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**Department of Economic and Social Affairs  
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 **2010 World Population and Housing Census Programme**

**United Nations Workshop on Population Projections for English Speaking  
African Countries**

Pretoria, South Africa  
29 October – 2 November 2012

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## **Introduction**

1. United Nations Statistics Division (UNSD), in collaboration with Statistics South Africa, organized the United Nations Workshop on Population Projections for English-speaking African countries. The Workshop took place from 29 October to 2 November 2012 in Pretoria, South Africa and was attended by 34 statisticians and demographers from 23 countries (see annex 1 for list of participants).
2. The purpose of the Workshop was to provide training to participating countries on how to generate population projections using census data. The participants also learnt about available software packages for generating population projections. The Workshop also drew participants' attention to the necessary preparatory work before undertaking the population projections (see annex 2 for the workshop agenda).

## **Opening**

3. The workshop was opened by Mr. Pali Lehohla, Statistician General, Statistics South Africa who welcomed the participants to the workshop. In his remarks, Mr. Lehohla stressed that there is more active participation by African countries in conducting censuses for the 2010 round compared to the case for the 2000 round. He attributed Africa's active participation in the 2010 round (with already around 80% of the countries having conducted a census) to a concerted effort through the annual Africa symposia on statistical development through which countries have exchanged experiences and been encouraged to undertake censuses. Mr. Lehohla stressed that through this conscious effort to conduct censuses, there is now more data so that evidence-based planning and decision making by the countries is based on facts. He further stated that the availability of data from the census has led to improvements in population projections in the African region compared to the past when these projections were merely based on estimates.
4. Mr. Lehohla also talked about the poor state of civil registration and vital statistics systems in Africa countries. He mentioned that the region is currently engaged in activities aimed at improving these systems.
5. On behalf of UNSD, Ms. Margaret Mbogoni, Statistician, Demographic and Social Statistics Branch, expressed appreciation to Statistics South Africa for hosting the workshop and for their continued support of the work of UNSD and to the African region in general. Ms. Mbogoni informed participants that the workshop was being organized in the context of the 2010 World Programme for Population and Housing Censuses and as part of a UNSD Italian Government funded project, "Strengthening national capacity to analyze, present and disseminate data for evidence-based policy making" for the African region whose objective is to enhance countries' capacity to use census data as an effective tool for policy planning.
6. Ms. Mbogoni emphasized that data analysis and projection of population into the future should form a basis for all major planning decisions as this information is valuable for governments as they make plans for future demands and expenditures for basic public infrastructure and services.

## Workshop presentations

7. Presentations made at the workshop are available on the UNSD website - [http://unstats.un.org/unsd/demographic/meetings/wshops/South\\_Africa/2012/list\\_of\\_docs.htm](http://unstats.un.org/unsd/demographic/meetings/wshops/South_Africa/2012/list_of_docs.htm).

## Conclusions

8. At the end of the Workshop, the participants came up with the following conclusions and recommendations:

- (a) Need for population projections - It was highlighted at the workshop that population projections, at national and sub-national levels, are necessary for future planning, among other uses. It was emphasized that at both national and sub-national levels, population projections should be aligned to serving pragmatic national or sub-national data needs for policy making, development planning, implementation of programmes, and monitoring and evaluation of programmes.
- (b) Need for appropriate input data - The accuracy of any population projection depends on the quality of the input data and the assumptions made about the course of future change. It is a prerequisite for generating projections to thoroughly assess the accuracy of the base population, in terms of reported data by age and sex, and to make appropriate adjustments as necessary. However, such adjustments should be undertaken with caution, i.e., they should be within the national demographic and socio-economic context.

In establishing the base population for projections, participants wanted to know if special population groups, such as those in institutions and the armed forces, should be included. It was pointed out that while there is no internationally agreed position on this, it was recommended that countries clearly specify in their reports the population that the projections relate to.

- (c) Projecting fertility and mortality - Statistical offices usually have several sources of fertility and mortality data, including censuses and intercensal demographic surveys. Participants wanted to know if input data for projecting fertility and mortality levels should be based on census data alone or should also take into account other data sources. It was concluded that all available data sources should be utilized, as appropriate, in order to establish the most likely trend of components of population change.
- (d) Methods of population projections - There is no standard method or technique for generating population projections. The choice of methodologies to be applied in generating population projections should be guided by the quantity and quality of data available at different geographic levels. It was noted, however, that the cohort component method is more appropriate at the national level while the ratio method at the lower sub-national levels. The ratio method is more appropriate at the lower sub-

national levels due to its simplicity in the face of the varied and complex subnational demographic settings and trends. The ratio method is also recommended because of the difficulty of obtaining comprehensive and reliable data about sub-national entities and the challenge of making corresponding assumptions on the future course of population components at these levels.

