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Measuring population and housing

Practices of UNECE countries in the 2010 round of censuses

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NOTE

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PREFACE

This publication reviews the practices followed by countries in the UNECE region (covering Europe, Central Asia and North America) during the 2010 round of population and housing censuses. The aim is to compare the different approaches and practices adopted by the countries and to assess the compliance with the Conference of European Statisticians (CES) Recommendations for the 2010 Censuses of Population and Housing (referred in the publication also as "CES Recommendations" or "CESR").

The material presented in the publication is based on the results of an online survey carried out in 2013 by UNECE among its member countries to collect information on practices followed in the 2010 census round, and on tentative plans for the 2020 round.

The publication is divided into three parts: the first part deals with census methodology, technology, and various operational and organisational aspects of census taking, as well as issues such as coverage, quality, costs, benefits, challenges and successes. The second part reviews the different topics investigated in the census, and the general degree of compliance of the practices followed by countries with the CES Recommendations for the 2010 census round. The third part looks at the lessons learned from the 2010 round of censuses and how these might be taken forward in the planning for the next round.

It is hoped that the publication will represent a useful tool for evaluating the 2010 round of censuses in the UNECE region, and that will provide National Statistical Offices with guidance and assistance in planning and conducting the censuses of the 2020 round.

Contents

Page

PREFACE iii

PART 1 METHODOLOGICAL AND OPERATIONAL ASPECTS OF CENSUS TAKING 1

1. INTRODUCTION 1
2. OVERVIEW OF THE METHODOLOGICAL APPROACHES ADOPTED IN THE 2010 ROUND 4
3. TECHNOLOGY, OUTSOURCING AND INNOVATIONS 14
4. OPERATIONAL FRAMEWORK I: FIELD OPERATIONS, COMMUNICATIONS AND PUBLICITY 31
5. OPERATIONAL FRAMEWORK II: LEGISLATION, SECURITY, CONFIDENTIALITY AND DISCLOSURE CONTROL 47
6. OPERATIONAL FRAMEWORK III: DISSEMINATION, DOCUMENTATION, METADATA AND ARCHIVING 53
7. COSTS, BENEFITS, QUALITY AND COVERAGE 62
8. CHALLENGES AND SUCCESSES 82

PART 2 CENSUS TOPICS 88

9. INTRODUCTION 88
10. DEFINING THE POPULATION BASE 93
11. GEOGRAPHIC CHARACTERISTICS 106
12. DEMOGRAPHIC CHARACTERISTICS 121
13. ECONOMIC CHARACTERISTICS 128
14. EDUCATIONAL CHARACTERISTICS 138
15. DISABILITY STATUS 142
16. MIGRATION 147
17. ETHNO-CULTURAL CHARACTERISTICS 158
18. HOUSEHOLD AND FAMILY CHARACTERISTICS 165
19. HOUSING 183
20. AGRICULTURE 207

PART 3 LESSONS LEARNED AND PLANS FOR THE 2020 ROUND 209

21. INTRODUCTION 209
22. KEY LESSONS LEARNED 209
23. PLANS FOR 2020 214

LIST OF TABLES

Table 2.1 - Population censuses in the UNECE region, 2010 round – Census date and type 5

Table 2.2 UNECE countries by census method used in the 2000 and 2010 census rounds..... 8

Table 2.3 Countries adopting a traditional census methodology by type of field enumeration..... 10

Table 2.4 Proportion of data collected by enumeration method for countries with a combined census 12

Table 2.5 Number of countries using registers in register-based or combined censuses, by type of registers..... 13

Table 3.1 Internet data collection in the 2010 round (number of countries)..... 14

Table 3.2 Percentage of census information collected online, by type of method..... 15

Table 3.3 Internet response: measures to ensure quality and security and to handle peak demands (number of countries) 16

Table 3.4 Use of field technology by traditional and combined census countries (number of countries)..... 17

Table 3.5 Use of OMR/OCR technology by traditional and combined census countries in data processing (number of countries and percentage) 19

Table 3.6 Use and application of software (number of countries) 20

Table 3.7 Use of IT systems to manage responses from different sources (multi-mode data collection), countries with traditional or combined censuses (number of countries)..... 20

Table 3.8 Techniques and processes used to transfer and transform administrative data (number of countries)..... 22

Table 3.9 Use of cartographic/geographic data in different stages of census operations (number of countries)..... 24

Table 3.10 Length of time for preparation of IT infrastructure (number of countries)..... 25

Table 3.11 Census activities that were either fully or partially outsourced 26

Table 3.12 Reasons for outsourcing and main gain/benefits achieved (number of countries and percentage)..... 27

Table 3.13 Main challenges from outsourcing..... 28

Table 3.14 Range of key innovations in the 2010 round (number of countries)..... 29

Table 3.15 Number of key innovations introduced in the 2010 round (number of countries)..... 30

Table 4.1 Aspects of the field operation in the 2010 round (number of countries and percentage) 32

Table 4.2 Types of questionnaires used, and how they were delivered and collected (number of countries and percentage)..... 33

Table 4.3 Other documentation and materials used by field staff during the enumeration (number of countries and percentage)..... 34

Table 4.4 Field staff recruitment and training (number of countries and percentage)..... 35

Table 4.5 Pre-enumeration activities and storage of completed questions (number of countries and percentage) 36

Table 4.6 Post-enumeration checks on coverage and quality (number of countries and percentage) 37

Table 4.7 Post-enumeration debriefing and evaluation of field operation (number of countries and percentage) 38

Table 4.8 Communications and publicity campaigns (number of countries) 39

Table 4.9 Aspects of the census on which countries consulted (number of countries and percentage) 39

Table 4.10 Key user groups and stakeholders consulted (number of countries and percentage) 40

Table 4.11 Methods and media used in the publicity campaign (number of countries and percentage) 42

Table 4.12 Locations used in the publicity campaigns (number of countries and percentage) 43

Table 4.13 Population groups specifically targeted in the publicity campaigns (number of countries and percentage) 44

Table 4.14 Aims of the publicity campaigns (number of countries and percentage) 45

Table 4.15 Publicity slogans 46

Table 5.1 Census legislation in UNECE countries, by type of census 48

Table 5.2 Access of personal census information or microdata (number of countries) 50

Table 5.3 Measures to protect the statistical confidentiality (number of countries) 51

Table 5.4 Statistical disclosure protection measures (number of countries) 51

Table 6.1 Dissemination methods used (number of countries and percentage) 54

Table 6.2 Dissemination of microdata samples (number of countries) 55

Table 6.3 Lowest level of geography for which any census data is disseminated (number of countries) 56

Table 6.4 Application of minimum population thresholds for the release of census outputs and the lowest level of geography (number of countries) 57

Table 6.5 Plans to publish general evaluation and data quality reports (number of countries and percentage) 57

Table 6.6 Documentation and metadata produced to support the census outputs (number of countries and percentage) 59

Table 6.7 Recommendations and other documentation referred to (number of countries) 60

Table 6.8 Length of time completed census returns or lined data bases are kept after the census (number of countries and percentage) 61

Table 7.1 Different measures of countries' census cost, by census methodology 64

Table 7.2 Median cost of 2010 census by type of census (in US dollars) 65

Table 7.3 Period of time that the costs relate to by type of census and region 65

Table 7.4 Percentage spent on different activities 67

Table 7.5 Count of countries by innovation and impact on cost and benefit 69

Table 7.6 Count of countries managing quality dimensions 74

Table 7.7 Methods used by countries to measure accuracy (number of countries and percentage) 76

Table 7.8 Count of countries by method used to measure under-coverage, over-coverage and variance, by type of census 77

Table 7.9 Count of countries that set and published targets for accuracy 79

Table 7.10 Count of countries that adjusted for missing values, by method 80

Table 8.1 Challenges faced in the 2010 round of censuses (number of countries reporting challenges) 83

Table 8.2 Criteria for defining a successful census (number of countries) 85

Table 8.3 Successes in the 2010 round of censuses (number of countries) 86

Table 9.1 Topics for the 2010 Population and Housing Censuses 89

Table 9.2 Level of compliance with CES Recommendations: inclusion of topics by core status 91

Table 10.1 Examples of definition of population concepts 97

Table 10.2 Number and list of countries adopting selected population counts (defined according to the criteria in Table 10.1) 99

Table 10.3 Number of countries by duration and modality of residence for the most important population count (population count 1) 99

Table 10.4 Number of countries by duration of residence and type of census for the most important population count (population count 1) 100

Table 10.5 Number of countries adopting specific criteria for the place of usual residence of selected population groups 101

Table 10.6 Number of countries including selected population groups in the usually resident population 102

