

**Economic and Social Council**Distr.: General
15 May 2012

English only

Economic Commission for Europe

Conference of European Statisticians

Sixtieth plenary session

Paris, 6-8 June 2012

Item 3(b) of the provisional agenda

The future of censuses and their role for national statistical systems**The integrated rolling census in Israel****Note by the Central Bureau of Statistics of Israel***Summary*

This paper explores ways to improve the methodology of Population and Housing Censuses to overcome deficiencies of the previous censuses, to modernize the process and to reduce the costs and response burden for the society. In Israel a decision was taken that the resources allocated for the census will be divided evenly throughout the decade and a continuous process of census surveying will be introduced, while the total budget will remain the same. The Central Bureau of Statistics will invest any savings into new technology and to developing methods towards a full register-based census. Since the census will be conducted on an ongoing basis, it will depend on continuous provision of resources. On the other hand, the experienced key staff members recruited for the census will mostly remain in the office for the benefit of developing the methods of all statistical surveys of the Central Bureau of Statistics.

I. Introduction

1. Israel conducted six censuses since its establishment in May 1948. The first census which was carried out in November 1948 was conducted under curfew and was used as the base for the Central Population Register (CPR). The four censuses that followed were conducted as classic censuses in which the whole country's area was canvassed, all possible dwelling facilities were enumerated and a demographic short questionnaire was completed by the interviewer for 100% of the residents. A short socio-economic questionnaire was completed for one fifth of the households. All of the five first censuses were conducted in a face to face interview, using paper questionnaires.

2. The sixth census, in the 2010 round of censuses, on 27 December 2008, was an Integrated Census (IC), in which an innovative approach was implemented. It was a register based census complemented by two sample surveys which aimed to evaluate the quality of the register and to supply parameters for calculating coefficients to correct improper registration in the CPR. See detailed methodology of the 2008 Census is available at:

www.cbs.gov.il/census/census/pnimi_sub_page_e.html?id_topic=2&id_subtopic=1

3. The exploration and evaluation of the available registers, as well as the execution of the 2008 IC, revealed that the quality of census supporting registers that are available in the country was not yet sufficient enough for a full register-based census. Therefore, the over-count and under-count sample surveys were still needed to produce coefficients for correcting the registers' estimates.

4. It also became clear that the IC, although had reduced costs substantively, still required extensive organizational, logistic and human resources for the implementation of the sample surveys.

5. The outcomes of the 2008 IC, initiated the search for ways to improve the IC methodology and to overcome these deficiencies in the upcoming 2020 round of censuses. An organizational decision was made that the resources allocated for the census will be flattened throughout the decade, while the total budget will remain the same. Any savings in the census operation will be invested in census supporting operations which will lead eventually to a full register-based census in the future.

II. Principles and requirements for the upcoming 2020 round of censuses

A. Preserving and maintaining the methodology and technology developed for the 2008 census

6. The methodology of dual system estimates that was developed for the evaluation of total error and under-count in censuses (Hogan & Walter, 1988) was extended to include the evaluation of over-count for the integrated census. The 2008 census results proved that the flaws in the CPR were still in a magnitude not tolerable in a full register-based census.

7. The technological tools and applications (for data collection, data integration and so on) developed for the 2008 incorporated many innovations that proved to be functional for the achievement of most of the goals set ahead of time, in particular those regarding timeliness and accuracy. The costs of technological tools amounted to more than one third of the total census costs, and they are envisaged as an infrastructure for further development and improvement.

B. Preserving experienced manpower and acquired expertise, while minimizing the fluctuations in the organization's manpower and the logistics implications

8. The staff recruited for the 2008 census had on average about 10 years of experience in statistical methodology, technology and logistics. In previous censuses most of the staff recruited for the census was lost to other organizations or other units within the Central Bureau of Statistics (CBS). Most of the experience and professionalism acquired during the planning and execution phases was lost. As specialists in censuses are rare, it was essential to find a way to preserve the leading professionals in the CBS and particularly in the census units.

9. The peaks in resources (human and budget) are troublesome vis-à-vis the flow of work, logistics within the CBS and budget allocation by the Ministry of Finance. Recruiting and training numerous new staff members is troublesome to any organization. Merely the allocation of experts' time, workspace and working equipment disrupts the routines in the whole organization. Avoiding peaks has its benefits per-se.