- (e) Assumptions for population projections - In producing population projections, attention should be paid to assumptions to be applied to the levels of mortality, fertility and net migration. These assumptions should be based on as much information as possible and should reflect realistic social, economic and demographic pathways of the country. Given its relevance to various complex factors, the difficulty in projecting the level and the direction of migration was underscored.
- (f) Projecting components of population change - It was recognized that projecting migration trends, both international and internal, was very difficult due to scarcity and the often irregular trends of the requisite data. It was also mentioned that where countries are producing yearly estimates of fertility, how to validate the reliability of these estimates was still an issue. Difficulties of modeling and projecting mortality taking into account the effect of HIV/AIDS were also highlighted, particularly when mortality input data come from other line ministries and not the NSO.
- (g) Time and life span of projections - It is worth noting that there is no standard time span over which a projection should be made. However, it is prudent to align the time span to planning requirements of the country at various geographical levels. It should be noted that all projections are provisional and may be revised accordingly as need arises, e.g. as new and reliable data become available, or as new and more robust techniques become available.
- (h) Variants/scenarios of population projections - While incorporating variants/scenarios into projections is desirable, they should be meaningful within the national demographic context. In this connection, countries may take advantage of existing projection scenarios documented by international organizations, including the United Nations.
- (i) Sub-national population projections - There is a growing demand for generating population projections at increasingly lower geographical levels. Although it is technically possible to generate the projections at any geographical level, the reliability and quality of input data, the policy relevance of the output, as well as disclosure concerns and soundness of future trends of the population components at lower sub-national levels should be used as a guide. Furthermore, sub-national projections should not only be internally consistent, but should also be consistent with a national projection.

Some countries indicated that they had faced difficulties in explaining the generated sub-national population projections particularly where some areas were shown to be declining in population size.

- (j) Projection of urban and rural populations - Projecting rural and urban populations still remains a challenge. To date, no concrete method or model has been identified as most appropriate for the projection of urban and rural populations. However, the ratio method as the only method of choice for the projection of rural and urban populations does not take into account relevant population dynamics except growth and size.
- (k) Sectoral population projections - Potential complications of generating socioeconomic projections beyond methodological issues were highlighted. The complexity of making assumptions associated with sectoral (socioeconomic) projections was emphasized. Sectoral projections should take into account public policy needs (e.g., school enrolment, employment, housing, etc.).
- (l) Population projections software - Although increasing availability of software has made the process of generating population projections less cumbersome, it is still critical to understand the rationale and methodological steps behind the automated process. It was pointed out, however, that there is still a gap between demand for and availability of tools/software for generating sub-national projections. In cases where countries are either not able to access and/or use such software, they are encouraged to resort to simple computations, such as using spread sheets, as a stop gap measure in addressing demand for projections.
- (m) Presentation of population projections results - Results should be released together with adequate documentation that includes, inter alia, the legal framework, the objectives, a description of the main findings, a summary, and recommendations. Results should be presented using the whole range of available media, tools and channels, including the Internet, and, as appropriate, social media.
- (n) Dissemination and utilization of census results - The workshop noted that dissemination of census results is one of the weak areas in the census process in most countries in Africa, with implications for utilization of the data from the census. It was recommended that NSOs develop their census data dissemination plans with a view to incorporating information use, which should explicitly identify specific messages for different types of data users and package them accordingly. It was also stressed that NSOs should be recognized as the custodian of national official statistics. In this context, participants noted the central role of the Statistical Act as it helps to strengthen credibility of official statistics and ensures proper responsibility for those statistics. It was further noted that this would contribute to the acceptance and full usage of the results by the public.
- (o) Best practices and guidelines - During the workshop, it became evident that national offices mandated with generating national and sub-national population projections need to be aware of and have access to best practices and sound guidelines. While the

workshop was used to share relevant national experiences, countries are encouraged to explore modalities of sharing best practices among experts in the Africa region. In addition, international organizations could help countries by compiling best practices and guidelines on the preparation, methodology and limitations of population projections, especially at sub-national level and for small populations.