Table 10.7 Number and list of countries with additional population bases 104

Table 10.8 Number and list of countries using bases other than persons 105

Table 11.1 Definition of 'locality' in the 2010 round (number of countries) 107

Table 11.2(a) Provision of data on urban and rural areas (number of countries) 109

Table 11.2(b) Criteria used to distinguish urban and rural areas (number of countries) 109

Table 11.3 Definition of location of place of work (number of countries) 111

Table 11.4 Criteria for specific groups of employed persons (number of countries) 112

Table 11.5 Place of work, lowest geographical level for data collection (number of countries) 113

Table 11.6 Location of school, college or university (number of countries) 113

Table 11.7 Mode of transport (number of countries) 115

Table 11.8 Distance travelled (number of countries) 116

Table 11.9 Time taken for journey (number of countries) 117

Table 11.10 Geographic characteristics: topics included, definitions and classifications 118

Table 12.1 Countries that used a classification of legal marital status different from the recommended classification 123

Table 12.2 Countries that collected data on de facto marital status, by means of doing so and compliance with the CES Recommendations (number of countries) 124

Table 12.3 Age of women on whom countries collected fertility-related information (number of countries) 126

Table 12.4 Countries that collected dates of marriages and/or consensual unions, and whether current or first marriage/union was collected 126

Table 13.1 Concept of activity status adopted (number of countries) 130

Table 13.2 Problematic cases assigned as 'economically active' (number of countries) 131

Table 13.3 Number of countries collecting information on non-core economic topics 137

Table 14.1 Numbers of countries including non-core educational topics in the census 140

Table 15.1 Questions on disability used by countries not adopting the Washington Group Short Set of questions 144

Table 16.1 Information collected on country/place of birth (number of countries) 148

Table 16.2 Source of information collected on country of birth and country of citizenship (number of countries) 149

Table 16.3 Countries collecting information on year (and month) of arrival in country, total duration of residence, and country of previous usual residence abroad 151

Table 16.4 Countries collecting information on previous usual residence and date of arrival using either the extensive or reduced mode 153

Table 16.5(a) Number of countries collecting information on geographic level of internal migration (reduced mode) 154

Table 16.5(b) Number of countries collecting items on the previous place of residence (extensive mode) 155

Table 16.6 Main reasons for international migration (number of countries) 156

Table 17.1 Number and percentage of countries that collected information on ethnicity and religion 159

Table 17.2 Distinction between ethnicity and nationality (number of countries) 160

Table 17.3 Nature of religious identification (number of countries) 160

Table 17.4 Type of questions used to collect information on ethnicity and religion 161

Table 17.5 Number of countries that collected information on language and main source of data ... 163

Table 17.6 Mode of collecting language information ... 164

Table 17.7 Countries that adopted more than one mode of collecting information on language ... 164

Table 18.1 Compliance with the CES Recommendation on classification of relationship to the Household Reference Person (number of countries) ... 172

Table 18.2 Compliance with the CES Recommendation on the classification of inter-relationship within the household for countries using the relationship matrix approach (number of countries) ... 173

Table 18.3 Compliance with the CES Recommendation on classification of household status (number of countries) ... 175

Table 18.4 Compliance with the CES Recommendation on classification of type of household (number of countries) ... 177

Table 18.5 Compliance with the CES Recommendation on classification of family status (number of countries) ... 179

Table 18.6 Compliance with the CES Recommendation on classification of type of family nucleus (number of countries) ... 180

Table 18.7 Compliance with the CES Recommendation on classification of tenure status of the household's accommodation (number of countries) ... 181

Table 18.8 Other household-related topics on which information was collected in the census (number of countries) ... 182

Table 19.1 Inclusion of housing core topics (number of countries and percentage) ... 189

Table 19.2 Classification used for housing core topics ... 195

Table 19.3 Housing non-core topics, by proportion of inclusion in the census by countries ... 197

Table 19.4 Inclusion of housing non-core topics (number of countries and percentage) ... 198

Table 19.5 Availability of selected topics for unoccupied dwellings (number of countries and percentage) ... 204

Table 20.1 Information on agriculture collected by selected UNECE countries ... 208

Table 23.1 Use of technology in 2010 and planned for the 2020 census round ... 214

Table 23.2 Barriers to adoption of new technology (number of countries) ... 215

Table 23.3 Innovations being considered for the 2020 census round (number of countries) ... 216

Table 23.4 Factors driving innovation in the 2020 census round ... 218

Table 23.5 Support for new housing topics in the 2020 census round (number of countries) ... 220

LIST OF FIGURES

Figure 2.1 UNECE member countries by census method – 2010 census round 7

Figure 7.1 Cost profile by type of census, in nominal and PPP-adjusted US dollars per capita 66

Figure 7.2 Average cost breakdown by census method (% of total spend) 68

Figure 7.3 Main users that benefit from the census by region 71

Figure 7.4 Main benefits by region 72

Figure 7.5 Number of quality dimensions managed 75

Figure 7.6 Number of methods used to measure accuracy 78

Figure 7.7 Overall effectiveness of methods used to measure accuracy 79

Figure 14.1 Number of countries by minimum age for data collection on educational attainment and type of census 139

Figure 15.1 Rating of quality of information on disability (number of countries, by census methodology) 146

Figure 19.1 Compliance of housing concepts used with the CES Recommendations 184

Figure 19.2 Type of density standard derived, by type of census and region 196

Figure 19.3 Countries by number of topics for unoccupied dwellings, type of census and region 205

Figure 23.1 Innovations considered for 2020 census round 217

Figure 23.2 Main census activities in which innovations are expected for 2020 census round 218

PART 1 METHODOLOGICAL AND OPERATIONAL ASPECTS OF CENSUS TAKING

1. INTRODUCTION

In the 2010 census round more countries in the UNECE region followed the trend, first started in the 1970s, by moving from a wholly 'traditional' approach based on a full field enumeration to alternative approaches to collecting census information in an attempt to reduce costs and improve efficiency. More countries than before now base their census either on information obtained solely from administrative sources or on the combined use of different sources including registers and sample surveys, as a complement or a replacement of traditional fieldwork operations. France adopted a unique 'rolling census' approach in which information is collected from a different (or rolling) sample of the population each year thereby enabling a 'census' to be created on an annual basis if required. The United States also adopted a new approach for their 2010 Census by collecting basic demographic information in a full decennial field operation (as it is required to do constitutionally) but supplementing this with more detailed information from an annual sample survey.

There were also many innovations, particularly in an attempt to improve the efficiency of collecting information in the field, with a significant number of countries relying on (a) geographic information systems to plan their census geography, (b) internet data collection, and the use of hand held devices and laptop computer to replace (or at least minimise) the use of traditional paper questionnaires, and (c) automatic data capture and coding technologies to minimise data processing errors.

Part 1 of this publication deals with general aspects of census management. These range from the increasing move away from the 'traditional' methodological approach to data collection, to some of the key operational aspects related to the census such as: the legislative framework; communications and publicity; security, confidentiality and disclosure control; and dissemination, documentation, metadata and archiving. Much attention is devoted to the increasing use of technology in all aspects of the census operation, and more focus is also given to the inter-related issues of cost, benefits and quality. Finally, some of the main challenges faced in undertaking modern censuses are summarised, but balanced with the main successes achieved in the 2010 round.

A summary of the main findings is given in this first chapter.

Methodology

The population census plays a central role in the official national statistical system of each country, by providing a reliable estimate of the population, as well as detailed description of the population by sex, age and other demographic, social and economic characteristics, at the national, regional and, most importantly, the smaller territorial levels. When a housing census is conducted together with the population census, information is also provided on the housing arrangements and on their characteristics and amenities.

Population censuses are usually taken once a decade, and in some cases once every five years, but the increasing use of information taken from continuous registers of administrative data (avoiding the need to collect new data each time) means that, theoretically at least in some countries, census-type statistics can be derived even more frequently should there be a need to do so. The continuing trend towards collecting more information by alternative methods is reviewed in Chapter 2.

Technology

Many of those countries that carried out field operations to collect all or part of their census information reported a variety of other technological aids for doing so (see Chapter 3). In particular, geographic information systems (GIS) – now pretty well established globally - were utilized for the purposes of mapping by more countries than any other technological tool. Some 13 countries reported using such technology for the first time in their field operations.

Over a third of countries that responded to the UNECE survey (18) reported that they provided an internet response option. In the 2000 round only 4 countries did so. However, bearing in mind that such technology was not relevant for those countries adopting a wholly register-based approach to the census, almost half of those countries conducting a field operation adopted an internet solution

The use of laptops or tablet computers by field staff, either for the purpose of recording actual census information or for management support, is also increasing; some 10 countries used such technology in the field in the 2010 round, compared with just 2 countries in the 2000 round.

