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United Nations Regional Workshop
on Census Data Evaluation
12 – 16 November 2012
Kampala, Uganda

Final Report of the Workshop[1]

Prepared by

United Nations Statistics Division

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I. INTRODUCTION

A. Background and objective of the workshop

1. The United Nations Sub-regional workshop on evaluation of census data took place in Kampala, Uganda, from 12 to 16 November 2012. The workshop was organized by the United Nations Statistics Division (UNSD), in collaboration with the Uganda Bureau of Statistics (UBOS). It was attended by 28 representatives from the National Statistical Offices (NSOs) of 20 English-speaking countries in Africa. (See Annex I for the list of participants and the NSOs they represented).

2. The workshop constitutes an activity of a project on "Strengthening national capacity to analyze, present and disseminate census data for evidence-based policy making" for countries in the African region. The objective of the project - which is funded by the Italian Government - is to enhance countries' capacity to analyze, present and effectively disseminate data collected by population and housing censuses to allow effective evidence-based policy making and continuous and rigorous monitoring of development interventions and policies.

3. The purpose of the workshop was to strengthen the technical capacity of the participating countries to evaluate the quality of census data based on the application of demographic techniques and through comparisons with other data sources such as previous censuses, sample surveys, and administrative registers. The workshop also provided a forum for countries to discuss possible types of errors in census data based on their experiences and lessons learned.

B. Results of the pre-workshop assignment

4. NSOs participating in the workshop were requested to complete a pre-workshop assignment prior to the workshop itself. The pre-workshop assignment was designed to provide an overview of the state of census data evaluation experiences in the English-speaking countries of Africa. Participants were asked to write a 2 – 3 page document responding to the following questions:

a. Did your office conduct the evaluation of census data? If not, why?
b. Objectives of the census data evaluation programme (for census count adjustment, for improving quality of the next census etc).
c. Was the census evaluation programme carried out by your organization or by external experts?
d. Methods used to evaluate census data (demographic methods, post enumeration survey, etc.) and when the evaluation was carried out (right after the data was compiled? Or after data were disseminated?)
e. Main results of evaluation of census data
f. Challenges in conducting census data evaluation

5. Pre-workshop assignments were received from 14 countries: Botswana, Egypt, Ghana, Kenya, Lesotho, Liberia (which was unable to attend the workshop), Malawi,

Mauritius, Mozambique, Nigeria, Rwanda, South Africa, Tanzania, and Zimbabwe. The assignments indicated that demographic analysis and post-enumeration surveys (PES) were the most common methods used to evaluate census data among the countries that described their experiences. However, the extent of the evaluations conducted by the different countries varied considerably.

6. Botswana has not yet evaluated its 2011 Population and Housing Census, but plans to evaluate the age and sex data using demographic methods once data editing and validation is completed. This evaluation will be conducted by analysts outside Statistics Botswana. It was noted that quality control measures were built into the census process from start to finish. Challenges faced in conducting the evaluation were insufficient human and financial resources, as a result of which Botswana was unable to conduct a post-enumeration survey.

7. Egypt's 2006 census was evaluated by the NSO using demographic methods, as well as by an external organization that conducted a PES. Age and sex data were evaluated using demographic methods, leading to the conclusion that although age reporting has improved since the 1996 census, the data are not highly precise in that respect. Comparisons with outside sources were used to evaluate socioeconomic data. Constraints faced in the evaluation included financing and the fact that the PES was conducted by an external organization.

8. Ghana conducted a PES four months after the 2010 Population and Housing Census. The PES was conducted in 250 enumeration areas (EAs) distributed across all regions of the country. Demographic analysis was also used to evaluate the age and sex structure of the population. The evaluation was conducted by the Ghana Statistical Service with some guidance from consultants on the PES. Challenges included the longer than recommended periods between the census enumeration, the PES, and reconciliation. The loss of some census structure numbers from the original questionnaires, which was caused by the numbers being washed off in the rain, made matching of some records difficult.

