



Economic and Social Council

Distr.: General
13 July 2022

Original: English

Economic Commission for Europe

Conference of European Statisticians

Group of Experts on Population and Housing Censuses

Twenty-fourth Meeting

Geneva, 21–23 September 2022

Item 4 of the provisional agenda

Upcoming censuses in the United Nations Economic Commission for Europe region

2022 Population and Housing Census in the Republic of Serbia – Innovations and Challenges

Note by Statistical Office of the Republic of Serbia*

Summary

The Population and Housing Census in the Republic of Serbia will be conducted in October 2022 in the traditional way using door-to-door interviews. However, for the first time paper questionnaires will not be used for data collection. Instead, enumerators will enter data in electronic questionnaires, using laptops.

This document presents the experience of the Statistical Office of the Republic of Serbia gained in the course of modernizing the traditional method of conducting a census, in the course of which challenges and obstacles were faced. It also covers a review of the most significant novelties introduced, as well as plans for further improvements to be made in order to conduct the 2031 Population and Housing Census using administrative data.

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I. Introduction

1. The conduct of censuses in Serbia has a very long tradition, which started back in 1834, when the first census was conducted on the territory that constituted Serbia at that time. Since 1884, all the censuses in Serbia have been carried out according to a special regulation in the traditional way, using paper questionnaires.
2. The national legal framework concerning the conduct of the 2022 Population and Housing Census (2022 PHC) comprises the Law on 2022 Census of Population, Households and Dwellings (Official Gazette of Republic of Serbia (RS), No. 9/2020 and No. 35/2021) and Official Statistics Law (Official Gazette of RS, No. 104/09 and No. 24/11).
3. The 2022 PHC is prepared, organized and carried out by the Statistical Office of the Republic of Serbia (SORS). Certain operations in preparing, organizing and implementing the census on the territory of municipalities, towns and the City of Belgrade are conducted by SORS in accordance with the law, via census commissions. Various bodies, such as ministries, special organizations, local self-government units, and other bodies are also involved, by completing activities within their authorities.
4. The objective of this document is to present briefly the practices entailed in conducting the census in the Republic of Serbia, focusing on the novelties planned for the 2020 census round and the challenges faced by SORS during the preparation phase.

II. Main characteristics of 2022 Population and Housing Census

5. The 2022 PHC is characterized by numerous novelties and specific circumstances, caused by the COVID-19 pandemic under which preparatory activities took place.
6. In order to improve the efficiency of the census operation, data quality and dissemination timelines, as well as to reduce respondent burden, SORS investigated alternative ways of implementing the census.
7. Since it was determined that the requisite conditions for conducting the 2022 PHC using registers (combined or register-based) were not met¹, SORS investigated alternative ways to modernize and transform the traditional method of conducting a census as far as possible and as much as was permitted by available capacities. A decision was made to conduct the 28th census based on the traditional method (door-to-door interview), using a new collection approach – Computer-assisted personal interviewing (CAPI) – which replaces pen-and-paper Interviewing (PAPI), while administrative sources will be used in certain phases such as imputations, control of coverage and quality, etc. In addition to this new mode of data collection, the 2022 PHC will for the first time include the following:
 - (a) A mechanism for connecting census and geospatial data at the level of the house number, which will make it possible to produce census data geo-referenced to 1 km²;
 - (b) A system that will allow monitoring of the course of enumeration in real time;
 - (c) Use of a Dual Estimation System in the Post Enumeration Survey² (PES).
8. The census is conducted in accordance with the Conference of European Statisticians Recommendations for the 2020 Censuses of Population and Housing, as well as with the Regulation (EC) No. 763/2008 of the European Parliament and of the Council of 9 July 2008 on population and housing censuses, in terms of the content, definitions and classifications. All core topics listed in the recommendations are included, as well as a set of selected non-

¹ The possibility to conduct a register-based census, as well as the possibility to set up a Statistical Population Register were tested under the project “Statistical Population Register” (IPA 2012 MB).

² In the Republic of Serbia since the 1953 PHC, quality control of data collected in the census has been performed through a PES. The data collected during quality control are compared with the results collected in the census in order to detect coverage errors and the quality of census data. Re-enumeration is based on the assumption that the conditions are the same as in the census, and that quality control is census-independent. In the 2022 PHC, the PES will be conducted immediately after the enumeration, by re-enumeration on a sample of 250 enumeration areas.

core topics in accordance with national needs. Furthermore, after consultation with users, several questions, which are not part of the recommendations, have also been incorporated.

9. The results will be presented according to the concept of total usually resident population.

10. The field work will be conducted from 1 to 31 October 2022, and data will be collected with reference to 30 September 2022 at 00:00.

11. The work is financed from the European Union's Instrument for Pre-accession Assistance (IPA) 2018 national programme, and partly from the budget of the Republic of Serbia.

