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*Steering Committee of the International
Monitoring Operation on the Population and Hous-
ing Censuses in Bosnia and Herzegovina*

Sixteenth Assessment Report

11 – 14 February 2014

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List of acronyms

BiH	Bosnia and Herzegovina
BHAS	Agency for Statistics of Bosnia and Herzegovina
CoM	Council of Ministers of BiH
CMIS	Central Monitoring Information System
CSO	Civil Society Organisation
DB	District Brčko
EA	Enumeration area
FBiH	Federation of Bosnia and Herzegovina
FOS	Federal Office of Statistics (FBiH)
EI	Entity Instructor
EN	Enumerator
EUPHC 2	Technical assistance to Population and Housing Census Phase II
GIS	Geographic Information System
ICEI	Department for International Cooperation and External Information
IMO	International Monitoring Operation
IMO MG	International Monitoring Operation, Management Group
IMO SC	International Monitoring Operation, Steering Committee
IT	Information Technology
LFS	Labour force survey
MCC	Municipal Census Commission (Census Commission of the units of local self-government)
MI	Municipal Instructor
PES	Post Enumeration Survey
Q	Question
RS	Republika Srpska
RSIS	Republic Srpska Institute for Statistics
SA	Statistical Area
SI	State Instructor
TA	Technical Assistance
TAP	Technical Assistance Project
TOR	Terms of Reference

INTRODUCTION AND BACKGROUND

1. A Population and Housing Census shall take place in Bosnia and Herzegovina (BiH) in accordance with the Law on the Census of the Population, Households and Dwellings in Bosnia and Herzegovina in 2013 as adopted by the Parliamentary Assembly of Bosnia and Herzegovina on 3 February 2012. The Council of Ministers of Bosnia and Herzegovina has invited the European Commission to organise the international monitoring of the Census. Therefore, the European Commission, the Council of Europe and the Council of Ministers of Bosnia and Herzegovina signed on 18 April 2012 a Memorandum of Understanding to agree upon the following:

- The general objective of the International Monitoring Operation (IMO) of the Population and Housing Census in Bosnia and Herzegovina is to monitor the compliance of the whole Census exercise, from the preparation to the data dissemination, with:
- International standards on population and housing censuses as defined by UNECE and Eurostat, and as adopted by the Conference of European Statisticians as Recommendations for the 2010 Censuses of Population and Housing;
- Regulation (EC) No 763/2008 on population and housing censuses, and its implementing measures;
- The Fundamental Principles of Official Statistics, adopted by the UN Statistical Commission, as well as the European Statistics Code of Practice, promulgated by the European Commission;
- Standards on data protection and confidentiality, as provided for in the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data of the Council of Europe, and the relevant European Union regulations in force.

2. The Operation will be carried out by a Committee of International Organisations, the Management Group (IMO MG) assisted by a Senior Census Expert, experts in population censuses, one or more experts in information technology and persons monitoring the census enumeration in the field.

3. The Senior Census Expert, the Census Experts and the IT Experts will assess the compliance of the Census in Bosnia and Herzegovina with the requirements listed in the Memorandum of Understanding, but they will not provide technical assistance.

4. Under the guidance of the Committee and the Senior Census Expert, the Census Experts shall:

- Examine the technical preparation of the Census including the pilot Census and post-enumeration survey, in particular the drafting of questionnaires and manuals;
- Monitor the collection, processing and dissemination of Census data, verifying the accordance with the requirements defined above;
- Control the fair and proper computation at all levels and whether the confidential nature of the individual data is fully guaranteed;
- Investigate any other matter with relevance for the Census.

5. The Management Group has designated Mr. Jean-Michel Durr as Senior Census Expert and Mr. Roberto Bianchini, Mr. Bent Noerby Bonde, Ms. Meryem Demirci, Ms. Kateri-

na Kostadinova-Daskalovska, and Mr. Guido Pieraccini as experts in population censuses. The Senior Census Expert and the Experts in population censuses form the IMO Steering Committee (IMO SC) of international experts.

6. The first mission of the IMO SC was conducted from 23 to 26 April 2012. The objective of this mission was to assess the preparations for the population and housing census in their main components, including the preparation of the pilot census. The report of the SC was sent by the Senior Census Manager on May 12 to the IMO MG.

7. The second mission was conducted from 26 to 29 of June 2012. The objective of this mission was to assess the progress made since the first mission in preparations for the population and housing census, including the preparation of the pilot census.

8. The third mission took place on 17 and 18 of September 2012 and was conducted by two members of the SC, namely, Mr. Jean-Michel Durr and Ms. Katerina Kostadinova-Daskalovska. The objective of the mission was to assess the implementation of recommendations made in previous reports and to assess the preparation of the pilot census, planned for October 15-29.

9. The fourth mission took place between 10 and 29 of October 2012 and was conducted successively by the members of the SC (5 days each, except the senior expert from 10 to 19 of October). The objective of the mission was to observe the conduct of the pilot census in the field. In addition, a team of four observers, composed of Lidija Naumovska, Gabor Rosza, Jean-Paul Sardon and Per Schöning was present during the whole period of the pilot census. Each of them covered several municipalities, in order to observe the pilot census field operations in all the 60 enumeration areas (EAs) sampled in the pilot.

10. The fifth mission took place from 19 to 21 of November 2012 (3 days) and was conducted by one member of the SC, Ms. Katerina Kostadinova-Daskalovska. The objective of the mission was to observe the conduct of the Post enumeration survey (PES) of the Pilot census in the field. The expert covered all 6 EAs (in 6 municipalities) sampled in PES sample in order to observe the PES field operations.

11. The sixth mission took place from 10 to 13 of December 2012 and was conducted by four members of the SC: Mr. Roberto Bianchini, Mr. Bent Noerby Bonde, Ms. Katerina Kostadinova-Daskalovska and Mr. Guido Pieraccini. The objective of the mission was to hear from the Statistical Institutions about the lessons learned from the Pilot Census and to assess whether the preparations are on level that could allow conducting a census in April 2013.

