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Are population censuses in Asia and the Pacific evolving?

The population census is among the most complex and massive exercises a nation undertakes, requiring comprehensive planning, immense resourcing, attentive implementation, and systematic collaboration on a national or even regional level, such as among the Pacific Island States. In return, the population census generates a wealth of data for legislative and evidence-based decision-making at all levels - global, regional, national and subnational.

With expanding and evolving statistical demands in the face of limitations and disasters such as the COVID-19 pandemic, National Statistical Offices are exploring new approaches to producing data and statistics, which among others, include "modernizing census taking".

This Stats Brief gives an overview of how census taking has been evolving over recent decades, focusing on Asia and the Pacific region as the home to two-thirds of the world's population.

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Introduction

The modern population census began to evolve in the 17th century. Prior to that time, inventories of persons, taxpayers, or valuables were made, but with two key differences. Those early inventories were for the purpose of control, for example, to identify who should be taxed, inducted into military service or forced to work, and they did not seek to count all the people or even a representative sample of them but only those in particular categories such as family heads or males of military age. Such surveys are known to have taken place in ancient Babylonia, Palestine, Persia, China, and Egypt,[1] with the Australian muster in 1788 being a more recent example.[2]

The contemporary concept of a population census as the complete enumeration of all people originated in the 17th and 18th centuries to comprehend the basic structure and trends of the society rather than to identify and control specific individuals. India's first census as a complete enumeration, listed as 1881,[3] is one of the earliest in Asia-Pacific, falling under the category of modern censuses. More developed Asia-Pacific nations like Australia list their first national census as 1911, around 30 years later than India, and some developing nations like Afghanistan list their first (and only) national census as 1979,[4] about 100 years after India.

1 https://www.britannica.com/science/census

2 https://www.records.nsw.gov.au/archives/collections-and-research/guides-and-indexes/census-musters-guide

3 https://www.censusindia.gov.in/Data_Products/Library/Indian_perceptive_link/History_link/censushistory.htm

4 https://iranicaonline.org/articles/census-ii

Censuses in Asia and the Pacific have changed greatly since India's first census in 1881. But how is census taking in the region evolving to meet new data and statistics demands stemming from new global commitments to inclusive development and Leave No One Behind?

The 20th century

The United Nations has been credited with increasing the number of countries conducting censuses in the second half of the 20th century. The Economic and Social Council (ECOSOC) was established in 1945 as one of the principal organs of the United Nations responsible for the direction and coordination of organization's economic, social, humanitarian, and cultural activities. The Economic and Social Council at its fourth session (February-March 1947), taking note of the recommendations of the Statistical Commission and the Population Commission, adopted a resolution recommending "*that all such Member States as are proposing to take censuses in or around 1950 use comparable schedules, as far as it is possible to do so*"; and requesting the Secretary-General, "*... to offer advice and assistance to all such Member States as are prepared to take comparable population censuses, whether by complete enumeration or on the basis of a scientific sample*".[5] The United Nations Population Commission, at its second session in August 1947, requested the United Nations Secretary-General to call the attention of Member Governments to the need for making adequate provision for the period of years required for the undertaking, to cover the preparatory work, the enumeration of the population, the tabulation of the data, and the publication of results. The Population Commission also proposed a minimum list of subjects "*for which comparability should be attempted in connection with the censuses to be undertaken in or around 1950*".[6]

The United Nations continues to place importance on comparable population censuses. Since the 1950s, the United Nations Statistics Division (UNSD) has served as the secretariat for the decennial World Programme on Population and Housing Censuses, promoting population censuses worldwide under the auspices of the United Nations Statistical Commission. Promotional efforts include setting standards and methods, for instance, through the publication of Principles and Recommendations for the Population and Housing Censuses,[7] providing technical assistance to strengthen national statistical capacity to undertake censuses and compiling and disseminating census results online and in print. Besides the UNSD, the United Nations Population Fund (UNFPA) also plays an important role in providing technical and financial assistance to population censuses.

The World Programme on Population and Housing Censuses offers some intriguing insights into the history of censuses. Official census documents dates back to 1947 when the Americas identified "*general procedural items such as a) de facto and de jure enumeration and presentation of population data, b) definitions of area detail including "urban" and "rural", c) special problems of enumerating non-Europeanised tribes of Indians, d) the integration of an agriculture census with a population census and e) general administrative problems relating to preparatory work, census office equipment and organization, and publication of census reports*". [8] Interestingly, all five of these issues remain relevant today including, somewhat disappointingly, a methodology for delineation of urban and rural areas for international and regional comparison purposes some 70 years after the Americas raised it in 1947.

