DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION
UNITED NATIONS

NATIONAL BUREAU OF STATISTICS OF CHINA

International Workshop on Population Projections using Census Data
14 – 16 January 2013
Beijing, China

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English only

Report of the Workshop[1]

Prepared by

United Nations Statistics Division

[1] This document is being reproduced without formal editing.

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I. INTRODUCTION

A. Background and objective of the workshop

1. The International Workshop on Population Projections using Census Data took place in Beijing, China, from 14 to 16 January 2013. The workshop was organized by the United Nations Statistics Division (UNSD), in collaboration with the National Bureau of Statistics of China (NBS). The workshop was attended by a total of 92 people – 29 from National Bureau of Statistics of 12 Asian countries and China, as well as 63 people from subnational statistics offices of China. (See Annex I for the list of participants and the NSOs they represented[2]).

2. This workshop was conducted as part of the project on strengthening statistical capacity development in China, funded by the Chinese Government. While providing guidance on producing population projections as a primary objective, the workshop drew participants' attention to the necessary preparatory work before undertaking the population projections. These include detecting and correcting errors in the base data, making assumptions about future trends in demographic parameters, the choice of method to use to project the population, how far into the future to project the population, and for what level of geography it is feasible to generate the projections.

3. The objective of the Workshop was also in line with the overall objective of the China Trust Fund Project, i.e., helping countries in Asia to develop a better understanding of international practices in various statistical areas, including population statistics. The workshop also provided a forum for countries to discuss national experiences in population projections and challenges faced.

B. Results of the pre-workshop questionnaire

4. Participants representing NSOs had been requested to complete a pre-workshop questionnaire prior to the workshop. The pre-workshop questionnaire was to explore the oeverall experiences in population projection in those countries, with a view to identifying their specific needs for training. Participants were asked to respond to 4 questions:

a. Is the office responsible for the preparation of population projections? If yes at what level (National, sub-national, urban-rural regions or communities level)? If not what agency/institution is responsible for the population projection in the country?
b. What is person's role in preparing population projection?
c. Has the person used any of the following software packages – PASEX/RUPEX, Spectrum/Demproj, MORTPAK or others?
d. What are the challenges your office facing while preparing for population projections?

[2] Representatives from sub-national offices of China are not listed.

5. All workshop participants replied to pre-workshop questionnaire. The analysis indicated that most of the NSOs invited conducted their own population projections, with the exception of Thailand, where the population projection was prepared by National Economic and Social Development Board (NESDB). They undertook not only national, but also subnational and urban/rural population projections. In terms of the software used, PASEX, Spectrum and MortPak were often used in countries and many also use self-developed software for population projections.

6. Challenges faced in producing population projections included: (a) limited knowledge with population projection methods; (b) lack of reliable data for various demographic components, especially on migration; (c) lack of reliable data for demographic components for small area and small population groups; and (d) making appropriate assumptions on fertility, mortality and migration into the future.

C. Opening session

7. The workshop opened with a statement by Mr. Luo Lan, Deputy Commissioner of the National Bureau of Statistics of China. Mr. Luo emphasized the importance of population projections for policy making. He informed the participants that China has been conducting population projections since the 1980s and those projections have been crucial in formulating social and economic policies in China. Mr. Luo also noted that increasing number of migration in China has posed challenges to the preparation of population projections and need to be studied further. Mr. Luo appreciated the fact that UNSD and NBS were jointly conducting such an important workshop and he wished all participants enjoyed their stay in Beijing.

8. Ms. Keiko Osaki-Tomita, Chief of the UNSD Demographic and Social Statistics Branch, made an opening statement. She outlined the importance of population projections for social and economic planning of a nation. In that context, it is of critical importance to take full advantage of the results from the 2010 round of population and housing censuses. By making appropriate assumptions and using necessary tools, countries can produce population projections for national planning purposes. Ms. Osaki-Tomita expressed appreciation to the NBS of China for its hospitality and assured that the team from the UNSD and the expert Mr. Thomas Buettner from the German Fund for World Population will spare no effort for the successful accomplishment of this workshop's goals.