C. Harmonizing sampling frames used for households and individuals in current surveys

10. In the last few years, since Israel got into the accession process to the Organization for Economic Co-operation and Development (OECD), there was an expansion in the number of current surveys conducted by the CBS in order to comply with data requirements of the OECD. The size of the population and the increase in population involved in surveys increased the probability of an individual to be sampled. This led to the decision to synchronize Household (HH) samples in order to reduce response burden.

D. Developing a geo-coded building and dwelling register

11. During the developing stages of the 2008 IC one of the registers that was lacking was a building and dwelling register (BDR). Several options were examined and eventually, the development of a register was abandoned due to budget restraints. Nevertheless, the need has not vanished, and has even expanded to other statistical domains. Budget planned for future census and staff from the previous census has been allocated for the development of this register.

E. Making use of all data available to increase robustness of census estimates

12. Data obtained from administrative sources and from sample surveys are to complete and enrich census data.

F. Incorporating and harmonizing census questions in current household surveys to increase sample size

13. Having shared questions in censuses and other surveys practically increases the sample size of the census and therefore improves the census estimates.

G. Annual population estimates will be updated by census results.

14. Annual population estimates were based, in the past, on censuses as a baseline and on the demographic changes registered in the CPR (births, deaths, marriages and divorces - vital statistics events - as well as local and international migration). This process distorted the accuracy of the estimates because of several problems immanent to the data sources:

(a) Flaws in the census data were kept until the next census corrected them;

(b) The CPR carries different errors because of late or wrong updates which concentrate in specific areas, like in addresses of interest. For example, the population estimates for new localities that were populated after the census, were based completely on updates of the CPR that are less reliable than the census. These constraints raised criticism on the CBS regarding local population estimates;

(c) The estimation of institutional population was updated only in the censuses. There was a need to find a procedure which will facilitate annual update for new localities and changes in dwelling regions as well as updating institutional population frequently.

H. Incorporating Global Positioning System (GPS) technology in census operation and in other current household and business surveys to correct for flaws in addresses.

15. The expansion of household surveys conducted by the CBS annually enables checking and improving the geo-coding quality of about 3-4% of the addresses in the CPR as well as in the BDR, currently under development. The vast use and the price reduction in the cost of GPS devices led to equipping field interviewers with GPS devices and obtaining the coordinates for each dwelling unit in the sample. These coordinates will be used as a quality control on the coordinates achieved through address geo-coding and cadaster geo-codes. The equipment will also be used as an aid in navigation in areas without street names and will reduce the amount of non-traceable dwellings.

II. The 2020 Integrated Rolling census

16. The type of census chosen to meet the terms set for the upcoming census was an Integrated Rolling Census (IRC). The main principles of the 2008 census are to serve the IRC. Yet, the operation of the census is to be applied over a ten year period.

17. Two issues are specifically addressed: budget and response burden.

18. The decision made with the Ministry of Finance was to stay within the limits of the original total budget allocated for the 2008 census and that any budget left will be used for developing census supporting data sources and registers. The expectation that budget will be available is based mainly on the evaluation of costs saved by avoiding peaks in the census activities.

19. Statistical tests made on the 2008 census data proved that there is no significant increase in the variance of census estimates if a 10% sample is drawn for each survey rather than 17% in the under-count survey and 20% in the over-count surveys. This led to the organizational decision to reduce the sample size, which was crucial to answer the need to reduce response burden inflicted on the population.

20. The time and budget savings facilitate the development of three major registers: Business and Dwelling Register, Education Register and Income Register:

(a) The BDR is based on the municipal taxation list and, when completed, will be used as the sampling frame for all household surveys carried out by the CBS. Currently, the lists of units vary in quality. Some data are of insufficient quality and need further improvement before they can be incorporated into the register;

(b) The education register is based on annual files received from all licensed education institutes in the country. The education register will be used to correct and complete education data in the IRC;

(c) The income register is based on income taxation files and supplemented by data on income received through various social security allowances. It was already used in the 2008 IC to add income information to the census file.

21. Census of Institutions - a full census of institutionalized population will be carried out over a two year cycle. The first year in each cycle will be devoted to updating the Institutions Register. In the second year of each cycle, a two-phased enumeration will be carried out; the first will be a full demographic enumeration of the population in all institutions in the register, and the second will be a socio-economic sample survey of the institutionalized population. The sample is a two-stage sample: in the first stage 10% of the institutions and in the second 20% of the residents within each sampled institution are included. Over a ten year period, 50% of the institutions will be sampled and 10% of the institutionalized population will be interviewed in the socio-economic survey.

