*	Is [NAME] Male or Female? *1.Male 2.Female*	In which month and year was [NAME] born? ***(Record the month first and then the year)***	How old is (NAME)? ***(If respondent doesn't know the exact age; use the historical calendar provided to estimate his/her age).***	Can [NAME] read and write with understanding in the following languages? *1.kinyarwanda 2.French 4.English 8.Other 0.Non 9.N/A* ***(Record the SUM of the codes reported)***	What is [NAME]'s marital status? *1.Never married 2.Married 3.Separated 4.Widowed 5.Divorced 9.N/A*	Was (NAME) a usual resident of this household untill at census time? *1 .Yes 2 .No*	Is (NAME) currently a usual member of this household ? *1 .Yes 2 .No*	(TO BE FILLED BY SURVEY OFFICERS) *1 Match 2.Possible match 3.Non-match 4. N/A*	(TO BE FILLED BY SURVEY OFFICERS) *1.Correct Enumeration 2.Erroneous Enumeration /Fabrication 3.Erroneous Enumeration /Duplication 4.N/A*
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

Household match status (FOR OFFICIAL USE ONLY).....|__|

. Match 1 to 1
'. Match 1 to 2
'. Match 2 or more to 1
'. Non match

ANNEX II: Estimates, Sampling Error, Confidence Interval, Coefficient of Variation and Design effects of Coverage Measures

Table 30: net coverage rate

			Standard	95% CI			
		Estimate	Error	Lower	Upper	CV	deff
		99.248	0.410	98.436	100.060	0.004	250.065
Variable1	**Variable2**						
RESIDENCE				**Lower**	**Upper**		
Urban		99.204	0.447	98.319	100.090	0.005	48.850
Rural		99.256	0.478	98.310	100.202	0.005	283.872
SEX				**Lower**	**Upper**		
Male		99.140	0.412	98.325	99.955	0.004	117.645
Female		99.344	0.410	98.533	100.156	0.004	134.044
N.S		102.232	3.834	94.638	109.825	0.038	2.208
AGE				**Lower**	**Upper**		
0-4		99.436	0.507	98.432	100.440	0.005	49.997
5-14		98.653	0.345	97.969	99.337	0.004	56.719
15-29		99.134	0.475	98.194	100.074	0.005	79.394
30-44		99.785	0.303	99.185	100.385	0.003	28.563
45-59		99.799	0.375	99.057	100.540	0.004	23.155
60+		100.021	0.513	99.005	101.036	0.005	15.780
N.S		98.657	0.000	98.657	98.657	0.000	94.570
SEX	**AGE**			**Lower**	**Upper**		
Male	0-4	99.388	0.554	98.290	100.486	0.006	29.272
	5-14	98.632	0.327	97.984	99.281	0.003	27.690
	15-29	98.946	0.481	97.994	99.899	0.005	37.617
	30-44	99.675	0.276	99.129	100.222	0.003	11.123
	45-59	99.691	0.294	99.108	100.274	0.003	6.838
	60+	100.141	0.738	98.681	101.602	0.007	8.143
	N.S	.(a)	.	.	.	.	.
Female	0-4	99.486	0.460	98.575	100.397	0.005	21.093
	5-14	98.673	0.365	97.950	99.396	0.004	29.426
	15-29	99.297	0.470	98.366	100.227	0.005	43.057
	30-44	99.878	0.329	99.227	100.528	0.003	17.853
	45-59	99.884	0.443	99.007	100.760	0.004	17.027
	60+	99.944	0.376	99.200	100.688	0.004	8.053
	N.S	.(a)	.	.	.	.	.
N.S	0-4	98.657	0.000	98.657	98.657	0.000	0.000
	5-14	98.657	0.000	98.657	98.657	0.000	2.640
	15-29	159.442	77.870	5.224	313.661	0.488	2.019
	60+	.(a)	.	.	.	.	.
	N.S	98.657	0.000	98.657	98.657	0.000	94.570
a	**Cannot be computed because the denominator equals zero.**						

Table 31: Match rate (%)

Variable1	Variable2	Estimate	Standard Error	95% CI		CV	deff
				Lower	Upper		
		98.657	0.148	98.365	98.950	0.001	15.139
RESIDENCE				Lower	Upper		
Urban		98.328	0.164	98.003	98.654	0.002	2.446
Rural		98.718	0.172	98.378	99.058	0.002	17.901
SEX				**Lower**	**Upper**		
Male		98.538	0.170	98.201	98.876	0.002	8.719
Female		98.784	0.140	98.507	99.060	0.001	7.934
AGE				**Lower**	**Upper**		
0-4		98.797	0.181	98.439	99.155	0.002	3.471
5-14		98.158	0.226	97.710	98.605	0.002	6.635
15-29		98.388	0.165	98.060	98.715	0.002	5.063
30-44		99.355	0.143	99.072	99.638	0.001	4.561
45-59		99.343	0.159	99.028	99.659	0.002	3.108
60+		99.333	0.196	98.944	99.722	0.002	2.396
N.S		81.635	9.825	62.178	101.093	0.120	1.834
SEX	**AGE**			**Lower**	**Upper**		
Male	**0-4**	98.723	0.214	98.300	99.147	0.002	2.373
	5-14	98.184	0.257	97.676	98.693	0.003	4.334
	15-29	98.182	0.223	97.740	98.623	0.002	3.776
	30-44	99.255	0.183	98.891	99.618	0.002	2.845
	45-59	99.269	0.180	98.913	99.625	0.002	1.495
	60+	99.078	0.321	98.442	99.715	0.003	1.837
	N.S	80.137	12.616	55.151	105.122	0.157	1.971
Female	**0-4**	98.873	0.196	98.484	99.262	0.002	2.105
	5-14	98.143	0.239	97.670	98.615	0.002	3.685
	15-29	98.621	0.157	98.310	98.932	0.002	2.943
	30-44	99.441	0.143	99.157	99.724	0.001	3.037
	45-59	99.402	0.199	99.009	99.796	0.002	3.132
	60+	99.507	0.186	99.138	99.875	0.002	1.744
	N.S	89.407	6.633	76.271	102.542	0.074	0.434

Table 32: census omissions rate (%)

		Estimate	Standard Error	95% CI		CV	deff
				Lower	Upper		
		1.330	0.004	1.321	1.338	0.003	5.567
Variable 1	**Variable2**						
RESIDENCE				**Lower**	**Upper**		
Urban		1.337	0.005	1.328	1.346	0.003	1.002
Rural		1.329	0.005	1.319	1.339	0.004	6.308
SEX				**Lower**	**Upper**		
Male		1.454	0.005	1.445	1.464	0.003	4.043
Female		1.215	0.005	1.206	1.225	0.004	3.468
N.S		1.343	0.000	1.343	1.343	0.000	6.159
AGE				**Lower**	**Upper**		
0-4		1.203	0.001	1.201	1.205	0.001	2.598
5-14		1.836	0.002	1.833	1.840	0.001	2.499
15-29		1.593	0.003	1.588	1.598	0.002	1.798
30-44		0.645	0.002	0.641	0.648	0.003	1.815
45-59		0.656	0.008	0.641	0.671	0.012	2.263
60+		0.659	0.007	0.644	0.674	0.011	2.346
N.S		1.343	0.000	1.343	1.343	0.000	5.478
SEX	**AGE**			**Lower**	**Upper**		
Male	**0-4**	1.277	0.000	1.277	1.277	0.000	8.567
	5-14	1.816	0.002	1.812	1.820	0.001	2.412
	15-29	1.819	0.001	1.816	1.822	0.001	1.071
	30-44	0.745	0.002	0.741	0.749	0.003	2.122
	45-59	0.729	0.012	0.705	0.753	0.017	2.452
	60+	0.918	0.011	0.897	0.939	0.012	2.607
Female	**0-4**	1.127	0.000	1.127	1.127	0.000	8.540
	5-14	1.857	0.002	1.852	1.861	0.001	1.747
	15-29	1.379	0.004	1.372	1.387	0.003	2.887
	30-44	0.559	0.002	0.556	0.563	0.003	1.204
	45-59	0.599	0.011	0.577	0.621	0.018	2.845
	60+	0.493	0.006	0.482	0.505	0.012	1.941
N.S	**0-4**	1.343	0.000	1.343	1.343	0.000	0.000
	5-14	1.343	0.000	1.343	1.343	0.000	100.971
	15-29	1.343	0.000	1.343	1.343	0.000	6.550
	N.S	1.343	0.000	1.343	1.343	0.000	5.478