However, the extent of usage of OCR/OMR technology has levelled of as more countries resort to using automatic electronic scanning of census questionnaires.

The complexity of much of the new software and the infrastructure required for many of the new and emerging technologies go beyond the current technical capabilities of many census agencies. It was clear in the 2010 round that significant components of the census operation needed to be outsourced in many countries.

Operational activities

In many countries, a specific census act or appropriate regulations are approved before each census (see Chapter 5). In some countries, however, more general statistics legislation includes all the necessary provisions required for the conduct of a population census and/or the production and dissemination of statistical data thereby obviating the need for specific census legislation.

Furthermore in all countries, there is legislation of some form in place that protects the confidentiality of personal information collected for census purposes. Moreover, all but one country reported having a formal policy and/or strategy for ensuring the security and confidentiality of such information. Most countries take measures to protect the statistical confidentiality of published output from the census, with post-tabular methods being more commonly adopted than pre-tabular methods.

Pre-enumeration census tests, pilots or rehearsals were conducted in over 90 per cent of countries while a post-enumeration survey to check coverage was carried out in almost two thirds (see Chapter 4).

All but four of the countries that conducted censuses with a traditional or combined methodology reported that they adopted a strategic communications programme before and during the census operation, and all that did so also carried out an extensive publicity campaign (see Chapter 4).

Dissemination and archiving

Over a third of countries use their websites as the prime medium for static outputs but 30 other countries (60 per cent) use this medium as an additional means of dissemination. Interactive online databases provide the main means of dissemination in 15 countries (see Chapter 6).

Microdata is becoming an increasingly valuable vehicle for the dissemination and manipulation of census data. Well over a third of countries reported that microdata samples are, or would be, available to selected *bone fide* users, and almost a quarter of countries reported that less detailed samples would be available to all users.

The range of metadata to support the census outputs varied considerably between countries. Most countries produced, or will produce, explanatory notes to accompany the statistical tables, and four fifths reported the production of papers or reports covering the methodological aspects of the census and a wide range of other specific issues. But less than a half reported that they had produced data dictionaries or glossaries of terms used in the outputs. Lack of such metadata is particularly prevalent among countries with register-based censuses.

Only 10 countries adopt a policy of making the individual census returns publicly available for socio-historical or genealogical research after a prescribed period of closure.

Costs, benefits and quality

Census costs have risen considerably since the 2000 round for those countries carrying out a traditional census, among whom the median per capita cost in the 2010 round is USD 5.57 compared with just USD 0.24 for those countries that adopt a register-based methodology (see Chapter 7). The average period of time over which these costs have accrued are, however, broadly similar for each methodology, the mean being 5.8 years for traditional census countries, 5.6 for register-based censuses and 5.0 for those countries adopting a combined approach.

Among countries with a traditional or combined census, field costs continue to account for the greatest proportion of the expenditure, by a large margin.

The introduction of more technology and innovation, particularly the use of online data collection and greater levels of outsourcing, has not only helped to reduce cost increases but has enabled countries to reap more benefits.

The measurement of accuracy was the focus of particular attention in the survey. Almost all countries now adopt one or more methods to measure accuracy. Some 90 per cent of countries carried out an independent post-enumeration coverage check.

The majority of countries (87 per cent) applied editing procedures to enable them to adjust for errors and inconsistencies. Imputation was the most commonly adopted method used by those countries that made adjustments for missing data.

Challenges and successes

Managing timeliness and financial resources were reported as being the most difficult challenges in the 2010 round (see Chapter 8). But other issues such as improving response rates and data quality proved to be almost as challenging – and more so for some countries, particularly those with large field operations.

However, more than two thirds of countries across the UNECE region reported that they had kept within their budget (one of the key criteria for defining a ‘successful’ census) and the same number managed to achieve improved data quality.

2. OVERVIEW OF THE METHODOLOGICAL APPROACHES ADOPTED IN THE 2010 ROUND

This chapter[1] presents a review of the different methodologies for carrying out the census adopted by countries in the UNECE region in the 2010 round (covering the period 2005-2014), and notes in particular where there have been significant changes compared to the previous 2000 census round. In making comparisons with the previous (2000) round, information from the UNECE publication "Measuring Population and housing – Practices of UNECE countries in the 2000 round of censuses" has also been used[2].

Where and when censuses were taken

For over six decades, the United Nations has supported national census-taking worldwide through the decennial World Programme on Population and Housing Censuses. In March 2005, the United Nations Statistical Commission at its thirty-sixth session initiated the 2010 World Programme on Population and Housing Censuses. The United Nations Economic and Social Council approved the programme through the adoption of its resolution 2005/13, which stressed the need for countries to conduct censuses at least once during the period 2005 to 2014.

Between 2005 and 2013 some 51 out of the total of 56 countries in the UNECE region (91 per cent) carried out a census in one form or another[3]. By the end of 2013, a census has not been carried out as part of the 2010 round in Andorra, Georgia, the Republic of Moldova, Ukraine, and Uzbekistan, but there are plans to do so during 2014 in the first three of these countries. In Ukraine the census was postponed to 2016 (outside the period for the 2010 round), and in Uzbekistan there are no plans for a census.

Table 2.1 shows when censuses in the 2010 round were taken within UNECE region, indicating the type of census methodology adopted by each country. Four fifths of all countries took a census in the two year period between 2010 and 2011 (all but 11 countries did so). The exceptions were Israel and Monaco (in 2008), Azerbaijan, Belarus, Kazakhstan, and Kyrgyzstan (2009), Turkmenistan (2012), and Bosnia and Herzegovina (2013), plus the three countries with a census planned for 2014 (Andorra, Georgia and the Republic of Moldova). The majority of countries (35) took their census in 2011 (though some countries that conduct five yearly censuses, such as Canada and Ireland, carried out two census in the reference period); this was greatly influenced by the fact that EU legislation prescribed 2011 as the reference year for the census information that is required to be provided to Eurostat by all EU member states. Of all the EU member states only Denmark and Finland did not (technically) take their censuses in that year – instead the reference date there was the last day of 2010.

[1] The material in this chapter has been taken largely from a paper on census methodology prepared for the UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html). The paper was prepared by the UNECE Task Force on Methodology (lead by Eric Schulte Nordholt, Statistics Netherlands) and was based on responses to the UNECE survey on 2010 census practices carried out earlier in that year, but also referred to material taken from an overview of the 2010 round of census in the UNECE region prepared by Paolo Valente (UNECE) and presented to the Conference of European Statisticians at its 60th plenary session in June 2012 (http://www.unece.org/stats/documents/2012.06.census.html).

[2] Measuring Population and Housing – Practices of UNECE countries in the 2000 round of censuses, United Nations publication Sales No. E.07.II.E.15, available online at: http://www.unece.org/stats/census.html

[3] Including the Former Yugoslav Republic of Macedonia, where the 2011 census was cancelled during the data collection.

Table 2.1 - Population censuses in the UNECE region, 2010 round – Census date and type

Census year	Reference date	Country	Type of census
2008	9 June 2008	Monaco	Traditional
	27 December 2008	Israel	Combined (registers + survey)
2009	25 February 2009	Kazakhstan	Traditional
	24 March 2009	Kyrgyzstan	Traditional
	13 April 2009	Azerbaijan	Traditional
	14 October 2009	Belarus	Traditional
2010	1 April 2010	United States	Traditional enum. with yearly updates
	1 October 2010	Tajikistan	Traditional
	14 October 2010	Russian Federation	Traditional
	7 November 2010	San Marino	Traditional
	31 December 2010	Denmark*	Register-based
	31 December 2010	Finland*	Register-based
	31 December 2010	Liechtenstein*	Combined (registers + enumeration)
	31 December 2010	Switzerland	Combined (registers + surveys)
2011	1 January 2011	Belgium*	Register-based (+ data from surveys)
	1 January 2011	France*	Rolling census
	1 January 2011	Netherlands*	Register-based (+ data from surveys)
	1 January 2011	Slovenia*	Register-based
	1 February 2011	Bulgaria*	Traditional
	1 February 2011	Luxembourg*	Traditional
	1 March 2011	Latvia*	Combined (registers + enumeration)
	1 March 2011	Lithuania*	Combined (registers + enumeration)
	16 March 2011	Greece*	Traditional
	21 March 2011	Portugal*	Traditional
	26 March 2011	Czech Republic*	Traditional
	27 March 2011	United Kingdom*	Traditional
	31 March 2011	Croatia	Traditional
	31 March 2011	Montenegro	Traditional
	31 March 2011	Poland*	Combined (registers + survey)
	10 April 2011	Ireland*	Traditional
	9 May 2011	Germany*	Combined (registers + enum. + survey)
	10 May 2011	Canada	Traditional
	21 May 2011	Slovakia*	Traditional
	30 September 2011	Serbia	Traditional
	30 September 2011	The Former Yugoslav Republic of Macedonia	Traditional *[census cancelled during field data collection]*
	1 October 2011	Albania	Traditional
	1 October 2011	Cyprus*	Traditional
	1 October 2011	Hungary*	Traditional
	2 October 2011	Turkey	Combined (registers + survey)
	12 October 2011	Armenia	Traditional
	22 October 2011	Romania*	Traditional
	23 October 2011	Italy*	Traditional
	31 October 2011	Austria*	Register-based
	1 November 2011	Spain*	Combined (registers + survey)
	19 November 2011	Norway*	Register-based
	20 November 2011	Malta*	Traditional
	31 December 2011	Estonia*	Combined (registers + enumeration)
	31 December 2011	Iceland*	Register-based (+ data from surveys)
	31 December 2011	Sweden*	Register-based
2012	15 December 2012	Turkmenistan	Traditional
2013	1 October 2013	Bosnia and Herzegovina	Traditional
2014 (planned)	1 April 2014	Republic of Moldova	Traditional
	1 September 2014	Andorra	Traditional
	5 November 2014	Georgia	Traditional

