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**CENSUS QUALITY AND DISCLOSURE CONTROL**

Post enumeration survey in the 2009 Pilot Census of Population, Households and Dwellings in  
Serbia

Note by the Statistical Office of the Republic of Serbia

**I. SUMMARY**

1. A post enumeration survey was conducted immediately after the 2009 Pilot census of population, households and dwellings in Serbia. All phases of the survey have yet to be completed. Results are available for the design and content of post enumeration questionnaires, preparation of manuals, training of post enumerators, field work, matching and copying census data, and development of data entry application and analysis of data. These results provide valuable input for preparation of the 2011 Census and post enumeration survey. There is a proposal for a change of methodology of census post enumeration surveys in Serbia. Instead of copying from census questionnaires all data that corresponds to data collected in the post enumeration, it has been suggest that only census identification data of dwellings, households and persons are copied in appropriate fields of post enumeration questionnaires. Other necessary data can be obtained after data entry of post enumeration and census data, by merging of data sets. In this way errors of copying census data can be minimized but potential drawbacks of the proposal are still to be considered. All these issues are discussed.

## **II. INTRODUCTION**

2. Census post enumeration survey (PES) has been conducted in Serbia after each census of population, households and dwellings since 1953. The main goal of the survey has been the estimation of coverage errors in enumerating population, households and dwellings and evaluation of quality of answers to selected census questions. At the same time, based on derived results the aim has been to point out ways to improve future census design and operations.

3. The 2009 Pilot census of population, households and dwellings (PC) in Serbia is specific in respect that it is followed by a small scale post enumeration survey. The primary purpose of this survey is to provide information that would help to improve methodology and operations of the 2011 Census PES. Also, some aims of the survey considering testing particular census questions have been set in advance.

4. All phases of the Pilot post enumeration survey have not been completed yet, but the findings up to now exceed our expectations. In this paper the basic characteristic of the conducted post enumeration survey are briefly described and some results and proposals for 2011 Census post enumeration survey are given.

## **III. 2009 PILOT CENSUS POST ENUMERATION SURVEY**

5. The post enumeration survey was conducted immediately after the Pilot census, in the period from the 22 to 30 April 2009 on 11 enumeration areas (EAs), with about 850 dwellings and 2000 persons. The selected EAs are a subsample of the Pilot census sample of EAs.

6. The Pilot census post enumeration survey (PPES) followed fundamental methodology principals already set up in census PES survey in Serbia, such as independence between the post enumeration survey and census. The main difference to the actual PES concerns the sample of EAs. Contrary to the census PES sample, the sample of EAs is small and not random so that estimates of coverage errors can not be obtained. However, the possibility of testing methodology and operations remain.

7. As in census, Division for sampling and data collection methods is responsible for the PES in the Pilot census. The development of the methodology and preparations and conduct of all operations of the PPES were done in close cooperation with others engaged in the Pilot census, in particularly with the Census division, the Department of agriculture and forestry and the Group for construction statistics. Their needs and interests concerning testing of census methodology and questions were the base for developing PPES methodology and measurement instruments.

8. The PPES also served as a training vehicle for new members of the Survey division who were given a chance to take part in all phases. Participation in PPES helped the staff to become aware of various sources of non sampling errors and the importance of their control. Also, it provided the staff with a clearer picture and understanding of the work ahead in census. In addition, team work and discussions concerning PPES operations resulted in new ideas and suggestions of how to introduce changes in census PES in order to improve the quality of the survey.

