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RESUME/ABSTRACT

Post Enumeration Surveys (PES) are increasingly being used in Sub-Sahara Africa as tools for evaluating quality of census data. Use of PES methodology to evaluate census data is not new in the Region. The first PES was undertaken in 1960 in Ghana and, during the 1980 Round of Census, a total of 15 countries, out of 47, included PES in their census programme. In the 2000 Round of Census, the number of countries having a PES as part of the census programme had more than doubled, although only a handful were successful in terms of producing useful results, which raised concerns as to whether PES's are worth undertaking.

The main objectives of the PES in Africa is to quantitatively and qualitatively evaluate accuracy of the census in terms of coverage and content errors as well as to assess the quality of enumeration areas as sampling frames for household based surveys. As censuses become more and more complicated and, as census results are used more and more for policy formulation and development planning, it is becoming imperative for national statistical offices to provide quantitative and qualitative limitations in the use of data.

The design of PES varies from country to country and experience indicates that a probability sample of between 0.5 percent - 1.5 percent of EAs are commonly selected, which allows generalization of statistical estimates at only higher levels of administrative structures in any country. Experience also indicates that structured questionnaires, with limited number of variables, are administered to all households in sample EAs.

Use of PES information has improved since the first evaluation was undertaken in the Region. The PES has effectively been used to inform users on the quality of census data by providing limitations, which to a large extent has contributed to increased confidence in use census data in decision making processes. The Census results in South Africa (1966) were, for example, adjusted by use of PES findings which indicated serious under-coverage in some parts of the country. On the other hand, there are distinct limitations and constraints in planning, managing and implementing PES programmes. The main lesson learned is that careful planning and implementation of the PES programmes can provide useful information on coverage and content and hence improve confidence of census information.

This paper focuses on experiences of conducting PES's in Sub-Sahara Africa. The issues highlighted include; sampling design, PES field and office activities, lessons learned and the way forward for the Africa region. Specific PES experiences and lessons learned from Tanzania and Uganda are provided.

1.0: THE PES IN AFRICA: AN OVERVIEW

1.1: Introduction:

A census is the most expensive and complex programme that can be undertaken by any national statistical office. It is recognized that due to the inevitable complexity of censuses, errors will always occur no matter the level of quality control mechanisms instituted. It is however important to note that magnitudes of errors do not diminish the importance of census data as long as users understand the limitations (Cambodia, National Institute of Statistics, 1999).

In the past, a number of census evaluation methodologies have been used to help understand limitations of census data, including demographic analysis, comparison of census totals with figures from other sources and matching census returns with those from probability surveys, commonly referred to as Post-Enumeration Survey (PES).

This paper focuses on experiences of conducting PES's in Sub-Sahara Africa. Specifically, issues highlighted include: sample design and survey methodology; PES implementation activities; lessons learned; and, the way forward. The experiences and lessons learned in planning and conducting PES programmes in Tanzania and Uganda during their 2002 census are provided.

1.2 Experience of conducting PES in sub-Saharan Africa

Experiences in planning and conducting PES in Sub-Sahara Africa date as far back as the 1960 Round of Censuses. Notably, the first PES in sub-Saharan Africa was undertaken in Ghana in 1960. It is also recorded that some Francophone countries conducted their first PES in the 1970 Round of Censuses. The outcomes from the first PES's were not however very encouraging because of poor planning and implementation. Furthermore, countries participating in the exercise felt that they were unnecessarily expensive especially coming soon after comparatively very expensive censuses. Thus, for about two decades after the Ghana experience, a number of African countries did not participate in the PES because of financial limitations (*Uganda, 2005*).

During the 1990 and 2000 Round of censuses, a number of countries participated in the PES. In December 1990, Zambia, for example, conducted a successful PES to evaluate its census. Findings from the PES gave a net coverage error of 1.9 percent, ranging from 0.9% in the rural areas to 2.6% in urban centres. The PES gave low range of Index Inconsistency for all ages; (8.10 – 16.97) and (12.65 – 23.71) for urban and rural areas, respectively. (*Central Statistics Office, Zambia, 1990*).