5 Resolutions adopted by the Economic and Social Council during its 4th Session from 28 February to 29 March 1947 (E/437), pp. 19-20. Available at https://documents-dds-ny.un.org/doc/UNDOC/GEN/NR0/752/50/img/NR075250.pdf?OpenElement.

6 Economic and Social Council, Official Records, 6th Session, Supplement No. 4 : Report of the Population Commission (E/571), p. 5 and Annex B. Available at https://documents-dds-ny.un.org/doc/UNDOC/GEN/NL1/481/94/pdf/NL148194.pdf?OpenElement.

7 https://unstats.un.org/unsd/publication/SeriesM/Series_M67Rev3en.pdf

8 https://unstats.un.org/unsd/statcom/2nd-session/documents/doc47/1947-26-CensusAmericas-E.pdf

The third session of the United Nations Statistical Commission in 1948 was the first to record national level plans for census taking.[9] There, 10 Asia Pacific countries[10] recorded their most recent census and/or plans for a future census, compared to 57 ESCAP member countries and areas reporting in 2020.[11]

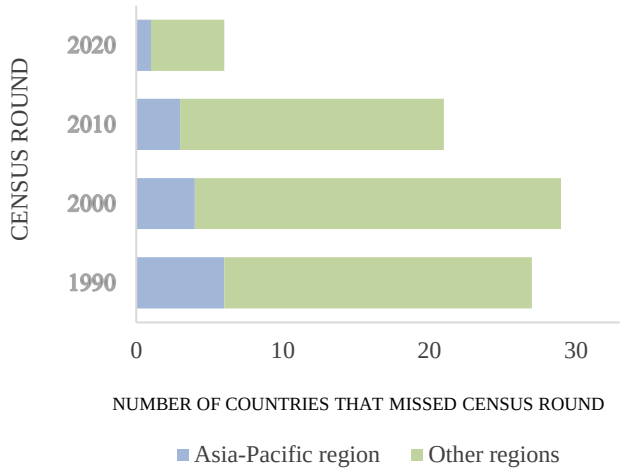
The 20th century also features one fortunate evolution – the strengthening of data protection following the widespread misuse of Census data during World War II. Actually, the first documented misuse of census data occurred when the United States Selective Service System used 1910 census data to verify the age of individuals suspected of lying about their draft eligibility. The use of census data to identify individuals to be rounded up during World War II, including in Germany and the United States, is cited as a tragic example of census data misuse. These instances of misuse continue to be cited today alongside an unsuccessful attempt by US federal authorities to access American census data to locate Muslim Americans after the terrorist attacks of 9/11.[12]

The 21st Century

In the 21st century, there have been three rounds of population censuses – 2000, 2010 and 2020–[13] and the number of countries missing census rounds is steadily falling (Figure 1), which is encouraging.

Censuses in the 21st century are taking place in a complex setting. New global commitments, such as the 2030 Agenda for Sustainable Development, have led to an increase in demand for more disaggregated statistics. At the same time, disasters and the recent outbreak of the COVID-19 pandemic add complications to data collection. However, with technological advancements and the availability of new data sources, National Statistical Offices now have more options at their disposal.

Figure 1. Census prevalence



Reference: https://unstats.un.org/unsd/demographic-social/census/index.cshtml#censusdates.

A global survey of National Statistical Offices on plans for the 2020 round of population censuses[14], conducted by the UNSD, provides some insights on contemporary "*general procedural items*" for population censuses. This survey gathered responses from 158 countries; 41 responses from Asia-Pacific countries are available. In the following sections, we will discuss the Asia-Pacific censuses through the lens of the UNSD survey.

Census methodologies are evolving

Traditional census taking, in principle, entails canvassing the entire country, reaching every single household and collecting information on all individuals within a brief stipulated period of time.[15] While the majority of countries in the world, as well as those in Asia and the Pacific, continue to employ the traditional approach, an increasing number of countries are relying on registers (solely or complemented by a full field enumeration or sample survey).

9 See Agenda items 3(a) and 3(c) available at https://unstats.un.org/unsd/statcom/3rd-session/documents/.

10 Australia, Burma (which is now Myanmar), China, India, Iran (which is now Iran, Islamic Republic of), Japan, New Zealand, the Philippines, Siam (which is now Thailand), and Turkey. Additionally, the Union of Soviet Socialist Republics (USSR) was listed with three distinct entries: Republics; Byelorussian Soviet Socialist Republic and Ukrainian Soviet Socialist Republic.

