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COORDINATION OF INTERNATIONAL STATISTICAL WORK IN THE UNECE REGION

Review of population statistics

Note by the secretariat

INTRODUCTION

1.   It is perhaps superfluous to underline that population statistics is one of the most important fields of official statistics at both the national and international level. The regular production of annual population series represents one of the pillars of national statistics. In fact, accurate and timely data on population at the national and sub-national level are among the basic statistics that are needed for decision-making and planning purposes at the central and local level. In addition, in most countries population data (either from annual statistics or from censuses) are used to allocate parliamentary seats, to assign financial resources to local administrations and for other key administrative functions.

2.   Population statistics are also particularly important because they are used to calculate a large number of indicators in different areas. For instance, many of the indicators used to monitor social and economic development are expressed as a proportion or percentage of either the total population or a sub-group of the population. Therefore, the accuracy of these indicators does not only depend on the accuracy of the measures used to monitor the social and economic phenomenon, but also on the accuracy of the population figures used in the denominator.

Inaccurate population figures would affect the quality of indicators based on population ratios, and this would ultimately result in misreporting trends for the concerned phenomenon[1].

3.   In the present paper, a number of issues are discussed related to annual population statistics. The authors recognize that several activities have been carried out or are in the process of being developed by regional and international organizations in the field of population statistics. However, the purpose of the paper is not to list the work conducted by different organizations, but rather to describe the issues that are currently open in this field.

4.   The first part is dedicated to the production of annual population statistics at the national level, describing the different data sources and the characteristics of the data production processes. Special attention is paid to the open issues and the difficulties faced by countries. The absence of standards at the international level (guidelines, best practices) on how to produce annual population statistics is underlined as a major issue. This includes the lack of international guidelines on the revision of population estimates in the intercensal period.

5.   The second part of the note covers issues related to the production and dissemination of annual population statistics at the international level[2]. Among the issues discussed are the absence of an internationally agreed definition of total population and the use of different data by international organizations to produce annual population statistics. Another important issue is the need to review the existing initiatives on dissemination of population statistics in the European region after 2006 when the Council of Europe terminated the activities of the European Population Conference.

I.   THE PRODUCTION OF ANNUAL POPULATION STATISTICS IN COUNTRIES

6.   Countries use different practices to produce annual population statistics, which could be summarized into three groups:
   (a) Use of *population registers*. Countries with up-to-date population registers fully rely on the registers to produce population statistics. In these countries, the production of population statistics is quite a smooth operation;
   (b) Use of *surveys*. Countries such as France use the annual census survey to produce annual population statistics;
   (c) *Annual updates* based on previous year population, births, deaths and migrations.

7.   Different issues could be discussed for each of these approaches, but this paper focuses only on the challenges faced by countries that produce population statistics on the basis of annual updates. For these countries producing accurate annual population figures requires a comprehensive and coherent system of data sources able to produce on a regular basis the following statistics:
   (a) population benchmark (population count given at a certain point in time);

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[1] It is the experience of a country in the ECE region that the gross enrolment ratio in primary school increased in one year from 87% to 96% only because a census was carried out and the population figure could be rectified.
2 Detailed information on the activities of International Organizations in the field of annual population statistics can be found on Database on International Statistical Activities (Integrated Presentation) on the UNECE Statistical Division website (http://unece.unog.ch/disa/disa.default.asp?Year=2006). The relevant areas are "1.1.1 Population and migration" and "4.3.5 Other administrative and non-survey sources".

      (b)   annual number of births and deaths;

      (c)   annual net international migration (which involves the counting of immigration and emigration).

8.   Given a population benchmark, the annual update can be produced by adding births and net migration and subtracting deaths. Although this is a simple calculation, it involves indeed a complex system of data collections, which, depending on the country, can be more or less reliable and simple to manage. Countries producing annual updates face the following challenges:

      (a)   producing an accurate population benchmark and accurate counts of births and deaths, and international migration;

      (b)   using consistent definitions of population, vital events and international migration;

      (c)   applying statistical methods to adjust/improve primary data (when necessary).