Table 33: Erroneous inclusion rate (%)

		Estimate	Standard Error	95% CI		CV	deff
				Lower	Upper		
		0.582	0.410	-0.229	1.394	0.703	249.997
Variable1	**Variable2**						
RESIDENCE				**Lower**	**Upper**		
Urban		0.546	0.449	-0.343	1.435	0.822	49.214
Rural		0.589	0.477	-0.356	1.534	0.810	283.733
SEX				**Lower**	**Upper**		
Male		0.599	0.412	-0.217	1.415	0.687	117.688
Female		0.563	0.409	-0.247	1.373	0.726	134.013
N.S		3.496	3.616	-3.665	10.657	1.034	2.203
AGE				**Lower**	**Upper**		
0-4		0.643	0.506	-0.359	1.644	0.787	49.884
5-14		0.496	0.348	-0.193	1.185	0.702	56.642
15-29		0.733	0.475	-0.208	1.674	0.648	79.412
30-44		0.430	0.302	-0.169	1.029	0.703	28.599
45-59		0.456	0.373	-0.283	1.194	0.818	23.147
60+		0.680	0.509	-0.328	1.687	0.749	15.785
SEX	**AGE**			**Lower**	**Upper**		
Male	**0-4**	0.668	0.554	-0.428	1.765	0.828	29.211
	5-14	0.455	0.330	-0.199	1.108	0.726	27.637
	15-29	0.774	0.482	-0.181	1.728	0.623	37.575
	30-44	0.422	0.276	-0.124	0.968	0.654	11.140
	45-59	0.421	0.294	-0.162	1.004	0.699	6.879
	60+	1.058	0.731	-0.391	2.506	0.691	8.207
Female	**0-4**	0.616	0.459	-0.293	1.525	0.745	21.049
	5-14	0.537	0.368	-0.191	1.266	0.685	29.393
	15-29	0.681	0.470	-0.251	1.612	0.691	43.138
	30-44	0.438	0.328	-0.211	1.086	0.748	17.847
	45-59	0.483	0.440	-0.388	1.354	0.910	16.991
	60+	0.438	0.372	-0.299	1.174	0.850	7.961
N.S.	**15-29**	38.124	30.189	-21.664	97.911	0.792	2.014

Table 34: Gross coverage error rate per unit enumeration (%)

				95% CI			
		ESTIMATE	Standard Error	Lower	Upper	CV	deff
		1.922	0.403	1.123	2.721	0.210	247.875
Variable1	Variable2						
RESIDENCE				Lower	Upper		
Urban		1.894	0.443	1.017	2.770	0.234	48.892
Rural		1.928	0.470	0.997	2.858	0.244	281.314
SEX				Lower	Upper		
Male		2.066	0.405	1.263	2.869	0.196	116.982
Female		1.787	0.403	0.988	2.585	0.226	132.783
N.S		4.810	3.567	-2.254	11.873	0.742	2.203
AGE				Lower	Upper		
0-4		1.852	0.500	0.863	2.842	0.270	49.866
5-14		2.357	0.341	1.681	3.034	0.145	56.610
15-29		2.340	0.468	1.414	3.267	0.200	79.364
30-44		1.077	0.301	0.481	1.672	0.279	28.662
45-59		1.113	0.370	0.381	1.846	0.332	23.005
60+		1.338	0.506	0.337	2.340	0.378	15.781
N.S		1.361	0.000	1.361	1.361	0.000	5.497
SEX	AGE			Lower	Upper		
Male	0-4	1.953	0.546	0.871	3.035	0.280	29.211
	5-14	2.296	0.324	1.654	2.937	0.141	27.613
	15-29	2.612	0.473	1.675	3.549	0.181	37.576
	30-44	1.169	0.274	0.627	1.712	0.234	11.173
	45-59	1.152	0.293	0.571	1.732	0.254	6.891
	60+	1.974	0.728	0.533	3.416	0.369	8.281
Female	0-4	1.749	0.454	0.850	2.647	0.259	21.049
	5-14	2.419	0.361	1.704	3.134	0.149	29.381
	15-29	2.070	0.464	1.150	2.990	0.224	43.218
	30-44	0.998	0.326	0.352	1.643	0.327	17.864
	45-59	1.083	0.436	0.219	1.947	0.403	16.884
	60+	0.931	0.368	0.202	1.660	0.395	7.872
N.S	0-4	1.361	0.000	1.361	1.361	0.000	0.000
	5-14	1.361	0.000	1.361	1.361	0.000	1.428
	15-29	38.966	29.778	-20.009	97.940	0.764	2.014
	N.S	1.361	0.000	1.361	1.361	0.000	5.497

ANNEX III: Formulae of Estimating Confidence Interval of Content Error Measures

Ninety-five percent confidence interval of net difference rate for category i :

$(i = 1, \ldots.., X)$

Ninety-five percent confidence limits are :

$$\frac{(X_{.i} - X_{i.}) \pm 2.\sqrt{X_{.i} + X_{i.} - 2X_{ii} + 1}}{n} \times (100)$$

Exceptions:

(1) if $(Xi. - Xii) = 0,$ then widen the high ninety-five percent confidence limit by adding :

$$\left[\frac{2}{n} \times (100)\right]$$

(2) If $(X.i - Xii) = 0,$ then widen the low ninety-five percent confidence limit by subtracting:

$$\left[\frac{2}{n} \times (100)\right]$$

(3) If both (1) and (2) above , the ninety-five percent confidence limits are estimated as :

$$\left[\frac{-4}{n} \times (100)\right] \quad \text{To} \quad \left[\frac{+4}{n} \times (100)\right]$$

Ninety-five percent confidence interval for the index of inconsistency :

(1) If $\left(\frac{X_{.i} + X_{i.} - 2X_{ii}}{n}\right) \leq .10$, ninety-five percent confidence limits are:

$$\frac{(X_{.i} + X_{i.} - 2X_{ii} + 2) \pm 2.\sqrt{X_{.i} + X_{i.} - 2X_{ii} + 1}}{X_{.i}\left(1 - \frac{X_{i.}}{n}\right) + X_{i.}\left(1 - \frac{X_{.i}}{n}\right)} \times (100)$$

(2) If $\left(\frac{X_{.i}+X_{i.}-2X_{ii}}{n}\right)$ > .10 , ninety-five percent confidence limits are :

$$\frac{\left(X_{.i}+X_{i.}-2X_{ii}+2\right)\pm 2.\sqrt{\frac{1}{n}\left(X_{.i}+X_{i.}-2X_{ii}\right)\left(n-X_{.i}-X_{i.}+2X_{ii}\right)}}{X_{.i}\left(1-\frac{X_{i.}}{n}\right)+X_{i.}\left(1-\frac{X_{.i}}{n}\right)}\times(100)$$

Ninety-five percent confidence interval for the aggregate index of inconsistency :

(1) If $\left[\frac{n-\sum_{i=1}^{s}X_{ii}}{n}\right]$ ≤ .10, ninety-five percent confidence limits are:

$$\frac{\left(n-\sum_{i=1}^{x}Xii+2\right)\pm 2.\sqrt{n-\sum_{i=1}^{s}X_{ii}+1}}{\left(n-\frac{1}{n}\sum_{i=1}^{x}X_{.i}X_{i.}\right)}\times(100)$$

(2) If $\left[\frac{n-\sum_{i=1}^{x}X_{ii}}{n}\right]$ > .10, ninety-five percent confidence limits are:

$$\frac{\left(n-\sum_{i=1}^{x}X_{ii}+2\right)\pm 2.\sqrt{\frac{1}{n}\left(n-\sum_{i=1}^{x}X_{ii}\right)\left(\sum_{i=1}^{x}X_{ii}\right)}}{\left(n-\frac{1}{n}\sum_{i=1}^{x}X_{.i}X_{i.}\right)}\times(100)$$