Within a record time of two weeks of census enumeration, Rwanda conducted a successful PES to evaluate the 1991 Census. A single stage stratified cluster sample design was used to select one hundred and twenty (120) out of 6,200 EAs in the country. Stratification was according to

rural and urban areas. The PES staff was selected from the best-qualified census staff pool. (Dauphin, Marjorie, 1993)

In 1993, Gambia conducted its PES three (3) months after census enumeration. A one-stage stratified sampling procedure was used to select twenty five (25) out of a total 1,593 EAs. The best census field workers were used to collect data but were assigned different areas from those they worked during the census. The overall coverage error was 3.61%, erroneously enumerated rate was 0.9 percent and net error rate was 2.7 percent. (PES Report, Gambia, 1993).

Within a period of one month after Census enumeration in 1996, South Africa conducted its PES was based on 800 EAs, approximately one percent of total EAs in the country. Stratification was according to provinces. The PES findings pointed to serious undercount of population of approximately 10.7 percent. There were also great variations among provincial estimates, ranging from 8.7 percent in Western Cape to 15.6 percent in Northern Cape Province. These results were effectively used in the adjustment of census findings at the national and provincial levels (PES, South Africa, 2004).

It should be mentioned that, with the exception South Africa, PES results in the region have not been used for adjusting the census results for fear of political repercussions.

1.3: Purpose of post-enumeration surveys

Although several methods are available for evaluating census data, almost all countries have relied primarily on PES methodology for evaluating undercounts (Biemer et al., 2001). Although the PES provides users with reliable quantitative and qualitative information on census data quality, experience, however, indicates that quality assurance alone cannot guarantee complete accuracy of census data (UNECA, 1975).

The main purpose of the PES coverage error analysis is to estimate the *Census omission rate*, *erroneous enumeration rate* and the *net coverage error rate* for households and persons. The PES analysis of coverage errors is based on the dual system estimator, which involves matching of records from two sources which are assumed to be independent (in this case, the census and the PES). For this purpose, we have two different samples used namely, P-sample and E-sample. For more information, see section 4 below.

Estimates of net coverage, census omissions, erroneously enumerated persons and content error rates are typical PES outputs. By use of carefully designed PES, population under/over-count can be converted into adjustment factors, which may accordingly be applied to increase or decrease population size of a given defined area. It has been reported that in some African countries, PES results have been used to support or defend census results when the accuracy of the census is challenged (Onsembe, 1999). Also, PES findings are used for many other purposes such as updating population estimates.

It has been noted that highlighting limitations of data enhances confidence in use of census data. On the other hand, there are distinct constraints in managing and implementing the evaluation survey.

1.4: Sample design and survey methods

In most countries, a pre-determined number of Primary Sampling Units (EAs) are selected through single-stage stratified cluster designs, aimed at enhancing generalization of results to higher administration levels; national, urban, rural and, in some cases, regions/provinces. To facilitate measurement of coverage, all households in selected EAs are included in the sample.

Typical samples are the Population sample (P) and the E-sample

(a) The P or population sample

The *P-sample* (population sample) consists of the PES sample EAs drawn from the same target population, but independently from the census, for the purpose of estimating *census omissions*. Thus, the central theme of any PES programmes is the measurement of census omissions. The methodology compares (matches) PES and census records. For ease of manipulation, population totals captured from the census and PES records can be represented in a two-by-two table, as given below:

Table 1.1: Estimation of Population in an area

	In Census	Out of Census	Total
In PES	N_1	D	N_1+D
Out of PES	C	N_2	N_2+C
Total	N_1+C	N_2+D	<i>Pop.</i>

Where:

N_1 = estimated number of persons counted in both Census and PES,

D = estimated number of persons counted only in PES,

C = estimated number of persons counted only in Census,

N_2 = estimated number of persons missed in both the census and PES

Hence:

N_1+C = estimate of total number of persons counted correctly in the

Census.

N_2+D = estimate of total number of persons counted correctly in the PES.

Estimate of total number of persons = $\{(N_1+D) (N_1+C)\} / N_1$

It should be mentioned that development of estimates assumes complete independence between census and PES.

