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Conducting population and housing censuses during the pandemic: An overview

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Abstract. This overview focuses on the implementation of the 2020 World Population and Housing Census Programme in 2020 and 2021 amid the COVID-19 pandemic; impact on census-taking in terms of adapting data collection instruments and techniques to the new pandemic reality; comparability with the previous census; and the long-terms impact on census-taking after the 2020 round.

Keywords: The 2020 World Population and Housing Census Programme, COVID-19 pandemic, census taking, data collection methods, challenges, censuses after 2020 round, UNSD survey, Expert Group Meeting

1. Introduction

This article should be read in conjunction with the article *The 2020 Round of Population and Housing Censuses: An Overview*, issued in the Statistical Journal of the International Association for Official Statistics[1] – an overview of census-taking before the COVID-19 pandemic. The earlier article pointed to the contemporary solutions that were planned to be implemented during the 2020 census round, covering the period 2015–2024 and the overall state of the art of the 2020 World Population and Housing Census Programme. Then, on 11 March 2020 the World Health Organization declared COVID-19, a disease caused by a coronavirus called SARS-CoV-2, as a global pandemic. At the moment of writing this text[2] the total number of COVID-19 cases around the world exceeds 130 million, with almost 3 million deaths. The full impact of COVID-19 pandemic on all the dimensions of social, economic, environmental and psychological wellbeing of the world population is certainly immeasurable and difficult to fully quantify; this contribution will focus on the impact the pandemic caused on population and housing census-taking in the year 2020 and 2021 and implications in terms of quality of census-taking, comparability with previous censuses, interpretation of resulting census statistics and the future of census-taking.

This contribution is based on a number of initiatives that the United Nations Statistics Division, in its role as the Secretariat of the 2020 World Population and Housing Census Programme undertook at the onset of the pandemic – a series of surveys dispatched to national statistical and census authorities, an Expert Group Meeting that took place in February 2021, and the report of the Secretary-General of the United Nations and background documents submitted to the Statistical Commission for its online 52nd session.

The focus is on censuses that were planned to take place in the years of 2020 and 2021 since these two years, as per the international recommendations[3] are peak years – all the Member States were called upon to conduct their population and housing censuses or otherwise produce small-area census statistics in one of those two years or as close as possible to enable regional and international comparability of census statistics. Accord-

[1] Statistical Journal of the International Association for Official Statistics; Volume 36, No. 1, 1 January 2020.
[2] March 2021.
[3] United Nations, Principles and Recommendations for Population and Housing Censuses, Revision 3, United Nations Publication, Sales No. E.XVII.10, New York, 2017.

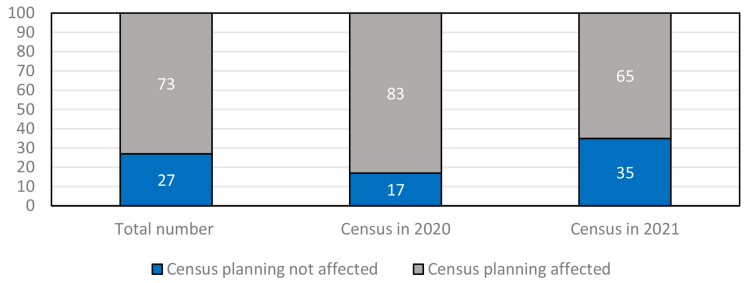

Fig. 1. Overall impact of COVID-19 (in percent).

ing to UNSD documentation, 121 countries/areas originally planned to conduct the population and housing census in these two years.

Based on surveys and other documentation, as well as direct contact with the national authorities in charge of the population and housing censuses, it is evident that the pandemic is having a significant adverse impact on the conduct of the censuses. Data collection is being postponed; enumeration time has been extended sometimes to over six months; the need for protecting enumerators and respondents has raised a number of issues such as availability of protective gear and interviewing while respecting social distancing; and questionnaires are being shortened. In addition to the negative impact from census postponements, the pandemic has made some segments of the population more difficult to enumerate. During periods of lockdown, travel restrictions and mandatory quarantines, students have left their place of education and workers have moved away from their workplaces. Countries plan the timing of the census to capture the maximum number of people at their place of usual residence. The pandemic has prompted changes to the expected location of large parts of the population, which is likely to negatively impact the quality of census statistics in the 2020 round of censuses.[4]

2. Impact on the overall conduct of population and housing censuses

In December 2020/January 2021 UNSD dispatched the most recent survey on the impact of COVID-19 on census taking in 121 countries/areas that originally planned to conduct the census in 2020 or 2021. The short survey requested information on the impact of the pandemic on preparatory activities, enumeration in the field, census methods and challenges. Replies were received from 104 countries/area, a response rate of 86%.