ANNEX IV: The total estimates along with precision values of various data items incorporated in measuring the coverage error

Table 35: The total estimates along with precision values of various data items incorporated in measuring the coverage error

Data Items	Estimate	Standard Error	95% CI		CV	deff
			Lower	Upper		
NON_MOVER	10,564,441.6	324,289.30	9,922,203.60	11,206,679.50	0	587.4
OUT_MOVER	302,541.3	26,811.40	249,442.70	355,639.80	0.1	18.9
IN_MOVER	533,942.0	37,656.70	459,364.90	608,519.10	0.1	21.6
MATCHED_NON_MOVER	10,425,395.1	317,848.70	9,795,912.40	11,054,877.80	0	526.1
MATCHED_OUT_MOVER	296,978.1	26,677.20	244,145.40	349,810.80	0.1	19.1
Match_IM	523,977.8	36,986.00	450,728.90	597,226.60	0.1	21.6
ERRONEOUS_INCLUSION	64,650.7	45,660.70	-25,778.00	155,079.40	0.7	252
CORRECT_ENUMERATION	313,710.0	27,885.10	258,485.10	368,934.90	0.1	19.8
CENSUS_POP	11,100,733.9	335,645.70	10,436,005.10	11,765,462.60	0	900
PES_POP	11,098,383.6	344,452.80	10,416,212.90	11,780,554.20	0	946
OMISSIONS	148,752.2	4,584.90	139,672.10	157,832.30	0	314.8
TRUE_POP	11,184,835.4	337,902.00	10,515,638.10	11,854,032.70	0	841.9
NET_ERROR	84,101.5	46,041.70	-7,081.60	175,284.70	0.5	248.1
GROSS_COVERAGE_ERROR	213,402.9	45,738.50	122,820.20	303,985.60	0.2	257.1

Table 36: The total estimates along with precision values of various data items incorporated in measuring the coverage error by the Residence type

Urban status		Estimate	Standard Error	95% CI		Coefficient of Variation	Design Effect
				Lower	Upper		
Urban	NON_MOVER	1,569,276.30	202,904.10	1,167,435.30	1,971,117.30	0.10	234.10
	OUT_MOVER	82,084.20	11,702.10	58,908.80	105,259.70	0.10	13.10
	IN_MOVER	153,316.30	12,186.00	129,182.60	177,450.00	0.10	7.60
	MATCHED_NON_MOVER	1,543,807.30	198,196.30	1,151,290.00	1,936,324.70	0.10	226.50
	MATCHED_OUT_MOVER	81,078.20	11,639.30	58,027.10	104,129.30	0.10	13.10
	Match_IM	149,989.10	11,930.90	126,360.40	173,617.70	0.10	7.60
	ERRONEOUS_INCLUSION	9,314.80	7,627.40	-5,790.90	24,420.60	0.80	48.60
	CORRECT_ENUMERATION	71,902.30	10,859.40	50,395.80	93,408.70	0.20	12.80
	CENSUS_POP	1,706,102.60	214,974.40	1,280,357.10	2,131,848.10	0.10	244.80
	PES_POP	1,722,592.60	211,813.70	1,303,106.80	2,142,078.50	0.10	235.80
	OMISSIONS	22,996.10	2,959.40	17,135.20	28,857.00	0.10	215.00
	TRUE_POP	1,719,783.90	217,689.30	1,288,661.70	2,150,906.10	0.10	245.50
	NET_ERROR	13,681.30	8,140.50	-2,440.50	29,803.00	0.60	53.30
	GROSS_COVERAGE_ERROR	32,310.90	8,222.20	16,027.30	48,594.50	0.30	54.80
Rural	NON_MOVER	8,995,165.30	368,915.90	8,264,546.60	9,725,783.90	0.00	451.00
	OUT_MOVER	220,457.00	25,833.60	169,295.00	271,619.10	0.10	24.00
	IN_MOVER	380,625.70	37,311.90	306,731.30	454,520.00	0.10	29.30
	MATCHED_NON_MOVER	8,881,587.80	362,212.90	8,164,244.20	9,598,931.40	0.00	425.10
	MATCHED_OUT_MOVER	215,899.90	25,687.40	165,027.20	266,772.50	0.10	24.20
	Match_IM	373,988.70	36,656.10	301,393.20	446,584.20	0.10	29.30
	ERRONEOUS_INCLUSION	55,335.90	45,019.20	-33,822.40	144,494.10	0.80	285.90
	CORRECT_ENUMERATION	241,807.70	26,917.40	188,499.10	295,116.30	0.10	23.80
	CENSUS_POP	9,394,631.20	382,339.00	8,637,428.90	10,151,833.50	0.00	530.70
	PES_POP	9,375,790.90	389,816.70	8,603,779.40	10,147,802.40	0.00	549.00
	OMISSIONS	125,756.10	5,196.00	115,465.70	136,046.60	0.00	309.60
	TRUE_POP	9,465,051.50	384,957.10	8,702,664.10	10,227,438.90	0.00	516.50
	NET_ERROR	70,420.30	45,401.00	-19,494.00	160,334.60	0.60	281.50
	GROSS_COVERAGE_ERROR	181,092.00	45,235.00	91,506.40	270,677.60	0.20	291.10

Table 37: The total estimates along with precision values of various data items incorporated in measuring the coverage error by the Sex

SEX		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
				Lower	Upper		
Male	NON_MOVER	5,033,818.00	165,381.20	4,706,289.00	5,361,346.00	0.03	72.02
	OUT_MOVER	159,797.80	14,822.85	130,441.90	189,153.70	0.09	10.83
	IN_MOVER	292,439.20	20,949.49	250,949.80	333,928.50	0.07	11.95
	MATCHED_NON_MOVER	4,959,297.00	161,654.80	4,639,148.00	5,279,446.00	0.03	69.13
	MATCHED_OUT_MOVER	157,903.90	14,789.68	128,613.70	187,194.10	0.09	10.91
	Match_IM	289,093.70	20,720.20	248,058.40	330,129.00	0.07	11.96
	ERRONEOUS_INCLUSION	31,852.92	21,954.43	-11,626.70	75,332.51	0.69	117.91
	CORRECT_ENUMERATION	167,682.30	16,034.45	135,926.90	199,437.70	0.10	12.08
	CENSUS_POP	5,316,736.00	172,231.00	4,975,642.00	5,657,831.00	0.03	77.01
	PES_POP	5,326,257.00	175,315.20	4,979,054.00	5,673,459.00	0.03	79.76
	OMISSIONS	77,988.83	2,575.34	72,888.51	83,089.15	0.03	65.53
	TRUE_POP	5,362,872.00	174,454.70	5,017,374.00	5,708,370.00	0.03	76.83
	NET_ERROR	46,135.91	22,244.28	2,082.28	90,189.54	0.48	116.65
	GROSS_COVERAGE_ERROR	109,841.80	21,964.75	66,341.71	153,341.80	0.20	116.63
Female	NON_MOVER	5,530,332.00	161,809.70	5,209,876.00	5,850,788.00	0.03	67.45
	OUT_MOVER	142,609.10	13,183.42	116,500.00	168,718.20	0.09	9.58
	IN_MOVER	240,852.70	18,009.48	205,185.90	276,519.50	0.07	10.68
	MATCHED_NON_MOVER	5,466,098.00	159,065.50	5,151,077.00	5,781,119.00	0.03	65.32
	MATCHED_OUT_MOVER	139,074.10	13,055.60	113,218.20	164,930.10	0.09	9.63
	Match_IM	234,884.00	17,626.25	199,976.20	269,791.90	0.08	10.75
	ERRONEOUS_INCLUSION	32,541.98	23,750.08	-14,493.80	79,577.77	0.73	135.07
	CORRECT_ENUMERATION	138,967.60	13,150.02	112,924.70	165,010.60	0.09	9.78
	CENSUS_POP	5,776,682.00	166,753.50	5,446,435.00	6,106,929.00	0.03	71.23
	PES_POP	5,771,185.00	171,967.10	5,430,613.00	6,111,757.00	0.03	75.76
	OMISSIONS	70,667.30	2,064.79	66,578.08	74,756.52	0.03	51.83
	TRUE_POP	5,814,807.00	166,779.30	5,484,510.00	6,145,105.00	0.03	69.56
	NET_ERROR	38,125.33	23,854.27	-9,116.80	85,367.45	0.63	132.11
	GROSS_COVERAGE_ERROR	103,209.30	23,825.06	56,025.00	150,393.60	0.23	134.84
N.S	NON_MOVER	292.03	291.33	-284.94	869.00	1.00	2.26
	OUT_MOVER	134.33	133.33	-129.73	398.38	0.99	1.03
	IN_MOVER	650.15	232.45	189.80	1,110.49	0.36	0.65
	MATCHED_NON_MOVER	0.00	0.00	0.00	0.00	.	.
	MATCHED_OUT_MOVER	0.00	0.00	0.00	0.00	.	.
	Match_IM	0.00	0.00	0.00	0.00	.	.