(b) The E-Sample

Experience indicates that besides population omissions, errors can also be made in the census itself, which can also contribute to overall error levels. *E-sample* (enumeration 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 original census records. The erroneous inclusions provide a correction in the dual-system of the true population. In practice, the E-sample is allowed 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 segments selected for the PES. A two-way match is conducted between the P-sample and the E-sample to identify both the omissions and the erroneous inclusions. The match also produces the estimates of the matched population and component required in the dual system estimation.

Common types of errors include: (i) duplicate/multiple enumerations (ii) ascribing people to wrong geographic locations (iii) insufficient information for matching (iv) erroneously enumerated population (enumerated elsewhere or fictitious person).

1.5: The PES main activities

Main PES activities undertaken include: field interviews/data collection; matching PES and census records; field reconciliation; data processing and developing estimates of coverage errors

(a) The questionnaire and PES interviews

The interview approach is commonly used to collect data through use of structured questionnaire, developed mainly with a purpose of establishing place of census enumeration of the PES population. Efforts are also made to get information on out-movers (those who moved out of Enumeration Area between census day and the PES interview date).

Basic questions for determination of place enumeration include: (i) what are the names of all people who lived here on census day? (ii) What are their relationships? (iii) What is their age and sex? (iv) Is each person still residing here? (v) What are the names and relationships of other people living here on census day but has since moved out? (Bureau of the Census, 1985)

(b) Matching and reconciliation

After data capture, PES and census data are matched by well trained matching clerks equipped with detailed guidelines to enable them determine match and non-match cases. It has been determined that the matching exercise is the most complicated part of the PES exercise.

A field follow-up operation is usually required to determine if the unmatched people in the E-sample unit were erroneously enumerated. The persons/households that may require reconciliation include (i) cases which are in census but not in PES (ii) cases in the PES but not in census (iii) partial match.

(c) Estimates of errors

Estimations are undertaken to provide quantitative and qualitative levels of coverage and content errors. It should be noted that the P sample is based on dual-system estimation formula for estimating total population.

National coverage is given by the Coverage Rate, which is the ratio of matched population to PES population, namely:

$$\text{Coverage Rate} = \{\text{Matched Population}\} / \text{PES Population}$$

Where:

- Matched population is the sum of estimated matched non-movers and estimated matched in-movers;
- PES population is the sum of estimated non-movers and estimated in-movers

The Erroneous Enumerations are given by the E-sample, namely:

$$\text{Erroneous Inclusion Rate} = \{\text{Erroneous inclusions}\} / \text{Census population}$$

Where:

Census population is calculated as the summation of: matched non-movers, matched out-movers, number of census erroneous inclusions in the population and number of census cases correctly enumerated in the census but missed in the

2: PES EXPERIENCE AND PRACTICE; A case of Tanzania and Uganda

The Tanzania and Uganda experiences highlight recent national approaches to planning, managing and implementing PES programme in Africa. The experiences illustrate that, even within the environment of substantial constraints, developing countries can undertake successful

PES. It also points to the fact success of PES are better guaranteed if included in the overall census strategic plan.

Main issues highlighted include: purpose and objectives of PES, sampling design, data collection, matching/reconciliation, development of estimates and lessons learned.

2.1: Experience and lessons learned in implementing the Tanzania PES

2.1.1: The Purpose and objectives of PES

The Tanzania PES, the first to be conducted in the country, was successfully undertaken ten weeks after the 2002 Population and Housing Census enumeration. The Division of Statistical Methods and Standards, National Bureau of statistics, was charged with the responsibility of planning and conducting the exercise.

The PES was part of the overall census operations, which ensured use of census infrastructure including; equipment, cartographic maps, field organizations and vehicles. The approach contributed to reduction of cost.

The basic objectives of the PES was to provide evaluate quality of census data, specifically measurement of coverage and content errors as well as identify sources of errors.

2.1.2: Main activities

(a) The sample design and field interviews

A stratified one-stage cluster-sampling scheme was used in selection of sample EAs and, to ensure accurate measurement of coverage errors, all households in sample EAs were included in the sample.