The survey requested countries to indicate whether or not COVID-19 affected the planning and conduct of their census, for those that scheduled one in the year 2020 or 2021. Nearly three in four countries (73 per cent) indicated being affected or anticipating being affected by COVID-19 (see Fig. 1). Among those respondents that originally scheduled a census in the year 2020, more than eight in ten (83 per cent) indicated being impacted, while nearly two-thirds (65 per cent) of those that scheduled a census in 2021 did so.[5]

3. Impact on census preparatory activities

Probing further in terms of pandemic's impact on population and housing censuses, the survey incorporated a question related to the census preparatory activities – more precisely, whether they had to postpone some or most of the preparatory activities initially scheduled for either 2020 or 2021. Figure 2 below displays that the staggering majority of responding countries (71% per cent of the total) overall had to postpone either some or most/all preparatory activities.

The list of preparatory activities that were adversely affected is as follows, also displaying the overall percentage of countries that reported postponements in the two years:[6]

- Training, 69%
- Publicity, 54%
- Pilot census, 52%

[4] United Nations, Report of the Secretary-General: Demographic Statistics, 52nd Session of the UN Statistical Commission, 14 December 2020.

[5] United Nations, Report on the results of the UNSD survey on the impact of the COVID-19 pandemic on 2020 round of population and housing censuses, Background document, 52nd Session of the UN Statistical Commission, March 2021.

[6] Ibid.

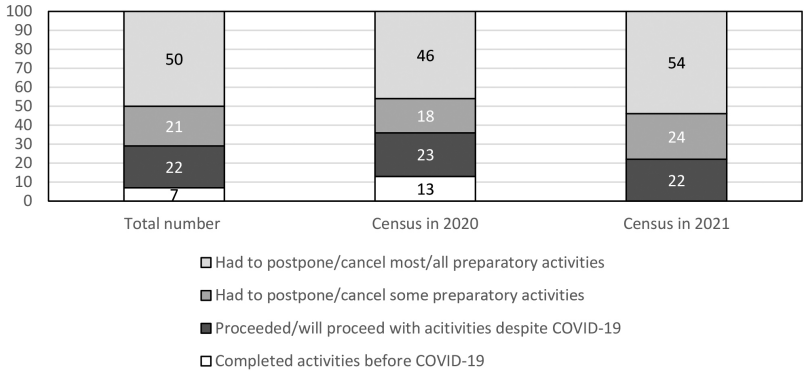

Fig. 2. Impact on preparatory activities (in percent).

- Procurement, 46%
- Mapping/cartography/listing, 41%
- Stakeholder outreach, 41%
- Project planning document, 30%

As assumed, training of the enumerators and supervisors was the activity most severely affected by measures introduced for the mitigation of risk of contracting COVID-19 as they require interactive environment and direct communication between the trainers and the trainees. Postponing pilot censuses have a domino effect, as it delays quality testing and introduction of necessary adjustments.

4. Impact on conducting enumeration in the field

The UNSD survey asked NSOs on whether COVID-19 impacted their field-based enumeration operation. In particular, the survey requested countries to indicate whether or not they had to stop or postpone or extend the field work of the population and housing census.

Among the responding countries that had originally scheduled a census in the year 2020, 28 per cent proceeded to conduct their enumeration in 2020 but had to extend the period of enumeration by weeks and months or to postpone the census to a later date in 2020. More than half of the countries had to postpone the census to the year 2021, while 15 per cent postponed the census to the year 2022 or beyond. Only 5 per cent of countries conducted their census without postponing or extending the enumeration period.

With respect to responding countries that had originally scheduled a census in the year 2021, half of the countries had to postpone the census to a later time, while 24 per cent postponed the census to the year 2022 or beyond. More than one in four (26 per cent) countries anticipate to not have to postpone or extend the enumeration period due to COVID-19. It should be noted that information provided by countries that originally scheduled a census in the year 2021, the information provided relates to the situation as at the time of the survey (mainly December 2020–January 2021), and a later assessment may be needed as census operations proceed in order to obtain a more accurate picture of the impact of the COVID-19 pandemic.[7]

Postponement of national population and housing census activities were caused not only by national circumstances linked to the pandemic; they were also subject to a much more global impact of the pandemic. For example, Cote d'Ivoire population and housing census, meticulously prepared over a period of years and relying on a combination of CAPI (face-to-face enumeration with tablet computers) and PAPI (face-to-face enumeration with paper questionnaires – for areas without proper infrastructure or exposed to increased risks to enumerators due to security issues) had to postpone the field enumeration initially scheduled for the period of 20 April – 15 May of 2020 as a consequence of the delay in delivery of the tablet computers due to the COVID-19 pandemic; the initial deadline for delivery of tablets from oversees producers, March 2020, could not be maintained. The first shipment of tablets reached Cote d'Ivoire in June 2020. As the presidential election in the country were scheduled for November 2020, the whole census was subsequently initially postponed for March 2021. The second postponement – now May

[7] United Nations, Report on the results of the UNSD survey on the impact of the COVID-19 pandemic on 2020 round of population and housing censuses, Background document, 52nd Session of the UN Statistical Commission, March 2021.