*Country in the European Economic Area

How censuses were taken – methodological approaches

Censuses have been traditionally based on a full field enumeration, with information collected using paper census forms. The census forms have changed over time. In the earliest European censuses they were just statistical summaries; later they became lists where each enumerated person was recorded in a separate line (within his own household); and finally they became individual forms where each individual/household had a separate form. The delivery and collection of the forms was done by census enumerators, but in more recent decades, mail delivery and/or collection has been adopted in several countries. As for the compilation of census forms, there was also a transition in many countries from form-compilation completed by enumerators/interviewers, to 'self-enumeration' where the forms are completed by the respondents themselves.

Countries are, however, becoming more creative in their census designs and developing new census methods. Increasingly countries are moving away from a full field enumeration with enumerators going from door to door to collect data, and instead are collecting or deriving individual census information from data held in administrative registers. During the 1970s, several Nordic countries were the first to move from the 'traditional' census, to this new 'register-based' approach. Denmark was the first country to conduct a fully register-based census in 1981, followed by Finland in 1991.

In some cases the motivation for change was to overcome organisational problems or opposition to traditional censuses coming from the public opinion where the traditional census was perceived as being too intrusive. In other cases the primary motivation was to reduce costs (by, for example, taking advantage of the information already available in the registers or other data sources), or the desire to produce census data more frequently than every ten years, such as on an annual or even a continual basis. But more often, the interest in developing new approaches to census taking was in response to a combination of these reasons.

The use of population and other registers in combination with other sources is at the centre of most of the new methods. In several countries in the UNECE region population registers do exist, but their coverage and quality is not always sufficient to produce census data without recourse to field operations. Registers covering other social and demographic characteristics also exist, but do not cover all census topics. For these reasons, combined systems were developed by some countries, making use of the information available in the registers to complement information collected through field operations or taken from other sources such as ad hoc sample surveys.

As a result of the development of these new methodologies, the classification of countries according to the approach used for carrying out the census is now more complicated. For the purposes of this report, however, three categories for summarising different census approaches have been used: 'traditional', 'register-based' and 'combined'. Although France's 'rolling census' approach – based on annual surveys carried out on rotation basis in the various municipalities, and aggregation of the results over five years - is unique and might therefore be regarded as a separate methodology in some circumstances, for the purpose of the analysis of the results of the UNECE survey it has been included within the broad 'traditional' group, including the censuses based on field data collection only.

The map at Figure 2.1 shows a distinctive geographic clustering of countries with similar census methodologies. Thus, register-based censuses are conducted mainly by the Nordic countries and selected countries in Central Europe, whereas the traditional census predominates in the eastern European, CIS, and English speaking countries.

Figure 2.1
UNECE member countries by census method – 2010 census round

If the methodology of register-based censuses was used by some Nordic countries already since the 1980s, most of the other alternative approaches were developed more recently, and the number of countries adopting them increased significantly in the last two census rounds. In order to assess the changes in census methodology in the recent past, Table 2.2 presents the census methods used in the 2000 and 2010 rounds by the 56 member countries of the UNECE.

Although the majority of the countries in the UNECE region still used the traditional approach in the 2010 round (35) there has been a clear increase in the use of alternative methodologies between the 2000 and the 2010 rounds. For the 2010 round nine countries (from three in the 2000 round) have joined the 'register-based' census club, and ten countries (from five in the 2000 round) collected part of their census information using administrative data or other sources rather than rely on a full field enumeration (see below). The number of countries conducting either a register-based or a combined census increased from 8 in the 2000 round to 19 (more than double) in the 2010 round.

Table 2.2
UNECE countries by census method used in the 2000 and 2010 census rounds

Census method in 2000 round:	Census method in 2010 round: Traditional	Combined	Register-based	(No census)	Total 2000 round:
Traditional	Albania, Armenia, Azerbaijan, Belarus, Bulgaria*, Canada, Croatia, Cyprus*, Czech Republic*, France* (1), Georgia, Greece*, Hungary*, Ireland*, Italy*, Kazakhstan, Kyrgyzstan, Luxembourg*, Malta*, Monaco, Montenegro (2), Portugal*, Republic of Moldova, Romania*, Russian Federation, Serbia (2), Slovakia*, Tajikistan, The FYR of Macedonia, Turkmenistan, United Kingdom*, United States (3)	Estonia*, Israel, Liechtenstein*, Lithuania*, Poland*, Switzerland, Turkey	Austria*	Ukraine	**40**
Combined		Latvia*, Spain*	Belgium* (4), Norway, Slovenia*		**5**
Register-based			Denmark*, Finland*, Netherlands* (4)		**3**
(No census)	Andorra, Bosnia and Herzegovina, San Marino	Germany*	Iceland* (4), Sweden*	Uzbekistan	**(7)**
Total 2010 round:	**35**	**10**	**9**	**(2)**	

Source: UNECE Survey and UNECE Census Wiki (2013)
Notes:
(1) Rolling census in the 2010 round
(2) Serbia and Montenegro in the 2000 round
(3) Traditional enumeration with yearly updates in the 2010 round
(4) Register-based census with selected data from existing surveys
*Countries in the European Economic Area
Countries that changed methods between 2000 and 2010 census rounds

The 'traditional' approach

What is a 'traditional' census? The responses to the UNECE survey showed wide a variation in the interpretation of the term and some differences in the detailed methodology between countries. What is perceived as a traditional census in one country may be regarded as a new methodology in another. With the use of new technologies and data-collection methodologies, and the availability of a multitude of data sources, the term may no longer accurately reflect the current state of census-taking, and is used differently across countries.

For the purposes of simplifying the analyses of the survey responses, the term 'traditional' here encompasses the concept where the census collects information on individuals (and housing units) provided directly by those individuals through a full field enumeration, whether by means of a door-step interview of household members, or through a self-completion paper questionnaire, or by providing the information by telephone or online via the internet (that is, encompassing all means of delivery of the census forms and the collection of the returns). The basic census characteristics on all

individuals and housing units are normally collected at a specific point in time, but more detailed characteristics can be collected on a samples basis through the use of long and short forms.

On this basis, the very different and much developed methodologies adopted in the censuses in the United States (traditional enumeration with short form plus annual updates based on sample surveys) and Canada (traditional enumeration with short form plus voluntary sample survey) have been classified as 'traditional'. France's newly adopted 'rolling' census would not fully qualify as 'traditional' since the characteristics of universality and simultaneity do not fully apply. But here the most essential criterion of collecting information directly from the data subject without recourse to the use of registers or other data sources justifies its inclusion in the traditional category for the purposes of this report.

Table 2.2 shows that some 35 of all the countries in the UNECE region (two thirds) conducted traditional censuses, or plan to do so, in the 2010 round. This is still, therefore, the preferred general methodological approach throughout the region, but is less so than was the case in the 2000 round in which over four fifths of countries adopted this approach. Countries in the UNECE region that moved away from a fully traditional methodology after the 2000 round to a combined approach in the 2010 round included Estonia, Israel, Liechtenstein, Lithuania, Poland, Switzerland and Turkey, while Austria took the bold step of moving straight to a fully register-based census in 2011.

Those countries that continue to undertake a traditional census are proportionately fewer in the European Economic Area[4] (EEA) (just over half) than is the case elsewhere in the UNECE region, where 22 countries (88 per cent) do so. This clearly reflects the overwhelming predominance of the traditional census in the CIS, Balkan and Eastern European states, as well as in Canada and the United States.