- (p) General recommendations - Given the technical nature of generating population projections, participants were of the view that the duration of the workshop was too short to fully master all the key aspects of the topic. It was recommended that the duration be extended to ensure adequate training. Furthermore, participants requested that a separate training workshop be conducted on generating population projections taking into account effects of HIV/AIDS.

As input into population projections, participants recognized the need for accurate demographic data. In this connection, participants emphasized the need for their countries to improve and strengthen their civil registration and vital statistics systems. Further, countries are highly encouraged to make full use of vital statistics generated by their vital registration systems.

### **Evaluation of the workshop**

9. In general, the workshop was favourably evaluated by the participants. For example, participants rated the quality of the materials and also quality of presentations got each a rating of 4.5 out of 5, while the extent to which the workshop achieved its objectives and also its overall value, each got 4.1 out of 5. The substantive sessions of the workshop were also highly rated receiving ratings ranging between 4.1 and 4.6. The overall planning and organization of the workshop was rated 4.5. Participants also indicated that the duration of the workshop was not adequate and that more time should have been allocated particularly for the hands-on exercises. Several participants also suggested that this type of workshop should cover incorporating into the projections the effects of HIV/AIDS.

## Annex 1. Agenda

Monday, October 29, 2012		
09:00 – 10:00	<b>Opening session</b>	Statistics South Africa UNSD
	<b>Session 1: Introduction</b>	T. Buettner
10:00 – 11:00	1. Introduction 2. The need for and the utility of population projections	
11:00 – 11:30	<b>Coffee break</b>	
11:30 – 12:30	3. Population projections for Africa: Background and challenges 4. Getting ready: Software, data, internet	
12:30 – 1:30	<b>Lunch break</b>	
	<b>Session 2: Establishing the Base Population</b>	
1:30 – 3:00	1. Overview of base population 2. Main factors responsible for distorted or incomplete data (i) Coverage errors (ii) Content errors (errors in age reporting by sex) 3. Corrective actions: Methods to detect, measure and correct distorted base populations	
3:00 – 3:30	<b>Coffee break</b>	
3:30 – 5:00	4. Hands-on exercises (i) Correcting a distorted sex ratio in a population (ii) Correcting a distorted age distribution in a population (iii) Move a population to a specific date	
Tuesday, October 30, 2012		
	<b>Session 3: Background and First Steps</b>	Ben Jarabi
9:00 – 10:30	1. The basic balance equation of Demography (i) Closed populations and components of change (ii) Open populations and (international) migration 2. Projections of total population by mathematical formulae (i) Linear versus exponential growth (ii) Intrinsic growth rate based on two population counts (iii) Projection of a total population using an intrinsic growth rate (iv) Hands-on Exercise: A simple projection of total population	
10:30 – 11:00	<b>Coffee break</b>	
11:00 – 12:30	3. Population projections: The Cohort-Component Method (i) The balance equation (ii) The mathematics of the cohort-component method (iii) Hands-on Exercise: A simple cohort-component projection	
12:30 – 1:30	<b>Lunch break</b>	
	<b>Session 4: Projecting the levels of mortality, fertility and migration</b>	T. Buettner
1:30 – 3:00	1. Historical trends in life expectancy, fertility and (international) net-migration	