SEX		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
				Lower	Upper		
	ERRONEOUS_INCLUSION	255.78	255.17	-249.57	761.12	1.00	1.98
	CORRECT_ENUMERATION	7,060.08	2,415.43	2,276.44	11,843.72	0.34	6.43
	CENSUS_POP	7,315.86	2,415.37	2,532.35	12,099.36	0.33	6.20
	PES_POP	942.18	369.40	210.60	1,673.75	0.39	1.13
	OMISSIONS	96.08	32.87	30.98	161.18	0.34	6.43
	TRUE_POP	7,156.16	2,448.30	2,307.42	12,004.90	0.34	6.43
	NET_ERROR	-159.70	259.00	-672.63	353.24	-1.62	2.03
	GROSS_COVERAGE_ERROR	351.86	255.54	-154.22	857.94	0.73	1.97

Table 38: The total estimates along with precision values of various data items incorporated in measuring the coverage error by the Sex

AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
				Lower	Upper		
0-4	NON_MOVER	1,519,677.70	60,875.40	1,399,117.10	1,640,238.30	0.00	21.70
	OUT_MOVER	41,549.90	4,901.50	31,842.60	51,257.10	0.10	4.50
	IN_MOVER	56,582.80	6,170.20	44,362.90	68,802.60	0.10	5.30
	MATCHED_NON_MOVER	1,501,267.80	59,703.10	1,383,028.90	1,619,506.80	0.00	21.00
	MATCHED_OUT_MOVER	41,142.70	4,885.70	31,466.90	50,818.60	0.10	4.50
	Match_IM	56,032.80	6,110.60	43,931.00	68,134.60	0.10	5.30
	ERRONEOUS_INCLUSION	10,292.70	8,148.90	-5,845.80	26,431.30	0.80	50.20
	CORRECT_ENUMERATION	49,057.50	5,903.60	37,365.60	60,749.30	0.10	5.50
	CENSUS_POP	1,601,760.80	63,576.40	1,475,851.00	1,727,670.50	0.00	22.60
	PES_POP	1,576,260.50	64,306.10	1,448,905.60	1,703,615.40	0.00	23.40
	OMISSIONS	19,378.00	771.40	17,850.30	20,905.80	0.00	22.40
	TRUE_POP	1,610,846.10	63,730.30	1,484,631.60	1,737,060.60	0.00	22.30
	NET_ERROR	9,085.30	8,177.50	-7,109.80	25,280.50	0.90	49.40
	GROSS_COVERAGE_ERROR	29,670.70	8,193.20	13,444.50	45,897.00	0.30	49.90
5-14	NON_MOVER	2,888,026.10	104,245.10	2,681,574.20	3,094,478.00	0.00	38.30
	OUT_MOVER	55,119.20	6,009.70	43,217.20	67,021.10	0.10	5.10
	IN_MOVER	93,499.60	8,412.60	76,839.00	110,160.30	0.10	5.90
	MATCHED_NON_MOVER	2,834,114.70	101,846.10	2,632,413.80	3,035,815.50	0.00	37.10
	MATCHED_OUT_MOVER	54,632.10	6,023.00	42,703.90	66,560.30	0.10	5.20
	Match_IM	92,477.50	8,297.90	76,043.90	108,911.00	0.10	5.90
	ERRONEOUS_INCLUSION	14,736.10	10,347.50	-5,756.50	35,228.70	0.70	56.50
	CORRECT_ENUMERATION	67,749.30	7,162.90	53,563.50	81,935.10	0.10	5.90
	CENSUS_POP	2,971,232.10	106,586.60	2,760,143.00	3,182,321.20	0.00	39.30
	PES_POP	2,981,525.80	109,554.70	2,764,558.50	3,198,493.00	0.00	41.40
	OMISSIONS	55,309.10	1,992.00	51,364.10	59,254.10	0.00	38.90
	TRUE_POP	3,011,805.10	108,626.90	2,796,675.20	3,226,935.10	0.00	39.50
	NET_ERROR	40,573.00	10,641.30	19,498.50	61,647.50	0.30	56.30
	GROSS_COVERAGE_ERROR	70,045.20	10,432.60	49,383.90	90,706.40	0.10	55.00

Table 38 (continued)

AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
				Lower	Upper		
15-29	NON_MOVER	3,052,983.40	97,735.10	2,859,424.20	3,246,542.60	0.00	32.50
	OUT_MOVER	139,152.60	12,008.20	115,370.90	162,934.20	0.10	8.10
	IN_MOVER	266,865.20	17,896.80	231,421.60	302,308.90	0.10	9.50
	MATCHED_NON_MOVER	3,006,550.40	96,116.70	2,816,196.40	3,196,904.40	0.00	31.70
	MATCHED_OUT_MOVER	135,526.20	12,090.80	111,580.90	159,471.40	0.10	8.50
	Match_IM	259,778.40	17,442.80	225,233.90	294,322.90	0.10	9.50
	ERRONEOUS_INCLUSION	24,170.30	15,717.10	-6,956.60	55,297.10	0.70	79.60
	CORRECT_ENUMERATION	129,185.80	11,827.30	105,762.30	152,609.20	0.10	8.50
	CENSUS_POP	3,295,432.60	99,570.80	3,098,237.90	3,492,627.30	0.00	32.10
	PES_POP	3,319,848.60	103,570.00	3,114,733.60	3,524,963.60	0.00	34.50
	OMISSIONS	52,957.60	1,626.20	49,737.00	56,178.20	0.00	31.20
	TRUE_POP	3,324,219.90	100,799.00	3,124,592.80	3,523,847.00	0.00	32.00
	NET_ERROR	28,787.30	15,880.20	-2,662.60	60,237.20	0.60	78.40
	GROSS_COVERAGE_ERROR	77,127.80	15,721.30	45,992.50	108,263.20	0.20	78.20
30-44	NON_MOVER	1,643,870.20	50,571.00	1,543,717.00	1,744,023.50	0.00	14.00
	OUT_MOVER	46,026.80	5,210.60	35,707.40	56,346.20	0.10	4.60
	IN_MOVER	75,398.20	6,693.90	62,141.40	88,655.00	0.10	4.60
	MATCHED_NON_MOVER	1,633,534.60	49,728.70	1,535,049.40	1,732,019.80	0.00	13.60
	MATCHED_OUT_MOVER	45,541.90	5,202.50	35,238.60	55,845.20	0.10	4.60
	Match_IM	74,643.20	6,630.10	61,512.70	87,773.70	0.10	4.70
	ERRONEOUS_INCLUSION	7,421.70	5,232.80	-2,941.50	17,785.00	0.70	28.70
	CORRECT_ENUMERATION	38,026.80	4,383.70	29,345.20	46,708.40	0.10	3.90
	CENSUS_POP	1,724,525.10	54,219.10	1,617,146.90	1,831,903.20	0.00	15.40
	PES_POP	1,719,268.50	54,262.90	1,611,803.70	1,826,733.30	0.00	15.50
	OMISSIONS	11,144.20	353.60	10,443.90	11,844.60	0.00	14.70
	TRUE_POP	1,728,247.50	54,305.30	1,620,698.70	1,835,796.40	0.00	15.30
	NET_ERROR	3,722.50	5,236.80	-6,648.70	14,093.60	1.40	28.40
	GROSS_COVERAGE_ERROR	18,566.00	5,252.60	8,163.40	28,968.50	0.30	28.70