9. Kenya conducted a PES within three months of the 2009 Population and Housing Census; the PES covered 305 EAs nationally. The results of the PES indicated that the net census coverage error rate was 10.2 percent. The results of the PES were not used to adjust census figures, but demographic analysis was applied to assess the quality of data on specific topics, including fertility and mortality, and minor adjustments were made before the analytical reports on these topics were produced. The evaluation was conducted by the Kenya National Bureau of Statistics in consultation with other government agencies and with technical assistance from the United States Census Bureau. Challenges encountered included the lack of capacity to undertake the estimation of errors, which necessitated the Census Bureau assistance. Lack of expertise and budget constraints also meant that the initial timeline for most evaluation activities was not met. The nomadic nature of the population in one province caused this province to be omitted from the PES due to the length of the period between the census and the PES.

10. Lesotho evaluated the results of its 2006 census using demographic analysis and the first PES ever conducted by the Bureau of Statistics. Although the results of the evaluation were published, the analysis of the PES was not completed in time to adjust the census figures. In general, the need to strengthen the capacity of the NSO to conduct census evaluation independently – as this has usually been done by an outside expert – was noted as a challenge for census evaluation.

11. Liberia conducted an evaluation of the population age and sex structure from the 2008 Population and Housing Census using demographic analysis. The evaluation was carried out by a consultant. The results of evaluation revealed inaccurate age reporting, so attempts were made to smooth the age data. The major challenge encountered in conducting this evaluation was that some of the needed software was unavailable.

12. Malawi also evaluated the age and sex structure from the 2008 Population and Housing Census using demographic analysis. The evaluation was conducted by the NSO in collaboration with a national university and international consultants. No challenges were encountered in conducting this evaluation.

13. Statistics Mauritius conducted an evaluation of the 2000 census data using demographic analysis. The population balancing equation, population projection, and comparisons between the Population Census and the Housing Census, which were conducted separately several months apart, were used to assess coverage error. Comparisons with administrative data were used to assess the quality of education data. One of the challenges faced in conducting the evaluation was insufficient training in the appropriate methods.

14. Mozambique evaluated its census using both a PES and demographic analysis. The PES was conducted one month after the census enumeration, and found a 2 percent undercount, with some omission of children under age 9 and some age misreporting. Demographic methods of evaluation were also applied during the data analysis phase. The evaluation was conducted by the NSO and a consultant. One of the challenges faced in the evaluation was the difficulty in relying on demographic methods to assess data quality in a context of high HIV/AIDS prevalence.

15. Nigeria evaluated the population age and sex structure from the census using demographic analysis, which indicated that age reporting was within tolerable bounds. The evaluation was conducted by the NSO together with external experts. Challenges encountered included the lack of sufficient staff trained in evaluation methods and some errors in the list of historical events used to assist respondents in estimating their age.

16. Rwanda conducted its 2012 Population and Housing Census only a few months prior to the workshop. The National Institute of Statistics of Rwanda (NISR) had commissioned a PES to follow the census, which was carried out approximately a month later. A census evaluation based on the results of the PES and demographic analysis of the census data was planned, but had not yet been conducted at the time of the workshop. It was expected that the evaluation will be carried out by the NISR in cooperation with international consultants. Challenges noted in the census operation overall were

insufficient capacity within the office to conduct the evaluation and other activities such as mapping, the need for more publicity regarding the PES, and the need for demographic training of the staff.

17. South Africa conducted a PES covering approximately 600 EAs shortly after the 2011 census. Census evaluation was conducted based on this PES by Statistics South Africa and external experts. In addition to the PES, the population balancing equation method, based on adjusted data from vital registration and estimates of migration, was used to estimate census coverage. The results of the evaluation indicated a 14.6 percent omission rate from the census enumeration. Challenges encountered in the evaluation process were technical difficulties in the PES matching process, which necessitated the hiring of external consultants, and the difficulty of obtaining reliable emigration data.

18. Tanzania evaluated the results of its 2002 Population and Housing Census using a PES that was conducted two months after the census enumeration. The PES covered approximately 1.7 percent of all census EAs. The evaluation was a collaborative effort between several national offices engaged in the census and statistics production. The results of the PES indicated an omission rate of 6.89 percent for all of Tanzania. Challenges encountered stemmed from the fact that the PES was adopted as an ad-hoc activity and not included in the original census planning; financial resources were inadequate, resulting in time delays. Insufficient training was available for the PES team.