	<p>2. Approaches to projecting life expectancy at birth</p> <ul style="list-style-type: none"> <li>(i) UN Model of life expectancy change (5 double logistic models,</li> <li>(ii) U.S. Census Bureau approach PASEX: E0LGST, E0PRJ</li> <li>(iii) Hands-on exercise: Projecting life expectancy over time.</li> </ul>	
3:00 – 3:30	<b>Coffee break</b>	
3:30 – 5:00	<p>3. Approaches to projecting total fertility</p> <ul style="list-style-type: none"> <li>(i) UN Model of total fertility change (3 double logistic models),</li> <li>(ii) U.S. Census Bureau approach PASEX: TFR LGST,</li> <li>(iii) Hands-on exercise: Projecting total fertility over time.</li> </ul> <p>4. Approaches to projecting the level of net- migration</p> <ul style="list-style-type: none"> <li>(i) Challenges and approaches to the projection of international migration,</li> <li>(ii) Hands-on exercise: Simple projection of net-migration.</li> </ul>	
<b>Wednesday, October 31, 2012</b>		
	<b>Session 5: Projecting the age patterns of mortality, fertility and migration</b>	T. Buettner
9:00 – 10:30	<p>1. Observing or borrowing: Sources of information about age patterns of mortality and fertility</p> <p>2. Projecting the age pattern of mortality</p> <ul style="list-style-type: none"> <li>(i) Tools for the modeling of age patterns of mortality: <ul style="list-style-type: none"> <li>• Model Life Tables (MORTPAK: Coale-Demeny, UN)</li> <li>• INDEPTH life tables</li> <li>• Relational model life table systems</li> <li>• Lee-Carter model</li> </ul> </li> <li>(ii) Hands-on exercise: Projecting mortality age patterns:</li> </ul>	
10:30 – 11:00	<b>Coffee break</b>	
11:00 – 12:30	<p>3. Projecting the age pattern of fertility</p> <ul style="list-style-type: none"> <li>(i) Tools for the modeling of age patterns of fertility: <ul style="list-style-type: none"> <li>• Coale’s Model Fertility Schedule,</li> <li>• Brass’ polynomials</li> <li>• UN Beta distribution and model schedules</li> </ul> </li> <li>(ii) Hands-on exercise: Projecting fertility age patterns <ul style="list-style-type: none"> <li>• UN approach: Model patterns of fertility</li> <li>• US Census Bureau approach: [RUPEX]</li> </ul> </li> </ul> <p>4. Projecting age patterns of migration.</p> <ul style="list-style-type: none"> <li>(i) Assumptions for projecting the age patterns of migration.</li> <li>(ii) Hands-on Exercise: Generating age patterns of migration</li> </ul>	
12:30 – 1:30	<b>Lunch break</b>	
	<b>Session 6: Introduction to Population Projections</b>	Ben Jarabi
1:30 – 3:00	<p>1. Recap: the main population projection methods</p> <p>2. Methods, input requirements, and results for the main population types</p> <ul style="list-style-type: none"> <li>(i) National populations</li> <li>(ii) Sub-national, sectoral populations</li> <li>(iii) Small populations</li> </ul>	
3:00 – 3:30	<b>Coffee break</b>	

3:30 – 5:00	3. Lab time: (i) Preparation of projections for own countries with national data (ii) Questions and answers	
<b>Thursday, November 1, 2012</b>		
	<b>Session 7: Population projections for national populations</b>	T. Buettner
9:00 – 10:30	1. Population projections for national populations (Presentation). (i) Using RUPEX/Spectrum (to be determined depending on operating system): <ul style="list-style-type: none"> <li>• Data input,</li> <li>• Projection parameter settings</li> <li>• Executing the projection</li> <li>• Obtaining, saving the results</li> </ul> (ii) Hands-on exercise: Preparing a cohort-component projection (cont.) (iii) Trouble shooting	
10:30 – 11:00	<i>Coffee break</i>	
11:00 – 12:30	2. Evaluation of projections results 3. Accounting for uncertainty -- Choosing alternative projections scenarios. 4. Hands-on exercise: Preparing and comparing different projection variants 5. Lab time	
12:30 – 1:30	<i>Lunch break</i>	
	<b>Session 8: Population projections for sub-national, sectoral or small populations</b>	Ben Jarabi
1:30 – 3:00	1. Examples of sub-national and sectoral population projections 2. Components of change for sub-national or sectoral populations: data sources and requirements 3. Methods suited for sub-national projections: bottom-up or top-down, cohort component versus ratio methods 4. Methods suited for sectoral projections: Participation-Ratio Method and Cohort-Progression Method	
3:00 – 3:30	<i>Coffee break</i>	
3:30 – 5:00	Lab time: Population projections for sub-national, sectoral or small populations	
<b>Friday, November 2, 2012</b>		
	<b>Session 9: Presenting results</b>	Ben Jarabi
9:00 – 10:30	1. How to present the results of population projections 2. Presentation of country projections by participants	
10:30 – 11:00	<i>Coffee break</i>	
11:00 – 12:30	3. Presentation of country projections by participants (Cont'd) 4. Questions and answers	
12:30 – 1:30	<i>Lunch break</i>	
	<b>Session 10: Final Matters</b>	UNSD
1:30 – 3:00	1. Comment and recommendations by participants 2. Completion of Workshop Evaluation by the participants 3. Closing	