Table 38 (continued)

AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
				Lower	Upper		
45-59	NON_MOVER	946,625.40	36,972.50	873,403.30	1,019,847.50	0.00	12.20
	OUT_MOVER	12,736.50	2,071.80	8,633.40	16,839.50	0.20	2.60
	IN_MOVER	29,408.90	4,013.90	21,459.40	37,358.30	0.10	4.30
	MATCHED_NON_MOVER	940,602.50	36,736.10	867,848.50	1,013,356.40	0.00	12.10
	MATCHED_OUT_MOVER	12,385.90	2,028.10	8,369.50	16,402.40	0.20	2.60
	Match_IM	29,023.50	3,951.80	21,197.30	36,849.80	0.10	4.20
	ERRONEOUS_INCLUSION	4,431.20	3,646.40	-2,790.30	11,652.60	0.80	23.30
	CORRECT_ENUMERATION	14,878.40	2,671.60	9,587.40	20,169.40	0.20	3.70
	CENSUS_POP	972,297.90	38,146.50	896,750.80	1,047,845.10	0.00	12.60
	PES_POP	976,034.30	38,317.40	900,148.70	1,051,919.90	0.00	12.70
	OMISSIONS	6,393.60	237.60	5,923.10	6,864.10	0.00	7.60
	TRUE_POP	974,260.40	38,003.40	898,996.50	1,049,524.20	0.00	12.40
	NET_ERROR	1,962.40	3,645.80	-5,257.90	9,182.70	1.90	23.00
	GROSS_COVERAGE_ERROR	10,824.80	3,662.40	3,571.60	18,077.90	0.30	23.30
60+	NON_MOVER	512,731.40	21,024.50	471,093.50	554,369.30	0.00	7.00
	OUT_MOVER	7,822.10	1,570.50	4,711.80	10,932.40	0.20	2.50
	IN_MOVER	9,365.20	1,734.40	5,930.30	12,800.00	0.20	2.50
	MATCHED_NON_MOVER	509,325.20	20,822.60	468,087.00	550,563.30	0.00	6.90
	MATCHED_OUT_MOVER	7,749.20	1,570.60	4,638.80	10,859.70	0.20	2.50
	Match_IM	9,288.10	1,725.10	5,871.70	12,704.50	0.20	2.50
	ERRONEOUS_INCLUSION	3,598.70	2,739.10	-1,826.00	9,023.40	0.80	16.20
	CORRECT_ENUMERATION	8,813.40	1,690.90	5,464.50	12,162.20	0.20	2.50
	CENSUS_POP	529,486.50	22,275.40	485,371.10	573,601.80	0.00	7.60
	PES_POP	522,096.60	21,790.00	478,942.70	565,250.50	0.00	7.40
	OMISSIONS	3,488.10	138.80	3,213.20	3,763.00	0.00	5.50
	TRUE_POP	529,375.80	21,686.90	486,426.10	572,325.60	0.00	7.20
	NET_ERROR	-110.60	2,712.40	-5,482.30	5,261.10	-24.50	15.80
	GROSS_COVERAGE_ERROR	7,086.80	2,772.50	1,595.90	12,577.70	0.40	16.50

Table 38 (continued)

Age groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
				Lower	Upper		
N.S	NON_MOVER	527.3	359.8	-185.3	1,239.8	0.7	1.9
	OUT_MOVER	134.3	133.3	-129.7	398.4	1.0	1.0
	IN_MOVER	2,822.1	867.3	1,104.5	4,539.7	0.3	2.1
	MATCHED_NON_MOVER	0.0	0.0	0.0	0.0	.	.
	MATCHED_OUT_MOVER	0.0	0.0	0.0	0.0	.	.
	Match_IM	2734.3	850.1	1,050.8	4417.8	0.3	2.1
	ERRONEOUS_INCLUSION	0.0	0.0	0.0	0.0	.	.
	CORRECT_ENUMERATION	5,998.9	2100.5	1,838.9	10,158.9	0.4	5.7
	CENSUS_POP	5,998.9	2100.5	1,838.9	10,158.9	0.4	5.7
	PES_POP	3,349.4	936.3	1,495.1	5,203.6	0.3	2.0
	OMISSIONS	81.6	28.6	25.0	138.3	0.4	5.7
	TRUE_POP	6,080.6	2129.1	1,864.0	10,297.2	0.4	5.7
	NET_ERROR	81.6	28.6	25.0	138.3	0.4	5.7
	GROSS_COVERAGE_ERROR	81.6	28.6	25.0	138.3	0.4	5.7

Table 39: The total estimates along with precision values of various data items incorporated in measuring the coverage error by Sex (Male) and Age groups

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
Male	0-4	NON_MOVER	774,377.20	35,626.70	703,820.30	844,934.00	0.00	13.60
		OUT_MOVER	19,190.60	2,675.30	13,892.30	24,488.90	0.10	2.90
		IN_MOVER	25,870.80	3,208.60	19,516.40	32,225.20	0.10	3.10
		MATCHED_NON_MOVER	764,649.90	35,153.00	695,031.10	834,268.60	0.00	13.40
		MATCHED_OUT_MOVER	18,828.40	2,636.90	13,606.10	24,050.70	0.10	2.90
		Match_IM	25,382.50	3,148.00	19,148.00	31,617.00	0.10	3.10
		ERRONEOUS_INCLUSION	5,440.90	4,526.40	-3,523.30	14,405.10	0.80	29.30
		CORRECT_ENUMERATION	25,277.20	3,653.30	18,042.00	32,512.40	0.10	4.10
		CENSUS_POP	814,196.40	36,939.10	741,040.40	887,352.40	0.00	14.00
		PES_POP	800,248.00	36,746.00	727,474.40	873,021.60	0.00	14.00
		OMISSIONS	10,457.70	475.10	9,516.80	11,398.60	0.00	13.90
		TRUE_POP	819,213.20	37,216.50	745,507.80	892,918.60	0.00	13.90
		NET_ERROR	5,016.80	4,559.60	-4,013.30	14,046.90	0.90	29.00
		GROSS_COVERAGE_ERROR	15,898.60	4,542.80	6,901.80	24,895.40	0.30	28.90
	5-14	NON_MOVER	1,438,828.80	56,029.80	1,327,864.70	1,549,792.80	0.00	19.20
		OUT_MOVER	26,601.50	3,827.80	19,020.80	34,182.20	0.10	4.30
		IN_MOVER	46,279.30	5,228.80	35,924.00	56,634.60	0.10	4.60
		MATCHED_NON_MOVER	1,412,303.40	54,736.20	1,303,901.20	1,520,705.50	0.00	18.70
		MATCHED_OUT_MOVER	26,353.40	3,847.60	18,733.50	33,973.40	0.10	4.40
		Match_IM	45,842.60	5,177.90	35,588.10	56,097.10	0.10	4.60
		ERRONEOUS_INCLUSION	6,715.80	4,872.70	-2,934.30	16,365.80	0.70	27.50
		CORRECT_ENUMERATION	31,947.70	4,018.20	23,989.80	39,905.70	0.10	3.90
		CENSUS_POP	1,477,320.30	57,916.60	1,362,619.50	1,592,021.00	0.00	20.10
		PES_POP	1,485,108.10	58,577.90	1,369,097.70	1,601,118.50	0.00	20.50
		OMISSIONS	27,200.20	1,072.00	25,077.10	29,323.20	0.00	20.00
		TRUE_POP	1,497,804.70	59,121.00	1,380,718.60	1,614,890.80	0.00	20.30
		NET_ERROR	20,484.40	5,062.30	10,458.80	30,510.00	0.20	27.70
		GROSS_COVERAGE_ERROR	33,915.90	4,915.00	24,182.00	43,649.80	0.10	26.30

Table 39 (Continued)