22. The sampling methodology is based on the scheme developed for the 2008 IC with only a few modifications:

(a) Under-count estimation survey – a hierarchical annual three-stage sampling process of municipalities, 10% of the statistical areas within municipalities, and 10% of the dwelling units or buildings in each sampled statistical areas (wherever possible);

(b) Over-count estimation survey – an improved and geo-coded CPR is used as the sampling frame. Sampling 10% of the administrative households registered in the sampled statistical areas amounts to 1% of the total number of households each year. Another 1% is sampled each year for the over-count survey from all non-sampled statistical areas and they are used for the over-count estimates at municipality level.

23. The Labour Force Survey (LFS), conducted by the CBS, will be used to support the census coverage and reliability. The expansion of the sample size, the improved geographic coverage and distribution of the survey, as well as the introduction of census questions in the LFS questionnaire, will be used for the estimation of the under-count on the municipality level.

24. The technological tools and applications developed for the 2008 IC are modified slightly to be used for the upcoming years. Bugs discovered in the 2008 IC were also corrected. These minor changes reduced the time and personnel needed for development and enabled launching the first round of the census of institutions in 2010 and the first round in the IRC in 2012.

25. The technology and operational procedures developed for the 2008 IC and the IRC were found to be adequate for other household surveys and were modified to support a full range of ad-hoc surveys which can be implemented with fewer time and staff resources.

26. Most of the experienced personnel that developed the 2008 IC remained in the CBS and were involved in the development of the IRC. The managing staff also remained involved in the census operations.

27. Currently, the CBS is engaged in the data collection phase of the 2011 IRC that was launched in February 2012, and is planned to end no later than November 2012. The reference day of the survey is 31 December 2011. The CPR and the BDR were used as the

sampling frames for the surveys. The first round of the Institutions census was completed and data was incorporated in the 2011 population estimates.

28. Annual population estimates for the SAs will be adjusted based on the updated census results and will be calibrated to the municipality adjusted estimates. The adjustments will be based on the IRC and on the estimated total population, taking into account vital events and migration registration in the improved CPR. The estimates regarding the institutionalized population will be updated every other year for the production estimates of the non-institutionalized population that will be used for the estimation and calibration of the household surveys.

29. The socio-economic data will be generated for the mid-term of the census period (5 years after the first year in a 10 year cycle). The first full cycle of data collection will be completed in 2022. Nevertheless, preliminary results will be released during the upcoming years.

III. Concluding remarks

30. The IRC is designed as the beginning of a process aimed at a full register-based census. It will also serve as an ongoing evaluation survey to facilitate quality control of the available administrative sources and registers to support a fully register-based census.

31. The first steps in the implementation of the IRC seem to meet major goals set for the 2020 census round. It proves to be fully integrated in the organizational operations and mode of management. It reduces the peaks in organizational operations, and saves budget and time used for training inexperienced personnel. The preliminary findings, generated by monitoring the data collection process, show improved quality of data collected, achieved through better and more extensive training of interviewers by experienced staff. The management plans and the data collection technology are implemented over a short period of time, and are running smoothly with no need for a pilot test.

32. Since the census is conducted on an ongoing basis, it is dependent on ongoing provision of resources (budget, human resources and administrative data). This dependency can be the Achilles heel of the census in times of crises or instability.

33. Careful risk management will be required, as is the case in a new mode of indirect data collection from municipalities that are currently tested as a data submission under a cooperation agreement. It addresses legal and operational issues raised. This mode will also allow for controlling the quality of data upon capture. Hence, municipalities will be involved in improving their own taxation data in the future.

34. Public criticism has already been directed at the IRC: municipalities and the research community that are used to the data produced by means of a traditional census would have liked the next census to provide the very same information.

35. This criticism should be addressed partially to the foreseen advancement in the use of statistical registers such as the occupation and industry register (on the individual level), as well as those that are already available – the BDR, Education and Income Registers. The registers may be linked to the improved CPR producing a full census including the core socio-demographic information for the whole population. A core element which will be still missing is the household composition, specifically the informal compositions such as cohabitation and living with a care giver.

36. Another aspect is shared by all censuses and it refers to the need to be attuned to changing technology and to adapt developments needed to better achieve the goals under effective limitations.

37. Last but not least is a shortcoming in the concept of the IRC as a census: the socio-economic data are averaged over a 10 years' period rather than being a snapshot. It may cause no problems in static areas, but dynamic areas in which the population size and their characteristics change often will have to be dealt with in tailor-made census processes. Moreover, it is expected that globalization processes will further introduce challenges for censuses and even more so for official statistics in general.