## Annex 2. List of participants

No.	Country / Organization		Contact Person Information
1.	BOTSWANA	1.	Ms. Tebogo Virginia SEBEKEDI Senior Statistician Statistics Botswana
		2.	Ms. Sehakgamaleng Portia MABOTE Statistician Statistics Botswana
		3.	Mr. Tebogo LALETSANG Senior Statistician, Census and Demographic Analysis Statistics Botswana
2.	EGYPT	4.	Ms. Hanaa BADAWEY General Manager Central Agency for Public Mobilisation and Statistics (CAPMAS)
3.	ETHIOPIA	5.	Mr. Girum WORDOFA Statistician Central Statistical Agency
4.	GHANA	6.	Mr. Godwin Odei GYEBI Head, Population Statistics Section Ghana Statistical Office
5.	KENYA	7.	Mr. James MUNGUTI Manager Kenya National Bureau of Statistics
6.	LESOTHO	8.	Mr. Teboho PUTSOANE Assistant Statistician Bureau of Statistics
7.	LIBERIA	9.	Mr. Robert S. TOWEH Senior Statistician Liberia Institute of Statistics & Geo-Information Services (LISGIS)
8.	MALAWI	10.	Mr. Richard Annuel Paul PHIRI Statistician/Demographer National Statistical Office
9.	MAURITIUS	11.	Ms. Marie Desiree Cyndy RAMOOLOO Statistician Statistics Mauritius
10.	MOZAMBIQUE	12.	Mr. Cassiano CHIPEMBE Director of Demographic, Vital and Social Statistics Instituto Nacional de Esttistica

No.	Country / Organization		Contact Person Information
		13.	Mr. Manuel GASPAR Vice President for Demographic and Vital Statistics Instituto Nacional de Esttistica
		14.	Xadrique MAUNZE Chief of Department of Demographic Studies National Statistic Office
11.	NIGERIA	15.	Mr. Chidimma Ben ARUKWE Deputy Director National Population Commission
12.	RWANDA	16.	Mr. Jean MUGABO Population Censuses Analyst National Institute of Statistics Rwanda
13.	SEYCHELLES	17.	Ms. Marie-Therese GOPAL Director of GIS National Bureau of Statistics
14.	SIERRA LEONE	18.	Mr. Peter Soulainman BANGURA Officer in Charge Demographic and Social Statistics Division Statistics Sierra Leone
15.	SOUTH AFRICA	19.	Ms. Maletela TUOANE-NKHASI Executive Manager Statistics South Africa
		20.	Ms. Nontsikelelo MANZINI Manager: Birth and Deaths Statistics South Africa
		21.	Ms. Mosidi Sarah NHLAPO Specialist Survey Statistician Statistics South Africa
		22.	Ms. Christine KHOZA Chief Integrative Analyst Statistics South Africa
		23.	Mr. Diego Iturralde Executive Manager Demographic Analysis Statistics South Africa
		24.	Mr. Lesego Lefakane Principal Demographer Statistics South Africa
		25.	Ms. Olga Masebe Senior Demographer Statistics South Africa

No.	Country / Organization		Contact Person Information
16.	SOUTH SUDAN	26.	Mr. Biong AROP Deputy Director, Demographic Statistics National Bureau of Statistics (NBS)
17.	SUDAN	27.	Ms. Amna MOHAMED ALI Data Analyst Central Bureau of Statistics
18.		28.	Mr. Mohamed KHAMIS Inspector of Statistics Elfashir Bureau of Statistics
19.	SWAZILAND	29.	Ms. Thembi Olga VILANE Statistician Central Statistical Office
20.	TANZANIA	30.	Mr. Seif Ahmad KUCHENGO Statistician National Bureau of Statistics
21.	UGANDA	31.	Ms. Helen Laetitia NAMIREMBE NVIIRI Principal Statistician Uganda Bureau of Statistics
		32.	Mr. Johnstone GALANDE Statistician Uganda Bureau of Statistics
22.	ZAMBIA	33.	Mr. Palver SIKANYITI Senior Demographer Central Statistical Office
23.	ZIMBABWE	34.	Ms. Tarisai CHIYAKA Statistician Zimbabwe National Statistics Agency (ZIMSTAT)
24.	UNSD	35.	Ms. Margaret Mbogoni Statistician, Demographic and Social Statistics Branch United Nations Statistics Division (UNSD)
		36.	Mr. Seiffe Tadesse Statistician, Demographic and Social Statistics Branch United Nations Statistics Division (UNSD)
		37.	Dr. Thomas Buettner UNSD Consultant
		38.	Mr. Ben Jarabi UNSD Consultant