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
Male	15-29	NON_MOVER	1,462,722.90	52,063.00	1,359,614.80	1,565,831.00	0.00	16.40
		OUT_MOVER	77,017.00	7,269.70	62,619.70	91,414.30	0.10	5.40
		IN_MOVER	147,125.70	10,859.20	125,619.50	168,631.80	0.10	6.30
		MATCHED_NON_MOVER	1,435,722.70	51,433.30	1,333,861.70	1,537,583.70	0.00	16.20
		MATCHED_OUT_MOVER	75,824.40	7,244.60	61,476.80	90,172.00	0.10	5.40
		Match_IM	144,858.30	10,693.30	123,680.80	166,035.80	0.10	6.30
		ERRONEOUS_INCLUSION	12,366.80	7,722.50	-2,927.30	27,660.90	0.60	37.50
		CORRECT_ENUMERATION	74,481.70	8,207.00	58,228.30	90,735.20	0.10	7.10
		CENSUS_POP	1,598,395.60	53,981.10	1,491,488.80	1,705,302.40	0.00	16.30
		PES_POP	1,609,848.50	55,457.90	1,500,017.00	1,719,680.10	0.00	17.10
		OMISSIONS	29,386.00	1,002.80	27,399.90	31,372.00	0.00	16.40
		TRUE_POP	1,615,414.80	54,959.80	1,506,569.70	1,724,259.80	0.00	16.40
		NET_ERROR	17,019.20	7,853.40	1,466.00	32,572.30	0.50	37.20
		GROSS_COVERAGE_ERROR	41,752.80	7,720.80	26,462.10	57,043.40	0.20	36.30
	30-44	NON_MOVER	745,638.40	24,940.70	696,244.60	795,032.20	0.00	6.90
		OUT_MOVER	25,680.30	3,236.90	19,269.80	32,090.90	0.10	3.20
		IN_MOVER	46,411.10	4,161.20	38,170.10	54,652.10	0.10	2.90
		MATCHED_NON_MOVER	739,826.80	24,534.90	691,236.80	788,416.80	0.00	6.70
		MATCHED_OUT_MOVER	25,632.60	3,238.30	19,219.30	32,045.90	0.10	3.20
		Match_IM	46,319.60	4,152.40	38,096.10	54,543.10	0.10	2.90
		ERRONEOUS_INCLUSION	3,339.90	2,190.60	-998.50	7,678.30	0.70	11.20
		CORRECT_ENUMERATION	22,925.20	2,894.00	17,193.80	28,656.60	0.10	2.80
		CENSUS_POP	791,724.50	27,147.40	737,960.60	845,488.50	0.00	7.70
		PES_POP	792,049.50	26,955.80	738,665.00	845,434.00	0.00	7.60
		OMISSIONS	5,919.00	204.60	5,513.80	6,324.30	0.00	7.70
		TRUE_POP	794,303.60	27,246.10	740,344.10	848,263.20	0.00	7.70
		NET_ERROR	2,579.10	2,195.10	-1,768.20	6,926.40	0.90	11.10
		GROSS_COVERAGE_ERROR	9,259.00	2,205.20	4,891.70	13,626.20	0.20	11.20

Table 39 (Continued)

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
Male	45-59	NON_MOVER	412,618.90	17,974.40	377,021.50	448,216.20	0.00	6.30
		OUT_MOVER	7,286.90	1,442.20	4,430.80	10,143.00	0.20	2.20
		IN_MOVER	19,006.30	2,463.90	14,126.60	23,886.00	0.10	2.50
		MATCHED_NON_MOVER	409,464.10	17,688.80	374,432.20	444,495.90	0.00	6.10
		MATCHED_OUT_MOVER	7,286.90	1,442.20	4,430.80	10,143.00	0.20	2.20
		Match_IM	19,006.30	2,463.90	14,126.60	23,886.00	0.10	2.50
		ERRONEOUS_INCLUSION	1,803.60	1,259.30	-690.30	4,297.60	0.70	6.80
		CORRECT_ENUMERATION	9,908.30	1,786.20	6,370.80	13,445.80	0.20	2.50
		CENSUS_POP	428,462.90	18,813.30	391,204.10	465,721.80	0.00	6.70
		PES_POP	431,625.20	18,855.90	394,282.00	468,968.30	0.00	6.60
		OMISSIONS	3,131.90	140.60	2,853.50	3,410.30	0.00	5.00
		TRUE_POP	429,791.20	18,972.20	392,217.80	467,364.50	0.00	6.70
		NET_ERROR	1,328.20	1,272.20	-1,191.30	3,847.70	1.00	6.90
		GROSS_COVERAGE_ERROR	4,935.50	1,262.00	2,436.20	7,434.90	0.30	6.80
	60+	NON_MOVER	199,180.80	9,672.30	180,025.30	218,336.30	0.00	3.70
		OUT_MOVER	4,021.50	1,019.10	2,003.20	6,039.70	0.30	2.00
		IN_MOVER	5,811.90	1,310.70	3,216.20	8,407.60	0.20	2.30
		MATCHED_NON_MOVER	197,330.20	9,409.90	178,694.40	215,966.00	0.00	3.50
		MATCHED_OUT_MOVER	3,978.20	1,018.70	1,960.80	5,995.60	0.30	2.00
		Match_IM	5,773.40	1,301.00	3,196.80	8,350.00	0.20	2.30
		ERRONEOUS_INCLUSION	2,185.90	1,544.30	-872.40	5,244.20	0.70	8.50
		CORRECT_ENUMERATION	3,142.10	881.80	1,395.70	4,888.40	0.30	1.90
		CENSUS_POP	206,636.40	10,291.70	186,254.30	227,018.50	0.00	4.10
		PES_POP	204,992.70	9,877.70	185,430.50	224,554.90	0.00	3.80
		OMISSIONS	1,894.10	90.50	1,714.80	2,073.40	0.00	3.40
		TRUE_POP	206,344.60	9,969.80	186,599.90	226,089.30	0.00	3.80
		NET_ERROR	-291.80	1,522.40	-3,306.70	2,723.20	-5.20	8.20
		GROSS_COVERAGE_ERROR	4,080.00	1,571.10	968.60	7,191.50	0.40	8.70

Table 39 (Continued)

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
Male	N.S	NON_MOVER	450.7	350.9	-244.3	1145.6	0.8	2.1
		OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		IN_MOVER	1,934.0	579.4	786.6	3081.5	0.3	1.3
		MATCHED_NON_MOVER	0.0	0.0	0.0	0.0	.	.
		MATCHED_OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		Match_IM	1,911.0	572.5	777.2	3044.8	0.3	1.3
		ERRONEOUS_INCLUSION	0.0	0.0	0.0	0.0	.	.
		CORRECT_ENUMERATION	0.0	0.0	0.0	0.0	.	.
		CENSUS_POP	0.0	0.0	0.0	0.0	.	.
		PES_POP	2,384.7	678.7	1040.5	3728.9	0.3	1.5
		OMISSIONS	0.0	0.0	0.0	0.0	.	.
		TRUE_POP	0.0	0.0	0.0	0.0	.	.
		NET_ERROR	0.0	0.0	0.0	0.0	.	.
		GROSS_COVERAGE_ERROR	0.0	0.0	0.0	0.0	.	.