2021 – was initiated by scheduling legislative elections for March 2021.[8]

Postponing the population and housing census in Cote d'Ivoire has both negative and positive consequences. Moving the census activities along the calendar and extending them over longer period than initially budgeted for resulted in increased costs. These were also subject to procuring protective gear due to mitigating the spreading of COVID-19. Hence, additional project operating expenses and unbudgetedbefore health expenditures resulted in extra costs. At the same time, the postponement lead to a development of additional instruments to improve census operations: development of the dashboard to monitor daily progress of data collection operations from the enumerator, team leader, supervisor and the home office; development of monitoring the quality of basis data in the questionnaire; use of para-data; and much more complete testing of the process, as well as full digitization of the control areas, initially available only on paper.[9]

Postponing the population and housing census provides an opportunity to assess the plausibility of different approaches to census operations, especially under the pandemic circumstances and the necessity to minimize physical interaction between enumerators and respondents. Germany is applying a combined census model – combining data from administrative registers and conducting a supplementary survey, crucial to determine the exact number of population, under the assumption that the required accuracy level can only be achieved through the personal contact between interviewer and respondent.[10]

After the onset of the pandemic in March 2020, the population and housing census in Germany was postponed for a year. That provided an opportunity to elaborate on several questions: can personal interviews be shortened? Or replaced by other modes? Replace face-to-face contacts by communication via telephone? Online survey? While discussing these various approaches of critical importance was the requirement to achieve the highest level of accuracy, health protection of both the enumerators and respondents, minimizing interference with personal rights, and, of course, feasibility and costs. The current standpoint (February 2021) envisages keeping face-to-face interviews while adding protective measure and developing the CATI (telephone interviews) alternative, with the final decision and the timing of the census scheduled for fall 2021.[11]

Pressed by the pandemic circumstances and the number of measures imposed by governments to mitigate the risks of COVID-19 infections, census-takers worldwide explored alternatives to face-to-face interviewing. As presented in the previous paper[12] on the 2020 World Population and Housing Census Programme, over 70 per cent of censuses in the 2020 round were of traditional kind – whereby each household is approached by census-takers to provide information, irrespective of the type of data collection involved. Data collection method relied in most cases on face-to-face interviews, whether using paper questionnaires or tablet computers or other electronic devices. These were often combined with an internet self-enumeration data collection method where such infrastructure existed. Telephone interviews were planned to be used as a secondary method, for reaching non-respondents and for follow-ups. Therefore, face-to-face interviewing was a major component of census-taking strategies in the majority of countries. Introducing measures to eliminate social contacts and, consequently, disable face-to-face interactions due to COVID-19 pandemic, prompted developing adjustments on the fly.

The UNSD survey asked the countries to provide information on changes/adaptations that they undertook to replace or reduce face-to-face interviewing. Figure 3 presents the results – it has to be outlined that the sum of the individual categories in terms of methods exceeds one hundred, as countries were asked to indicate all that applied – and it was often the case that more than one method was applied. As can be seen from the data, most replies indicated introducing CATI – telephone data collection – as the preferred alternative to face-to-face interviewing, around 58 per cent of the total replies, followed by internet self-enumeration – CAWI, with 51 per cent overall. To a lesser extent countries were also exploring using administrative data – 26 per cent, and

[8] United Nations Expert Group Meeting on the Impact of COVID-19 Pandemic on Conducting Population and Housing Censuses and on Census Data Quality Concerns, 9–12 February 2021, UN Statistics Division, New York: The Case of Cote d'Ivoire, available at: https://unstats.un.org/unsd/demographic-social/meetings/2021/egm-covid19-census-20210209/docs/s03-02-CIV.pptx.

[9] Ibid.

[10] United Nations Expert Group Meeting on the Impact of COVID-19 Pandemic on Conducting Population and Housing Censuses and on Census Data Quality Concerns, 9–12 February 2021, UN Statistics Division, New York: Planning the Census in Germany during the Pandemic – Challenges and Prospects, available at: https://unstats.un.org/unsd/demographic-social/meetings/2021/egm-covid19-census-20210209/docs/s03-05-DEU.pptx.

[11] Ibid.

[12] Statistical Journal of the International Association for Official Statistics, Volume 36, No. 1, 1 January 2020.

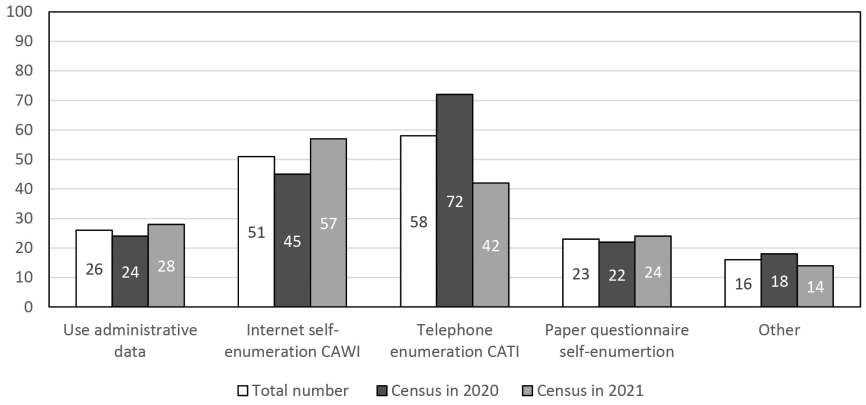

Fig. 3. Changes/adaptations made to census method(s) in order to replace face-to-face data collection (%).

introducing self-enumeration with paper questionnaires (mail-out, mail back or drop off/pick up) – 23 per cent.