9. The main phases of the PPES can be split into three broad categories, tasks prior to collection of data, data collection and tasks after collection.
10. Activities prior to the collection of data in the field are:
  - (a) Budget planning;
  - (b) Methodology development;
  - (c) Sample selection;
  - (d) Questionnaire design;
  - (e) Preparation of the manual and training of the post enumerators.
11. Activities that follow collection of data are:
  - (a) Matching, linkage of the PPES data to the PC data
  - (b) Comparison of PPES and PC data (copying data from Pilot census questionnaires to post enumeration questionnaires)
  - (c) Data entry program development
  - (d) Data entry
  - (e) Data analysis and summary of the results
  - (f) Integration of results into a List of recommendations for the 2011 Census

#### **IV. SOME OUTCOMES OF THE POST ENUMERATION SURVEY**

##### **A. The questionnaires**

12. The basic questionnaires of the PPES survey are:
  - (a) The questionnaire for enumerating dwelling, household and persons. The data of these questionnaires is used for identifying coverage errors and are filled for all dwellings, households and persons in selected EAs.
  - (b) The questionnaires:
    - (i) for household and dwelling and
    - (ii) individual form.
13. The last two questionnaires are used for evaluation of quality of answers to selected census questions and they are filled only for about 10 per cent subsample of households in each EA of the PPES.
14. In this PPES survey all the forms were made as similar as possible to the original Pilot census questionnaires but with columns where the census data can be copied after PPES data collection.
15. For the first time, in the PPES, a form similar to the Pilot census Controller form was used by the post enumerator. The post enumerator was obliged, while in the field and in course of enumerating, to fill for each dwelling or household a table row, with: the address information,

identification of dwelling and household, name of the head of the household and the number of persons in the household and temporarily present. On the front page of this form there are fields that the post enumerator fills with summary data after completing collection of data in EA as well as fields where corresponding data is to be copied from the Pilot census, in the phase of comparison.

16. The post enumeration Controller form data was used for random systematic selection of households for quality check of answers. This is different than in previous census PES, where the supervisor performed systematic selection of households from the list of enumerated households in the census. From past experience it seems, that in some cases, there was abuse of available census data in the PES that affected the post enumerators' field work. They tended to accept results from census and therefore repeat the same errors. In this case post enumeration does not provide measures of coverage errors and is a waste of resources. With introduced changes misuse can be avoided.

17. The Controller form has been of great assistance in the phase of linking the post enumeration data to census data. Also in this Pilot, it was concluded that the summary data on the front page of the post enumeration Controller form could replace the data of one of the auxiliary forms, Comparative list, that was used in previous census PES and was filled in the phase of comparison of post enumeration and census data. From experience, Comparative list was not easy to fill, clear instructions that would cover all possible cases were difficult to write and long, which resulted in errors. Excluding this form and using the data from the front page of the Controller makes the post enumeration more efficient. Instructions for the post enumerator can be simplified, time saved and errors can be reduced. Apart from these benefits for the Controller, it can be used by the supervisors in 2011 Census to check the post enumerators' field work.

18. The questionnaire for enumerating dwelling, household, and persons (lists of persons form) used in PPES, has been designed to be as similar as possible to corresponding Pilot census form. It needs to be changed for the 2011 Census PES. Instead of two tables, one for household members and the other for temporary present persons, one table should exist for all persons irrespective whether they are household members or not. In the phase of linking post enumeration with census data, it is much easier to have one listing, especially for erroneous cases of different classification of a person, in census as a household member, in post enumeration as a temporary present, and conversely.

19. Also, the question 'Type of dwellings' should be moved from the inside to the front side of the questionnaire for enumerating dwelling, household and persons, because there are empty dwellings in which case tables with persons are skipped. It would also be useful for data entry that the cover page has three additional auxiliary questions whose answers are provided by the post enumerator:

- (a) Is the household selected for quality control of answers?
- (b) How many individual forms are filled, and
- (c) How many rows are filled in the listing of individuals (in questionnaire for enumerating dwelling, household and persons)?

20. The answer to the last two questions are provided after copying census data. The answer to the last question enables a jump out of the list of person table of the questionnaire for dwelling, household and persons in data entry.