11 https://unstats.un.org/unsd/demographic-social/census/censusdates/

12 https://www.abc.net.au/radionational/programs/rearvision/the-dark-side-of-census-collections/7860908

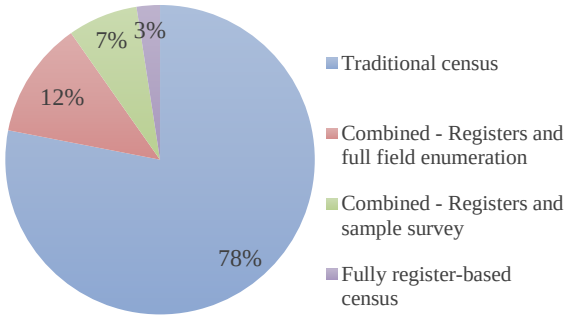
13 The 2000, 2010 and 2020 rounds, respectively, cover the years 1995–2004, 2005–2014, and 2015–2024.

14 https://unstats.un.org/unsd/statcom/51st-session/documents/BG-Item3j-Survey-E.pdf

15 https://unstats.un.org/unsd/publication/seriesM/Series_M67Rev3en.pdf

The UNSD survey results indicate that in Asia and the Pacific, most countries (78 per cent) used or will use the traditional approach to censuses in 2020, i.e. full field enumeration with paper/electronic questionnaires. The remainder utilizes administrative registers for producing small area statistics, either by combining registers and full-field enumeration (12 per cent), combining registers with sample surveys (7 per cent), or using full register-based census (3 per cent). In Asia-Pacific, rolling censuses have not been implemented (Figure 2).

Figure 2. Main census method in Asia-Pacific countries



There has been a trend toward innovative approaches, such as the use of satellite imaging and remote sensing, as well as the combination of two or more enumeration methods to ensure completeness of coverage, timeliness, and the production of census data that meets expectations and demands. The hybrid census is one such innovative methodology for generating spatially disaggregated population estimates in situations when traditional census enumeration is impossible due to insecurity or instability. In the hybrid census, a small-scale survey, called micro-census, is conducted. Then through statistical modelling techniques, counts of the population within small defined areas from micro-census are combined with satellite imagery in order to estimate populations and their characteristics in areas not covered by the micro-census. One example of the use of hybrid census method in the Asia-Pacific region is the case of Afghanistan, where a census has not been conducted since their first and only national census undertaken in 1979.[16]

De jure or *de facto* remain relevant concepts

There are two generally accepted concepts for counting total population in a census, *de jure* (a count based on a person's usual residence) and *de facto* (a count based on the place where a person is present at the time of the census). Some countries choose to adopt both concepts. According to the UNSD survey results, in Asia and the Pacific, while some countries apply solely the *de jure* or *de facto* concept (41 per cent and 32 per cent, respectively), a significant number of countries (27 per cent) have chosen to produce census data (e.g. total population count) on the basis of both concepts.

Technology and evolution go hand in hand

For many countries, quantum leaps in the use of technology commenced towards the end of the 20th century and the beginning of the 21st century. For example, schedules for the phases of the 2001 Indian Census were scanned through high-speed scanners, and handwritten data from the schedules were converted into digitized form through Intelligent Character Reading (ICR).[17] In Australia, the 2006 census was the first to give respondents the option of completing their form online.[18] Nonetheless, Australia did not perform a digital first census until 2016[19] when 63 per cent of respondents completed their census form online. The use of portable electronic devices for data collection quickly gained popularity due to their features, which include the ability to improve the quality of collected data, facilitate field operations, improve management and supervision of enumerators, and enhance the usability of census data.

16 https://www.unfpa.org/sites/default/files/pub-pdf/Census_Strategy_Final_July.pdf