Exploring the alternatives to face-to-face interviewing was done in conjunction with other adjustments as well. The Population and Housing Census of Malaysia provides a well-documented and illustrative example of the challenges posed by the COVID-19 pandemic. Initially scheduled for 7 July 2020, the Malaysia Population and Housing Census – MyCensus 2020 planned for an e-census – internet self-enumeration – phase starting from 20 June to 9 July 2020, followed by face-to-face interviews from 7–24 July 2020. After the proclamation of the pandemic, the Government of Malaysia introduced the Movement Control Order for the whole country starting on 18 March. Realizing that these measures will have serious impact on planned census operations, the first adjustment was introduced with moving the e-census from 7 July–30 September, followed by a second phase – face-to-face – from 7–24 October. However, the upsurge in COVID-19 cases prompted the Government to introduce population movement restrictions in selected states, again forcing the re-adjustment of the census schedule, with the e-census running from 7 July to 21 December 2020, and the second face-to-face phase from 20 January to 6 February 2021.[13]

By the beginning of the year the COVID-19 pandemic in Malaysia prompted another Movement Control Order, starting as of 11 January, that again resulted in moving the census schedule up to and possibly after May 2021. In the process, significant efforts were implemented to shift securely from face-to-face strategy to optimizing the usage of e-census and telephone interview as the main mode of response, at the same time exploring using administrative sources for obtaining census information. An additional factor influencing census-taking was identified as reluctance to participate for COVID-19 fear in communities, resulting in non-cooperation with census authorities. In addition, recruitment of census enumerators was hampered by concerns regarding contracting the virus. Extending the enumeration period to almost a year in itself generate legitimate concerns regarding the quality of collected data due to the movement of population in this period of time and recollection errors.[14]

5. Challenges

The UNSD survey requested countries to indicate up to three main difficulties they faced in conducting their census during the COVID-19 pandemic. The response options consisted of the following pre-specified areas of challenge: i) Need to reduce face-to-face interaction; ii) Personnel not available or ill; iii) Funding limitations/constraints; iv) Procurement difficulties; v) Mobility restrictions and problems with transportation; vi) Closure of establishments; vii) Other difficulties; and, viii) No/minor difficulties.

The most critical challenge identified by the responding countries was the need to reduce face-to-face interaction between enumerators and household members (see Table 1). More than 70 per cent of the respond-

[13] United Nations Expert Group Meeting on the Impact of COVID-19 Pandemic on Conducting Population and Housing Censuses and on Census Data Quality Concerns, 9–12 February 2021, UN Statistics Division, New York: Major changes in the design of population and housing censuses due to the Covid-19 pandemic in Malaysia, available at: https://unstats.un.org/unsd/demographic-social/meetings/2021/egm-covid19-census-20210209/docs/s03-06-MYS.pdf.

[14] Ibid.

Table 1
Challenges to conducting census during pandemic

Challenges to conducting census during COVID-19 pandemic	Need to reduce face-to-face interaction	Personnel not available/ill	Funding limitations/ constraints	Procurement difficulties	Mobility restrictions/ problems with transportation	Closure of establishments	Other difficulties	No/minor difficulties
Total replies	76	76	76	76	76	76	76	76
Total number of responding countries reporting impact of COVID-19	60	24	34	22	28	13	12	2
Per cent (%)	*79*	*32*	*45*	*29*	*37*	*17*	*16*	*3*
Total replies	39	39	39	39	39	39	39	39
Countries expected to conduct census in 2020	32	13	17	8	16	8	4	0
Per cent (%)	*82*	*33*	*44*	*21*	*41*	*21*	*10*	
Total replies	37	37	37	37	37	37	37	37
Countries expected to conduct census in 2021	28	11	17	14	12	5	8	2
Per cent (%)	*76*	*30*	*46*	*38*	*32*	*14*	*22*	*5*

ing countries indicated this as one of their top three challenges. This applies equally to countries that conducted their census in the year 2020 or are planning to conduct their census in 2021. More than 40 per cent of responding countries indicated funding limitations and constraints as a major challenge. Similarly, mobility restrictions of field staff and problems with transportation of census materials was highlighted by more than 40 per cent of the responding countries as one of the major adverse impacts of the pandemic on the conduct of population and housing censuses.

The survey results indicated that all responding countries that conducted a census in 2020 faced at least one major difficulty, while among those conducting or planning to conduct their census in 2021, just about 5 per cent do not anticipate facing any major difficulty.