Table 40: The total estimates along with precision values of various data items incorporated in measuring the coverage error by Sex (Female) and Age groups

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
Female	0-4	NON_MOVER	745,300.50	29,238.20	687,395.80	803,205.30	0.00	9.50
		OUT_MOVER	22,359.20	3,146.50	16,127.80	28,590.70	0.10	3.40
		IN_MOVER	30,712.00	3,712.60	23,359.30	38,064.60	0.10	3.50
		MATCHED_NON_MOVER	736,618.00	28,614.40	679,948.60	793,287.30	0.00	9.20
		MATCHED_OUT_MOVER	22,314.30	3,146.00	16,083.90	28,544.70	0.10	3.50
		Match_IM	30,650.30	3,705.20	23,312.40	37,988.20	0.10	3.50
		ERRONEOUS_INCLUSION	4,851.80	3,640.60	-2,358.20	12,061.80	0.80	21.20
		CORRECT_ENUMERATION	23,753.50	2,976.60	17,858.40	29,648.60	0.10	2.90
		CENSUS_POP	787,537.60	30,472.10	727,189.10	847,886.10	0.00	9.80
		PES_POP	776,012.50	31,633.20	713,364.60	838,660.40	0.00	10.70
		OMISSIONS	8,920.00	342.80	8,241.10	9,598.80	0.00	9.60
		TRUE_POP	791,605.70	30,420.80	731,358.90	851,852.60	0.00	9.60
		NET_ERROR	4,068.20	3,640.10	-3,140.90	11,277.20	0.90	20.80
		GROSS_COVERAGE_ERROR	13,771.80	3,673.20	6,497.30	21,046.30	0.30	21.20

Table 40 (Continued)

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
Female	5-14	NON_MOVER	1,449,197.40	50,988.10	1,348,218.10	1,550,176.70	0.00	15.80
		OUT_MOVER	28,517.70	3,376.20	21,831.30	35,204.10	0.10	3.10
		IN_MOVER	47,034.90	4,465.00	38,192.10	55,877.60	0.10	3.30
		MATCHED_NON_MOVER	1,421,811.30	49,907.90	1,322,971.40	1,520,651.20	0.00	15.40
		MATCHED_OUT_MOVER	28,278.70	3,372.70	21,599.20	34,958.10	0.10	3.10
		Match_IM	46,634.90	4,429.10	37,863.30	55,406.40	0.10	3.30
		ERRONEOUS_INCLUSION	8,020.30	5,505.70	-2,883.40	18,924.10	0.70	29.40
		CORRECT_ENUMERATION	35,182.30	4,122.70	27,017.50	43,347.20	0.10	3.80
		CENSUS_POP	1,493,292.60	51,759.80	1,390,785.10	1,595,800.10	0.00	15.90
		PES_POP	1,496,232.20	53,720.10	1,389,842.40	1,602,622.10	0.00	17.10
		OMISSIONS	28,100.50	976.80	26,166.00	30,035.00	0.00	15.70
		TRUE_POP	1,513,372.80	52,634.70	1,409,132.60	1,617,613.00	0.00	15.90
		NET_ERROR	20,080.20	5,624.60	8,941.00	31,219.30	0.30	28.80
		GROSS_COVERAGE_ERROR	36,120.80	5,558.60	25,112.30	47,129.40	0.20	28.40
	15-29	NON_MOVER	1,589,968.50	48,271.20	1,494,369.80	1,685,567.10	0.00	13.10
		OUT_MOVER	62,135.50	5,487.10	51,268.60	73,002.40	0.10	3.80
		IN_MOVER	119,348.30	8,121.80	103,263.50	135,433.20	0.10	4.30
		MATCHED_NON_MOVER	1,570,827.70	47,415.30	1,476,924.20	1,664,731.20	0.00	12.80
		MATCHED_OUT_MOVER	59,701.80	5,478.40	48,852.10	70,551.50	0.10	3.90
		Match_IM	114,920.10	7,811.90	99,449.00	130,391.20	0.10	4.30
		ERRONEOUS_INCLUSION	11,547.70	8,014.60	-4,324.80	27,420.20	0.70	43.30
		CORRECT_ENUMERATION	54,288.90	5,676.20	43,047.50	65,530.30	0.10	4.60
		CENSUS_POP	1,696,366.10	48,498.90	1,600,316.50	1,792,415.70	0.00	12.50
		PES_POP	1,709,316.80	50,933.90	1,608,444.90	1,810,188.80	0.00	13.70
		OMISSIONS	23,566.00	671.20	22,236.60	24,895.30	0.00	11.80
		TRUE_POP	1,708,384.30	48,797.90	1,611,742.60	1,805,026.00	0.00	12.40
		NET_ERROR	12,018.20	8,056.50	-3,937.30	27,973.70	0.70	42.50
		GROSS_COVERAGE_ERROR	35,113.70	8,028.80	19,213.10	51,014.20	0.20	42.50

Table 40 (Continued)

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
Female	30-44	NON_MOVER	898,231.90	28,533.10	841,723.50	954,740.20	0	7.6
		OUT_MOVER	20,346.50	2,748.40	14,903.50	25,789.40	0.1	2.9
		IN_MOVER	28,987.10	3,288.20	22,475.00	35,499.20	0.1	2.9
		MATCHED_NON_MOVER	893,707.80	28,143.90	837,970.30	949,445.20	0	7.4
		MATCHED_OUT_MOVER	19,909.30	2,720.20	14,522.00	25,296.60	0.1	2.9
		Match_IM	28,323.60	3,215.00	21,956.50	34,690.70	0.1	2.9
		ERRONEOUS_INCLUSION	4,081.80	3,063.70	-1,985.70	10,149.40	0.8	17.9
		CORRECT_ENUMERATION	15,101.60	2,096.30	10,950.00	19,253.20	0.1	2.3
		CENSUS_POP	932,800.50	30,425.60	872,544.30	993,056.80	0	8.4
		PES_POP	927,219.00	30,353.10	867,106.20	987,331.80	0	8.4
		OMISSIONS	5,225.20	171.80	4,884.90	5,565.40	0	8
		TRUE_POP	933,943.90	30,482.30	873,575.30	994,312.50	0	8.3
		NET_ERROR	1,143.40	3,068.80	-4,934.20	7,221.00	2.7	17.8
		GROSS_COVERAGE_ERROR	9,307.00	3,068.30	3,230.40	15,383.60	0.3	17.8
	45-59	NON_MOVER	534,006.50	21,709.00	491,013.10	577,000.00	0	7.2
		OUT_MOVER	5,449.60	1,237.90	2,997.90	7,901.20	0.2	2.2
		IN_MOVER	10,402.60	2,114.70	6,214.40	14,590.70	0.2	3.3
		MATCHED_NON_MOVER	531,138.40	21,621.10	488,318.90	573,957.90	0	7.2
		MATCHED_OUT_MOVER	5,099.00	1,133.00	2,855.20	7,342.80	0.2	2
		Match_IM	10,017.20	2,027.30	6,002.30	14,032.10	0.2	3.3
		ERRONEOUS_INCLUSION	2,627.50	2,415.90	-2,157.10	7,412.10	0.9	17.3
		CORRECT_ENUMERATION	4,970.00	1,090.20	2,810.90	7,129.20	0.2	1.9
		CENSUS_POP	543,835.00	22,227.20	499,815.10	587,854.90	0	7.4
		PES_POP	544,409.10	22,029.40	500,781.00	588,037.20	0	7.3
		OMISSIONS	3,261.70	136.90	2,990.70	3,532.80	0	5.1
		TRUE_POP	544,469.20	21,865.70	501,165.40	587,773.00	0	7.1
		NET_ERROR	634.20	2,404.60	-4,127.90	5,396.30	3.8	16.9
		GROSS_COVERAGE_ERROR	5,889.20	2,434.90	1,067.00	10,711.50	0.4	17.4

Table 40 (Continued)

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
Female	60+	NON_MOVER	313550.6	13903.4	286015.7	341085.6	0.0	4.9
		OUT_MOVER	3800.6	893.7	2030.7	5570.6	0.2	1.6
		IN_MOVER	3523.6	968.4	1605.8	5441.5	0.3	2.1
		MATCHED_NON_MOVER	311995.0	13970.6	284326.9	339663.0	0.0	5.0
		MATCHED_OUT_MOVER	3771.0	893.5	2001.5	5540.6	0.2	1.6
		Match_IM	3514.7	967.6	1598.3	5431.1	0.3	2.1
		ERRONEOUS_INCLUSION	1412.8	1214.7	-992.8	3818.4	0.9	8.1
		CORRECT_ENUMERATION	5671.3	1541.9	2617.6	8725.0	0.3	3.3
		CENSUS_POP	322850.1	14583.4	293968.4	351731.7	0.0	5.3
		PES_POP	317074.3	14277.2	288799.1	345349.5	0.0	5.1
		OMISSIONS	1594.0	69.1	1457.0	1730.9	0.0	4.1
		TRUE_POP	323031.2	14396.0	294520.7	351541.8	0.0	5.1
		NET_ERROR	181.2	1211.1	-2217.3	2579.6	6.7	8.0
		GROSS_COVERAGE_ERROR	3006.7	1222.2	586.2	5427.2	0.4	8.2
	N.S	NON_MOVER	76.6	54.0	-30.3	183.5	0.7	0.3
		OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		IN_MOVER	844.2	454.2	-55.3	1743.7	0.5	1.9
		MATCHED_NON_MOVER	0.0	0.0	0.0	0.0	.	.
		MATCHED_OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		Match_IM	823.2	442.9	-54.0	1700.5	0.5	1.9
		ERRONEOUS_INCLUSION	0.0	0.0	0.0	0.0	.	.
		CORRECT_ENUMERATION	0.0	0.0	0.0	0.0	.	.
		CENSUS_POP	0.0	0.0	0.0	0.0	.	.
		PES_POP	920.8	456.7	16.2	1825.3	0.5	1.8
		OMISSIONS	0.0	0.0	0.0	0.0	.	.
		TRUE_POP	0.0	0.0	0.0	0.0	.	.
		NET_ERROR	0.0	0.0	0.0	0.0	.	.
		GROSS_COVERAGE_ERROR	0.0	0.0	0.0	0.0	.	.