#### **B. The manual and the training of post enumerators**

21. According to experience in the PPES the Manual and the training for 2011 Census post enumeration should include only specific instructions for PES. It is very important that in 2011 Census, post enumerators are chosen among the best census enumerators who are already very well acquainted with census methodology, definitions and instructions. Also, for the success of the PES, it is crucial to stress the significance of independence of census and post enumeration. The post enumerator must collect data in the EA he/she is in charge of without seeing the data collected in census for that particular EA.

#### **C. Collection of data**

22. Several members of the Division for sampling and data collection methods participated as enumerators in the field. They realized the importance of: up to date maps of EAs with clear descriptions; perfect acknowledgment and understanding of census definitions and instructions for properly filling the forms. Also, it is significant that the enumerator achieves an adequate contact with respondent. In the PPES, there were cases when people refused to give answers or gave answers without opening the door.

23. In selected EAs for 2011 Census post enumeration population should be in various ways informed in order to be prepared to accept post enumerators.

#### **D. Matching and Comparison of PPES data to the PC data**

24. All the members of the Survey division participated in linking post enumeration with census data and copying census data. This experience will help improve the Manual and training, particularly for some ambiguous cases such as: unit not registered in census or post enumeration, wrongly enumerated, household splits and merges.

25. It is also important to stress that, for household selected for quality control, data from census is copied for all persons registered in control, no matter how they are registered in census (even in case as belonging to a second household or as temporary present person). For persons of the selected household that are not registered in post enumeration survey but are registered in the census, new individual forms should be filled. Even though the quality of answers can be checked only for persons registered in both occasions, information of persons registered in only post enumeration or census could be used in the analysis of characteristics of persons missed.

26. Precise instructions and good training are needed for adoption of this sensitive part of the methodology. It is recommended that the 2011 census PES training includes a test with sample data for matching post enumeration to census data and copying census data to PES forms.

**E. Data entry application and entry**

27. Data entry application has been developed in CSPRo by a Survey division member. This application is complex and it enables multilevel data entry of: the questionnaire for enumerating dwelling, household and persons; and for selected households for quality check - household and dwelling form and individual form for each member of the household. For coded questions range errors can not be made during data entry, but missing and skip errors and any inconsistencies are allowed as long as they are on the questionnaire being entered. In other words, entry is in such a way that it includes all the errors that are on the questionnaire. The application developed for this PPES only partly includes interactive coding of quality of answers (missing data, writing not readable, skip error, methodologically incorrect, methodologically correct). For the 2011 Census, data entry application of PES will include complete coding of quality for which all the census logical rules are needed.

28. In this PPES survey data entry has been done in an intelligent way and a capable and responsible operator was selected. It was pointed, that in the data entry quality is much more important than speed. The operator must follow the messages during data entry and act as suggested.

**F. Analysis**

29. As the analysis of data is still going on, only some comparisons of answers in post enumeration and Pilot census of individuals from households selected for quality control are completed.

30. In all, 180 individual forms have data for persons registered in post enumeration and census. If there was a difference to an answer to a particular question the material collected in Pilot census was examined to check whether the copying has been done correctly. An additional data base was formed with all corrections of errors that are a consequence of incorrect or missed copying of census data. Data analysis will be performed with and without copying errors (in case of difference in answers).

31. Answers of 17 questions were compared to see whether they are equal or different in post enumeration and Pilot census (see Table 1). Out of all possible answers 7.7 per cent are different. Answers to questions on education, type of income, activity of the supporter, existence of disablement and the last 6 digits of the person identity number have 10 per cent or higher disagreement between the answer in post enumeration and census. Out of all answers to 17 questions of 180 individuals, 0.7 per cent of differences are due to incorrect copying.

32. Questions that are most frequently answered differently are those that demand two answers or need to be filled according to some additional instruction on the questionnaire, or are hard to answer because they are personal. Causes for differences could also be carelessness in collecting data or a different respondent in census and post enumeration. The question on who provides an answer to a particular form would be useful in control.

33. It was found that the questions that are most difficult for copying are those with a longer list of possible answers and the question concerning the 6 digit identity number.