Table 2.3 shows the more detailed field methodology for those countries (30 in total) that reported conducting a traditional census in the UNECE survey. Such enumerations were sometimes conducted with the aid of registers but only for use as a sampling frame or control (9 of the responding countries). However, far more countries (19) reported no use of registers at all in the enumeration process. The United States now conducts its census with a complete enumeration collecting limited demographic data only, supplemented with data on the full range of census topics (on a sample basis only) from the American Community Survey (first fully implemented in 2005)[5]. As noted above, France now carries out a rolling census in which a moving sample of the population is enumerated each year, such that the whole country is covered at least once within a five year period. Interestingly, perhaps, whereas among EEA countries only half reported no use of such registers, four out of five non-EEA countries did so.

The survey results also show that among the 30 responding countries that adopted this broad 'traditional' approach, the most commonly adopted enumeration method was the face-to-face interview. All 16 non-EEA countries collected some information in this way, and in 14 of these it was the only method of data collection. Canada and the United States were the exceptions. Canada collected more than half of its census information (55 per cent) via online returns and a further third (30 per cent) through paper questionnaires. This reflected the particular focus given by Statistics Canada in 2011 to collecting data online. In contrasts in the United States (where there was no internet response option available) almost two thirds of its census information (63 per cent) was

[4] The European Economic Area comprises the member states of the European Free Trade Association (EFTA) (Iceland, Liechtenstein and Norway) and the member states of the European Union (27 member states at the time of the UNECE survey in early 2013, not including Croatia that joined the EU in July 2013).

[5] In the United States, the 2010 decennial census form included only limited demographic and housing questions (i.e., age/date of birth, sex, race, Hispanic origin, relationship, and tenure). This basic information is supplemented with more detailed information from the American Community Survey (ACS), an annual sample survey. Data collected from the census short form and the ACS comprised the 2010 Census. Therefore, although in this publication the United States census is classified in the "traditional census" category, some of the results presented for this country refer to data collected in the American Community Survey.

collected from self-compilation of paper questionnaires (short form data only) and a further third through a door-step interview during their nonresponse follow-up operation.

In only 6 of the 14 countries with traditional census in the EEA region was the door-step interview method used at all. Greece, Malta and Romania collected all (or almost all) the information with this method, which was the main method also in Hungary (65 per cent of the data) and Bulgaria (59 per cent). Exceptionally, Cyprus used, instead, an electronic questionnaire with computer assisted personal interview (CAPI) software. Elsewhere in majority of countries (9 in all) the bulk of information was recorded via self-completion paper questionnaires (delivered to the household either by mail or by an enumerator), with the amount of information collected ranging from 16 per cent in Hungary to 99 per cent in France and 100 per cent in Ireland and Luxembourg.

Table 2.3
Countries adopting a traditional census methodology by type of field enumeration

Countries:	Full field enumeration (traditional census)		Traditional enumeration with yearly updates of characteristics on a sample basis	Rolling census (cumulative continuous survey)
	supported by register data used only as frame or control	without using register information		
Albania		X		
Armenia		X		
Azerbaijan		X		
Belarus		X		
Bosnia and Herzegovina		X		
Bulgaria*	X			
Canada		X		
Croatia		X		
Cyprus*		X		
Czech Republic*	X			
France*				X
Georgia		X		
Greece*		X		
Hungary*	X			
Ireland*	X			
Italy*	X			
Kazakhstan		X		
Kyrgyzstan		X		
Luxembourg*		X		
Malta*	X			
Montenegro		X		
Portugal*		X		
Republic of Moldova		X		
Romania*	X			
Russian Federation		X		
Serbia		X		
Slovakia*	X			
Tajikistan		X		
United Kingdom*	X			
United States			X	
TOTAL:	**9**	**19**	**1**	**1**

*Country in the European Economic Area

As noted above Canada collected, proportionally, more information via the internet (55 cent) than any other traditional census taking country, but only eight other countries with traditional census did so at all. All of these were in the EU with proportions ranging from 50 per cent in Portugal and 41 per cent in Bulgaria to 2 per cent in Luxembourg.

It is almost certain that the use of the internet will increase significantly over the next decade, and will become far more widely adopted in the next census. Some 33 countries in total, regardless of their basic methodological approach, reported that they are likely to collect data in this way in the 2020 round. This would almost double the number that did so in the 2010 round (see Chapter 23).

The collection of census information via the telephone using either paper/electronic questionnaires or automated interviewing technology is also a viable medium. However, only three countries with traditional census (Canada, Malta and the United States) deployed this option, and even in there, less than four per cent of information was collected in this way.

All but three of the traditional census countries used only a 'long' form to collect the information – whether this was by face-to-face interview, self-completion or telephone. Three countries (Canada, Italy and the United States) preferred to use a 'short' form to collect basic demographic information on the whole population while relying on a long-form to collect the more detailed characteristics for a sample of the population only.

The register-based approach

Nine countries carried out their census using a primarily register-based approach (Austria, Belgium, Denmark, Finland, Iceland, the Netherlands, Norway, Slovenia, and Sweden). Seven are in the EU, and all are in the EEA (see Tables 2.1 and 2.2). Apart from Austria and Slovenia, all are geographically clustered in Northern Europe. This is three times the corresponding number in the 2000 round (when only Denmark, Finland and the Netherlands used this approach, as shown in Table 2.2), and reflects a growing trend away from the traditional approach for the reasons outlined above.

One of the six new countries (Austria) took the radical decision of moving from a traditional census in the 2000 round to a fully register-based approach in one step. And of the others, Iceland and Sweden did not take a census in the 2000 round. Six of the countries use only data linked together from administrative registers to create the population and demographic variables, but three countries (Belgium, Iceland and the Netherlands) also used (or recycled) some data from pre-existing sample surveys to provide such variables that are either missing, or cannot be accessed, from registers. However, in the 2010 round, such data amounted to only a very small proportion (five per cent or less) of the total population information for each country. Moreover, all the register countries collected the census information relating to their housing entirely from registers.

A summary of the various registers used as data sources for the census in countries using either a register-based or combined approach is given below.

The combined-methodology approach

Ten countries, comprising one fifth of the total number of responding countries, adopted a 'combined' methodological approach whereby some information was taken from registers while other information on selected variables was collected through a field operation, either using census forms completed by all households in a way similar to the 'traditional' approach described above or by means of ad hoc sample surveys. Four countries adopted the first of these two approaches while six adopted the second (see Table 2.4).

The balance of the amount of data collected from different sources varied from country to country. At one extreme, Estonia reported that it collected two thirds of its census data from households online, a fraction less than a third via computer assisted personal interview, but with only one per cent of its data taken from registers, whereas Switzerland, on the other hand, derived 97 per

cent of its data from registers and only three per cent directly from a self-completion questionnaire. In Germany, the spread was more even with half its data taken from registers and half using more traditional means (including both interview and self-completion modes).

Table 2.4
Proportion of data collected by enumeration method for countries with a combined census

Countries by type of combined census methodology	Proportion of data collected by data collection method						
	Interview			Self-completion		Registers	Existing surveys
	Paper form	CAPI	Telephone	Paper form	Internet		
Register plus full field enumeration for selected variables							
Estonia*	-	32	-	-	67	1	-
Latvia*	-	59	-	-	32	9	-
Liechtenstein*	-	-	-	65	25	10	-
Lithuania*	61	-	-	-	34	5	-
Register plus sample field data for selected variables							
Germany*	15	-	-	30	5	50	-
Israel	-	60	20	10	-	10	-
Poland*	-	22	3	-	12	63	-
Spain*	-	10	-	48	37	5	-
Switzerland	-	-	-	2	1	97	-
Turkey	32	48	-	-	-	20	-

*Country in the European Economic Area

The scope of registers used

Clearly, administrative registers now play a vital role in census taking – even in those countries still adopting a traditional approach. The majority of countries use administrative data in one way or another in connection with the census. Uses range from supporting census activities, especially when establishing address-lists, to complementing census data or verifying/controlling the quality of the collected data, and, of course, to providing the actual census database itself. As well as reporting on the extent to which registers were used to provide census data, countries also identified in the survey the different types of registers used (Table 2.5).

As it could be expected, the countries with access to a population register used it; all the register-based and combined approach countries (19 in total) did so, suggesting that such a register is the minimum prerequisite for any country not undertaking a traditional field enumeration census, and, indeed, this data source was used more than any other type of register.

All the nine countries with register-based census employed a wide range of registers. In addition to the population register – vital for providing basic demographic data - all or most of these countries used registers relating to addresses, buildings/dwellings, employment/unemployment, social security, tax, and commercial businesses. Other sources of information included education registers

which were specifically reported by four countries. Five of the countries reported using all the registers specifically identified in the survey, together with others; Finland reported the use of more than 30 different administrative or statistical database files.