A number of replies indicated facing "Other" challenges. These included:

- Households not permitting interviewers access to their dwelling because of the fear of COVID transmission;
- Challenges with staff selection and training due to the need for social distancing;
- Internal migration patterns of some population groups (eg. students not being present at a term time locality);
- Increase in item non-response with self-enumeration by paper questionnaire or Internet (CAWI);
- Low response rate with CATI;
- Operational challenges in managing multi-mode data collection; and,
- Adapting to changes to working from home (eg. the implication of data processing by staff operating from home on potential data confidentiality breaches).[15]

The Population and Housing Census of Mexico reference date was fixed at 15 March 2020 and the enumeration period was scheduled from 2 to 27 March 2020, with a follow-up verification set for two weeks after the conclusion of the enumeration. The census was based on a face-to-face interview with an appropriate respondent in the household – head of household or the reference person in the household older than 18 years of age. Complementary methods were also introduced – internet self-enumeration and telephone-assisted interview (CATI). Enumerators were instructed to undertake at least three visits to a specific housing unit to obtain the interview, each on different times of the day.[16]

The first confirmed COVID-19 case in Mexico was recorded on 27 February 2020 and the calendar of events impacting the census was as follows:

- 27 February – First confirmed COVID-19 case in Mexico
- 11 March – WHO declares global pandemic
- March 14 – Social distancing introduced at the national level

[15] United Nations, Report on the results of the UNSD survey on the impact of the COVID-19 pandemic on 2020 round of population and housing censuses, Background document, 52nd Session of the UN Statistical Commission, March 2021.

[16] United Nations Expert Group Meeting on the Impact of COVID-19 Pandemic on Conducting Population and Housing Censuses and on Census Data Quality Concerns, 9–12 February 2021, UN Statistics Division, New York: Impact of the COVID-19 Pandemic, Censo 2020, INEGI, Mexico, available at: https://unstats.un.org/unsd/demographic-social/meetings/2021/egm-covid19-census-20210209/docs/s03-01-MEX.pdf.

- 18 March – First COVID-19 death recorded in Mexico
- 24 March – The authorities decreed Phase 2 of the pandemic, which means that there has been community contagion; Federal Government suspends non-essential services
- 27 March – End of census enumeration
- 30 March – Health authorities declare a state of sanitary emergency; suspension of non-essential activities continues; new health measures prohibit face-to-face interviews
- June-July – Face-to-face interviews are resumed in each State according to the risk level.[17]

Overall, the census enumeration in Mexico, despite the challenges presented above, was achieved within the originally planned timeframe; however, in the last week of enumeration period there was a notable increase of non-response and isolated assaults on enumerators. Secondary activities, such as verification of questionable answers were conducted for only a week, and the remaining two weeks had to be re-scheduled for June to August. Post-enumeration survey had to be cancelled altogether and these postponements triggered delays in subsequent phases, including the release of census data. Therefore, different secondary stages of the census had to be re-scheduled or altogether suspended, forcing INEGI to adapt to daily circumstances on the fly, while at all times giving priority to the safety of the census personnel and responding population. Attempts to encourage the population to use the available applications for internet self-enumeration did not result in the expected outcome, as only 0.3 per cent of answers were received that way.[18]

While the considerable number of countries/areas that originally planned to conduct the population and housing census in 2020 or 2021 decided to postpone their census operations for a post-pandemic time, still others introduced a number of adjustments to ultimately conduct the census as planned. In the case of England and Wales, for example, where the Population and Housing Census took place on 21 March 2021, all of the 2020 was dedicated to institute measures aimed at mitigating risks of COVID-19 contagion and yet ensuring the success of the census. Some of the measures included canceling certain pre-census activities, such as dispatching staff to check addresses in the field. The Office of National Statistics (ONS) arranged for contact centre staff to work from home and increased capacity for using CATI – capturing the data by telephone and in case of the need for a field follow-up, ensuring the availability of protective gear and revised doorstep routines. ONS also developed instruments to exploit COVID-19 infection data to forecast which areas are likely to go into lockdown and plan accordingly, to name a few.[19]

Canada is scheduled to conduct its quinquennial population and housing census in May 2021 and introduced a list of measures to maintain the quality and completeness of the coverage. Statistics Canada introduced its wave methodology designed to achieve high response rates and elicit self-response through varied, targeted prompts whereby ninety per cent of household will be mailed an invitation letter, followed by a reminder one for non-responsive households. Final notice would be the third mailed attempt to solicit information from non-responding households; it will be followed by a text message or automated call and finally by dispatching enumerators. For the remaining ten per cent a combination of drop-off and canvasser methods is planned to be used. Therefore, the basic plan is to introduce optimal collection strategies to achieve high response rate by way of self-enumeration and involving minimal contact for non-response follow up. As COVID-19 can interfere with the collection overall or in certain regions, a plan B, consisting of the basic plan and adding statistical contingency planning based on administrative data was developed. Another list of actions aimed at mitigating risks has been introduced, such as adding additional telephone resource, providing Personal Protection Equipment (PPE) to enumerators, to name a few. Statistics Canada also invested considerable efforts to use administrative data for Plan B and some of the findings in comparing household-level data from the 2016 census and the available administrative records, across all dwellings, indicate that there was close to 60 per cent of households with perfect match, and almost 92 per cent with at least a partial match. However, the findings also indicated that the quality of administrative data was of different levels in certain areas of the country.[20] Therefore, one of the consequences of mini-