A total of 915 out of 55,217 EAs (representing approximately 1.7 percent of non-institutional population areas) was selected with probability proportional to number of EAs (PPS) in each stratum. It is important to note that the homeless, passengers in transit and collective households were excluded from the sample.

The main domains of study included; rural, with regions as sub-strata and urban areas, which allowed better estimation of coverage errors at those levels.

A structured questionnaire, which was used for household interviews, contained issues related to: socio-demographic characteristics of Population (two full names, relationship to head, sex, and age and marital status); household enumeration status; and, information on out-movers. The PES interviewers were selected from among the best performers during the census enumeration. But, in an effort to ensure independence between census and PES, the selected enumerators were assigned different EAs from those in which they worked during the census. However, despite all efforts made to separate the two exercises, it was impossible to achieve complete independence. A total of 990 staff were involved in the PES field data collection, which included 23 supervisors, 52 Regional Supervisors and 915 enumerators, one for each EA.

The PES was undertaken ten weeks after Census enumeration, which translated into substantial movement of census population, the out-movers and in-movers. The long delay contributed to poor information on basic socio-demographic characteristics of movers.

(b) Matching PES/Census records and undertaking Field reconciliation

With technical assistance from UNFPA advisers, the PES Team developed rules and guidelines for the matching exercise, which involved comparisons of PES and census records. In addition, rigorous training was organized before deploying matching clerks to undertake the tasks assigned. The matching exercise revealed substantial problems with age data. To address the problem, the guidelines were revised to allow for high tolerance limits.

In spite of great efforts instituted to match all records, there remained several cases of unmatched cases that could not be resolved in the office. In such cases, it was decided to carry out field reconciliation visits.

During reconciliation, budgetary constraints did not allow field Teams to visit all problematic EAs. Specifically, field work was undertaken in only 56 EAs countrywide, limited to only those with very low match status.

A number of factors were identified as contributing to mismatch of PES and census records:

- Map boundary problems

Some EA boundaries were not well defined on the ground, especially those that lacked prominent features as well as those that had experienced frequent changes due to, for example, roads and building constructions. In a number of cases, enumerated households were placed outside the EA boundary or genuine households missed out during enumeration

- Mixing codes, in some cases, where more than one enumerator was deployed to cover one EA
- The long delay between PES and census resulted into poor information on the socio-demographic characteristics of the movers
- A change or misspelling of names between PES and census records.

Overall, the reconciliation exercise produced useful information on erroneous enumerations.

(c) Data handling

Manual editing involved making necessary changes on PES returns and emphasis was laid on tallying identification of geographical codes for the Census and PES. Editing clerks were not allowed to make changes on any field information but when it became necessary, it was done. For example, no allowance was made for more than one head of household in the same count. Likewise, due to many people not stating (or possibly not asked) their sex, it became necessary to impute appropriate code by checking the name of that person