Table 2.5
Number of countries using registers in register-based or combined censuses, by type of registers

Type of register	Type of census	
	Register based census	Combined census
Total countries using registers	**9**	**10**
Population register	9	10
Address register	6	5
Building or dwelling register	9	7
Employment/unemployment register	9	4
Social security/insurance register	7	7
Tax register	6	5
Business register	7	5
Other registers	7	5

As expected, less reliance was placed, generally, on registers among those countries adopting a combined approach (but all had a population register). But even countries such as Estonia, that reported collecting as little as one per cent of its census information in this way, used six different registers.

Moreover, the results of the survey revealed that a significant number of countries with traditional census also have registers that could potentially allow them to move to a census that is based, or at least partially based, on administrative data. For these countries, however, the real issue is not the existence of the registers per se, but rather their content, especially in terms of coverage and quality, which would need to be of a sufficiently proven standard to provide an acceptable alternative to data collected directly from individuals. Other barriers to the use of registers are likely to include the lack of standardisation among different data sources, particularly where they are not managed by the National Statistical Institute (NSI), technical or legal problems in accessing or linking data, presence of a limited number of variables, and, not least, deep-rooted political or public opposition. Thus the move away from the traditional approach entirely is unlikely to be achieved throughout the UNECE region by 2020.

3. TECHNOLOGY, OUTSOURCING AND INNOVATIONS

The UNECE publication on practices in the 2000 round of population and housing censuses reported that developments in technology were changing the way censuses were being conducted. The situation is no different for the 2010 round, which saw the adoption of several new technologies in a number of countries. These included scanning technologies to replace manual data capture, the use of digital maps and geographical information system (GIS) technologies to supersede traditional census cartography, and the use of the internet to provide respondents with an opportunity to submit their census information online. For many of the 50 countries that responded to the UNECE survey in respect of this topic, these technologies were used for the first time in the census, while for others they represented a consolidation of existing practices.

This chapter reports on several aspects of the technological practices adopted for the management of census operations, mapping, data capture and editing, and data processing. It also summarises the extent to which technological and other operational services were provided by external providers, and the range of innovations adopted by countries in an attempt to improve the efficiency of their census[6].

Use of technology in field operations

About a third of responding countries (18) reported that they provided an internet response option. However, bearing in mind that such technology was not relevant for those countries adopting a wholly register-based approach to the census, almost half of those countries conducting a field operation adopted an internet solution (45 per cent). (It should be noted here that in Luxembourg, although the census questionnaire was downloadable from the internet, the return was made via a more conventional printed form).

The majority of these countries (12) offered the internet as one of several initial response modes. Here respondents could, alternatively, chose to make their return by more conventional methods such as a paper questionnaire or through a door-step interview (Table 3.1). The other countries used the internet option as the sole initial means of data collection, and only offered other methods when an online response was not forthcoming.

Table 3.1
Internet data collection in the 2010 round (number of countries)

	Total countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
No use of internet	**31**	20	9	2	15	16
Field data collection	*22*	*20*	*0*	*2*	*6*	*16*
No field data collection	*9*	*0*	*9*	*0*	*9*	*0*
Use of internet	**18**	10	0	8	15	3
Online	*17*	*9*	*0*	*8*	*14*	*3*
Offline	*1*	*1*	*0*	*0*	*1*	*0*
Internet as sole initial option	5	2	-	3	4	1
Internet as multi-choice option	12	7	-	5	10	2

[6] The material in this chapter has been taken largely from reports of the UNECE survey prepared by Janusz Dygaszewicz (Central Statistical Office of Poland) on technology, Marc Hamel (Statistics Canada) on innovation and Ian White (UK Office for National Statistics) on outsourcing, and presented to the Joint UNECE-Eurostat Work Session on Population and Housing Censuses (Geneva, 30 September to 3 October 2013) (http://www.unece.org/stats/documents/2013.10.census1.html)

It might have been expected that those countries that went out of their way to encourage an internet response would reap the benefit of doing so by collecting a greater proportion of the census information in this way than might otherwise have been the case. And this was in fact the case in Bulgaria and Lithuania where over a third of their census information was collected online (Table 3.2). However, even some countries offering a choice of response modes from the outset achieved very high proportions of online responses – particularly in Canada where more than half the data was collected via the internet, and where there was an initial publicity campaign specifically aimed at encouraging households to complete their census questionnaire online. But Estonia achieved the highest level of response online, where two thirds of the information was collected in this way.

Table 3.2
Percentage of census information collected online, by type of method

Traditional census	Percentage	Combined census	Percentage
Canada	55	Estonia	67
Portugal	50	Spain	37
Bulgaria	41	Lithuania	34
Italy	33	Latvia	32
Czech Republic	27	Liechtenstein	25
Hungary	19	Poland	12
United Kingdom	16	Germany	5
Slovakia	7	Switzerland	1

Collecting personal and sometime sensitive information via the internet poses particular problems in ensuring data quality and the security and confidentiality of the census information provided. Countries employed various methods to ensure the security and privacy of data collected via the internet, and often different methods were used in parallel (see Table 3.3).

Unique access codes were used by two thirds of countries (12), and the use of personal identification numbers (PINs) that allowed for the form to be completed in more than one session, was additionally adopted by seven of the countries. In five countries, to ensure the confidentiality of collected data, a physically separate computing infrastructure was employed for collected data via different modes; CAPTCHA[7] for the Internet census was commonly used in five countries, in the attempt to prevent automated software from performing actions which degrade the quality of the online census system. Other unique solutions were employed by Estonia and Lithuania.

In order to deliver the logins and passwords needed to authorize secure access to the online form, the most commonly adopted method was to send these to the respondents' postal address, printed either on paper versions of the questionnaires or on letters (11 out of the 18 countries did this) (see Table 3.3). In two countries delivery of such logins and passwords was by an enumerator. Two countries did not provide logins and passwords – but these were derived from reference information taken from registers. Six countries used other methods – for example, in Luxembourg persons could only fill in the online census form by identifying themselves via an electronic signature, and in the Baltic states of Estonia, Latvia and Lithuania the respondent's ID reference was authenticated using bank code details.

[7] Short sequence of keys shown on the screen (or played by the speaker for the audio CAPTCHA), to make sure that it is a human entering data, and not an automatic system such as those used by hackers to attack websites.

Table 3.3
Internet response: measures to ensure quality and security and to handle peak demands (number of countries)

	Total countries	Type of census		Region	
		Traditional	Combined	EEA	Non-EEA
Methods to ensure security/privacy:					
Unique access codes provided	**12**	8	4	10	2
PIN to allow early exit and return	**7**	4	3	4	3
Household security questions	**1**	0	1	1	0
Physically separate computing infrastructure	**5**	3	2	3	2
Visual or audio CAPTCHA	**5**	3	2	5	0
Other method	**3**	1	2	3	0
Distribution of login and password:					
Via paper questionnaire	**8**	5	3	6	2
Via mailed letter	**3**	2	1	2	1
By enumerator	**2**	1	1	2	0
Via email	**1**	1	0	1	0
Established from register	**2**	0	2	2	0
Other method	**6**	3	3	5	1
Data control quality features:					
Automatic sequencing of questions	**15**	7	8	13	2
Interactive editing	**13**	7	6	11	2
Use of drop-down menus	**14**	8	6	12	2
Assisted coding	**7**	2	5	6	1
Other means	**2**	1	1	1	1
Strategies to cope with peak demand:					
Outsourcing to increase capacity	**6**	4	2	6	0
Modifying response periods	**1**	1	0	1	0
Limiting promotion of online option	**2**	1	1	2	0
Encourage off-peak usage	**7**	3	4	7	0
Other strategies	**4**	1	3	4	0
None of the above	**4**	3	1	1	3

Various methods for data quality control and correction of collected data were applied by countries adopting an Internet response option (see Table 3.3). All countries but two (the Czech Republic and Slovakia) adopted a system of automatically sequencing questions so that only those that were relevant were shown, and all but three (the Czech Republic, Estonia and Germany) made use of drop-down response menus to ensure only valid entries were recorded. Interactive data editing to reconcile inconsistent responses was also adopted by most of the countries offering an internet response option, and other measures were also employed such as assisted coding. Switzerland used uniquely dynamically generated lists for household members and relationship between household members based on the household size.

Countries used different strategies to deal with potential problems resulting from high peak demand on their system infrastructure (see table 3.3). For example seven countries encouraged usage

during off-peak times, or put in place systems to carefully monitor and manage internet usage, with (as in the case of Italy, for example) the ability to scale up operations at times peak demand. Six countries mitigated the risk by outsourcing the design and/or operation of the internet response systems to external suppliers or hired external Internet service companies to increase capacity; while two countries (Germany and Slovakia) reported that they minimised the promotion of their internet response option - though in both cases this resulted, not surprisingly perhaps, in very much lower levels of online response than elsewhere (five and seven per cent respectively). Four countries were confident enough to meet peak demands without the need for any specific strategy at all.