19. Zimbabwe evaluated the results of its 2002 census using demographic analysis, as a PES was not conducted. The evaluation found evidence of age heaping and age shifting, and suggested that estimates of mortality derived from children ever born data, and those relying on model life tables, may not be appropriate in the context of Zimbabwe. Challenges encountered included the lack of reliable migration data and the need for additional technical capacity to conduct demographic analysis of the census.

C. Opening session

20. The workshop opened with a statement by H.E Mr. John B. Male-Mukasa, Executive Director of the Uganda Bureau of Statistics. Mr. Male-Musaka said that the interest in the workshop demonstrated the extent to which the “African statistical fraternity” recognizes the importance of population and housing censuses. He emphasized the opportunity afforded to the participants to study the evaluation of the quality, reliability and comparability of census data, as well as to network with representatives from other NSOs in Africa.

21. Mr. Srdjan Mrkic, Chief of the UNSD Demographic Statistics Section, made an opening statement on behalf of Mr. Paul Cheung, the Director of UNSD. He outlined the significance of census statistics for assessing the overall social and economic development of a nation. In that context, it is of critical importance to provide as precise as possible assessment of the reliability and accuracy of census data, as it represents a crucial input for data users. While a number of techniques used for assessing the quality of census statistics have been elaborated within the 2010 World Programme on Population and Housing Censuses, including the importance pf the Post Enumeration

Survey, this workshop, hosted by the Uganda Bureau of Statistics, focuses on demographic techniques used for that purposes. Mr. Mrkic expressed appreciation to the Government of Uganda for its hospitality and assured that the team from the United Nations Statistics Division and the United Nations Population Division will spare no effort for the successful accomplishment of this workshop's goals.

22. H.E. Aston Kajara, the Minister of State for Finance for Uganda, welcomed the participants and workshop organizers. Mr. Kajara noted that quality data is the cornerstone of good government planning, and that census data is the foundation for many statistical indicators that are critical for Africa at this stage in the continent's development. He added that there is a great need for continuous measurement of the outputs of programmes and initiatives in order to provide data-based evidence for decision-making and to promote sustainable development. Mr. Kajara concluded by noting that the Ugandan census has been postponed from 2012 to 2013 due to financial limitations and stressed the importance of disseminating up-to-date census results in order to help justify the cost of the census.

D. Organization of the meeting

23. The meeting was conducted according to the Organization of Work (Annex II). The workshop started with an introductory presentation on the United Nations 2010 World Programme on Population and Housing Censuses. Technical presentations by UNSD, in collaboration with the United Nations Population Division (UNPD), began with an overview of census evaluation methods. Topic-specific presentations were then given on the evaluation of data on age and sex distribution, fertility, child mortality, adult mortality, and the evaluation of data from consecutive censuses, and socioeconomic characteristics of the population. Hands-on exercises were included with each topic, with the exception of the evaluation of socioeconomic data, to help participants better understand the tools and methods introduced in the presentations. Towards the end of the workshop, a number of countries made presentations on their respective experiences with census evaluation. The workshop conducted a discussion on census adjustment in the context of quality assessment of census statistics. All of the presentations and exercises contributed by the participants and UNSD are available on the United Nations Statistics Division (UNSD) website.[2]

24. The workshop concluded by adopting a set of recommendations related to the issues raised during the workshop; they are presented in part III below.

II. SUMMARY OF PRESENTATIONS AND DISCUSSIONS

A. The 2010 World Programme on Population and Housing Censuses

25. UNSD made a presentation on the 2010 World Programme on Population and Housing Censuses. The presentation introduced the three main objectives of the work programme: (a) agreeing on a set of international principles and recommendations for conducting a census; (b) facilitating countries in conducting at least one census within the

[2] Please see: http://unstats.un.org/unsd/demographic/meetings/wshops/Uganda/2012/list_of_docs.htm

period from 2005 to 2014; and (c) assisting countries in disseminating census data in a timely manner. The presentation also provided an overview of the main UNSD activities that have been implemented in order to achieve the above-mentioned objectives. The activities have included developing census-related methodological guidelines and manuals, conducting expert group meetings, training workshops and advisory missions, developing the census data dissemination tool CensusInfo, and providing census taking information and facilitating the sharing of national experiences through the Census Knowledge Base.