34. Out of 180 questionnaires 39 per cent are without error (complete agreement of post enumerated and census data), 31 per cent with one discrepancy, 16 per cent with 2, 6 per cent with 3 differences and 7 per cent with more than 3 discrepancies.

Table 1. Answers of 180 individuals to 17 questions according to whether they are equal in post enumeration and Pilot census and errors due to copying census data (%)

	Number of answers (%)			
	Total	equal in Control and Census	not equal	
			All	copying errors
<b>Total</b>	<b>100</b>	<b>92.3</b>	<b>7.7</b>	<b>0.7</b>
Name and last name	100	95.6	4.4	0.0
Sex	100	98.3	1.7	0.0
Birth day	100	96.7	3.3	0.0
Birth month	100	96.1	3.9	0.0
Birth year	100	98.3	1.7	0.0
Last 6 digit of person ID	100	89.4	10.6	1.7
Place of residence of mother when the person was born	100	91.7	8.3	0.0
Ethnicity	100	98.3	1.7	0.0
Highest educational attainment	100	80.6	19.4	0.0
Educational qualifications	100	93.9	6.1	0.0
Economic activity	100	87.2	12.8	0.0
Status in employment	100	94.4	5.6	0.0
Type of income	100	84.4	15.6	1.7
Is the person financially dependent	100	92.8	7.2	1.1
Activity of the supporter	100	85.6	14.4	5.6
Existence of disablement	100	86.7	13.3	0.6
Type of disablement	100	98.9	1.1	1.1

Note: The questionnaire can be found on:

<http://webrzs.statserb.sr.gov.yu/axd/en/Popis2011/KKobrasciE.htm>

## **G. Methodological issues**

35. It was obvious, after participating in the matching of post enumeration and census data and copying census data to PES forms, that these activities are not without error. For the phase of linkage the importance of clear instructions of how to perform it with lots of caution is necessary.

36. As for copying census data, it has been concluded that this phase can be radically changed. It has been suggested that, by following precise instructions, only necessary census data is copied on the questionnaire for enumerating dwelling, household and persons: the identification of dwelling and household and person serial number and the name of person, if a person is not registered in post enumeration but registered in the census. Also, for households selected for quality check, census household identification data should be copied on the household and dwelling form and person serial number on the individual form. For all other data, an extra column for census data, would not be needed. It can be obtained by merging PES with census data, after completing census and post enumeration data entry. In this way copying of data will be avoided, time saved and errors caused by copying reduced. A precondition for this procedure is that census and post enumeration data entry are done in an identical way and obey the same rules. In this way post enumeration data will be compared to census data after data entry. This data is used in further processing so the procedure will make sense.

37. This change will require the changing of the questionnaires and PES data entry application. The most important change of the application is that it would be necessary that person identification (apart from dwelling and household identification in post enumeration and in census and post enumeration serial number) must include the census serial number. For a person not registered in post enumeration or census the corresponding serial number should be '00'.

38. This idea still has to be considered for possible drawbacks. In previous censuses it was not necessary to wait until census data entry ends for PES results. The analysis of PPES data is ongoing. An attempt will be made to match the post enumeration data to corresponding Pilot census data, make comparisons and come to some conclusions.

## **V. CONCLUDING REMARKS**

39. All phases of the Post enumeration survey in the 2009 Pilot census of population, households and dwellings in Serbia are not yet completed. Even though the analysis of collected data is still going on, there are already many useful findings that will help to improve the methodology, organization, collection and processing of data.

40. It has been determined where some changes to questionnaires are needed and how to improve instructions and training for the post enumerators. It is also proposed that only census identification of dwellings, households and persons is copied in the phase of comparison of post enumeration and census data, which was not the case in post enumeration surveys of previous censuses.

41. Because of the Pilot post enumeration survey, the preparation for the census post enumeration survey has started much earlier than usual, so the staff will be better prepared and more efficient in fulfilling their responsibilities.

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