As is reported in Chapter 23, use of the internet as means of collecting information in the next round of censuses is almost certain to become more widely adopted. Some 33 countries (almost double the number in 2010 census round) reported that they are likely to collect data in this way in the 2020 round.

Use of technology in field work

Many of those countries that carried out field operations to collect all or part of their census information reported a variety of other technological aids for doing so (see Table 3.4). Geographic information systems (GIS) – now pretty well established globally – were utilized for the purposes of mapping by more countries (19 of those that responded to the survey) than any other technological tool. Of these, 13 countries reported using such technology for the first time in their field operation. Proportionately, usage seems to be more prevalent in EEA countries (12 out of 20) than elsewhere in the UNECE region (7 out of 19). However, just as many countries reported that they did not use GIS at all, relying, presumably, on more traditional cartographic methods for mapping.

Table 3.4
Use of field technology by traditional and combined census countries (number of countries)

Use of technology:	Total countries	Type of census		Region	
		Traditional	Combined	EEA	Non-EEA
GIS	**19**	13	6	12	7
1st time use	***13***	*8*	*5*	*7*	*6*
Laptop	**10**	4	6	7	3
1st time use	***8***	*4*	*4*	*6*	*2*
Uploading data	**10**	4	6	7	3
1st time use	***8***	*2*	*6*	*6*	*2*
Mobile/cellular phones	**9**	5	4	7	2
SMS texting	**8**	5	3	6	2
1st time use	***6***	*4*	*2*	*3*	*3*
GPS	**7**	3	4	4	3
1st time use	***6***	*2*	*4*	*3*	*3*
CATI	**7**	3	4	3	4
1st time use	***4***	*1*	*3*	*3*	*1*
Tablet	**3**	2	1	3	0
1st time use	***3***	*2*	*1*	*3*	*0*
Hand held devices	**2**	1	1	1	1
1st time use	***2***	*1*	*1*	*1*	*1*
Other technology used	**5**	4	1	4	1
1st time	***4***	*3*	*1*	*3*	*1*

More recent geo-spatially related technologies such as global positioning systems (GPS) are also now being adopted for censuses. Seven countries reported doing so, including six for the first time in their censuses. (See below for a discussion of the wider use of GIS in other census processes.)

The use of laptops or tablet computers by field staff, either for the purpose of recording actual census information or for management support, is also increasing; some ten countries used such technology in the field in the 2010 round, compared with just two countries in the 2000 round. Those countries that recorded census information on such devices also had the facility to upload the data collected to the appropriate data processing centres; eight countries reported doing so. Only Ireland and the UK did not use laptops or tablet computers in the field for this purpose.

The use of mobile phones, smart phones and other hand held devices now presents further ways in which modern technology can potentially assist the field operation. Some eleven countries used such technology, and eight of these were able to use SMS texting to allow exchanges of information between field staff and census headquarters.

What the figures in Tables 3.4 suggest is the extent to which countries in the UNECE have not yet utilised modern technology in their field operations. In future censuses, however, the situation may well be rather different, and a two fold increase in the number of countries using such technology – particularly GIS - can be anticipated (see Chapter 23).

The introduction of such new technologies in the census, however, also presents problems. From the results of the UNECE survey the use of tablets and laptops in field operations turned out to be somewhat problematic for a number of countries. Almost half of the countries using laptops experienced at least one problem, and two thirds reported problems with using tablets. Most problematic were limitations to the working life of batteries and the reliability of data transmission. But Poland and the United States seemed to have beaten the problems with using hand-held devices - neither reported any technical difficulties.

Using OCR/OMR technology in data processing

Data capture and other data processing activities are the areas where new technologies can play the most significant role in the whole of the census operation. Many countries had, by the time of the 2000 round, switched from manual data capture processes to automatic systems based on advances in the fields of scanning, imaging, optical character recognition (OCR) and optical mark reading (OMR). The results from the UNECE survey on the 2010 round suggest that there has been little development since then.

The proportion of countries using OCR/OMR in the 2010 round was 67 per cent (26 out of 39 responding countries), compared with 71 per cent in the 2000 round (29 out of 41). But there are more countries now adopting a register-based approach for whom such data capture technology is no longer necessary. Table 3.5 thus shows the extent to which OCR and OMR was used only for countries that required data capture processes for information collected through a field operation (the traditional or combined approach censuses). The proportion of countries using OMR (just over a half) overall was fairly consistent for EEA and non-EEA countries but was a little higher in countries with a traditional census and where all the data is required to be captured (55 per cent), compared with just four out of the ten countries adopting a combined approach and where there is generally less data collected through a field operation. Use of OCR (whether capturing alpha or numeric characters) was generally more widely adopted. But 13 countries still do not use such technology, and as will be seen in Chapter 23, it seems that the decline in the use of this technology will continue.

Despite the widespread availability of automatic repair of unrecognised characters during data capture using either look-up tables or contextual editing, there are more countries that have continued to use clerical or operator manpower to do this job editing. Only twelve countries (less than a third) monitor the rates of character substitution as measure of the quality of data capture.

Table 3.5
Use of OMR/OCR technology by traditional and combined census countries in data processing (number of countries and percentage)

	Total countries	Type of census		Region	
		Traditional	Combined	EEA	Non-EEA
Total responding countries	**39 (100%)**	**29 (100%)**	**10 (100%)**	**21 (100%)**	**18 (100%)**
OMR or OCR used	26 (67%)	21 (72%)	5 (50%)	13 (62%)	13 (72%)
OMR	20 (51%)	16 (55%)	4 (40%)	11 (52%)	9 (50%)
OCR (for numeric responses)	24 (62%)	20 (69%)	4 (40%)	12 (57%)	12 (67%)
OCR (for alpha responses)	24 (62%)	19 (66%)	5 (50%)	11 (52%)	13 (72%)
Neither OMR nor OCR used	13 (33%)	8 (28%)	5 (50%)	8 (38%)	5 (28%)
Automated repair of captured entries:					
- using look-up tables	14 (36%)	12 (41%)	2 (20%)	8 (38%)	6 (33%)
- using contextual editing	10 (26%)	8 (28%)	2 (20%)	5 (24%)	5 (28%)
Operator/clerical repair of unrecognised images	20 (51%)	15 (51%)	5 (50%)	12 (57%)	8 (44%)
Monitoring of character substitution rates	12 (31%)	11 (40%)	1 (10%)	8 (38%)	4 (22%)

Software applications

Countries used software applications for several different aspects in the conduct of their census operation, such as: in support of the training of, and effective communication with, field staff; for the overall managements of data collection, or the maintenance of GIS; for the storage or linkage of data collected from different sources; for the processing of data; or for the building of the main census database. For most purposes, countries have tended to use their own applications rather than rely on commercial or other software, but an increasing number of countries were dependent on software developed by external contractors (see also the section on Outsourcing below). An analysis of software use, by kind of application, is shown in Table 3.6.

It is clear that countries tended to use their own applications for all purposes (other than for training and maintenance of GIS) than any other single source of software, but that taken as a whole, non self-proprietary software was utilized far more often, indicating the degree of specialization and expertise that such software now demands. The results of the survey show that software produced commercially or developed by contracted suppliers was frequently used, particularly for the purposes of building the main census database, maintaining GIS, processing data or transforming information from administrative records to statistical data, and the dissemination of outputs. But what is almost as noteworthy is the proportion of countries that did not use software of any kind for many of these purposes other than the actual processing of data. There may have been a certain amount of misreporting on this particular. While it is feasible that more than half the responding countries did not require the use of software to support the training of field staff, for example, it is less likely that software was not required for such technical activities as supporting the management of the census (where 16 countries seem to have managed without it) or the maintenance of a GIS.

Table 3.6
Use and application of software (number of countries)

Use of software:	Total countries using SW (%)*	Of which, by type of software:					No use of SW
		Own (proprietary)	Open source	Commercial	Developed by contractor	Customized by contractor	
To support effective organization and communication	**31 (65%)**	14	1	8	7	1	17
For use in the training process	**21 (44%)**	6	1	6	7	1	27
For building knowledge database	**32 (67%)**	11	1	10	8	2	16
To support multi-mode data collection	**29 (60%)**	13	0	5	10	1	19
To store data from multi-mode collection	**34 (71%)**	13	1	9	9	2	14
Data processing	**43 (90%)**	17	0	9	12	5	5
Record linkage	**34 (71%)**	16	1	9	7	1	14
Dissemination	**43 (90%)**	15	3	13	11	1	5
Census management and accounting	**32 (67%)**	15	1	10	5	1	16
To maintain GIS	**29 (60%)**	5	0	10	9	5	19
Other applications	**6 (13%)**	2	0	1	2	1	42

* Percentage of all 48 responding countries

Linked to the enquiry into software application related to the storage of data from different channels, countries undertaking a field operation also reported on whether or not they used IT systems to manage and integrate the responses from different sources (such as via enumerators in the field, direct mail and online returns) (Table 3.7). The split was pretty even with 20 countries reporting such use and 21 reporting no such use. For those that did, more frequently adopted was an online application which provided for the collection of responses in real time – some 11 countries used IT in this way (10 of which were in the EEA plus Switzerland).