D. Organization of the meeting

9. The meeting was conducted according to the Organization of Work (Annex II). The workshop started with an introductory presentation on the importance of population projections for national planning purposes. Following the introduction, NBS of China made a presentation on the history, methods and results of population projections in China. Technical presentations were made by Mr. Thomas Buettner and UNSD, focusing on various aspects of population projections including establishing base population, projecting the level and age patterns of fertility, mortality and migration, making population projections and presenting population projection results. Hands-on exercises

were included with each technical presentation, to help participants better understand the tools and methods introduced in the presentations. Towards the end of the workshop, a number of country representatives made presentations on their respective experiences with producing population projections. All of the presentations and exercises contributed by the participants and UNSD are available on the UNSD website.[3]

II. SUMMARY OF PRESENTATIONS [4]

A. Introduction

10. This Session consists of two parts. The first part was a presentation made by UNSD introducing the participants to the purpose, the format and the trainers of the workshop. The session also aimed to enhance participants' understanding on the utility of population projections and provid an overview about the current global population dynamics, with an emphasis on Asia.

11. Participants recognized that the analysis and projection of national population were at the base of all major planning decisions. Given that most countries in Asia have completed the population censuses in the 2010 round and released the results, time is appropriate for NSOs to conduct population projections using the latest census data.

12. The second part of the Session was a presentation made by the NBS of China. It introduced the history of population projection in China, as well as the methods and results of the most recent population projections. Population projections are used in China as a basis for setting and evaluating population and socioeconomic development programs. Population projections also made it possible to evaluate basic population data produced in population censuses. The cohort-component method is used for population projections in China. The most recent projection was produced based on the 2000 population census data with different assumptions on fertility, mortality and migration for urban and rural areas.

B. Main population projection methods

13. Session 2 covered the basic elements of population projections. First, the basic accounting identity was presented for both close and open populations. Next, two approaches to population projections were discussed - projection by mathematical formulas and projection by the cohort-component method.

14. Participants also leaned about the dynamics of demographic parameters, so-called demographic transitions, which enabled predicting the future size and structure of population with certain degree of confidence. For open population, the level of immigration and emigration also affects population projections at varying degrees.

[3] Please see: http://unstats.un.org/unsd/demographic/meetings/wshops/China/2013/list_of_docs.htm

[4] An annotated agenda with more details on what have been covered during the workshop, available software, as well as additional resources is available online at http://unstats.un.org/unsd/demographic/meetings/wshops/China/2013/list_of_docs.htm
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15. Three methods of projections using mathematical functions - linear function, exponential function and logistic function – were introduced. The cohort-component method, as the most popular method for projecting populations, was discussed during the presentation. It was noted that caution was to be exercised regarding the choice of methods in generating population projections: the choice should be flexible, depending upon the period of projection applied, the level of population growth, the size of population, the availability of data, the time pressure imposed on producing the projection and etc.

C. Establishing the base population

16. It is a prerequisite for generating projections to thoroughly assess the accuracy of the base population (i.e., the reported population by age and sex), and to make appropriate adjustments as necessary. The Session covered the importance of the base population and its age structure as a starting point for population projections. Participants were introduced to the main methods – graphic analysis, examining age and sex ratios and using summary indices – that can be used to identify possible errors in the base population data. Use of consecutive censuses in detecting errors was also discussed.

17. The presentation in the Session also covered methods, such as smoothing, to adjust or correct the errors. Participants were reminded, however, that adjustments of data should be undertaken with caution, i.e., they should be within the national demographic and socio-economic context. Moreover, the original census data should not be modified.

D. Projecting the level of fertility, mortality and migration

18. This Session introduced participants to the projection of mortality, fertility and migration levels, including the use of appropriate models and software tools. It guided participants in selecting a suitable model and the corresponding tool for the projection of a particular demographic component.

19. Two main approaches are available for the preparation of projections of levels of mortality (life expectancy at birth) and fertility (the average number of children per woman, i.e., TFR). The United Nations approach does not model the level of life expectancy and total fertility directly, but their amount of change (increase or decrease) relative to the level. A double-logistic function has been used to allow for a non-symmetric trend of change.