A.   Producing an accurate population benchmark and accurate counts of births and deaths, and international migration

Population benchmark

9.   Usually the benchmark for the population count is provided by the census. In the ECE region, census methodology is evolving and in some countries do not include the traditional full coverage of the total population in the field. Nordic countries have a consolidated experience in using population registers for population statistics. New methods such as the rolling census and the combination of registers with field operations or sample survey data are more recent and their impact on defining accurate benchmarks for population counting is still not clear.

10.   The definition of who should be counted in the total population and its implications for measurement is also becoming more challenging. People move across and within countries more frequently and the concept of permanent residence is now more ambiguous than decades ago. People may live their life commuting between different municipalities or different countries. And two municipalities and two countries may claim the counting of the same person for planning purposes or allocation of resources. The need is emerging in countries to produce more than one population count, where each count responds to different needs[3]. Despite the need to differentiate population counts produced for legal and statistical purposes, in some countries the population based on legal residence still drives the production of population count for statistical use.

11. Countries use different approaches to define the population benchmark. Some countries use the de-facto concept while others use the usual residence criteria. In the UNECE region, all countries use the concept of usual residence. This concept is more relevant for planning purposes because it relates to the place where people "live", but poses some challenges for its measurement. In fact, it is not always easy to define a unique place of usual residence for people

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[3] In the 2001 Italian census, for example, three population counts were produced: usual resident, present population, population using territorial services. In France, different population counts are produced for the municipalities, one for statistical purposes and one for juridical purposes. The counting used for juridical purposes (mainly funds allocations) includes persons who may be resident in another municipality. The municipal counting produced for juridical purposes overestimates the total population of France and is not used for statistical purposes.

who move frequently their place of living. In some countries sets of "residence rules" have been developed, helping to identify the place of usual residence for the different population groups. In other countries, concepts like "main residence" and "secondary residence" have been developed, based on either objective or subjective criteria. However, the challenge still remains for many countries on how to apply the residency rules in the field. The issues include the duration of residence and its measurement, the interpretation of duration as actual and/or intended, and the treatment of people who live between two countries (such as "transnational" households).

Births and Deaths

12.   Almost all countries in the ECE region have in place systems to register vital events (civil registration systems), which can be used to measure the number of births and deaths (with a different degree of accuracy, depending on the level of maintenance of the registers). However, developing countries do not have complete reliable registration systems of births and deaths. Vital statistics are estimated on the basis of censuses and surveys with sometimes very large confidence intervals.

13.   The availability and quality of vital statistics is an important issue in many countries. Frequent problems include:
  (a)   under-enumeration of vital events (for instance, omission of registration of births when the newborn dies a few days after the birth);
  (b)   misreporting of information (for instance, misreporting of age at death or cause of death);
  (c)   problems deriving from changes in the legal/administrative framework (for instance, changes in registration procedures);
  (d)   problems associated with the organisation of the civil registration systems (for instance, problems in the exchange of information with hospitals, ministries or other administrations).

14.   Outside the UNECE region, problems also relate to:
  (a)   apathy of the general public. In less developed countries there is a general lack of awareness on the need to register or people do not have incentives to register and thus do not understand the need for registering vital events;
  (b)   lack of political interest in the system. The registration system may be in place but it is not functioning properly because there is no political will in improving it and scarce resources are allocated to other areas.

15.   A number of standards and guidelines have been adopted over the last years by the UN Statistical Commission (Handbooks on Civil Registration and Vital Statistics Systems, various volumes, United Nations, 1998-2002[4]). Several regional workshops have been conducted since the beginning of the 1990s by UNSD and its partners. However, not much progress has taken place in the field in the last decades, particularly in less developed countries. It is estimated that

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4 See the Database on International Statistical Activities (Integrated Presentation) on the UNECE Statistical Division website (http://unece.unog.ch/disa/disa.default.asp?Year=2006), area "4.3.5 Other administrative and non-survey sources"

the coverage of vital events in the world has not moved too far from the 50% of the 1960s. And in some countries, such as in the Eastern part of the ECE region, the registration systems have actually deteriorated in the last 20 years or so. The reasons for a lack of progress vary. Producing and maintaining national registration systems for statistical purposes is not an appealing argument particularly in less developed countries, since the system is not considered cost-effective if used only for statistics. Other forces in addition to statistics should advocate for its development. Civil registration systems provide the legal/reliable documentation on the identity of individuals and the proof of the occurrence of vital events and as such are of fundamental importance for the good governance of a country. Statistics are only by-products of the registration system. The improvement of existing registration systems is an area where statisticians do not have full control, given their role of data users rather than data producers.