12. The total number of laptops procured is 15,500.

A. Main drivers of technological innovation and data collection methods

13. The transition from PAPI to CAPI is motivated by the various advantages resulting from the use of computing devices. One of the main benefits is an improvement in data quality. In addition, investment in CAPI will pay off in more-timely data. Owing to a shorter processing time, the lag between the end of fieldwork and availability of final results will be reduced. In contrast to the 2011 PHC when dissemination started 12 months after the end of fieldwork, in the 2022 PHC the dissemination of final results is planned to begin five to six months following the completion of fieldwork.

14. The use of the CAPI method and a longer time for fieldwork (four instead of two weeks) will make it necessary to engage only about 17,200 direct participants (instructors and enumerators), a figure that is less than half of the 2011 number of 41,000.

Table 1

Summary comparison of 2011 PHC (PAPI) vs. 2022 PHC (CAPI)

	2011 (PAPI)	2022 (CAPI)
Enumerators	36,559	15,000
Instructors	4,471	2,200
Duration of fieldwork	15 days (additional 2–5 days in large towns)	31 days
Printed material	300 t of printed materials; 12 million filled in main questionnaires	550,000 main questionnaires (to be used in extraordinary situations); guidelines
Data processing	12 months	5–6 months
Beginning of dissemination	12 months after the end of fieldwork	5–6 months after the end of fieldwork

III. Field data test

15. The Pilot Population and Housing Census was conducted from 1 to 30 April 2019 on a sample of 260 enumeration areas (EAs), out of a total of 41,000, in 51 municipalities/towns. The sample covered 132 EAs in urban areas and 128 EAs in rural areas.

16. After fieldwork from 22 May to 5 June 2019, a PES was conducted by performing a re-enumeration in 16 EAs.

A. Objectives of the Pilot

17. The main goal of the Pilot Census was to test in due time and through simulation of enumeration field activities the solutions that will be applied in the main operation, in order to eliminate timely all potential deficiencies.
18. The following aspects were tested in the pilot census:
 - (a) Methodological and organizational instruments;
 - (b) Two modes of data collection: self enumeration via the Internet (computer-assisted web interviewing, CAWI) and CAPI. CAWI was organized in three towns, Belgrade, Novi Sad and Nis, from 1 to 7 April 2019, and CAPI after completion of the CAWI, from 8 to 30 April. In the remaining municipalities/towns, trained enumerators collected data using laptops, from 1 to 30 April;
 - (c) In-house development of applications;
 - (d) The possibility of linking census and geospatial data;
 - (e) The Dual Estimation System in the PES;
 - (f) Hierarchical monitoring, according to the roles and responsibilities of the staff (instructors, coordinators and supervisors);
 - (g) Outsourcing of some key activities such as CAWI data collection, design of software that allows update/collection and use of geospatial data, and the preparation of electronic maps.

B. Main conclusions

19. Although the preparation and implementation phases were successfully conducted, the total response rate for CAWI was 5.4 per cent. The response was greater in urban settlements (7.5 per cent) than in rural ones (3 per cent).
20. Some of the main reasons for such a result are:
 - (a) Distrust in online data collection and an unreadiness to disclose personal information online: in Serbia these factors still pose a significant barrier;
 - (b) Even though around 70 per cent of people in Serbia had Internet access when the pilot census was conducted, using the Internet for self-enumeration was not accepted by a significant part of the population due to prevailing habits i.e. beliefs about the predominant reasons for using the Internet;
 - (c) The population was not sufficiently aware of the benefits of this mode of data collection, including cost reduction, burden on respondents, etc.
21. Based on the results of the pilot census results, it has been decided that CAWI should not be used as a method for collecting data, not only due to low response rate but also due to the difficulty of monitoring the coverage.
22. Outsourcing undoubtedly has certain advantages. However, it involves potential risks, especially when key components are concerned. In order to avoid external suppliers, it was decided to develop the key technical components in-house.
23. Production of census data geo-referenced to 1 km² is feasible.
24. A Dual Estimation System will be applied in the 2022 PES.
25. Further upgrading of the applications for data entry and monitoring is necessary, as well as a technical solution for collecting geospatial data.