20. The approach employed by the US Census Bureau (USCB) uses a logistic function to model the level indicators directly. In addition, the USCB models allow the user to set upper and lower limits on the indicators.

21. Based on available data, either national data series or reference estimates from international organizations, a suitable method can be selected to calculate future trajectories of life expectance or total fertility.

22. Projecting the level of net migration is not an easy task because of the often erratic migration trends. A discussion of the most common approaches to projecting migration concluded the Session.

E. Projecting the age pattern of fertility, mortality and migration

23. The Session introduced participants to the projection of age patterns of mortality, fertility and migration, including the appropriate models and software tools. Guidance was provided on selecting a suitable model and the corresponding tool for the projection of the age pattern a particular demographic component.

24. Age patterns of mortality, as exemplified in the Model Life Tables, exhibit certain regularities, which are helpful in generating plausible age patterns of mortality in the future. Similarly, empirical age patterns of fertility can be used as a basis for projections. While the level of migration tends to fluctuate erratically, the age patterns of migration also have some regularities, that can be factored in predicting the age patterns of migration.

F. Population projections for national populations

25. The Session introduced participants how the preparation and execution of population projections can be done, using the cohort-component method for the entire country. Main available projection software and their specific strength and limitations were introduced, as well as the data needed for preparing population projections and the steps necessary to perform a population projection.

26. The Session built upon the topics learned in the preceding sessions, and applied them to an example using a selected cohort-component projection software. The Session also provided participants with the opportunity to prepare national projections using their own data or data from the United Nations.

27. Participants were reminded that before a projection can be conducted, one needs to examine thoroughly the quality of input data and agree on realistic assumptions about of the course of future change of demographic parameters. In order to deal with uncertainty involving future demographic trends, projections can be conducted with variants or by creating illustrative scenarios.

G. Presentation of the results of projections

28. This Session comprised two parts. In the first part, participants learned the ways to present the results of population projections in an effective manner. It was stressed that one needed to know first the target audience to whom the message could be delivered. The presentation of outcomes should address the points clearly, ideally with reference to some policy implications. Graphic displays of results are effective ways to present results and communicate with audience. It is important to document data sources, assumptions applied and the methodologies used, in presenting the results of population projections.

The second part of the Session was presentations by six participating national/sub-national statistical offices. They include – Bhutan, Cambodia, China Beijing sub-national statistical office, Census and Statistics Department, Hong Kong SAR of China, Mongolia, and the Philippines.

29. Bhutan used the cohort-component method for population projections. Data sources included the 2005 population census and the National Health Surveys in 1991, 1994 and 2000. The assumptions used were declining fertility and mortality level and no international migration. Results were shown on the projected total population as well population of 65 years and over for the period from 2005 to 2020.

30. Cambodia produced its population projections using the cohort-component method. Data sources used for the projections included the 1996 Demographic Survey, 1995 Knowledge Attitudes and Practice Survey (KAP), 1998 and 2008 Population censuses, 1998 National Health Survey, the Cambodia Demographic and Health Surveys in 2000, 2005 and 2010, and the 2004 Cambodia Inter-censal Population Survey. The presentation showed the projected levels and age patterns of fertility, mortality and migration until 2030. Population projections were produced until the year 2030.

31. The presentation made by the Beijing Statistical Office introduced methods used for sub-national level population projections, as well as the challenges faced. Main sources for population projections for Beijing were the 2000 and 2010 population censuses and sample surveys. Cohort-component method was used for projections. Evaluation of the base population data was carried out by using the post-enumeration survey, by comparing with administrative sources, calculating summary indices and using data from consecutive censuses. Smoothing technique was used to correct the data. Assumptions made for the projections included steady fertility level, slowly growing life expectancy and increases in labour immigration to Beijing. Main challenges in producing population projection was the size of float population in the city, as well as setting appropriate fertility and mortality level for the floating population.

32. The Census and Statistics Department of Hong Kong SAR of China prepared a new set of population projection for the next 30 years. The cohort-component method was used for the projection with assumptions on fertility, mortality and migration. Government policy was taken into consideration in making assumptions and one specific example illustrated was the impact of babies born to women from Mainland China and the subsequent policy change on the fertility level assumption.