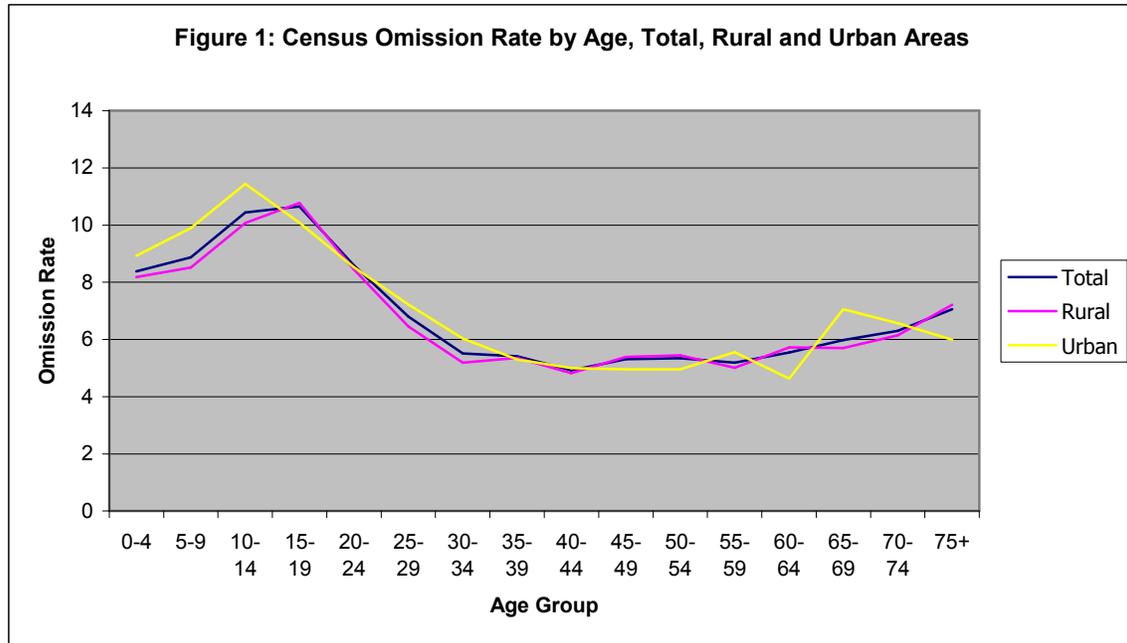
Data processing for the PES involved development and test of systems for data capture, validation and tabulation/analysis. The IMPS software was used for data capture and editing. The mode of data capture was mainly keying. The CENTRY systems (data entry module of IMPS) was used for data capture while CONCOR was used for editing. The SPSS and EXCEL packages were used for data export, analysis and tabulation

(d) Findings/Estimates

The PES findings indicated that 98.6 percent of those interviewed reported that they were enumerated during the Census; about 0.6 percent said that they were born after or in-migrated after the Census; and, about 0.1 percent of persons did not know if they were enumerated.

The overall PES gave coverage of 93.2 percent and, hence an omission rate of approximately 6 percent (*Tanzania PES, 2005*).

The figure below gives omission rates by age, rural and urban.



Source: PES report, Tanzania

The scope on content error estimation was limited to only four variables - relationship to head of household, sex, age and marital status.

The index of inconsistency was used for matched cases to measure response variance by use of formula given below:

$$I = \frac{N_{1j} + N_{2j} - 2 M_{ij}}{\left(\frac{1}{nN_{1j} (n - N_{2j})}\right) + N_{2j} (n - N_{1j})}$$

where: M_{ij} = number of matched cases in j-th category

n = total number of reported cases

N_{1j} = number of cases in the census for j-th category

N_{2j} = number of cases in the PES for j-th category

Indices of Inconsistency for Marital status by Rural and Urban:

Marital Status	Residence		
	Tanzania	Rural	Urban
Never married	2.078	1.929	2.832

Married	-54.465	-53.237	-50.746
Living together	89.520	94.280	90.202
Divorced	41.395	41.635	40.925
Separated	62.462	62.261	62.981
Widowed	14.409	13.360	17.393
Not stated	89.135	87.957	100.02

Source: PES Report, Tanzania

2.1.3: Lessons Learnt

- a) The PES resources were inadequate for the activities aligned.
- b) Time allocated for training was inadequate and this affected quality of work, more specially map interpretation.
- c) Less than required numbers of supervisors were deployed and hence quality control was poor.
- d) Failure to undertake a pilot PES did not contribute to desired finalization of questionnaire and field organization
- e) Delay in conducting PES field interviews allowed large movement of census population, and consequently poor information on the socio-economic characteristics of out-movers.
- f) Providing full names, with least spelling errors, are essential for appropriate matching and reconciliation exercise.

2.2: Experience and lessons learned in implementing Uganda PES

2.2.1: Purpose and Objectives of Uganda census

The Uganda Post-Enumeration Survey, undertaken within a period of three months after census enumeration, was an integral part of the 2002 Census Programme.

The office of the Census Technical Officer, through a strong PES Teams, had overall responsibility of planning and implementing the programme. External technical assistance was provided by staff of Makerere University and advisors from UNFPA regional office in Addis Ababa. A comprehensive survey methodology, developed by organisers, contained various components of the PES including: questionnaire, sampling design, field data collection

procedures, matching rules for the PES and census records, field reconciliation and estimation procedures for coverage and content errors.