IV. Design and development of the information system

26. In order to ensure compliance with the new requirements for census implementation, a data centre architecture needed to be reconstructed and the network infrastructure upgraded.
27. The CAPI application for data collection was developed in-house under the system of integrated data processing (IST)³, by SORS.
28. For census purposes IST will be used for data collection, data synchronization and data processing. IST captures any type of data, does data validation on the spot (data validation on answer) and/or in batches (data validation on full datasets) and directs the census questionnaire flow. Through a complex operation of synchronization, IST supports smart data transfer to a server. On the server, data will be immediately stored in relational databases.
29. The special advantage of CAPI application for data entry is that it can operate off-line, so the Internet is not required. Internet connection is necessary for daily synchronization and transmission of data to the central database, which the enumerators will do from home.
30. Based on the pilot census results, the applications for data entry and monitoring were further improved. Furthermore, considerable changes were made regarding technical solutions for the collection of geospatial data, in order to have the entire process upgraded. Geospatial data were retrieved from the address register and incorporated in the CAPI application. Since the address register is not complete and updated and therefore certain objects exist in the field but not in the address register, geospatial data for those objects will be collected in a different way, using the open source tool 'QGIS' that is adapted to the needs of the census.
31. More than 20 applications, developed by SORS experts, will be used for data collection and processing, as well as for logistical support and organization. Besides applications for data entry, for monitoring fieldwork during the census and PES, special web applications have been developed to be used for the enumeration of specific population categories (diplomatic staff, prisoners, persons in social institutions, etc.), formation of census commissions, testing and ranking candidates, preparation of contracts, equipment distribution, calculation of remuneration for work done, etc. Applications are also under development for certain phases of data processing, such as contingency control, logical control, tabulation of results, etc.
32. Bearing in mind that the security of the information and communication system is one of the highest priority issues, SORS has defined protection measures, methods and procedures for achieving and maintaining an adequate level of ICT system security in accordance with the Law on Information Security (Official Gazette of RS Nos. 6/2016, 94/2017 and 77/2019) and the Law on the Protection of Personal Data (Official Gazette of RS No. 87/18). Information security management is regulated by several internal documents such as the Rulebook on the Security of ICT Systems, Rulebook on the Use of ICT Resources, Procedure and Measures for Strengthening Information Security in SORS, etc. In order to preserve confidentiality and to protect sensitive census data collected in the field, one of the measures that will be applied is data encryption.

V. Impact of the COVID-19 pandemic

33. Relying on the results of an exhaustive risk analysis and assessment, it was decided to postpone the census for six months, i.e. to conduct census fieldwork in October 2021

³ IST makes data processing simple, increases the value of data through a unified system and reduces data complexity. How does IST do it? Data entry, processing and reporting in one place; unique interface regardless of statistical domain or questionnaire type; easy applications and data sharing; using software that SORS already has, without buying additional software. What can IST do for an NSO? It integrates data, transforms the system to be compliant with the Generic statistical Business Process model (GSBPM), activates metadata for everyday production, empowers staff skills and flexibility, reduces costs.

instead in April 2021, due to the unfavourable epidemiological situation caused by COVID-19, which could have significantly compromised the preparation and fieldwork of the census. However, as the epidemiological situation became worse, during debates about the Draft Law on Amendments to the Law on the 2021 PHC, deputies proposed amendments in the Assembly of the Republic of Serbia extending the postponement of the census until October 2022. After the adoption of these amendments, the Law on Amending the Law on the 2022 Census of Population, Households and Dwellings was adopted on 7 April 2021.

34. Following this decision on postponing census fieldwork and in order to ensure the production of reliable and high quality data, SORS focused on investigating various scenarios, such as: potential adjustments of census questionnaires; adoption of additional data collection modes; changing methods and plans for the enumeration of special population groups; preparing plans and actions for different scenarios that would allow SORS to be flexible and responsive to the situation during the pandemic, etc.

35. Apart from CAPI, as the main data collection mode, data will be also collected via computer-assisted telephone interviewing (CATI) in cases where face-to-face interviewing is not possible due to the unfavourable epidemiological situation.

36. Despite the unfavourable circumstances, preparation activities continued according to the modified action plan.

VI. Challenges

37. In the planning and preparation phase, SORS faced numerous challenges as a consequence of both the modernization of the census practices and the postponement of fieldwork due to the COVID-19 pandemic.

38. Introducing new technologies significantly influenced the entire census process, and brought a number of challenges and risks for which adequate solutions had to be found. Key challenges include: building capacity for designing and implementing field operations; in-house development of numerous application solutions; loss of/damage to laptops; possibility of data loss; training of staff skilled enough to use laptops for data collection; data protection; ensuring technical support during fieldwork; public trust in data security and confidentiality; reuse of laptops, etc.

39. One of the important challenges for SORS was to create the conditions for the production of census data geo-referenced to 1 km². Technical solutions for collecting coordinates were modified in accordance with the findings of the pilot census findings, in cooperation with the Republic Geodetic Authority, which is in charge of maintenance of the address register. The biggest challenge was to develop a means of enabling the collection of coordinates for objects existing in the field but not in the address register.