33. Mongolia conducted its population projection based on the 2010 population and housing census. The cohort-component method was used and the projection was done for the period of 2010-2040. The base population was evaluated using the summary indices – Whipple's index, Myer's blended index and UN age-sex accuracy index. Three fertility assumptions – slow, medium and fast decline – were used. Different age-specific fertility patterns were also used. Mortality age-pattern was obtained by using the United Nations Far East Asian model life table (MortPak) and assumptions on the mortality level were also made. Net migration data were obtained from population censuses.

34. The Philippines used data from multiple censuses in the past (1970, 1980, 1990, 1995, 2000 and 2010), National Demographic and Health Surveys from 1973 to 2008 and vital statistics reports on births and deaths. Cohort-component method was used. Summary indices were used to assess the quality of population by age and sex data. After identifying the undercount of children at younger ages, adjustment was made for population projection purposes. The projected fertility level adopted the UN model of fertility decline, i.e., high fertility and slow pace of decline. The base total fertility level was obtained from the 2008 National Demographic and Health Survey. For mortality level, the UN's general pattern was adopted and the 1995 Philippines Census-based life tables were used. The projection assumed international migration has no impact on population at the national level. The main challenge facing in the country for population projections is the lack of migration data. In addition, the software currently in use (PEOPLE) is outdated.

ANNEX I. List of Participants

No.	Country /Organization	Contact Person Information
1.	Bhutan	Mr. Cheku DORJI Sr. Statistical Officer National Statistics Bureau Royal Government of Bhutan Thimphu, Bhutan
2.	Bhutan	Mr. Pema NAMGAY Statistical Officer National Statistics Bureau Royal Government of Bhutan Thimphu, Bhutan
3.	Cambodia	Mr. Samrith CHAN National Institute of Statistics Phnom Penh, Cambodia
4.	Cambodia	Mr. Kimhor MENG Deputy Director General National Institute of Statistics Phnom Penh, Cambodia
5.	China	Ms. Guizhi LI Deputy Director, Department of Population and Employment National Bureau of Statistics of China
6.	China	Ms. Jie WU Director, Department of Population and Employment National Bureau of Statistics of China
7.	China, HongKong SAR	Mr. Hon Kwan LAM Senior Statistician, Census and Demographic Statistics Census and Statistics Department Hong Kong Special Administrative Region Government China
8	China, Macao SAR	Mr. Celestino LEI Chief, Computer System Administration Sector Statistics and Census Service Government of Macao Special Administrative Region
9.	China, Macao SAR	Mr. Hang Chan MAK Chief, Department of Demographic, Social and Employment Statistics Statistics and Census Service Government of Macao Special Administrative Region

No.	Country /Organization	Contact Person Information
10.	Indonesia	Mr. Wien KUSDIATMONO Head of Yogyakarta Provincial Statistics Office BPS Statistics Indonesia
11.	Indonesia	Mr. Indra Murty SURBAKTI Division Head of Demographic Statistics BPS Statistics Indonesia
12.	Korea, DPR	Mr. Yong Nam PAEK Senior Official Central Bureau of Statistics
13.	Korea, DPR	Mr. Hyok WON Department Director Central Bureau of Statistics
14.	Lao, PDR	Mr. Phetsavanh BOUTLASY Senior Statistician Staff Social Statistics Division, Social Statistics Department Lao Statistics Bureau
15.	Lao, PDR	Ms. Phouthida SITTHILAJVONGSA Technical Staff Social Statistics Division, Social Statistics Department Lao Statistics Bureau
16.	Malaysia	Ms. Noor Faadlilah ISMAIL Assistant Director, Population and Demographics Division Malaysia Department of Statistics
17.	Malaysia	Ms. Nadia MISKIMAN Assistant Director, Population and Demographics Division Malaysia Department of Statistics
18.	Mongolia	Ms. Uranbileg BYAMBATSOGT Officer Population and Housing Census Bureau National Statistical Office of Mongolia
19.	Mongolia	Mr. Jargalsaikhan TUVSHINTUR Officer Population and Housing Census Bureau National Statistical Office of Mongolia
20.	Myanmar	Ms. Hla Hla Assistant Director Central Statistical Organization Myanmar
21.	Myanmar	Ms. Sandar MYINT Assistant Director Department of Population Ministry of Immigration and Population