16.   The development and maintenance of registration systems for vital events needs the engagement of different stakeholders. The commitment of the UN Statistical Commission at international level and of national statisticians at national level should be strengthened by alliances at national and international level with institutions that are directly responsible for developing and maintaining registration systems, if we want to ensure their progress in the near future.

Net migration (including immigration and emigration)

17.   The accurate measure of net migration is an increasing challenge for all countries. Many countries, particularly in the SEE and CIS region, do not have adequate infrastructure to record international movements. But even more developed countries face the challenge of measuring immigration and emigration, as shown by the inconsistencies of some of the data coming from different sources.

18.   If the level of misreporting inflows and outflows in a country would be the same, this would not affect the net migration and the production of annual population figures. Unfortunately this does not happen very often. The counting of outflows is usually more problematic than inflows. In fact, the deficiency of sources used to measure inflows migration can be complemented with population-based data collections. This is harder to do for outflows, making the production of annual population figures particularly challenging for countries with large emigration.

19.   Countries are confronted with a broad range of issues when building migration estimates to use in the population balance:
   (a)   Unavailability of data sources on international migration flows;
   (b)   Available data sources on international migration use residency rules that are inconsistent with the framework adopted in other sources;
   (c)   Available data sources do not cover all population groups (for example permits of stay do not cover national citizens);
   (d)   Available data sources, which cover different groups of migrants can overlap and if different definitions for different types of migrants are used, it may lead to inconsistencies and double counting. For example, those asylum seekers taking up a job can be counted as asylum seekers and as labour migrants producing biased migration estimates if data are directly summed up;

(e)   Available data sources have accuracy problems, due to disincentives to report changes of residence (as in the case of administrative data) or because of limitations due to sample size and/or sample design (in the case of data derived from sample surveys);

(f)   Additional and specific problems affect emigration data, since departures tend to be less well recorded than arrivals as most countries are reluctant or unable to closely monitor the exit of persons from their territory. Moreover, from a statistical point of view, persons leaving the country are difficult to be counted because of their absence[5].

(g)   In the EU area, traditional sources of migration statistics often do not record migrations between countries given the Schengen agreement and the free circulation of persons.

20.   Another important issue, relevant in all countries irrespective of the level of development of the statistical system, is the inclusion of undocumented or illegal migrants in the total counting of the population. Some countries make special efforts to include them in the census, but there are still no guidelines or best practices that could help the countries to address this issue[6].

21.   In addition to international migration, internal migration is also relevant when population estimates at sub-national level are produced. Annual counting of internal migrants can be very cumbersome where population registers do not exist. When estimates of internal migrants are produced for the purpose of annual updating of the sub-regional populations, different sources are used, including health or tax registration systems. The provision of population data at detailed geographical level can be very controversial because of the small size of stocks and flows involved.

B.   Consistent definitions should be used for population stocks and flows

22.   In order to ensure international consistency to the population figures, the three components used to annually update the population should be based on common definitions. Although the definitions of births and deaths usually do not pose methodological problems[7], some challenges remain on two critical aspects of international migration flows:

(a)   *Minimal duration of stay*: consistent thresholds on minimal duration of stay should be used for defining usual resident population and international migrants. For example, if the 12-month rule is used at the census to determine the benchmark for the resident

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[5] Countries such as Albania, Armenia, and Georgia found very large discrepancies in the population figures when a new census was carried out mainly due to unrecorded emigration. The gap between the population estimated before the census and the data provided by the census varied from 11% to 18%. The lack of reliable information on migration and vital events is still making the re-construction of population figures between the two censuses a challenging task (see Section 4.).

[6] The ECE Steering Group on migration statistics is planning a review of methods used by countries to count and estimate undocumented migrants together with other forms of migrants who are difficult-to-measure, such as short-term migrants.