12. The seventh mission took place from 12 to 15 February 2013 and was conducted by one member of the SC, Mr. Roberto Bianchini. The objective of the mission was to assess the situation on the progress of preparation and implementation of the IMO recommendations in the new context of the postponement of the census, with a focus on the achievement of the deadlines regarding cartographic preparations. A second objective was to collect information and materials for a more detailed assessment on the progress of census preparatory activities to be made by all members of the SC in March 2013.

13. The eighth mission was conducted by the complete SC from 18 to 22 March 2013. The objective of the mission was to assess in detail progress made in the preparations with regard to the milestones given after the sixth mission in December 2012, when the SC recommended to postpone the census to October 2013.

14. The ninth mission was conducted by two members of the SC, Jean-Michel Durr and Katerina Kostadinova-Daskalovska from 22 to 25 April 2013. The objective of the mission was to assess the progress made in the preparations with regard to the milestones given in the sixth mission and updated in previous missions.

15. The tenth mission was conducted by the full SC from 28 to 31 May 2013. The objective of the mission was to assess whether the progress made in the preparations was sufficient to consider that the country was ready to conduct a census in October 2013.

16. The eleventh mission was conducted by three members of the SC, Mr. Jean-Michel Durr, Mr. Bent Noerby Bonde and Mr. Guido Pieraccini from 16 to 19 July 2013. The objective of the mission was to assess whether the preparations were still on track after the positive assessment of the 10th mission to conduct a census in October 2013. A special focus was put on the preparation of data processing.

17. The twelfth mission was conducted by four members of the SC, Mr. Roberto Bianchini, Mr. Bent Noerby Bonde, Ms. Katerina Kostadinova-Daskalovska and Mr. Guido Pieraccini from 3 to 6 September 2013. The objective of the mission was to assess the state of play regarding to forthcoming census field activities (including PES) and data processing activities following the field activities as well as the overall census preparations in accordance to the Census milestones and SC recommendations and advices given through the previous missions and SC reports.

18. The thirteenth mission was conducted by five members of the SC: Mr. Roberto Bianchini and Mr. Guido Pieraccini from 27 September to 4 October, Ms. Katerina Kostadinova-Daskalovska from 4 October to 11 October; and Mr. Jean-Michel Durr and Ms. Meryem Demirci from 11 October to 18 October. The objective of the mission was to monitor the enumeration of the census, including its final preparations and final operations. During this mission, the SC was assisted by a team of 27 international observers, deployed all over the country.

19. The fourteenth mission was conducted by one member of the SC: Ms. Katerina Kostadinova-Daskalovska from 1 to 3 November 2013. The objective of the mission was to monitor the conducting of the Post-enumeration survey following the Census. During this mission, the SC was assisted by a team of 5 international observers, deployed all over the country from 1 to 10 November.

20. The fifteenth mission was conducted by one member of the SC: Mr. Guido Pieraccini from 17 to 18 December 2013. The objective of the mission was to assess that the data processing system was functional and in accordance with the SC recommendations.

21. The sixteenth and present mission was conducted by five members of the SC from 11 to 14 February 2014. The objective of the mission was to assess the starting of the data processing and the implementation of the SC recommendations.

22. The expert wish to express his gratitude to the directors and staff of the Agency for Statistics of Bosnia and Herzegovina (BHAS), the Statistical Institutes of the Federation of Bosnia and Herzegovina and Republika Srpska (RS) for their availability and collaboration, and to the staff of Council of Europe for the organisation of the mission.

EXECUTIVE SUMMARY

23. The objective of the mission was to assess the starting of the data processing and the implementation of the SC recommendations. The SC met with the three Statistical Institutions and visited the data processing centre to assess in depth the procedures implemented.

24. The data processing centre is now operational and fulfils the conditions for storage and processing of census materials, including security. 298 staff have been recruited and trained. Data capture is in final testing phase but is already performing adequately. The SC made recommendations to optimize the process in order to reduce the time needed and allow earlier dissemination of the census results.

25. Significant progress in improving the methodology of data captures and matching procedures of the Post Enumeration Survey have been observed. However, the SC recommends revising the timeliness of the activities to complete them in shorter time than planned.

26. In terms of communication, the SC observes that the lack of pro-active response to critics, constantly deplored during its previous missions, has now a negative impact on the confidence in the data processing phase and in the results that will be released later.

27. The situation of the Director and Deputy Directors of the Agency is still unclear. Their position has been prolonged until the end of February but no information about their replacement is available. This situation bears the risk of a lack of management of the operation in its critical phases of data processing and dissemination.

28. It is reminded to the Agency the obligation to provide documents translated in English to the SC members, to enable their assessment.

29. Finally, the SC considers that the measures proposed by the Agency to ensure security and confidentiality of data are efficient and adequate, but strongly recommends that at the end of the data processing the images of the questionnaires be destroyed and the personal data be removed from the Census database.

30. In conclusion, the SC considers that the data processing phase is starting well and in accordance with the SC recommendations, but that some optimization of the timeliness is possible. In the coming months the SC will closely monitor the census data processing to assess its compliance with international standards and best practices. Therefore, regular information in English on the progress and updated timetable are requested from the Agency for Statistics.