Table 40 (Continued)

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
N.S	0-4	NON_MOVER	0.0	0.0	0.0	0.0	.	.
		OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		IN_MOVER	0.0	0.0	0.0	0.0	.	.
		MATCHED_NON_MOVER	0.0	0.0	0.0	0.0	.	.
		MATCHED_OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		Match_IM	0.0	0.0	0.0	0.0	.	.
		ERRONEOUS_INCLUSION	0.0	0.0	0.0	0.0	.	.
		CORRECT_ENUMERATION	26.8	26.5	-25.6	79.2	1.0	0.2
		CENSUS_POP	26.8	26.5	-25.6	79.2	1.0	0.2
		PES_POP	0.0	0.0	0.0	0.0	.	.
		OMISSIONS	0.4	0.4	-0.3	1.1	1.0	0.2
		TRUE_POP	27.2	26.8	-26.0	80.3	1.0	0.2
		NET_ERROR	0.4	0.4	-0.3	1.1	1.0	0.2
		GROSS_COVERAGE_ERROR	0.4	0.4	-0.3	1.1	1.0	0.2
	5-14	NON_MOVER	0.0	0.0	0.0	0.0	.	.
		OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		IN_MOVER	185.4	185.0	-180.9	551.8	1.0	1.4
		MATCHED_NON_MOVER	0.0	0.0	0.0	0.0	.	.
		MATCHED_OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		Match_IM	0.0	0.0	0.0	0.0	.	.
		ERRONEOUS_INCLUSION	0.0	0.0	0.0	0.0	.	.
		CORRECT_ENUMERATION	619.2	432.2	-236.7	1475.1	0.7	2.3
		CENSUS_POP	619.2	432.2	-236.7	1475.1	0.7	2.3
		PES_POP	185.4	185.0	-180.9	551.8	1.0	1.4
		OMISSIONS	8.4	5.9	-3.2	20.1	0.7	2.3
		TRUE_POP	627.6	438.1	-240.0	1495.2	0.7	2.3
		NET_ERROR	8.4	5.9	-3.2	20.1	0.7	2.3
		GROSS_COVERAGE_ERROR	8.4	5.9	-3.2	20.1	0.7	2.3

Table 40 (Continued)

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
N.S	15-29	NON_MOVER	292.0	291.3	-284.9	869.0	1.0	2.3
		OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		IN_MOVER	391.2	133.6	126.6	655.9	0.3	0.4
		MATCHED_NON_MOVER	0.0	0.0	0.0	0.0	.	.
		MATCHED_OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		Match_IM	0.0	0.0	0.0	0.0	.	.
		ERRONEOUS_INCLUSION	255.8	255.2	-249.6	761.1	1.0	2.0
		CORRECT_ENUMERATION	415.1	323.7	-226.0	1056.2	0.8	2.0
		CENSUS_POP	670.9	407.7	-136.5	1478.4	0.6	1.9
		PES_POP	683.3	320.5	48.5	1318.0	0.5	1.2
		OMISSIONS	5.6	4.4	-3.1	14.4	0.8	2.0
		TRUE_POP	420.8	328.1	-229.0	1070.6	0.8	2.0
		NET_ERROR	-250.1	255.3	-755.7	255.5	-1.0	2.0
		GROSS_COVERAGE_ERROR	261.4	255.1	-243.8	766.7	1.0	2.0
	60+	NON_MOVER	0.0	0.0	0.0	0.0	.	.
		OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		IN_MOVER	29.6	29.2	-28.3	87.5	1.0	0.2
		MATCHED_NON_MOVER	0.0	0.0	0.0	0.0	.	.
		MATCHED_OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		Match_IM	0.0	0.0	0.0	0.0	.	.
		ERRONEOUS_INCLUSION	0.0	0.0	0.0	0.0	.	.
		CORRECT_ENUMERATION	0.0	0.0	0.0	0.0	.	.
		CENSUS_POP	0.0	0.0	0.0	0.0	.	.
		PES_POP	29.6	29.2	-28.3	87.5	1.0	0.2
		OMISSIONS	0.0	0.0	0.0	0.0	.	.
		TRUE_POP	0.0	0.0	0.0	0.0	.	.
		NET_ERROR	0.0	0.0	0.0	0.0	.	.
		GROSS_COVERAGE_ERROR	0.0	0.0	0.0	0.0	.	.

Table 40 (Continued)

SEX	AGE groups		Estimate	Standard Error	95% Confidence Interval		Coefficient of Variation	Design Effect
					Lower	Upper		
N.S	N.S	NON_MOVER	0.0	0.0	0.0	0.0	.	.
		OUT_MOVER	134.3	133.3	-129.7	398.4	1.0	1.0
		IN_MOVER	43.9	43.5	-42.4	130.1	1.0	0.3
		MATCHED_NON_MOVER	0.0	0.0	0.0	0.0	.	.
		MATCHED_OUT_MOVER	0.0	0.0	0.0	0.0	.	.
		Match_IM	0.0	0.0	0.0	0.0	.	.
		ERRONEOUS_INCLUSION	0.0	0.0	0.0	0.0	.	.
		CORRECT_ENUMERATION	5,998.9	2,100.5	1,838.9	10,158.9	0.4	5.7
		CENSUS_POP	5,998.9	2,100.5	1,838.9	10,158.9	0.4	5.7
		PES_POP	43.9	43.5	-42.4	130.1	1.0	0.3
		OMISSIONS	81.6	28.6	25.0	138.3	0.4	5.7
		TRUE_POP	6,080.6	2,129.1	1,864.0	10,297.2	0.4	5.7
		NET_ERROR	81.6	28.6	25.0	138.3	0.4	5.7
		GROSS_COVERAGE_ERROR	81.6	28.6	25.0	138.3	0.4	5.7

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Odette MBABAZI
Jean Pierre UWINEZA
Andre GASHUGI
Silas MUNYEMANA
Eric BUGINGO
Alphonse SHUMBUSHO
Jocelyne UWAMAHORO
Hassan YAHYA
Jean Paul NDISANZE
Antoinnette HABINSHUTI
Alicia INGABIRE
Maureen TWAHIRWA
Yolande KABEGA
Elias DUSENGE
Sita KAZIMBAYA

Secretary

Simonie MUREKERAHO

Drivers

40 drivers (mostly from NISR)

98 Motorists (hired during the listing operation)

NISR MANAGEMENT TEAM

Yusuf MURANGWA, Director General
Odette MBABAZI, Deputy Director General/CS
Andre GASHUGI, Director of Administration
Jean Pierre UWINEZA, Director of Finance
Willy GASAFARI, Director of Census
Juvenal MUNYARUGERERO, Census Field Expert
Prosper MUTIJIMA, Census Coordinator
Augustin TWAGIRUMUKIZA, Director of ICT
Sebastien MANZI, Director of Economic Statistics
Dominique HABIMANA, Director of Statistical Methods, Research and Publications
Antoinette HABINSHUTI, Planning Officer
Jean Paul NDISANZE, Planning Officer