No.	Country /Organization	Contact Person Information
		Myanmar
22.	Nepal	Mr. Yadu Nath ACHARYA Statistical Officer Central Bureau of Statistics, Nepal
23.	Nepal	Mr. Uttam Narayan MALLA Director General Central Bureau of Statistics, Nepal
24.	Philippines	Ms. Estelita MARQUEZ Statistician III Houshold Statistics Department National Statistics Office, Philippines
25.	Philippines	Ms. Marjorie VILLAVER Statistician III Houshold Statistics Department National Statistics Office, Philippines
26.	Thailand	Ms. Supaporn ARUNRAKSOMBAT Senior Statistician National Statistical Office Thailand
27.	Thailand	Ms. Orasri HINTAMAI Statistician National Statistical Office Thailand
28.	Viet Nam	Ms. Nguyen Thi Xuan MAI Director, Department of Population and Labour Statistics General Statistics Office of Viet Nam
29.	Viet Nam	Ms. Nguyen Thu DUNG Statistician, Department of Population and Labour Statistics General Statistics Office of Viet Nam
30.	United Nations Statistics Division	Ms. Keiko Osaki-Tomita Chief, Demographic and Social Statistics Branch United Nations Statistics Division New York, USA
31.	United Nations Statistics Division	Ms. Haoyi CHEN Statistician, Demographic Statistics Section Demographic and Social Statistics Branch Statistics Division New York, USA
32.	EXPERT	Mr. Thomas Buettner German Fund for World Population Schivelbeiner Str. 34 10439 Berlin, Germany

ANNEX II: Programme of Work

Monday, 14 January 2013

9:00-10:00 **Opening ceremony**

National Bureau of Statistics of China – Commissioner Luo Lan
United Nations Statistics Division – Ms. Keiko Osaki-Tomita, UNSD

10:00-12:30 **Session I. Introduction**

- *The need of population projections – Ms. Keiko Osaki-Tomita, UNSD*
- *Population projections for Asia: background and challenges – Ms. Keiko Osaki-Tomita, UNSD*
- *Population projections: the Experience of China – Mr. Feng Nailin, NBS China*

12:30-14:00 *Lunch break*

14:00-15:30 **Session II. Main population projection methods –** Mr. Thomas Buettner, German Fund for World Population

- *The basic accounting identity of Demography*
- *Projections by mathematical formulae*
- *Projections by the cohort-component method*

15:30-17:30 **Session III. Establishing the base population** – Ms. Haoyi Chen, UNSD

- *Errors in data (coverage errors, content errors)*
- *Correcting distorted or incomplete data*

Tuesday, 15 January 2013

9:00-12:30 **Session IV. Projecting the levels of mortality, fertility and migration -** Mr. Thomas Buettner, German Fund for World Population

- *Projecting life expectancy at birth*
- *Projecting total fertility*
- *Projecting international net-migration*

12:30-14:00 *Lunch break*

14:00-17:30 **Session V. Projecting the age patterns of mortality, fertility and migration -** Mr. Thomas Buettner, German Fund for World Population

- *Projecting age pattern of mortality*
- *Projecting age pattern of fertility*
- *Projecting age pattern of migration*

Wednesday, 16 January 2013

9:00-12:30 **Session VI. Population projections for national populations -** Mr. Thomas Buettner, German Fund for World Population

- *Tools for preparation of national population projections*
- *Preparing the data and formulating assumptions*
- *Dealing with uncertainty: variants and illustrative scenarios*

12:30-14:00 *Lunch break*

14:00-17:00 **Session VII. Presentation of the results of projections**

- *Guidelines and tools for the preparation of results - Ms. Haoyi Chen, UNSD*
- *Presentation of country projections by participants - Chaired by Ms. Keiko Osaki-Tomita, UNSD*
  - *Bhutan*
  - *Cambodia*
  - *China Beijing sub-national statistical office*
  - *Census and Statistics Department, Hong Kong SAR of China*
  - *Mongolia*
  - *The Philippines*

17:00-17:30 **Closing**