Follow-up of Census enumeration

PAYMENT OF ENUMERATION STAFF

31. The total amount needed for the payment of the enumeration staff amounted 6,158,522.46 Euros. It was distributed as such:

Enumerators	5 072 979.25 EUR
Municipal instructors	724 602.85 EUR
Cantonal Census Commissions	9 203.25 EUR

Municipal Census Commissions	286 291.75 EUR
State and entity instructors (only external)	65 445.36 EUR
Total	6 158 522.46 EUR

32. The EU grant was used to finance 5 072 979.25 Euros and the remaining part, 440 082.46 Euros was financed by the BiH budget:

	Financial plan/EU Grant	Total number of questionnaires according to first results	Transferred from the grant budget	Difference to be paid from the BiH budget
FBiH	3,118,847.24	3,423,429.22	3,118,847.24	(304,581.98)
RS	1,838,390.86	1,957,774.09	1,838,390.86	(119,383.23)
Brcko District	115,741.14	131,858.39	115,741.14	(16,117.25)
Total	EUR 5,072,979.25	EUR 5,513,061.71	EUR 5,072,979.25	EUR 440,082.46

33. The EU Delegation made the grant available on November 8. In accordance with the "Agreement on the use of funds from the direct grant, between the Agency for Statistics of BiH and entity statistic institutions", the Agency was able to transfer the funds to the Entities Statistical Institution from 4th of December 2013 on.

34. Federal office for statistics (FOS) has done payments for the participants in the Census as follows:

- Enumerators and municipal instructors were paid in period 20-27 December 2013;
- Members of municipal census commissions were paid in period 20-21 January 2014;
- External entity instructors were paid in period 20-21 January 2014;
- Members of cantonal census commissions were paid on 20-21 January 2014.

35. Republika Srpska Institute for statistics (RSIS) performed payments for the participants in the Census on following dates:

- Enumerators and municipal instructors were paid in period 12-30 December 2013;
- External entity instructors on 13 January 2014.

36. Payments regarding the PES made up to 12 December 2014:

Controllers (PES interviewers)	41 593.39 EUR
Municipal instructors	25 401.35 EUR

Total	66 994.74 EUR
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Assessment

37. Almost all enumeration staff has been paid at the time of the mission, except the staff of the Statistical Institutions involved at State Instructors or Entity Instructors. However, they received their payment at the end of December and some reimbursement at the end of January, which is quite late after the completion of the work. The reason is the complex financial circuit, based on the EU Grant procedures, and also the number of documents to check before payment.

Recommendations

38. The three statistical institutions and the financial institutions involved should draw lessons from this process and consider how to speed up the payment for further large operations, such as agricultural census. For example, an advance of 80% could be given to the staff immediately after the operation and the 20% remaining after verification of all documents.

Management of Census Operations

39. The SC could observe better collaboration and coordination among the three statistical institutions. The directors are meeting regularly, in particular using the videoconference system, and technical staff from the three institutions is working in the data processing centre in a good collaboration atmosphere.

40. However, the situation of the Director and Deputy Directors of the Agency is still unclear. Their position has been prolonged until the end of February but no information about their replacement is available. This situation bears the risk of a lack of management of the operation in its critical phases of data processing and dissemination.

41. In terms of planning, a timetable is regularly updated. Unfortunately, the document given to the SC was not translated in English and thus the SC was not able to analyse this document. It is reminded to the Agency the obligation to provide documents translated in English to the SC, to enable their assessment.

Recommendations

42. It is recommended to clarify as soon as possible the situation of the management of BHAS in order to provide all staff engaged in census operations a clear visibility on the management.

43. The SC requires from the Agency to provide regularly updated timetable in English, as well as the documents describing the processing phases. In addition, a monthly reporting of the data processing phase is requested to follow-up this phase.

Post Enumeration Survey

44. After completion of the fieldwork for the Post Enumeration Survey (PES), the questionnaires and other documents were stored in the data processing centre. Data processing of the PES questionnaires has not been started yet. The PES team has been recently working on revision of data processing procedures and manual preparation of the PES questionnaires ac-

ording to the SC recommendation regarding the data capture without any manual intervention on the questionnaires.

45. The PES team prepared two new documents: a) instruction for manual preparation, and b) rules for controlling manual data capture of PES data. These documents were sent to the IT team for comments. The PES team revised the detail activity plan considering the current situation of setting data processing system. The team have also reviewed the existing three documents namely: i) manual for control of coverage and quality of data collected by the census, ii) matching procedures and rules, and iii) content of the publication of the first release of PES results.

46. Following the SC recommendations, the procedures for manual preparation of the PES questionnaires have been revised. This step will be undertaken basically for separation of empty PES questionnaires and control books from the census box and checking the number of the PES questionnaires with the information in the control book.

47. Procedures and rules for manual data capture of PES questionnaires have been revised to capture data as it is in the questionnaires. Also, some applications for checking the quality of data capture were developed. These procedures were sent to the IT team for their comments.

48. As planned, the census questionnaires corresponding to the EAs sampled in the PES have been given priority for data processing. During the mission, the SC was informed that scanning operation for the PES EAs have been completed recently and the process of data recognition and completion of these EAs would be undertaken soon.

49. Matching procedures and rules have been drafted and tested during the pilot census. However, the PES team emphasized that these procedures are not complete and they need technical support to improve the matching rules. Currently, the following four successive steps have been identified for matching the PES database with the census database: a) matching individuals, households and dwellings respectively within the respective EA, b) matching individuals in accordance with the information on residence status of individuals (collected through individual questions of 1 to 7 in the P-1 form) within the respective EA, c) matching operation of non-matched cases using entire census database, and d) matching operation for the residence status of individuals who match with the individuals enumerated outside the PES EAs - entire census database . And, the final step will be reconciliation visit for final decision of non-matched cases. This phase is planned as potential phase according to the results of matching operation.

50. Matching rules have been developed with the variables of ID number of persons (13 digits) and name and/or surname. According to the current work plan, data capture of PES questionnaires will be completed by April-2014 and matching procedures including reconciliation visit will be completed by mid-Nov 2014.

Assessment

51. The PES team consisting of members from all entities has been working efficiently for improving the methodology and documents regarding data capture and matching procedures of PES questionnaires. The SC appreciates the progress in coordination of the work and collaboration between the entities to implement the PES activities.

52. Significant progress in improving the methodology of data captures and matching procedures has been observed. However, according to the current work plan, implementation of the activities would take quite long time and would be finalised mid-2015. Considering that the PES covers only 240 EAs, it is not clear why the implementation of these activities would take more than one and half year.