[17] Ibid.
[18] Ibid.
[19] United Nations Expert Group Meeting on the Impact of COVID-19 Pandemic on Conducting Population and Housing Censuses and on Census Data Quality Concerns, 9–12 February 2021, UN Statistics Division, New York: Adapting the England and Wales 2021 Census design due to COVID-19 pandemic, available at: https://unstats.un.org/unsd/demographic-social/meetings/2021/egm-covid19-census-20210209/docs/s03-08-GBR.pptx.
[20] United Nations Expert Group Meeting on the Impact of COVID-19 Pandemic on Conducting Population and Housing Censuses and

mizing the adverse impact of the pandemic in terms of census-taking lead to developing innovative approaches for imputation using administrative data for the purpose of the census and this is expected to be further elaborated in the future.

Relying on administrative data was already planned in a number of countries, either by generating census-like small area statistics solely from administrative registers or by applying a combination of sources, filling some of the data from registers and dispatching enumerators to collect other variables and verify the register-based ones. Indonesia, in planning for its 2020 Population and Housing Census, initially developed such a combined approach – pre-loading existing data from the National Population Register and then dispatching enumerators in the field to collect information on characteristics not available in the Register and to verify the pre-loaded data. However, the implementation of the planned approach was seriously and adversely affected by the COVID-19 pandemic and resulting in channeling funds earmarked for the census into other segments of the society for health and economic recovery. The census exercise also envisaged a first phase for internet self-enumeration, originally scheduled for a month and a half, but then had to be extended for another two months. Realizing that the face-to-face enumeration has to be adapted to the pandemic and the concerns of the replying population, additional funds were allocated to equip each enumerator with face shield, face mask, disposable gloves, a vest and so on. In addition, the questionnaire was shortened to accommodate faster interviewing and the initial modes of collection – face-to-face interview with tablets and paper questionnaire were replaced with drop-off/pick up paper questionnaire and face-to-face interview with paper questionnaire. After implementing these adjustments in conducting the census, the results between the data in the National Population Register and those collected in the field indicated that the Register included individuals that actually moved from the place of registration for work, school or other reasons. While not significant at the national level, those differences were actually much more consequential at lower levels of geography and administration. The fact that the Indonesia 2020 census data found almost 9 per cent of the total population where the place of usual residence did not coincide with the place of registered residence clearly points to the need to invest additional work in the reliability of administrative data for census purposes.[21]

In addition to the difficulties related to the postponement of census operations, adjusting data collection approaches and introducing alternative sources of information, population and housing censuses conducted or are to be conducted while the effects of the COVID-19 pandemic are impacting the functioning of societies are facing questions regarding the quality of collected statistics. For example, comparing statistics obtained from two subsequent population and housing censuses is a well-tested technique to assess the quality of the most recent census and to quantify the changes in the economic and social spheres that occur in between the two censuses. This comparison is even more powerful when applied to small areas as it then becomes more granulated and illustrative. In that context and taking into account the fact that the censuses in the pandemic will reflect the actual changes in the way societies behaved in 2020, the issue of comparability with the censuses from ten or so years ago raise the need to institute and test techniques that would allow for a nuanced interpretation of most recent census statistics and to add layers of meta data information that would inform stakeholders and users on issues related to the quality of census data and their elucidation.

In that context, census experts convened to the United Nations Expert Group Meeting on the Impact of COVID-19 Pandemic on Conducting Population and Housing Censuses and on Census Data Quality Concerns, that took place online from 9–12 February 2021, from the UN Statistics Division in New York concluded that providing sufficient metadata becomes more important than before considering the significant change in the census design and concerns for data quality and potential effects of the pandemic on census statistics. It recommended that each census authority should produce detailed metadata on changes in the design, modifications in census questions, adjustments in census counts (for identifying institutional population for example), imputation of data for non-response and other quality measurements as well as evaluation of the co-

on Census Data Quality Concerns, 9 -12 February 2021, UN Statistics Division, New York: Achieving and Assessing Census Data Quality Amid the Uncertainty of a Pandemic, available at: https://unstats.un.org/unsd/demographic-social/meetings/2021/egm-covid19-census-20210209/docs/s04-02-CAN.pptx.