B. Overview of methods of census evaluation and the workshop agenda

26. In this session, UNSD made a presentation providing an overview of methods for census evaluation. The presentation first reviewed the purposes of census evaluation, including (a) providing users with information on data quality; (b) identifying types and sources of errors for future improvement in the census operation, and (c) providing a basis for the possible adjustment of census figures. The presentation emphasized that census data evaluation should be an integral part of the entire census programme, and that the scope of the evaluation should be determined at the census planning stage. The second part of the presentation introduced the types of errors that occur in census taking – coverage and content errors – and available methods for assessing the quality of census data. The evaluation methods introduced included demographic analysis and interpenetration studies based on one census only, and both matching and non-matching methods based on multiple sources of data. The non-matching methods included demographic analysis and comparisons with administrative sources, and the matching methods included Post-Enumeration Surveys (PESs) and record checks.

27. At the conclusion of the presentation the workshop agenda was briefly reviewed. It was emphasized that the workshop curriculum focuses on demographic analysis for census evaluation, using both one and multiple sources of data.

C. Evaluation of age and sex structure

28. A presentation was made by UNSD and UNPD on the evaluation of data on the age and sex structure of the population. The presentation first emphasized the importance of accurate age and sex data for understanding all other population characteristics that can be analyzed using census data. Age and sex data collected from the census should therefore be evaluated for possible errors such as age misreporting or the under-enumeration of certain population groups. The presentation introduced several methods that can be used to evaluate population data by age and sex. They included: (a) the population pyramid; (b) graphical cohort analysis; (c) age ratios; (d) sex ratios; and (e) two summary indices of age reporting, Whipple's Index and Myers' Blended Index. The advantages and limitations of each method were discussed.

29. Hands-on exercises for the evaluation of age and sex data were conducted using Excel. The exercises included (a) constructing and evaluating a population pyramid by 1- and 5-year age groups; (b) calculating and plotting age and sex ratios; and (c) calculating Whipple's Index and Myer's Blended Index.

D. Evaluation of fertility data

30. The UNSD and UNPD presentation in this session focused on the evaluation of fertility data obtained through two types of questions usually collected in population censuses: children ever born and recent births in the household. For each type of question, the presentation reviewed: (a) how questions are usually asked on the census questionnaire; (b) common data quality issues related to each question, and (c) fertility indicators that can be derived from the question.

31. Following this overview, the presentation moved on to the evaluation of data on children ever born (CEB) and recent births in the household. Initial checks for the consistency of the data included the tabulation of CEB data and calculation of proportion childless, proportion missing, and mean parity by age group of the mother. The use of the El-Badry correction when the data indicate that a high proportion of women were classified as parity missing was also discussed. For recent birth data, the calculation of Age Specific Fertility Rates (ASFRs) and comparison with external sources were introduced as methods for assessing the data. For both types of data, the importance of understanding any rules used to edit the data was stressed.

32. The presentation also provided an overview of methods used to estimate fertility indicators and how these can be used to evaluate the quality of fertility data. The Brass P/F ratio method for the adjustment of recent fertility data was presented in detail, as well as the reverse survival method for estimating past fertility levels. The assumptions, data requirements, advantages and limitations of each method were discussed. A brief introduction was also given to several other methods used to estimate fertility levels.

33. The hands-on exercises for fertility were conducted using several different methodological tools based on their suitability to the type of analysis at hand. Initial data checks, including the calculation of mean CEB by age group, the determination of whether or not to apply the El-Badry method, and the calculation and plotting of ASFRs were conducted using Excel. Using these calculations, participants were then instructed on how to implement the P/F method using the Mortpak software package for demographic estimation. Finally, participants practiced implementing the reverse survival method using spreadsheets developed as part of the IUSSP demographic estimation project.

E. Evaluation of child mortality data

34. The UNSD and UNPD presentation in this session focused on the evaluation of child mortality data obtained through census questions on children ever born (CEB) and children surviving (CS). As indicated in the presentation, survival of children ever born is often used to derive estimates of child (under-5) mortality. The presentation began with an overview of life table construction and a discussion of how to choose the appropriate model life table for a given analysis. The initial inspection of CEB/CS data through tabulations such as those presented in the fertility section, as well as the calculation of proportion of children deceased, were then discussed.