53. Considering that the census questionnaires for PES EAs were already scanned and completion of the data would be finished soon; the PES activities could be implemented giving priority to its activities not depending on the progress in the census activities such as data processing. In this regard, the timing of some of the PES activities should be reviewed to finish all possible phases including reconciliation visit as early as possible to get reliable feedback from the field.

54. The PES team has successfully implemented preparation of manuals and instructions. However, some procedures such as the control of the quality of manual data capture and also the control of the census data captured for the PES EAs are not clearly defined. Also, principles and criteria for identification of residence status of the enumerated persons are still under discussion.

55. In addition, it is observed that the manuals do not cover some of the steps. For example, no clear instruction is given for how to build database for double records (if any), matched cases and non-matched cases that would be undertaken automatically or manually. Also, how the reconciliation visits will be organised in the field, how non-matched cases will be classified for reconciliation visit (for example, classification of non-matched households with all members in the PES and in the census, and non-matched persons in the matched households, etc.) are not covered in the manuals.

Recommendations

56. As suggested during the mission, the PES questionnaires should be captured in double to ensure the quality. The two captures should be compared and inconsistencies corrected using original questionnaires (paper questionnaires). Census questionnaires of PES EAs are already captured using optical data capture system. During the mission, quality control procedures for capturing the census data have not been decided yet. However, it is suggested to have extra effort to ensure the quality of capturing the census data for the PES EAs.

57. In principle, same criteria for determining residence status of the enumerated population should be used for both PES and census data to estimate coverage and content errors. Any variation in determining population of PES and census will create a bias in measuring the errors. Also, the SC emphasizes that for measuring content error, original data sets before editing and imputation for both PES and census should be used.

58. The SC recommends revising the timeliness of the activities in the current work plan of PES. In particular, duration of the data capture and matching operations can be completed in shorter time than planned to carry out reconciliation visits as early as possible. This is a very important step to finalise the status of non-matched and unresolved cases.

59. According to the current plan, reconciliation visits will be conducted one year after the census, in October 2014, after capturing entire set of the census questionnaires and matching the PES records with complete census database. As the status of non-matched individuals will be searched in the field referring to the census date, it is highly recommended to carry

out reconciliation visits as soon as possible and after finishing matching operation within PES EAs.

60. The SC appreciates the effort of the PES team for producing manuals/instructions for PES activities and understands the difficulties of translation of these materials. However, in order to have clear picture of on-going activities, basic documents should be provided in English to the SC. In this regard, the SC demands the English translation of the PES questionnaires (in original format), of the updated timetable of the remaining activities, of the rules for matching in detail, of the method of reconciliation visit and method of calculation of coverage and content errors.

61. In addition, the SC requests statistical information about the implementation of the PES activities in upcoming missions. For example, number of dwellings, households, individuals enumerated in the PES and in the census of PES EAs (by enumeration areas), number of usual residents in both databases, double counting (if exists) in PES and census databases, number of matched and non-matched individuals and households, etc.

Census Communication Activities

62. In the aftermath of the census field operation the country nears national elections planned for October 2014, and politicians and organisations outside the statistical offices often ask for data, especially on ethnicity. The statistical offices respond that such data will not be available before the beginning of next year, but obviously the political pressure and the rumours about the outcome of the census will continue to multiply.

63. This mission offered the opportunity for the statistical offices to draw lessons learnt from the communication during the census. The Agency management expressed its satisfaction about its communication campaign albeit it started late. It praised the work of its press officer, and it had convincingly delivered the outputs and activities that had been planned. Criticism from media and NGOs were seen as unjustified and based on hidden agendas from political or other interests.

64. The Federation Office for Statistics found that the communication strategy had been too soft and not aggressive and proactive enough to dominate the public agenda. The same impression was shared by the Statistical Institute of RS, which believed that in the future the communication strategy and activities should be much more proactive and ensure that the centre stage in the public agenda is held by the statistical offices and not by a variety of interest groups.

65. The Steering Committee did not have time to meet the media during this mission, but met a number of NGOs that had followed the census closely, some of them carrying out a number of information activities towards the public and observations in the field, including collecting complaints from citizens about the enumeration procedures. These NGOs still complained that the statistical offices were not responding to their questions and raised a number of issues that they found the Agency had not answered sufficiently clearly:

- Why did the enumerators keep the questionnaires at home every night and how could this ensure people's privacy of the information collected and how did this influence people's answer to the sensitive questions?
- How would the statistical offices be able to give correct data, when it was easy to observe several advocacy campaigns, teaching how to fill out questionnaires false-

ly, and encouraging non-residents of BiH to come to the country to be enumerated? The NGOs estimated that the enumeration figures published were 10 % higher than the real population numbers. They noted that no information had been given on how the questionnaires would be processed to identify non-residents through questions 1 to 7 and also other questions such as the place of work.

- Why the Agency did not update its website with answers to typical questions and took into account questions that had been raised since the establishment of the website?
- How would the Agency ensure that the identification of the individuals was removed after the processing in order to ensure that the census data were not used for other purposes?

Assessment

66. Among the indicators of a successful communication and outreach strategy are:

- The public is clearly focused on the usefulness of census data;
- There is trust that the information is being used only for statistical purposes;
- There is no over-count of non-residents having taken part due to misinformation from political, religious and other interest groups;
- There is no under-count as a result of resistance against participation.

67. Very few people refused to take part in the census and the enumeration in the field, with very few exceptions, ran smoothly. This is an indicator that the three months' communication campaign has been successful and/or that all external campaigns have encouraged people to take part in the census for one or another reason.

68. The three statistical institutions, and in particular the Agency, must learn how to handle contestation and critics proactively in order to set the public agenda instead of leaving external interests doing it. No matter how uncomfortable this might be for the technical institutions, it is indeed the role of the media and NGOs to hold governments, politicians, and public institutions accountable to the population.