The purpose of the PES was to facilitate measurement of magnitude, direction and sources of errors of the 2002 population and housing census.

2.2.2: Main activities

(a) The PES Questionnaire and sampling design

Two major survey documents for the PES included the questionnaire and enumerator's manual. Unlike the census, the PES questionnaire had very few variables; full name; relationship to head of household; sex; age; religion; ethnicity; marital Status; household enumeration status; and, agricultural holding

Two major domains of study were identified; urban and rural. The rural domain was further stratified into four regions; Central, Eastern, Northern and Western.

The census EAs were the primary sampling units and a total of 350 were selected into the sample through one-stage stratified cluster design methodology. In order to achieve the objective of estimation household/person coverage rates, the PES targeted only persons living in private households. Thus, institutional population and homeless persons were excluded from the sample.

(b) The PES Interviews/data collection

Highly experienced enumerators who worked during the census were retained to PES interviews. To maintain independence between census and PES however, the organisers ensured that the enumerators worked in different areas (EAs) from those covered during the main census. Interviews were undertaken using the structured questionnaires.

(c) Matching and Reconciliation

Data collection was immediately followed by a matching exercise whereby the PES and census records were compared with the aim of identifying enumeration status of the PES population. Before being deployed, the matching clerks underwent a one-week training on matching procedures.

The matching exercise revealed that some households/persons enumerated in the census could not match with households/persons enumerated in the PES. Likewise, a number of PES households/persons could not be matched with census households/persons. It was therefore decided to take back to the field the un-matched cases for reconciliation. However due to inadequate funding, reconciliation was only undertaken in selected EAs.

(d) Handling of PES data

Manual editing involved checking the PES questionnaires and emphasis was laid on: geographical codes; sex, arising from many cases of not stated (whereby sex was imputed based on names).

The CSPro software was used for manual data capture, verification and editing. To minimize errors in the data capture, verification was maintained at 100% throughout the exercise. The initial tables were exported from CSPro to SPSS and EXCEL packages for export, analysis and tabulation

(e): The findings/Estimates

The Uganda PES is considered a great success. The estimates gave a national coverage of 94.3% for the 2002 census, or an omission of 5.7%. It should be mentioned that the figures compare favourably with data from other countries in the sub-region.

There was no significant difference in coverage rate between males and females. The urban coverage rate (88.2%) was lower than that of the rural (95%). There was major difference among rural strata. The Northern Region had the lowest coverage rate of 93.7% while the Western Region had the highest coverage rate of 96.1%. The age group (20 – 39 years) had the lowest coverage rate of 92.2% followed by age group (0 – 4 years) with a coverage rate of 94.4%.

For measurement of response errors between the census and the PES, Rate of Agreement and the Aggregate Index of Inconsistency were used.

The Rate of Agreement (RA) was calculated as:

$$RA = \frac{\sum_{i=1}^c Y_{ii}}{n} \times 100$$

Where Y_{ii} = number of cases where category i was given as response in both
Census and PES

n = The total number of PES cases for which there was a report in both census and PES

c = Number of categories for a given characteristic

The Index of Inconsistency was calculated as Ratio of the Simple Response Variance (SRV) to the total variance for a given item. Calculation was based on each response category i according as given below:

$$I \equiv \frac{(y.i - y_i - 2y_{ii})}{\frac{1}{n}[y.i(n - y_i) + y_i(n - y.i)]} * 100$$

Sex had the highest rate of agreement of 98% and lowest aggregate index of inconsistency of 4%. In contrast, age had the highest index of inconsistency (33%) and lowest rate of agreement of 71%.

The aggregate Indices of Inconsistency of other characteristics were as follows: relationship with head of household, 29%; marital status, 21%; and, religion, 19%. Conversely, rates of agreement were quite low: relationship, 86%; marital status, 85%; and, religion, 88%.