[7] The registration of vital events is usually done on the basis of place of occurrence. In order to identify births and deaths of resident population and to count the total number of births and deaths affecting the resident population, vital events referring to non-resident persons should be excluded and vital events occurred abroad but referring to resident persons should be included.

population, the same rule should be applied to identify and count international immigrants and emigrants. However, different sources used to measure migration flows may be based on different criteria and may not match the same threshold used to define the resident population.

   (b) *Legal status*: international migrants can have regular or irregular status with respect to their entry and stay in the country. The choice of including or not irregular immigrants is not always consistent in the population count and the count of migration flows.

C.   Apply statistical methods to adjust/improve primary data

23.   When available data are incomplete or inaccurate, statistical methods can be used to improve estimates of the various components included in the population balance. Countries of UNECE region are in very diverse situations with respect to availability and quality of data on the natural and migratory component of population change and different approaches are used to improve/adjust existing data. Major problems are reported to measure inflows and outflows of migrants and different policies are adopted on the treatment of their estimates:

   (a) given the unavailability of any data, in some countries the population is updated by using the natural components only (births and deaths);
   (b) given the limitations of existing data, some countries make an estimate of net migration on the basis of available information, such as historical trends, partial data or data from other countries;
   (c) different sources are sometimes combined in order to cover the various population groups forming the total migration movement (for example combining sources on foreigners and nationals).

24.   Although the production of the population data for statistical purposes should not be lead by legal and/or administrative requirements, there is the practice in some countries to use unadjusted legal and/or administrative population. This happens even if statistical adjustments could estimate some of the population components such as not registered emigration or undocumented/illegal migrants, which could provide better population counts.

25.   The reluctance to adjust data that are often the by-product of administrative activities can also be explained by the need to maintain consistency across population estimates at different geographic levels.

D.   Lack of international programmes on the production of annual population statistics

26.   There are no standards or programmes at international level to guide countries in their regular production of annual population statistics. It can be argued that the formula to produce annual population statistics is quite straightforward. However, calculating/estimating each component and building it into the formula can be quite a complex process. Different approaches can affect the quality of statistics and the comparability of data at international level. The use of population statistics to allocate parliamentary seats and financial resources makes the calculation of annual population figures open to public debate not only at national level but also at regional level[8]. It would not be productive to develop international standards to produce annual

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[8] The allocation of seats in the European Parliament based on population counts and the new definition of qualified

population statistic, since the choice on the best methodology depends on the national context. However, the development documented best practices at international level could support national statisticians in their work and could help them to prevent political interference. Under the framework of the UN Statistical Commission and the regional statistical fora, there are several processes[9] currently underway to provide guidance and assist countries in measuring the three components of population counting (vital statistics, migration, census), but there is no international discussion on how to bring together these components to produce annual population figures.

II. THE PRODUCTION OF ANNUAL POPULATION STATISTICS AT INTERNATIONAL LEVEL

A. Internationally agreed definition of total population

27.   As described above, there is a growing pressure to produce internationally comparable data on population, which is the basic component of many statistical indicators. However, no internationally agreed definitions or guidelines are available on the definition of population, except for those developed in the context of the System of National Accounts or the census recommendations[10]. The census recommendations are very detailed for the region of the CES and refer to the total population as the usual resident population. The Draft Census Recommendations that will be considered at the forthcoming UN Statistical Commission are more general and leave the definition open to consider both present and resident population. Within the resident population two options are also given for the duration of stay (at least 12 months, as in the CES Recommendations, and most of the last 12 months).

28.   The purpose of an agreed international definition of total population would not be to impose to the countries a specific approach (which should first serve the national needs), but rather to define common criteria for national population counts to be used at international and supranational level[11]. In the development of such a common definition, the following issues should be considered:

  (a)   minimal duration of stay (duration threshold): the census recommendations (UNECE, 2006; UN, forthcoming) indicate a 12-months threshold. Data provided by UNECE countries based on the 2000 Census round relate to diverse duration thresholds, usually ranging from 3 to 12 months, while a number of countries used other criteria to define usual residence. The treatment of nationals living abroad is particularly important in the provision of comparable population figures, since they have been sometimes included in the count of resident population irrespective of the length of residence abroad;

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majority for the adoption of decisions by the EU Council reinforce the need to develop standards on the production of population statistics to make sure that the annual figures are comparable among the EU countries.