69. There are still a number of issues that need to be answered by the statistical offices to ensure that prejudices or misunderstandings do not prevail and hamper the trustworthiness of the 2013 census.

Recommendations

70. It is recommended that the Agency:

- Updates the census website and list of answers to questions;
- Invites the media to a guided tour of the data processing centre to present the data processing operations and show all the security precautions taken to avoid manipulation of data;
- Reacts continuously and promptly to false information spread;

- Answers critical questions from media and NGOs and continues to engage in a dialogue with these stakeholders and users;
- Outlines a strategy for responding to political and other pressure until and during the publication of census results.

Assessment of Data Processing

DATA PROCESSING CENTRE

71. The procurement to select the premises for the census data processing operations has been finalized in time, before the end of the fieldwork. The selected place fulfils the conditions for storage and processing of census materials, including security. The space is well distributed and the centre offers separate places for archive, central servers, scanning preparation, scanning equipment and for completion operators. At the time of the mission all network requirements were fulfilled, including the disaster recovery backup to the server located in the Brčko district. Nevertheless, little problems of connection to the local LAN were observed from time to time on the computers used for completion and data entry.

72. The recruitment of the personnel was accomplished by the end of January. The three Institutions selected jointly a short list of 500 persons out of 5.000 applications. Nevertheless, the final selection of the 298 persons employed was performed by the Agency with some complains from RSIS on lacks of transparencies on the selection criteria, whereas FOS expressed its satisfaction regarding this process. It should be noted that the selected personnel respect the ethnic group percentages agreed by the three Institutions.

73. The success of the data capture process depends to a large extent on the training of the staff involved in the capturing operations. Specific manuals and training materials were prepared for the different actors involved in the data capture phase: scanner operators, completion operators, supervisors and coders. These materials were the basis for training the different actors involved in the data capture phase, which started at the end of January and lasted for about 5 days.

74. At the moment 298 persons work in the data processing centre in two shifts of seven hours each one. 160 persons are devoted to the manual preparation of the census materials (80 teams of 2 persons), 6 persons to the scanning operation, 60 persons to the manual entering of EA control forms (P3) and the remaining 72 persons are divided between tile phase, completion phase and supervision. This asset is provisory since the tile, completion and supervision phases are still under testing.

75. Each team devoted to the manual preparation of the census materials works on one EA. First they check if the box is open or close and, in that case, they make a note in their daily report. After that the questionnaires that are empty or cancelled are separated from the other valid questionnaires and the number of P2 questionnaires is compared with the preliminary results. In case of differences bigger than 5 the team make a note in their daily report. At this point the clean materials are put back in the box and go back to the archive for being processed by the scanners.

76. The data processing started at the beginning of February, even if for the moment it is limited to manual preparation, scanning and manual entering of the P3s. At the time of the

mission 3300 EAs were manually prepared (about 330 EAs per day), 1500 EAs were scanned (about 150 per day) and 2000 P3s were manually entered (about 200 per day). With the actual assets of the personnel the time needed to end the three operations are 71 days for manual preparation, 158 days for scanning and 120 days for entering the P3s.

Recommendations

77. The opinion of the SC is that the manual preparation, the scanning phase and the manual entry of P3s as they are currently configured involve too many people and are not really optimized. For example, putting back EA boxes in the storage room after manual preparation and later taking them again from the storage for scanning is a waste of time and motion. Many slack periods could be easily avoided dispatching the personnel among the different phases, cutting redundant operations and renting or buying additional scanners.

E-FLOW PLATFORM

78. The Agency currently does not own the source code of the platform and is not able to carry out any change to the system without the help of the external company hired to develop the platform. Moreover, it seems that the technical support from the external company expired in the last weeks and that there is no assurance that they would provide any help, would the need to modify the platform arise.

79. The SC strongly recommended not to perform any manual modification on the paper questionnaires before scanning and to capture the questionnaires as they are. It noticed that the Institutions organise activities accordingly. All the checks and modifications will be applied in automatic or semi-automatic way after the scanning. Moreover, the codifications will also be performed in a later phase.

80. A full test of the e-flow platform is undergoing using 10 scanned EAs. The results of this process will be compared with the same 10 EAs manually entered and will provide some estimation of the quality and of the time needed to accomplish the whole operation.

81. The need to introduce a new phase for reconciling records with duplications of the IDs at the level of EA was discussed with the member of the SC. Different solutions are under consideration but a semi-automatic solution performed at the end of the e-flow operations seems to be the most efficient.

82. An alternative data entry application was developed with the support of the TA Project to process those questionnaires that are damaged or not properly recognized by the Data Capture System. The data entry application was revised, introducing the same changes that were recommended for the e-flow platform in the 10th SC report.

Recommendations

83. It is recommended to carefully estimate the time needed by the e-flow platform activities on the basis of the data coming from the final e-flow test. The SC considers that this phase is one of the most critical and strongly advises to dispatch the personnel involved in the whole data processing on the basis of the test results.

84. A process guaranteeing the unicity of the record's ID and the referential integrity between P1s and P2s should be introduced, preferably at the end of the e-flow operations and based on the joined analysis of the records composing each EA.

85. A mechanism should be defined to evaluate the work of the operators involved in the e-flow platform, preferably on a weekly basis. In addition, aggregated quality indicators should be defined to decide when there is the need to re-process a specific EA due to low performances of the e-flow operators.

CODING

86. A global strategy was developed on how to perform the coding of the three main international classifications adopted for the census (ISCO, NACE and ISCED) and an ad-hoc application called g-Code is under development to approach this issue.

87. The g-Code application for coding the occupation is ready and tested with the pilot census data. The application is composed of two parts. A first part is running in background and - on the basis of a thesaurus derived from the last LFS survey – attempts to automatically code the wording of the answer. A second application is used to manually code the wordings that are not automatically coded.

88. The coding of municipality, settlement, country, citizenship, ethnicity, religion and mother tongue will be also performed with the g-code application: the same approach used for the codification of the occupation is adopted. The validity between municipality and settlement will be checked at this stage.