[21] United Nations Expert Group Meeting on the Impact of COVID-19 Pandemic on Conducting Population and Housing Censuses and on Census Data Quality Concerns, 9–12 February 2021, UN Statistics Division, New York: The Indonesian Population Census 2020 Highlights, available at: https://unstats.un.org/unsd/demographic-social/meetings/2021/egm-covid19-census-20210209/docs/s03-04-IDN.pdf.

herence of census results with previous census results and other relevant sources.[22]

Similarly, it was noted that evaluation of the impact of changes in the design of census operations on the census quality will be very useful for understanding challenges in comparing census results with the results of previous censuses. In that context, the experts noted that comparability of census data over time (census conducted during COVID-19 as compared to results of census from previous cycles) might be challenging due to changes in questionnaire data items (shortening the questionnaire in order to reduce face-to-face-interaction during field data collection); shifting of census reference date (recall effect); changes in methods of collection (use of multi-mode including self-enumeration modes).[23]

Additionally, the experts pointed to the fact that censuses conducted during the COVID-19 pandemic could potentially reveal trends, changes and patterns in society not seen in previous census results, although to what extent those trends/changes would be significant is yet to be seen. Such new trends, changes and patterns will have implications for census data comparability over time. Certain census subject matter areas are particularly susceptible due to the impact of COVID-19, such as internal and international migration (due to border closing, banning of international flights, etc.), labor force participation (in terms of number employed and unemployed, hours worked, place of work, commuting time), school enrolment and attendance (impact of online education), and housing and living arrangements (usual place of residence; temporary living arrangements due to COVID-19). Similarly, the meeting recommended that whenever possible, questions on births, deaths and migration collect information on the exact date of such an event rather than ask about the occurrence of events during a reference period.[24]

Consequently, the increased significance of proper and comprehensive assessments and evaluations of census operations using appropriate methodologies, such as post enumeration surveys and demographic methods, intended to strengthen public confidence in the census results and inform future census planning efforts. In that context, the experts outlined that the communication with data users is extremely important – census result quality assessment need to be reported transparently, completely and comprehensively so that users are fully informed on the reliability and quality of census data (in terms of accuracy, timeliness, relevance) in order to preserve trust in official statistics.[25]

Overall, the experts concluded that existing initiatives in a number of countries aimed at using administrative data and registers to replace the traditional census – already quite visible in this census round and well documented during the meeting – is only accelerated by the difficulties caused by the pandemic and the accompanying costs, thus prompting an intensive effort in that direction. The experts requested UNSD to proceed with the development of the methodological guidelines in that respect, based on existing regional experiences and national practices leading to register-based production of small area census statistics.[26]

6. Concluding remarks

Just less than a year and a half ago (end of 2019) the 2020 Round of Population and Housing Censuses, covering the period 2015–2024, appeared to be more contemporary, more attuned to the technological and methodological advances in statistical data collection and overall more promising in achieving the ultimate goal of the UN-launched 2020 World Programme on Population and Housing censuses – conducting or otherwise generating small-area census statistics at least once in the ten-year period. And then the COVID-19 pandemic struck with a force and ruthlessness rarely, if ever before, documented in the history of humankind, spreading the virus worldwide with unprecedented speed and consequences. The population and housing census, already a highly complex undertaking, requiring mobilizing significant human and financial resources, multi-year meticulous planning and testing, and, for at least seventy per cent of world countries or areas, relying on canvassing the whole country and on face-to-face interviewing each household for collecting the necessary and relevant information, could not escape being severely and adversely impacted by the pandemic. And, as coincidence would have it, the UN recommends conducting national population and housing censuses in the years ending in “0” or “1” for enhancing regional

[22] United Nations Expert Group Meeting on the Impact of COVID-19 Pandemic on Conducting Population and Housing Censuses and on Census Data Quality Concerns, 9–12 February 2021, UN Statistics Division, New York: Conclusions and Recommendations, available at: https://unstats.un.org/unsd/demographic-social/meetings/2021/egm-covid19-census-20210209/conclusions.pdf.

[23] Ibid.

[24] Ibid.

[25] Ibid.

[26] Ibid.

and international comparability of census data – and one hundred twenty-one countries/areas originally complied with this recommendation, scheduling their national censuses for 2020 and 2021, during the apex of the COVID-19 pandemic.

These circumstances tested the resilience, skills and capacity of census-takers worldwide. Faced with government-issued measures aimed at mitigating the spread of the virus, with lockdowns, instructions for working from home, closure of institutions and non-essential services, enforcing social distancing and widespread fear of contracting the virus among the population at large, on one hand, and the need to respect the previously adopted census schedule, approved budgets and the periodicity of subsequent censuses critical for more precise exploitation of census statistics and building reliable estimates, on the other hand, the first and obviously forced solution was postponing census operations, from preparatory ones to field work. About 75 per cent (out of 104 countries/areas that initially planned to conduct the population and housing census in 2020 or 2021) opted for this solution, and, as it becomes even more apparent as we move on through 2021, the postponement of these censuses is expected to last until at least 2022 and perhaps beyond.