35. The second half of the presentation covered the estimation of infant and child mortality using indirect estimation techniques pioneered by William Brass. The rationale and assumptions of the method, the data requirements, computational procedure, and interpretation of results were all covered. Comparison of the results with measures of child mortality derived from other sources was explained as a means of using child mortality estimation to assess the quality of CEB/CS data from the census.

36. Hands-on exercises for the child mortality section focused on the application of the Brass indirect estimation method. The exercises began with the calculation and plotting of mean CEB and CS by age group of the mother, in order to assess the consistency of the data, in addition to a rapid assessment of the data through comparison with United Nations estimates of child mortality. The remainder of the exercises focused on the implementation of the indirect method using the Mortpak program and the interpretation of the results obtained using different model life tables.

F. Data evaluation with consecutive censuses

37. The UNSD and UNPD presentation on this topic reviewed four methods used to evaluate census coverage, several of which can also be used to assess the quality of data on recent deaths in the household, which is commonly used to derive estimates of adult mortality in censuses. The four methods are (a) the population balancing equation; (b) death distribution methods, namely the general growth balance (GGB) method; (c) cohort survival ratios; and (d) the cohort component method for population projection. Detailed examples were provided to demonstrate the computational procedure for each method, and their respective advantages and limitations were discussed.

38. The population balancing equation is the most fundamental equation in demographic analysis and its logic is straightforward. According to the population balancing equation, population at the time of the second census should be equal to the population at the first census, plus births, minus deaths, plus net migration during the inter-censal period. Therefore, if information on inter-censal births, deaths, and migration is available, the under or over-coverage of the second census relative to the first one can be derived. This method is easy to use at the national level, but the required data is not readily available in many countries. The GGB method applies the logic of the population balancing equation to inter-censal change in the size of specific birth cohorts, and produces estimates of the relative completeness of the two censuses as well as the completeness of death registration or inter-censal deaths collected from census question on household deaths.

39. The inter-censal cohort survival ratio method compares the size of birth cohorts enumerated in successive population censuses. In the absence of census errors and significant migration, the ratio of the number of persons enumerated in the second census to the first census should approximate the survival rate that would be expected on the basis of prevailing mortality conditions. Finally, the cohort component method compares the enumerated population in the second census with the expected population based on the projection of the population enumerated in the first census (based on additional information on the inter-censal fertility, mortality and net international migration).

40. After covering the calculation of age-specific death rates and the period life table as consistency checks for the quality of data on deaths in the household, the exercises provided hands-on examples of the application of the GGB, cohort survival ratio, and cohort component methods (the necessary data for the population balancing equation method was not available for many of the countries attending the workshop). The GGB method was implemented using spreadsheets developed by IUSSP, and the cohort component method using the PROJCT single-year projection module in Mortpak. Cohort survival ratios were computed using Excel.

G. Evaluation of socioeconomic data collected from censuses

41. This presentation by UNSD and UNPD first outlined the core socioeconomic characteristics that were recommended by the *United Nations Principles and Recommendations for Population and Housing Censuses*, Rev. 2 for inclusion in censuses. The core topics included household size and composition, marital status, education, and economic activity. Recommended definitions and common measurement issues related to each of these topics were discussed.

42. It was highlighted that although methods for the evaluation of socioeconomic data are not as advanced as those for demographic data, several tools can be used to assess the consistency of data on the socioeconomic characteristics of population collected from censuses. They include: (a) checking the internal consistency of the data through tabulations and cross tabulations with other relevant characteristics; and (b) comparing the data with those from other sources such as household surveys and administrative records. The use of assessment tools were demonstrated via examples on data on population by household size and relationship to household head, population by marital status, age at first marriage, literacy rate, current school attendance, economic activity status, and the unemployment rate.

H. Country presentations on experiences with census evaluation

43. Eight participating countries gave presentations on their national experiences with census evaluation: Egypt, Mauritius, South Africa, South Sudan, Sudan, Tanzania, Uganda, and Zambia. Post-enumeration surveys (PES) and demographic analysis were the most common census evaluation methods used by the NSOs that presented their experiences.

44. Egypt conducted an evaluation of the 2006 national census using demographic analysis and a post-enumeration survey that was conducted by an external organization. The analysis found that age reporting improved significantly from the 1996 to the 2006 census. Evaluation of socioeconomic data was conducted using comparison with external sources. The PES found an omission rate of 8.7 percent. Constraints faced in the evaluation included the need for financial support.