Recommendations

89. A test of the whole g-code application should start as soon as possible. Estimation of timing and resources needed for coding should be based on the test results.

90. Recommendation already provided previously to record all answers on questions on ethnicity, religion and mother tongue without any other aggregation than grammatical variations (for example adjective/noun, or masculine/feminine form) is strongly reaffirmed. Dissemination should be made of all possible answers found with their frequency, users making their own aggregation as they wish.

DATA EDITING AND DATA CORRECTION

91. The application that performs contingency controls is now developed. This application checks inter-records consistencies (relation between P1, P2 and P3, relations with the reference person, etc.) and identifies the usual resident population. Nevertheless, a review and a finalization of these rules should be performed, also taking into account that it is part of the bigger process of data editing.

92. A discussion was initiated between the three institutions on the opportunity to use some statistical methods for data correction. The option suggested by the SC of using the Fellegi-Holt approach and the related hot-deck imputation methods it is still under consideration by the institutions.

93. In order to correctly perform data editing and data correction, the statistical institutions believe they need some technical assistance from international experts who could help them in conceptualizing the work.

94. The solution proposed to avoid any alteration of data through automated correction of logical errors is to share the set of rules defined at least with a group of professionals coming from the three Statistical Institutions. Scripts for automatic correction of logical errors must pass substantial testing before being approved for use. The algorithms shall be tested on real census material coming from the whole country. Every correction of census data performed through any application must be tracked into the Census database and should be reversible.

Recommendations

95. It is recommended to define an appropriate global strategy to approach the editing and correction of the Census micro-data.

96. Concerning the correction of logical errors, the SC still strongly supports the use of statistical methods for data correction, like the Fellegi-Holt approach and the related imputation methods. The SC also underlines that a good editing and imputation procedure should be automatic, objective and reproducible, should make an efficient use of the matching fields, should ensure that imputed records are internally consistent and should have an audit trail for evaluation purposes.

97. The SC should be able to assess and re-run on the initial Census database the set of rules defined for automated correction of logical inconsistencies and, eventually, the editing and imputation procedure as a whole.

PROTECTION OF PERSONAL INFORMATION

98. Protection of personal information is a central issue during and after data processing. Personal information should be processed according to strict rules of individual data protection and used only for the essential statistical purposes planned within the census data processing. During the processing of census data, names can be useful for two main purposes: identify duplicate records and perform the record linkage of the census individual data with the PES records.

99. Disclosure of personal data can partially happen in different phases of the data collection and data processing but the two main situations in which this can happen systematically are: i) accessing the questionnaire images; ii) accessing the digital data in the Census database.

100. The solution proposed by the Agency to avoid situation of type i) is that only the e-flow platform will access to the images collections via an application embedded into the platform and not accessible directly by the operators. At the end of the e-flow process related to a specific EA, the images generated by the scanning will be encrypted while the original files will be deleted.

101. The solution proposed by the Agency to avoid situation of type ii) is that all the Census applications should encrypt personal data when writing them to the Census database. This encryption will be performed with a key known only to application, not stored in database. Such solution should prevent access to personal data in database from System administrators and any other users.

102. The solution proposed by the Agency to avoid any alteration of data in the Census database is to prevent any changes to the database not made through an application, and if not

prevented, then discover them. For this purpose the Census database must log all changes to a location where database administrator cannot alter them.

103. In the document named *Protocol For Protection Of Census Data*, under article VII is stated: “*at the end of data processing the Statistical institutions will have: i) the final database for the whole Bosnia and Herzegovina with encrypted personal data; ii) the raw database for Bosnia and Herzegovina from the e-flow system with encrypted personal data; iii) the database of encrypted images in digital format.*”

Recommendations

104. The solutions proposed by the Agency to ensure security and confidentiality of data are adequate for what concern the data processing phase.

105. The SC doesn't see any valid reason why the personal data should be kept after the end of the cleaning phase and PES matching, except for the surname of the household head that could be useful for sample purposes and the agriculture census as provided by article 9 of the census law. Any other utilization of personal census data, such as for example the creation of a population register based on census data, would be a violation of the BiH Census Law.

106. The SC strongly recommends that when data cleaning and PES matching will be completed the images be destroyed and the personal data deleted from the Census database. Only the National Archives, in accordance with the Law on Archives, may request the questionnaires.

Dissemination of the census results

107. Preliminary census results were published in accordance with the Census Law within 90 days after the enumeration. On November 5th 2013 BHAS released the preliminary Census results at BiH, entity, Brcko District, cantonal and municipal levels. The preliminary results refer the total number of enumerated persons, households and dwellings. Afterwards, in December, FOS and RSIS released the preliminary Census results at the lower - settlement level for FBiH and RS, and BHAS for the settlements in District Brcko. The press release and the publications were issued in paper as well as PDF format are available on the web sites of the respective statistical institutions.

108. Both in the press release and in the publications, it was explained that the preliminary results were prepared immediately after the census by summing up the number of enumerated dwellings and individuals from the EA control forms and that they were limited in their content. In particular, it was stressed that the total number of enumerated persons was not the same than the total resident population, which would be released in the final census results after processing the content of the questionnaires. Similarly, no results by ethnicity or any other characteristic could be released before capturing and processing the questionnaires.

109. Unfortunately, this did not prevent interest groups and some media from passing information on the speculated ethnic structure of the country or municipalities, or to comment on the enumerated population as if it was the resident population.

110. Two strategies were prepared for the dissemination of census results, one on communication and one on dissemination. The dissemination strategy includes two parts, the first related to publications, and the second to online dissemination through the websites of the statistical institutions. Besides the fact that the dissemination strategy foresees consultation of users about their needs, such consultation was not held so far. As the management and the statisticians stated, the rationale behind is that they know the users' needs since in the past period they were constantly receiving data requests and in absence of updated census results the users were asking census data from 1991 Census. The most frequent requests are from politicians and journalists referring the population structure by ethnicity, religion and mother tongue as well as by state institutions referring demographic and educational characteristics. Nowadays, since the demonstrations started, the most required are data on unemployment.