Postponing a population and a housing census comes at a cost – the cost of updating the addresses and household listing, for example, the costs of maintaining the census infrastructure (staff, IT systems, storage capacities and so forth) beyond the initially allotted period of time, the costs of continually communicating the rationale to the public, not to mention much broader costs of the unavailability of recent and timely produced detailed statistics on evidence-based policy- and decision-making, especially in the context of the need for small areas statistics for tracking and monitoring the pandemic.

At the same time, postponing the census also opens the door for enhancing the census instruments and methodology. As documented quite a few countries undertook the development of contemporary solutions for increasing the efficacy of field work and data collection using the window provided by the postponement.

It has to be outlined that countries that rely on fully register-based production of census-like small areas statistics were largely unaffected by the pandemic and that fact resonates quite clearly and loudly across the census-takers community worldwide. While the number of countries that have these capacities does not appear to exceed fifteen per cent of the total number of countries/areas, they are seen as spearheading the future solutions for producing detailed population, economic and social statistics.

Countries that decided to conduct the census in 2020 and 2021 were facing situations that were fairly new and unprecedented. Significantly extending the enumeration period, in some cases for well over six months, clearly raises issues in terms of the quality of data. For example, the fact that a number of people, following government instructions on measures to mitigate the pandemic, moved from their place of usual residence, such as students and a large majority of workers, thus complicating the collection of reliable data related to usual residence. The recollection errors are more frequent with the longer passage of time. And of course, the reluctance of the respondents to communicate with the enumerators fearing the spread of the virus was a formidable obstacle.

In an effort to bring to the bare minimum the physical interaction between the enumerators and the respondents, census-takers resolved to introducing data collection modes that eliminated such interaction, by putting more effort in building capacity for internet self-enumeration and telephone-based interviewing, as well as dropping off and collecting paper questionnaires. As well documented, switching the data collection modes mid-way through the census often results in additional risks as preparing the respondents to use internet self-enumeration, for example, requires detailed campaigning, testing, and ensuring that all the measures related to securing confidentiality and privacy of responses are well in place. Additionally, extensive testing is key to introducing different data collection modes and that was not always available in the circumstances.

Another set of solutions forced on census-takers during the pandemic was shortening the questionnaire to include just a short set of core variables. Such an approach was certainly efficient in terms of significantly simplifying and speeding the data collection, conducted either by enumerators or by self-enumeration. Unavoidably, though, these data would not suffice in terms of meeting the needs of stakeholders and users; thus, additional data collection exercises will have to be planned in the eventual wake of the pandemic to fill the gaps, ensure time series consistency and generate detailed statistics requested by users.

The quality of census data for censuses conducted during the pandemic might further be adversely affected by the fact that training activities, instead of being conducted in person, shifted to online settings. In person training has clear advantages as it fosters interaction, discussion and teamwork. Coupled with the fact that

monitoring of census operations and management of census activities also shifted to online arrangements, the lack of personal interaction between enumerators, supervisors and managers might result in less opportunities to raise questions, clarify instructions or ask for guidance and advice, all possibly resulting in lesser quality of the collected information and increasing the need for additional editing in subsequent phases of data processing.

Consequently, in the aftermath of census-taking during the pandemic and related to all the difficulties and expected "anomalies" in data on several census topics, such as place of usual residence, please of work, commuting, school attendance, to name a few, it is of utmost importance to provide a full and comprehensive overview of all meta-data and to provide users and stakeholders with in-depth information related to the interpretability of census statistics taken during the pandemic. These data will largely reflect what actually transpired in countries conducting censuses during the pandemic and they would need to be put in the proper context from the historical perspective, while at the same time documenting societies that changed dramatically in the course of a single year.

Census-taking during pandemic turned full attention to the capability of administrative sources to supply the necessary information on households and people. Administrative registers were used for many different purposes: for improving census coverage over all; for imputing data for non-responding households; acquiring information on institutional population; or as a major frame for census taking. Valuable experiences and practices acquired in the process will certainly lead to further harmonization and integration of administrative sources for the purpose of generating official statistics, in general, and for census statistics, in particular. While relying on administrative registers is well developed in certain regions of the world, the infrastructure of administrative registers differs from country to country and even within regions in one country as well. Consequently, in the forthcoming period, and especially for countries that are starting to develop those applications, there would be a need for providing global methodological guidance for register-based censuses – as per one of the conclusions and recommendations from the UN Expert Group Meeting and based on existing regional materials.

In that context, and as documented, countries are embarking on a road to develop statistical population registers as a backbone of the national statistical system, aimed at essentially replacing the master census file both for the sake of generating relevant, accurate, reliable and timely statistics and as a sample frame for detailed statistical data collection exercises and surveys. It is expected that the next round of censuses will witness a significant increase in the number of countries/areas that are building and using these instruments. And this initiative is fully in line with the recently introduced UN Legal Identity Agenda – a recommended model for the holistic approach to civil registration, vital statistics, identity management and, ultimately, register-based production of small-area population and related statistics.

The United Nations Statistics Division will continue to monitor the implementation of the 2020 World Population and Housing Census Programme throughout the census decade and to report the findings to the UN Statistical Commission on a regular basis.

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