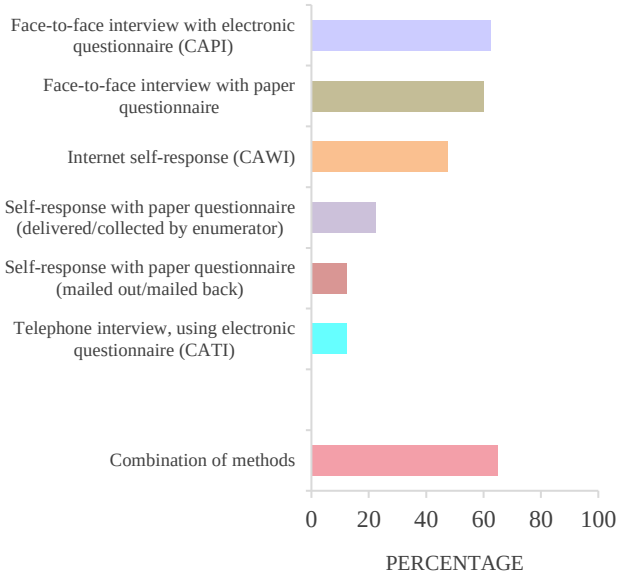
17 https://censusindia.gov.in/Ad_Campaign/drop_in_articles/05-History_of_Census_in_India.pdf

18 https://www.abs.gov.au/AUSSTATS/abs@.nsf/mediareleasesbyReleaseDate/4C85D1995909281FCA2571CD000F74D9?OpenDocument

19 https://www.abs.gov.au/websitedbs/D3310114.nsf/Home/Assuring%20Census%20Data%20Quality

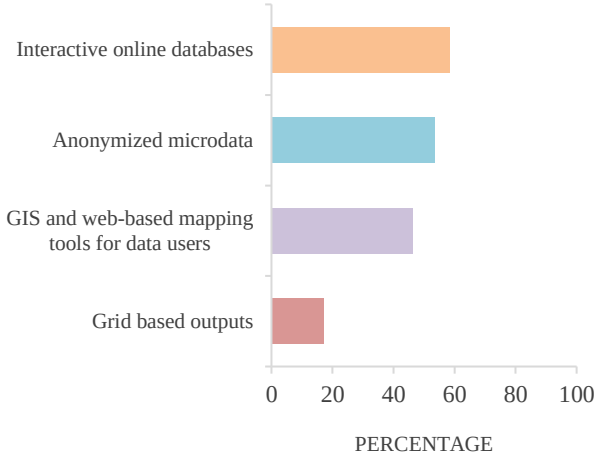
The UNSD survey findings provide an overview of the enumeration methods being used, either alone or in combination (Figure 3). Face-to-face interviews with an electronic questionnaire (CAPI[20]) are the most commonly used method by countries in Asia and the Pacific (63 per cent), followed by face-to-face interviews with a paper questionnaire (60 per cent) and internet self-response (CAWI[21]) (48 per cent). It's worth mentioning that 65 per cent of countries benefit from a combination of methods.

Figure 3. Methods of enumeration in Asia-Pacific countries for field-based data collection



Countries are also expanding use of innovative methods for disseminating and visualising census data in a more user-friendly manner, as well as to promote web-based, interactive, free and open dissemination platforms capable of hosting geospatial data. According to the findings of the UNSD survey, 59 per cent and 54 per cent of Asia-Pacific countries, respectively, aim to provide interactive online databases and anonymized microdata. The following section will address geospatial data products.

Figure 4. Plan to provide contemporary data dissemination products in Asia-Pacific countries



Geospatial information is increasingly being used

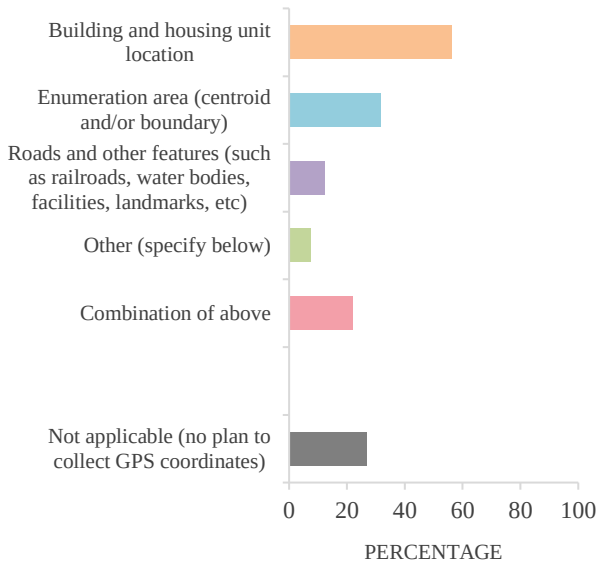
Another new development in census-taking is the growing role of geographic information systems (GIS), which contributes to improving census maps and delineation of enumeration areas, facilitating census field operation, monitoring and supervision, and greatly enhancing census data dissemination and communication. Electronic data collection devices allow capturing GPS coordinates, which result in an adequate geo-referenced statistical information infrastructure. Geo-referenced data enables the use of models for the granular assessment of population distributions, though require advanced capacity in integrating GIS into statistical production systems.