111. The Strategy for dissemination of the 2013 Census results prepared within the EU-PHC TA project, was not officially adopted, but was accepted by the three statistical institutions and they are working according to it. In December 2013 was adopted a tentative dissemination plan according to which the publishing of the final census results is supposed to start in April 2015 by releasing the first publication on population by sex and age and to end in August 2016 with the last publication on fertility. The present dissemination plan is based on the present plan of data processing activities, and will be adjusted in accordance with any change in the plan of data processing activities. BHAS is responsible for dissemination of the census results on BiH, entity, Brcko District, cantonal and municipal levels. For dissemination of the census results on settlement level are responsible FOS and RSIS for their entities and BHAS for District Brcko.

112. According to the agreed dissemination plan, 15 publications (16 with Book 0 on preliminary results) prepared as hard copies will be published and each will be printed in 100 copies. The publication will be available at the same time on USB stick, CD and on the website. The planned number of hard copies is based on the obligation to provide any publication to the National library and to all the state institutions. The publications will consist of methodology, tables with data, analytical part and graphics. For preparing the derived topics and analytical parts BHAS asked expert support through the TA project. In addition, a Census atlas will be prepared, where data contained in the 15 publications will be presented as maps. The three statistical institutions defined the exact content of the first five publications (Annex 1. Dissemination plan for publications).

113. The online dissemination of the final results will be done with use of PC-AXIS software provided with support of Danish and Swedish national statistical office (NSO). The Danish NSO provided a license for one year of software use and held 4 trainings for the software use (including participants of the three statistical institutions). The Swedish NSO provided upgrading of the software that will allow dissemination of the results not only in English, but also in Bosnian, Croatian and Serbian language. Book 0 on preliminary results is already prepared for transferring in PC-AXIS. Just before final converting of data in PC-AXIS, data should be controlled with a software that will detect the possible individual data disclosure i.e. cells in the tables where are less than 3 households and less than 10 persons. The software hides automatically such cells and makes masking of the other respective cells in the table, so that no individual data can be disclosed. Census data available on line will be accompanied with metadata.

114. For the time being there is still no clear plan for control and verification of the tabulations prepared for publishing. This part still has to be worked out together with the methodologists and IT staff.

115. Although it has no legal obligation, BHAS intends to prepare hypercubes for Eurostat as requested for EU member states. The methodologists will provide the definitions of variables included in the hyper cubes upon which the IT staff will prepare hypercubes.

Assessment

116. According to the present plan the first census data will be published in April 2015, 17 months after the enumeration which is a bit late. In addition, the release of the last publication in August 2016 is not in line with the Census law that stipulates that the final census results will be available within the period from 1 January 2014 until 31 December 2015.

117. The lack of consultation of users about the type of data and type of tools for data dissemination hampers the definition of an efficient dissemination plan.

118. Different types of tools for dissemination as hard copy publications, publications on USB, CD and on web site as well as on line dissemination are planned. However, publication of census data at small geographical levels on hard copies is not very useful and suitable for further use for users' analyses.

Recommendations

119. The SC reiterates the advices and recommendations given so far:

- Dissemination strategies should be identified with users' consultation. Consultation of users is an essential part of census operation to determine demand for potential topics, to deliver relevant products and services with suitable format and to adapt a range of products and services to meet current or emerging needs. Dissemination plan should meet the needs of different types of users.
- It is advised that statistical institutions hold meetings with different type of users including state institutions, educational and scientific institutions, private companies belonging to different industries, banks and other financial institutions etc. Meeting can be organised as bigger gathering one or more types of users or discussions with smaller focus groups.
- It is advised to reconsider the plan for publishing 15 publications as hard copies with data on lower territorial levels and instead to publish more analytical reports and thematic analyses on higher territorial levels. The detail census data on each territorial level shall be available on line through the dissemination database. In addition, some predefined tables can be placed on the web census portals for on line use as well to be available in electronic format on different media as USB, CD etc.
- It is advised to follow the changes in the data processing activity plan, to adjust the dissemination time table accordingly and to do efforts for publishing the final census results much earlier than in the tentative dissemination plan.

ANNEXES

ANNEX 1. DISSEMINATION PLAN FOR PUBLICATIONS AND ON LINE DATA BASE

	Medium	Date of release
Book 0. Preliminary census results on enumerated persons, households and dwellings	Paper	January 2014
On line data base	web	March 2015
Book 1. Population by age (5 years age groups) and sex by settlement places	Paper, USB	April 2015
Book 2. Population according to ethnicity and sex, by settlement places	Paper, USB	June 2015
Book 3. Literacy, education, computer literacy and attending school by municipality	Paper, USB	July 2015
Book 4. Population according to ethnicity, religion and mother tongue by municipality	Paper, USB	September 2015
Book 5. Migrations by municipality	Paper, USB	October 2015
Book 6. Economic characteristics of the labor force	Paper, USB	December 2015
Book 7. Dwellings by municipality	Paper, USB	February 2016
Book 8. Marital status	Paper, USB	March 2016
Book 9. Households by municipality	Paper, USB	April 2016
Book 10. Disability by municipality	Paper, USB	June 2016
Book 11. Female fertility by municipality	Paper, USB	August 2016
Book 12 Buildings and dwellings by municipality	Paper, USB	June 2015
Book 13. Families by municipality	Paper, USB	July 2015
Book 14. Households and families	Paper, USB	September 2015
Book 15. Agricultural fond/ stocks by municipality	Paper, USB	October 2015