[9] See the Database on International Statistical Activities (Integrated Presentation) on the UNECE Statistical Division website (http://unece.unog.ch/disa/disa.default.asp?Year=2006). The relevant areas are "1.1.1 Population and migration" and "4.3.5 Other administrative and non-survey sources".

[10] CES Recommendations for the 2010 Censuses of Population and Housing (UNECE, 2006), UN Principles and Recommendations for Population and Housing Censuses, Revision 2 (UN, forthcoming)

[11] Standards on the definition of total population could acknowledge different uses of population figures, and could be based not only on the concept of residence, but also on other concepts, such as the use of services.

(b) treatment of persons with irregular status: the census recommendations (UNECE, 2006; UN, forthcoming) indicate that such persons should be included in the resident population, provided that they comply with the 12-months rule. However, in the 2000 Census round countries followed various approaches in dealing with foreigners without a legal status or with a not well defined/temporary status such as asylum seekers or short-term immigrants[12,] with regard to the inclusion in the resident population.

29.   In addition to these general issues, the treatment of specific population groups, such as students studying in another country, should also be considered[13.]

B.   Population data disseminated by international organizations

30.   There is no unique approach to dissemination of population data by international organizations. Many international organizations use the population estimates provided by the UN Population Division to ensure international comparability, particularly when population is used to calculate other indicators (such as GDP per capita, enrolment ratios). For the majority of countries, these figures are in line with the national data, but for countries where the measurement of population is more problematic (because of large migrations for example) there may be discrepancies with national data. For these countries, some international organizations disseminate the data as provided by the countries, but even data provided by countries in different contexts (for example economic or social and demographic[14]) can sometimes be different.

31.   The dissemination by international organizations of different population figures is sometimes justified by the different purpose that they serve. For example, measuring trends of GDP per capita across countries may justify the use of the UN estimates or other methods used to smooth the population between the two censuses[15], but the same estimates cannot be used when data have to be disseminated by population sub-groups (for example by sex, age, race, ethnicity, labour force status).

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[12] In some cases these population groups were included in the resident population, in other cases they were considered as present but not resident while other countries did not included them in any population count (for detailed analysis and results: UNECE/Eurostat (2004) Definitions and measurement of International migration in the 2000 Census Round and issues for the 2010 Round, available at:
http://www.unece.org/stats/documents/2004.11.census1.htm)
[13] See the paper by M. Skaliotis *The Use of Annual Estimates of Total Population for Decision Making in the EU* (paper presented at the ECE-Eurostat Work Session on Population Censuses, Geneva 23-25 November 2004).
[14] In a few countries the population considered for National Accounts can be different from the population considered for demographic purposes. These differences are small in the majority of the countries, but in a few countries they may be more significant.
[15] If national data are used in countries where there are large discrepancies between the population data of the census year and the pervious year, changes in GDP per capita would reflect the miscalculation of population data in the years before the census rather than real changes in GDP per capita.

III. DEMOGRAPHIC PROJECTIONS

32.   Demographic projections have always had a critical importance for policy-making, because they set the basis for medium and long-term planning in many fields. Demographic projections acquired even higher strategic relevance for countries where the effects of population ageing and international migration are expected to be particularly strong over the next decades, as a consequence of decreasing fertility and increasing longevity.

33.   In this context, the preparation of population projections, both by national and international organisations, could be subject to political pressure and influence. The selection of the assumptions on the future developments of fertility, mortality and especially migration, is a critical issue in the preparation of the projections where there is always a degree of subjectivity. Therefore, it is particularly important to guarantee that the Fundamental Principles of Official Statistics (in particular those concerning transparency, professionalism, and independence) are respected and guaranteed in the preparation of demographic projections.

34.   There are no international standards in the field of population projections. The principles guiding the production of population projections are based on the same calculation used to prepare annual population figures: each year the population changes according to the number of births, deaths and net migration. How these components evolve in the future can be estimated based on stochastic or not stochastic models, which each country may adjust to its circumstances. Therefore, international standards in the production of population projections may be inefficient. However, countries may benefit from the development of good practices in this area which could be developed under the existing CES programme on population projections16.