The UNSD survey results indicate that in Asia and the Pacific, most countries (73 per cent) collect or plan to collect geographic coordinates either for enumeration area, building and housing unit location, or roads and other features (32 per cent, 56 per cent, 12 per cent, respectively); see Figure 5. Several countries also intend to offer GIS and web-based mapping tools for data users and/or Grid-based output (46 per cent, 17 per cent, respectively); see Figure 4.

20 CAPI: Computer-assisted personal interviewing

21 CAWI: Computer-assisted web interviewing

Figure 5. Plan to collect geographic coordinates in Asia-Pacific countries



Crisis spurs evolution

New Zealand provides a case study of when censuses are disrupted, postponed or even cancelled as a result of disasters (2011), economic measures (1931) or war (1941). In 2011, New Zealand's five-yearly census was cancelled after a devastating earthquake hit the Canterbury region less than two weeks from the census scheduled date of 8 March 2011. Cancelling the census so close to the due date cost around $NZ65 million, as forms had already been printed and distributed to half a million houses. The 2011 Census was subsequently rescheduled for 2013, resulting in a seven-year rather than five-year gap between censuses. In comparison, neither the 1931 nor 1941 censuses (which were also cancelled due to the Great Depression and the Second World War respectively) were rescheduled, leading to two decade-long gaps between censuses, with the next census being conducted in 1945.[22]

New Zealand was also challenged with a lower-than-expected response rate to its census in 2018. This compelled them to apply a truly innovative approach – combining census records with administrative data to build a census dataset based on administrative enumeration. Instead of using statistical imputation processes to address missing census records, New Zealand used administrative data sources, data integration techniques and estimation methodologies to create a census dataset, putting to the test the traditional concept of a census being an enumeration per se.[23]

COVID-19 is now presenting a 'crisis' situation as well. While COVID-19 is not an earthquake or a war, it is causing disruption to statistical operations and introducing austerity measures. To assess the pandemic's impact on census-taking in the 2020 round, UNSD has conducted two surveys, targeting countries that originally scheduled a census in the year 2020 or 2021.[24] According to the findings of the second survey, 78 per cent of the 23 respondent countries in Asia and the Pacific were affected by the COVID-19 outbreak. The countries that had already concluded their field operations, implemented register-based censuses, or had a stable COVID-19 status made up the remainder. As a result of the crisis, many of affected countries postponed their censuses (50 per cent) or extended the enumeration period (39 per cent). Among the major challenges that countries encountered was the requirement to reduce face-to-face interaction, mobility restrictions, procurement and staffing difficulties, and funding limitations and constraints due to reallocation of the government budget for other priorities, e.g. health and economic recovery (such as the case of Indonesia[25]).

However, innovation flourishes through constraints. The UNSD's second survey reveals a rush towards utilizing innovative approaches to tackle the challenges raised by the pandemic. The majority of responding countries whose censuses were impacted by the pandemic declared a change or adaptation to their planned approaches and methods (72 per cent). Self-enumeration with mail-out/mail-back or drop-off/pick-up, telephone data collection, online data collection, and the utilization of administrative data are all common ways. For example, both Indonesia and Malaysia had intended to conduct their 2020 Census using a combination of online and traditional enumeration methods, but COVID-19 led to greater

22 https://nzhistory.govt.nz/page/census-held-after-two-year-delay

23 https://www.stats.govt.nz/methods/overview-of-international-peer-review-of-2018-census-methodology

24 https://unstats.un.org/unsd/demographic-social/census/COVID-19/

25 https://unstats.un.org/unsd/demographic-social/meetings/2021/egm-covid19-census-20210209/docs/s03-04-IDN.pdf

reliance on online data collection methods and the extension of reporting periods. There is also a tendency towards online and virtual training for enumerators.

Concluding

Since the 17th Century, censuses and census taking have evolved. Technology has enabled evolution of collection, processing and dissemination methodologies, and has made new data sources available as well, such as satellite images in the case of Afghanistan. Disasters, in the very broadest sense, also provide opportunity for evolution as evidenced by the tightening of data protection after the misuse of census data during World War II and more recently, in New Zealand when faced with lower than expected response rate in their 2018 Census. COVID-19 is spurring further evolutionary steps across Asia and the Pacific.

Technology, data integration methodologies and big data sources such as satellite images are sure to feature in the Population Census landscape for decades to come.

For more information regarding ESCAP's work in statistics development please visit:
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