45. Mauritius presented the results of the evaluation of the 2000 Population and Housing Census, which was conducted using demographic analysis and comparison with administrative data and previous censuses. Based on the population balancing equation,

it was found that there was a net census undercount of 0.4 percent. Comparison with external sources was used to evaluate census demographic and socioeconomic data.

46. South Africa presented the results of their evaluation of the 2011 census, which included a PES conducted two months after the census enumeration, demographic analysis, and comparison with external data sources. The PES indicated an omission rate of 14.6 percent for persons and 14.3 percent for households. Demographic data was evaluated through comparison with previous censuses and administrative data, including the civil registration. During the evaluation process it was found out that the lengthy census questionnaire might be one of the contributing factors to content errors in the data.

47. Both Sudan and South Sudan presented the results of applying the methods taught in the session on the evaluation of age and sex structure to data from the 2008 census, which covered both countries prior to the independence of South Sudan. Sudan presented results for the full national census, which revealed significant age misreporting and unusually high sex ratios among older ages. South Sudan applied the same techniques to census data from its territory only and found very similar results. South Sudan noted that insecurity, inaccessibility of the population, and capacity of the census office were challenges to the census operation.

48. Tanzania presented the results of the PES used to evaluate the 2002 census. The presentation described the organization of the PES, which was conducted two months after the census enumeration. The PES found an omission rate of 6.89 percent, slightly higher in urban than in rural areas. Challenges encountered in census evaluation included funding limitations, lack of capacity and formal training on conducting a PES, and problems with some cartographic materials.

49. Uganda presented the results of the evaluation of its 2003 census and plans for the evaluation of the upcoming 2013 census. A PES was conducted four months after the 2003 Uganda census due to delays in implementation. Other challenges encountered were shortage of funds, and the fact that delays in conducting the PES eliminated the possibility of pre-testing the PES questions. Net under-coverage was estimated at 5.6 percent for the 2003 census. For the upcoming census, a pilot PES was conducted in 2011. Parts of the census operation process were also evaluated.

50. Zambia presented results from the evaluation of its 2010 census. The age and sex structure of the population was evaluated using demographic analysis and comparison with previous censuses. Inter-censal growth rates and the population age structure were used to compare census coverage over the past several censuses.

I. Adjusting census figures

51. The presentation made by UNSD discussed issues related to the adjustment of census figures. It laid out common reasons for adjusting census figures, namely, (a) when there were substantial errors, i.e., over or under-count in the census counts; (b) when coverage of certain population groups is deficient and some parts of the country might as a result be disadvantaged in terms of the allocation of government funds and/or seats in

legislative bodies; and (c) when the census count is used for future inter-censal estimates and projections.

52. The adjustment may be carried out on the total count of the population in the country; sometimes further adjustment is possible in order to assure that basic population distributions, by major civil division, age, or sex, are consistent with the aggregate adjusted figures. The basis for the adjustment should be census evaluations, such as post enumeration surveys or assessment using demographic techniques. The coverage rate derived from these studies can be used directly to adjust population size. The presentation also highlighted a number of considerations that should be taken into account before adjusting census figures, including the cost of adjustment and the need to explain the adjustment process to the public and other stakeholders.

III. CONCLUSIONS AND RECOMMENDATIONS

53. The participants of the workshop agreed on the following conclusions and recommendations:

a. The participants of the workshop expressed their appreciation to the Uganda Bureau of Statistics for hosting the workshop, to the United Nations Statistics Division for organizing and conducting the workshop and to the United Nations Population Division for providing substantive support and expertise.
b. The workshop concluded that the process of evaluating the quality of census data is of critical importance for both the producers and users of statistics; for producers, it offers an insight in terms of plausibility and reliability of data and users are provided with a more comprehensive understanding of issues that need to be focused upon in the phase of data exploitation and analysis.
c. Population and housing census is an enormous exercise and its numerous components provide ample opportunities for introducing errors in the count of population, households, housing units and their characteristics. While these errors in coverage and content of the census are to be expected and various techniques are, as a rule, introduced in each of the phases of the census to eliminate or minimize them, it is still necessary to conduct additional and thorough assessment of resulting statistics within the national statistical office, in addition to the analysis conducted by specialized users and institutions.
d. In that context, it is essential to start planning for the census quality control and census data evaluation simultaneously with the process of planning for the census itself. Setting the quality control and census evaluation team early is necessary as it would allow for continuous monitoring and input since quality control has to be maintained throughout the entire process of planning and executing the census.
e. It was emphasized that the Post Enumeration Survey represents a vital indicator of the quality of the census, both in terms of coverage and content. In that context, the workshop recommended that all the population and housing censuses should plan for and execute the Post Enumeration Survey, while at the same time recognizing the additional complexity and costs that such survey involves.