40. In addition to the modifications made to the process of data collection, postponing enumeration activities implied that the costs would be much higher than initially planned for. Additional funds are necessary for:

(a) Renting the space for laptops and ensuring physical and technical security of the warehouse for laptops;

(b) Training a larger number of enumerators and instructors than planned in order to increase back-up staff from 12.5 per cent to 20 per cent and to ensure smooth implementation of the field activities;

(c) Procurement of protective equipment and disinfectants for all participants in the training and the field enumeration;

(d) Increase in travel costs during the fieldwork, mostly due to significant increase in fuel prices;

(e) Engagement of additional staff for the implementation of epidemiological measures in local self-government units;

(f) Enumeration in social protection institutions;

(g) Expanding the media campaign, increasing the visibility of census activities and strengthening the trust of citizens, raising the visibility of SORS;

(h) Increasing remuneration for enumerators and instructors in order to approach the average salary in the Republic of Serbia.

41. Furthermore, it was necessary to continuously follow the development of the epidemiological situation in order to identify and assess potential risks in due time and to make adaptations/modifications to the planned activities.

VII. Current state of play

42. As there are, at the time of preparing this document, fewer than three months left before the beginning of fieldwork, intensive preparation activities are nearing completion.

43. The main methodological and organizational tools, as well as application solutions are prepared, the territory update (revision of enumeration areas) has been completed, census commissions have been formed in local self-government units, the 2022 PHC website has been launched, etc.

44. The selection and training of candidates is in progress, comprising three levels:

(a) Level 1 – municipal coordinators. A five-day training was held for municipal coordinators, who are mostly selected from among SORS staff.

(b) Level 2 – instructors. The selection of candidates for instructors is in progress. The candidates are selected via public call, and can apply only through the Internet by filling in an electronic application form on the SORS site. After being tested on their computer skills and being interviewed, the candidates are obliged to attend a five-day training course.

(c) Level 3 – enumerators. A public call will soon be published. The candidates will also apply by filling in an electronic application form on the SORS site. After the test of computer skills a five-day training course will be organized.

45. Training of instructors and enumerators will be organized in local self-government units, candidates' physical presence being required. In order to ensure uniform training, necessary materials (presentations, exercise materials, short videos, etc.) are in the course of preparation. At the end of the training, the candidates are obliged to pass a test, based on which the final selection will be made.

46. Preparation is nearing completion for methodological and organizational tools, as well as of application solutions for the enumeration of specific population categories, which will be conducted in cooperation with ministries and other institutions.

47. SORS is aware that the significant changes envisaged need to be communicated through a complex, multi-layered media campaign, directed towards different parts of the society by well-planned and managed communication activities. The media campaign, aimed at increasing the visibility of census activities and at preserving the trust in official statistics, is in progress. Through this campaign, information will be provided to the public in order to raise awareness about the significance of the census data for the society in general. Considerable attention will be paid to encourage citizens to respond to the public call. The media campaign includes the use of both online and offline communication channels.

VIII. Beyond 2022 PHC

48. Even though the new census methodology cannot be applied in the 2022 PHC, SORS continues to take steps to create the conditions necessary to conduct the 2031 Census on the basis of administrative sources.

49. After the completion of 2022 PHC, a 'simulation' of a register-based census is planned, using administrative data available at that point in time. The results will show the shortcomings in terms of availability, coverage, content and quality of the administrative

sources and what needs to be improved in registers so that they can be used in the register-based census.

50. In this regard it is planned to do the following:

(a) Based on the main findings from the activity described above, SORS will prepare a road map which will include proposed targets and necessary steps to be taken;

(b) Organization of national workshops with the main aim of discussing the possibilities, future steps, roles and responsibilities of the relevant institutions in the process of introducing a register-based census and the deadlines for the implementation of agreed steps;

(c) Conclusions from the national workshops will be presented at a conference where SORS will emphasize the findings of the analysis and the road map;

(d) The final phase will involve drawing up an action plan for the introduction of the register-based census, and identifying all public administration bodies relevant for this activity.

51. However, bearing in mind that administrative sources will not be able to provide data for all core topics defined in the recommendations, SORS has decided to overcome the lack of certain data by establishing a statistical population register. This register will be developed on the basis of 2022 PHC data, and regularly updated from available administrative sources.

IX. Conclusions

52. In the current census round SORS has made improvements by implementing a paperless strategy, in which the development of the necessary technical solutions in-house by SORS experts is of particular importance.

53. However, the commitment to modernization and implementation of the best international experiences – in terms of census methods on the one hand and the constant demands of the society for more timely results with lower costs and reduced response burden, on the other hand – presents SORS with new challenges. The introduction of a completely new approach based on administrative data implies that numerous prerequisites must be met, such as the availability of data with sufficient level of coverage and quality, public acceptance, good cooperation with the authorities responsible for the registers, significant initial investments, etc.

54. The adoption of a new Official Statistics Law will round off the legal framework that will enable the downloading of data not only from state sources but also from private ones. With the experience, knowledge and willingness to progress, we expect to achieve the goals that have been set.