The urban omission and erroneous inclusion rates were 11.8% and 7.7%, respectively. On the other hand, the rural omission and erroneous inclusion rates were 5.0% and 3.3%, respectively. (Uganda PES, 2005)

2.2.3: Lessons learned

- a) There were attempts to plan PES and the census together. However, towards the time of census enumeration, focus was on census work and PES activities were postponed until after census fieldwork. This meant that implementation of PES was delayed, resulting into the fieldwork being conducted four months after the census enumeration. If activities the PES are planned together with the census, then it is possible that fieldwork would be carried out immediately (within the recommended 3 months) after the census.
- b) Poor planning would contribute to failure to undertake the mandatory pilot PES, which implies use of untested instruments.
- c) Use of staff involved in census exercise compromises the independence of PES from census and violated a major assumption of the PES. To ensure usefulness of the PES findings, the independence of PES from census should be respected.
- d) Inadequate funding for the PES leads to delays in the implementing activities, such as fieldwork, data matching, data management and field reconciliation. Furthermore, inadequate funding lead to piecemeal implementation of some activities, including field reconciliation, whereby a sample of unmatched EAs being reconciled in the field. The effect of this on the results of reconciliation is unknown.

- e) Extensive delays between census enumeration and PES field work lead to increased number of census movers and, which further causes immense difficulties in matching PES and census records due to memory lapse. Consequently, high omission errors and response errors can sometimes be observed.

4.0: COCNLUSION AND WAY FORWARD

Experience in the Region indicates that PES is the most preferred methodology for evaluating quality of census data, more especially for measurement of coverage and content errors. Thus, countries appear to recognize the contribution of the PES to census programmes.

It should be noted that PES have been , in most cases, part and parcel of the census programmes and therefore no longer treated as ad hoc exercises. It is regrettably noted, however, that a greater number of countries either do not undertake PES or are unable to complete the exercise in terms of producing final and useful outputs. Furthermore, it is observed that number countries have failed to undertake the PES within the recommend three months after census enumeration and consequently, problems have arisen in matching the PES and census records. It also observed that use of the PES findings have not been critically examined either in census analysis nor in adjusting census results or improving census programmes

There were major constraints to successful PES programmes including; inadequate findings; poor planning and implementation of the exercise; and, lack of technical skills to guide the programs. It is also clear that PES programmes have not been independent of the census programmes as expected. As indicated, most countries have all ended up deploying census officers.

It is also noted that although a PES can greatly contribute to the process of building confidence in the census results, a poorly designed and implemented survey can inflict considerable damage to census legitimacy.

Given the above, the following are suggestions for the way forward:

- At the time of census planning, countries should include careful planning of the PES, with detailed information on organizational structures, work plan, budget, data analysis, matching and reconciliation. The PES Team should be independent of census programme and provide specific responsibility to the PES and its field staff. The work plan should ensure that the PES fieldwork is in the field at least three months after census enumeration, as this will ensure minimal movement of census population.
- The PES funding should be separated from the census. Experience indicates non-separation of the two budgets favors census programmes as opposed to the PES, with little funding for the PES activities. Inadequate funding will affect fieldwork and analysis. A full PES budget should be prepared and approved, making sure that the PES Team has availability of adequate funds at all stages.

- Questionnaire should be made very simple, which ensures a focus on coverage. A PES should not be used to collect extra information that could not be achieved through census or should not be used to collect irrelevant information which may be irrelevant for coverage and content errors measurement.
- If we have to use PES findings a yardstick in assessing the accuracy of census, field data collection should strive to be of better quality than the census. Thus, few highly qualified personnel should be used and there should be adequate supervision. It should be mentioned that, in the past, some countries have thought it adequate to institute good-quality assurance procedures at various stages of census activities and hence address very reasons for a PES (*UNSD/SADC, 2001*).
- At the design stage, countries fail to address issues of matching and reconciliation, which are complex and require highly skilled expertise to undertake efficiently. Specifically, countries have encountered difficulties in matching names. Also, there is lack of unique physical addresses in the rural areas of developing countries needed for comparing names of individuals and households. It is important that these are addressed at the planning stage.

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