f. National statistical offices need to build their capacity, supported by the United Nations, to apply and interpret advanced tools for census data evaluation, primarily from the demographic toolbox. As demonstrated at the workshop, demographic methods for evaluating the completeness and plausibility of census statistics provide a powerful instrument and should be incorporated as routine operations within national statistical systems.
g. The workshop further recommended that census data evaluation by way of demographic methods is best and most effective if conducted before disseminating census data; this will ensure that users of the census data are fully informed in respect of the quality, reliability and accuracy of census statistics.
h. The participants recognized the usefulness of various methodological tools that were presented at the workshop including MortPak and the IUSSP spreadsheets; and expressed the opinion that there was a need for continuous commitment in updating these two methods, especially from the point of view on the impact of HIV/AIDS, in a coordinated manner. In that respect, the workshop requested both United Nations Statistics Division and United Nations Population Division to play an active role in this process.
i. The workshop noted that the United Nations population estimates often differ from national census results and that these discrepancies place national statistical authorities in a need to provide additional explanations regarding the reliability of census statistics to skeptical users. In that context, the workshop recommends that the United Nations Statistics Division, in cooperation with the United Nations Population Division – which produces United Nations population estimates – explore the possibility of organizing regional/sub-regional seminars that would provide an opportunity to present and discuss the process of producing United Nations population estimates and projections, as these carry a specific weight in African countries.
j. The workshop recommended exploring the possibility of establishing more effective communication and exchange with the producers of the United Nations population estimates in order to ensure a more harmonized presentation of population figures.
k. The workshop requested United Nations Statistics Division to initiate discussion regarding the guidance on the level of under/over-enumeration in population and housing censuses that would automatically trigger the need for adjustment in the preparation for the 2020 round of population and housing censuses.
l. The participants also recommended developing a workshop curriculum focusing on measuring city daytime population in population and housing censuses and called on United Nations Statistics Division in that respect.

ANNEX I. List of Participants

No.	Country /Organization	Contact Person Information
1.	Botswana	Ms. Bakang Susan MOTSWAGAE Statistician Statistics Botswana Gaborone, Botswana
2.	Egypt	Ms. Fatma ABDELRADY General Manager, Family Research Department Central Agency for Public Mobilization and Statistics Cairo, Egypt
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4.	Ghana	Mr. Gershon P.Y. TOGOH Senior Statistician Ghana Statistical Service Accra, Ghana
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6.	Lesotho	Ms. Matlokotsi MAKOA Chief Statistician, Head of Population Statistics Division Bureau of Statistics Maseru 100, Lesotho
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10.	Nigeria	Mr. Adekunle Solomon BELLO Assistant Director (Census)

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26.	Uganda	Mr. Mark KAJUBI Senior Statistician Uganda Bureau of Statistics Kampala, Uganda
27.	Zambia	Mr. Iven Mwiimbi SIKANYITI Acting Deputy Director Central Statistical Office Lusaka, Zambia
28.	Zimbabwe	Mr. Aluwisio MUKAVHI Sampling Manager, Population Census Division Zimbabwe Natioanl Statistics Agency Harare, Zimbabwe
29.	UN STATISTICS DIVISION	Mr. Srdjan MRKIC Chief, Demographic Statistics Section Demographic and Social Statistics Branch Statistics Division
30.	UN POPULATION DIVISION	Kirill ANDREEV, Ph.D. Population Officer, Population Estimates and Projection Section Population Division

No.	Country /Organization	Contact Person Information
31.	UN STATISTICS DIVISION	Ms. Haoyi CHEN Statistician, Demographic Statistics Section Demographic and Social Statistics Branch Statistics Division
32.	UN STATISTICS DIVISION	Ms. Maia SIEVERDING Associate Statistician, Demographic Statistics Section Demographic and Social Statistics Branch Statistics Division