ANNEX 2. AGENDA OF THE MISSION

AGENDA

International Monitoring Operation Steering Committee

Date: 11 - 14 February 2014

Tuesday, February 11, 2014, Republika Srpska Institute for Statistics (RSIS), Banja Luka		
09:00 – 10:30	Meeting with the Director and top management of RSIS <ol style="list-style-type: none"> 1. Radmila Čičković, director 2. Radosav Savanović, deputy director 3. Bogdana Radić, assistant director, sector for statistics of population, education, social statistics and justice 4. Radoslav Latinčić, assistant director, ICT and publishing sector 	RSIS, Banja Luka
10:30 – 13:00	Meeting of the IMO SC with working group members from RIS <ol style="list-style-type: none"> 1. Bogdana Radić, assistant director, sector for statistics of population, education, social statistics and justice 2. Radoslav Latinčić, assistant director, ICT and publishing sector 3. Mladen Radić, head of department for the development of IT and publications 4. Vladan Sibinović, head of publication databases and statistical publications 5. Mladen Marić, head of department for data entry, application development and databases administration 6. Bojan Stanković, senior officer for implementation of standards, survey methodologies and statistical activities 7. Nataša Gojković, senior officer for confidentiality of statistical data and control of information disclosure 8. Rajko Vranješ, senior officer for population censuses and projections 9. Dara Petković, senior officer for national population change statistics 10. Nataša Dragić, senior officer for register of spatial units and GIS 11. Darko Marinković, senior officer for statistical sample and analysis 12. Dean Arežina, senior officer for population censuses and projections 	RSIS, Banja Luka

	13. Dragana Mandić, senior officer for migration statistics 14. Vanja Vilipić, senior officer for social protection, health and gender 15. Gordana Grbić, head accountant for financial affairs 16. Vanja Đuran, officer for planning and realization of statistical activities	
13:00 – 14:30	Lunch break	
14:30 – 16:00	Meeting of the IMO SC with working group members from RIS (cont'd)	

Wednesday, February 12, 2014, Institute for Statistics of FBiH (FIS), Sarajevo		
9:00 – 10:30	Meeting with the Director, Deputy Director, Census coordinator and Head for Statistics of Statistics Service in Tuzla Canton of the Institute for Statistics of FBiH <ol style="list-style-type: none"> 1. Hidajeta Bajramović, Director 2. Hidaeta Čolović, Assistant Director 3. Mehmed Krajnović, Head for Statistics of Statistics Service in Tuzla Canton 4. Aziz Dedović, Head for Statistics of Statistics Service in Mostar 	FIS, Sarajevo

10:30 – 13:00	<p>Meeting with all relevant staff for the Census preparation (methodology, logistics, data processing, dissemination, communication, PES etc.)</p> <ol style="list-style-type: none"> 1. Jasmina Velić, Head of the Department of Population Statistics and Population Register 2. Nusreta Imamović-Kaljanac, Head of the Department of Industry, Construction and Energy Statistics, 3. Sanela Čengić, Head of the Financial Affairs Department 4. Zehra Kaba, Head of the Publishing Department 5. Nermina Ibrišević, Head of the Department of National Accounts Statistics 6. Nermina Sarajkić, Head of Department for Developing of Applications for Data Entry 7. Šemso Šurković, Head of Department of Information Systems and Technical Support 8. Muamera Idrizović, Adviser for Demographic Analysis and Projections 9. Arijana Muhić, Head of the Department of Statistical Methods and Coordination 	FIS, Sarajevo
13:00 – 14:00	Lunch	
14:00 – 16:00	<p>Meeting with all relevant staff for the Census cartography</p> <ol style="list-style-type: none"> 1. Munira Zahiragić, Assistant Director 2. Belmira Hadžiabdić, Head of the Department of GIS and Spatial Unit Register 3. Suada Lokvančić, Special Advisor for the Register of Spatial Units 	FIS, Sarajevo

Thursday, February 13, 2014, Agency for Statistics of BiH (BHAS), Sarajevo		
09:00–10:30	<p>Meeting with the Director, Deputy Director and Census coordinator of the Agency for Statistics of BiH</p> <ol style="list-style-type: none"> 1. Zdenko Milinović, director 2. Slavka Popović, deputy director 3. Fadil Fatić, deputy director 4. Nora Selimović, Group for coordination 	BHAS, Sarajevo
10:30–11:30	<p>Meeting with Methodology Team</p> <ol style="list-style-type: none"> 1. Nora Selimović – Methodology 	BHAS, Sarajevo

	<ul style="list-style-type: none"> 2. Vladimir Mijović - Methodology 3. Radoslav Ćorović - Methodology 	
11:30-12:30	Meeting with PES Team <ul style="list-style-type: none"> 1. Edin Šabanović 2. Jasna Isaković 3. Vladimir Mijović 	
12:30-13:30	Lunch break	
13:30-15:30	Visit of Data processing Centre <ul style="list-style-type: none"> 1. Zdenko Milinović, director 2. Slavka Popović, deputy director 3. Fadil Fatić, deputy director 4. Nora Selimović, methodology 5. Sulejman Hasanović, data processing 	E Sarajevo
14:45-15:45	Meeting JM Durr with Paola Pampaloni, Head of the BiH Unit in DG Enlargement	EU Delegation, Sarajevo

Friday, February 14, 2014, Agency for Statistics of BiH (BHAS), Sarajevo		
09:00-10:00	Meeting with Dissimination Team <ul style="list-style-type: none"> 1. Ivona Bulić 	BHAS, Sarajevo
09:00-10:00	Debriefing with Dr. Daviddi, Deputy head of EU Delegation (JM Durr).	EU Delegation, Sarajevo
11:00-12:30	Meeting with representatives of NGOs (JM Durr, Bent Noerby Bonde)	
10:00-16:00	Continuation of the meeting with the Director, Deputy Director and Census coordinator and IT staff of the Agency for Statistics of BiH	BHAS, Sarajevo

	<ol style="list-style-type: none">1. Zdenko Milinović, director2. Slavka Popović, deputy director3. Fadil Fatić, deputy director4. Nora Selimović, Group for coordinations5. Sulejman Hasanović, data processing	
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