IV. INTERCENSAL POPULATION ESTIMATES AND THE REALIGNMENT OF PAST ESTIMATES WITH NEW CENSUS FIGURES

35.   As most countries in the ECE region have published the final results of the population census taken in the 2000 round, problems have emerged in realigning the population size and structure resulting from the census with the estimates produced before the census. For a few countries of the region, this affects the population data series of the years between two censuses disseminated at both national and international level. Countries and international organizations address this issue differently. Some countries simply do not revise the past population figures accepting the wide difference between the census year and the year before. Other countries revise the population figures between the two censuses using different methods[17]. International and regional organizations also adopt different approaches when using data from national sources[18]: they keep the original data or use benchmarking methods to smooth the data among the 10 year period.

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[16] Under this programme, regular meetings are organised (jointly by ECE and Eurostat) to give demographic projection experts the opportunity to exchange experiences and discuss methodologies in this field. For more details see activity 3.20 in the UNECE Annual Statistical Programme 2007, available on the UNECE Statistical Division website at: http://www.unece.org/stats/stats_e.htm.

[17] These methods include: smoothing techniques based on equally redistributing the change rate of the population to the inter-censual period and calculation of population based on vital statistics and migration.

[18] In general, international organizations use data from national sources for disseminating demographic data while

36.   Countries in the region which found large discrepancies between population estimates and census data have asked the assistance of the international community to realign their population figures between the two censuses. Ad hoc advisory services were provided to these countries by international and national donors. With the coming up of the new census round and the possibility of having the same problem re-emerge, there is the need to assess the relevance of developing guidelines on methodologies to be used at national and international level to produce population estimates for the intercensal period and realign past estimates with new census figures. These guidelines could build on the work carried out within the research community[19] and should take into account the different levels of availability and quality of information on the different components of population change (fertility, mortality and international migration).

V.   CONCLUDING REMARKS

37.   In conclusion, the following issues may need the attention of the international statistical community:

38.   Production of annual population statistics: it represents a primary output of a NSO but no international standards or best practices exist to assist countries in this field. The population update is simple in its mathematical expression but it can be very difficult to provide reliable and consistent estimates of benchmark population, births, deaths and international migrations. The fact that some countries find considerable discrepancies between the population estimated through the annual update and the population enumerated at the census is a clear sign of underlying problems. At international level, work could be considered to present possible options and good practices on data sources and statistical methods to produce good quality estimates. These good practices should deal with the most problematic issues, as for example the measurement of net international migration when international migration statistics do not cover all the in-flows and out-flows of persons.

39.   International standards on total population: at the international level there are some agreed standards defining the population at the census[20], while no definition exists on the total population to be produced on an annual basis. Countries are invited to produce internationally comparable census data, but comparability may be lost in the annual updates. The development of international standards could be considered on how to define population statistics and to enhance their comparability across countries.

40.   Demographic projections: statistical methods to produce demographic projections have in most cases a consolidated tradition, based on the so- called 'cohort-component model'. Other important developments, as for example the use of stochastic models, are still in the stage of statistical research. Demographic projections can have a crucial importance in influencing policy

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they mostly use the population estimates produced by the UN Population division when calculating rates or ratios in the context of economic statistics (for example calculating GDP per capita) or social statistics (for example calculating enrolment ratios).

[19] See for example, M. Poulain and A. Herm "*Basic Methodology for the recalculation of intercensal population estimates*", Eurostat Working Paper and Studies 2003.

[20] CES Recommendations for the 2010 Censuses of Population and Housing (UNECE, 2006), UN Principles and Recommendations for Population and Housing Censuses, Revision 2 (UN, forthcoming)

decisions, as for example in the field of pension reform. The transparency of methods and assumptions and the guarantee of independence of NSOs carrying out demographic projections could be addressed at the international level.

41.   Intercensal population estimates and realignment of past estimates with new census data: most countries face the problem of building consistent population estimates once data from the latest census become available. Countries and international organizations have developed various good practices to address the issue, depending on existing statistical frameworks. The issuance of international guidelines and/or good practices could represent a useful tool for many countries and ensure more standardized approaches in the future.

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