ANNEX II: Programme of Work

Monday, 12 November 2012 Day 1: Overview and First-Step Analyses	
9:00 – 9:30	Registration of participants
9:30 – 10:00	Welcome/opening remarks - Mr. John B. Male-Mukasa, Executive Director, Uganda Bureau of Statistics - Mr. Srdjan Mrkic, United Nations Statistics Division - Hon. Aston Kajara, Minister of State for Finance, Uganda
10:00 – 12:30	<u>The 2010 World Program on Population and Housing Censuses</u> The session introduces the objectives of the world programme on censuses and UNSD activities to support this programme <u>Overview of Methods of Census Evaluation and the Workshop Agenda</u> This session reviews the objectives and planning of a census evaluation programme, types of census errors, and methods of data evaluation, including methods based on the census alone and methods based on the comparison of census data with data from other sources. Comparative techniques involving both matching and non-matching data will be reviewed, and the strengths and weaknesses of each approach will be discussed. A brief overview of the agenda for the remainder of the workshop will also be presented.
12:30 – 13:30	Lunch
13:30 – 17:00	<u>Evaluation of Age & Sex Structure</u> Age and sex are the two fundamental variables of demographic analysis. The session covers demographic methods used for the evaluation of a population's age and sex structure and identification of potential census errors, including the population pyramid, age ratios, sex ratios, graphical cohort analysis, Whipple's index, and Myers`s Blended Method. This session also discusses common census errors on age and sex variables, and their impacts on further demographic analysis. A hands-on exercise will follow the presentation.
Tuesday, 13 November 2012 Day 2: Fertility & Child Mortality	
9:00 – 12:30	<u>Evaluation of Fertility Data</u> The session discusses demographic methods used for evaluating the quality of fertility data, focusing on errors in data on children ever born/children surviving and recent fertility. Data checks using average parities, age-specific fertility rates and other key fertility indicators will be covered, as well as the indirect estimation of fertility and comparisons with other data sources. A hands-on exercise will follow the presentation by UNSD.
12:30 – 13:30	Lunch
13:30 – 17:00	<u>Evaluation of Child Mortality Data</u> This session covers the evaluation of data on child mortality, beginning with a review of life table construction and the use of model life tables. Indirect estimation of child mortality using Brass-type methods will then be covered, including steps for preliminary evaluation of data quality. A hands-on exercise will

	follow the presentation by UNSD.
Wednesday, 14 November 2012 Day 3: Evaluation Methods Using Multiple Censuses	
9:00 – 12:30	Data Evaluation with Consecutive Censuses: Adult Mortality and Census Coverage Many of the methods used to evaluate census coverage using multiple censuses are derived from multi-census methods for the estimation of adult mortality, so in this full-day session the two topics are covered together. Census coverage methods derived from the population balancing equation are covered, as well as death distribution methods for the evaluation of adult mortality data, intercensal cohort survival ratios and the cohort component method for evaluating census coverage.
12:30 – 13:30	Lunch
13:30 – 17:00	Data Evaluation with Consecutive Censuses: Adult Mortality and Census Coverage (continued) During the second part of the day, the morning's presentation will be completed as needed and participants will complete and present hands-on exercises.
Thursday, 15 November 2012 Day 4: Socioeconomic characteristics	
9:00 – 12:30	Evaluation of Socioeconomic Data Collected from Censuses This session covers consistency checks for census data on the social and economic characteristics of a population using methods such as cross-tabulation, cohort analysis and comparison with other data sources. Topics covered are household size and structure, marital status, literacy, school attendance and economic activity. A hands-on exercise will follow the presentation by UNSD.
12:30 – 13:30	Lunch
13:30 – 17:00	Country Presentations on Experiences with Census Evaluation Participants will be invited to give a short presentation on census evaluation programs carried out by the statistical offices of their countries.
Friday, 16 November 2012 Day 5: Census Adjustment and Wrap-Up	
9:00 – 17:00	Country Presentations Continued Adjusting Census Figures This session discuses possible reasons and methods for adjusting census figures. Wrap-Up and Final Discussion