Table 3.7
Use of IT systems to manage responses from different sources (multi-mode data collection), countries with traditional or combined censuses (number of countries)

IT system:	Total countries	Type of census		Region	
		Traditional	Combined	EEA	Non-EEA
Online application, collecting responses in real time	11	8	3	10	1
Application collecting responses before field follow-up	5	2	3	4	1
Other application	4	2	2	3	1
No such application	21	19	2	5	16

Response to the survey also revealed that only a quarter of those responding countries carrying out a field operation (11 out of 40) utilised technology, or otherwise provided special facilities, for people with physical or mental disabilities to participate directly in the census. However, it is likely that, with the increasing prevalence of equality legislation, particular in the EU, user-friendly technologies will become more widely adopted in the future.

Technologies used for administrative sources of data

So far attention has focused more on technology used by those countries adopting some degree of data collection through a field operation, but the survey also asked those countries that collected or used data from administrative sources to report on what techniques they used to do so. Of the 30 responding countries that adopted a traditional census, 19 did not collect or use administrative data at all for the purposes of their census. The following analysis (Table 3.8) therefore focuses on those countries that did – 11 countries with traditional censuses (in which such data was used primarily to provide a frame or control for the enumeration processes), the 9 register-based countries and the 10 countries adopting a combined methodological approach – some 30 in all.

Almost half of these countries (14) transferred data sets through a secure ICT channel, by administrative data keepers. More than half of these were eight of the nine countries conducting a wholly register based census; only the Netherlands - of these countries - did not do so, and this was primarily because all the registers used for the census were already held by Statistics Netherlands who were, therefore, themselves, the data keepers. Meanwhile, 10 countries received their data from the respective administrative data keepers through external electronic data carriers, and 14 did so via hard copies.

The techniques used to collect data from administrative registers, usually from several different sources, were often complex, using multi-modal approaches. Of 30 countries that did so, 12 used more than one of the techniques identified in Table 3.7; three countries (Belgium, Iceland and Poland) used three of them, and Slovenia used all four.

Table 3.8 also shows the processes used in transforming the information collected from such administrative records into census data. 'Validation' was adopted by 23 countries (including 19 out of the 20 responding EEA countries), while 'standardisation' was used by more than half the reporting countries (16), and 'conversion', by just under a half (14). The results of the survey indicate an increasing use of automatic cleaning, standardisation and data validation techniques. It should be a guideline for the forthcoming round of censuses.

One register-based country (Denmark) reported that such processes were not applicable in its case. Statistics Denmark explained in their response to the survey that the transformation from register to census data was done at an earlier stage, when the statistical registers from which the census data are subsequently derived, were originally produced.

As with the techniques used to collect data from administrative registers, many countries used multi-modal approaches to transforming the data. Of 30 countries that did so two thirds used more than one of the processes identified in Table 3.8; six countries used four of them, and three countries (Hungary, Iceland and Poland) adopted all five.

Countries that used administrative data also reported if any hardware/systems/utility infrastructure had been constructed or modernized for specific purposes for the 2010 round. The results are also shown in Table 3.8. Three of the 30 countries did not provide any information on this aspect, but of the 27 that did more than half (15) had constructed or modernized their infrastructure to collect the census data from registers, 14 had done so for the purpose of storing such data and 13 for the purposes of linking the data. The relatively low proportions of register-based countries that had done so probably reflects the fact that NSIs there already had fully operational systems and infrastructures in place for their annual or general statistical programmes and did not, therefore, need to have any developed specially for the census. Indeed both Finland and Slovenia specifically reported this. On the other hand those countries carrying out traditional censuses, in the main, reported such construction or modernization of their infrastructure for all the purposes identified in the table.

Table 3.8
Techniques and processes used to transfer and transform administrative data (number of countries)

	Total countries*	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Techniques used to transfer data:						
Transfer of data through secure channel ICT by administrative data keepers	**14**	1	8	5	12	2
Delivery/ receipt of data hard copies directly by/ from administrative data keeper	**14**	5	4	5	11	3
Delivery/receipt of external electronic data carriers containing data files directly by administrative data keepers	**10**	5	3	2	8	2
Remote access and capturing data in electronic form allowing its processing	**4**	1	1	2	3	1
Other	**4**	3	1	0	3	1
Processes used to transform data:						
Validation	**23**	7	8	8	19	4
Standardisation	**16**	4	6	6	14	2
Conversion	**14**	1	7	6	12	2
Parsing	**9**	1	3	5	8	1
Upcasing	**5**	1	2	2	5	0
Other	**1**	0	1	0	1	0
Not applicable	**4**	3	1	0	3	1
Construction/modernisation of hardware/systems/utility infrastructure:						
To collect data from administrative registers						
Yes	**15**	5	2	8	13	2
No	**12**	4	7	1	9	3
To store data from administrative registers						
Yes	**14**	2	4	8	12	2
No	**13**	7	5	1	10	3
To link data from administrative registers						
Yes	**13**	2	2	9	11	2
No	**14**	7	7	0	11	3
To store metadata or information on processes and products						
Yes	**11**	3	3	5	10	1
No	**15**	6	6	3	11	4

* Out of 30 countries using administrative data.

GIS technology

Geographic information systems (GIS) – now pretty well established globally – were utilized for the purposes of mapping by more countries (19 of those that responded to the survey) than any other technological tool. For all countries that carry out a traditional census, in particular, good cartographic support is essential to enable the fieldwork to be carried out effectively and to ensure universal coverage. As evidenced by the use, reported above, of GIS by those countries carrying out a field operation there is a strong and growing interest in the use of GIS as a tool to support the process of conducting the census generally, and, in particular, as a tool to enable more user-friendly visualization of statistical results. Indeed, three quarters of the responding countries (35 out 48) reported that their NSIs have either a dedicated GIS unit or cartographic staff, or (as in the case of Montenegro) have access to such a unit. And a further six countries reported plans to create one. Although Statistics Denmark has such a unit, it reported that no use is made of GIS technology in any stages of its census – one of only two countries to do so (the other was the Netherlands).

The survey revealed that cartographic materials were widely used in various stages of the census (Table 3.9). Thirty-one out of 50 responding countries reported the use of paper maps in at least one stage of their census operation; four out of five of all countries with a traditional field operation used them during the enumeration phase. Nowadays, such maps hardly represent the height of current cartographic technology, but, nevertheless, they continue to be the most widely used form of geographic support for census field work, although ortho-photography, vector data and digital topographical maps were reported as being increasingly used among countries with a traditional census methodology.

Digital layer boundaries of statistical divisions and vector data are now widely used, particularly for data dissemination and analysis regardless of the census methodology adopted. These technologies were also utilised by 21 countries during census preparatory work, and by 13 countries to coordinate and monitor enumerators in the field. However, there was no reported use of remote sensing by any country for any purpose other than by Georgia for data analysis. This technology is perhaps still too untested to be applied to the census operation generally.

The results of the survey have brought to light that GIS and mapping technologies generally are still under-utilised by many countries across the UNECE region. While their use in the field might be expected to decline in the future as more countries move to alternative ways of collecting data, a greater opportunity surely exists for using mapping tools to expand the range of geographical products and more sophisticated data visualisation of census outputs generally (see Chapter 23).

Table 3.9
Use of cartographic/geographic data in different stages of census operations (number of countries)

Type of cartographic/ geographic data	Stage of census operations where it was used	Total number of countries	Type of census			Region	
			Traditional	Register-based	Combined	EEA	Non-EEA
Sketch maps	Preparatory stages	**7**	5	0	2	3	4
	Fieldwork	**6**	5	0	1	4	2
	Other purposes	**1**	1	0	0	1	0
	Not used	**29**	15	8	6	21	8
Paper Maps	Preparatory stages	**20**	18	0	2	6	14
	Fieldwork	**25**	22	0	3	11	14
	Data analysis	**4**	4	0	0	1	3
	Data dissemination	**3**	3	0	0	1	2
	Other purposes	**2**	1	0	1	2	0
	Not used	**17**	5	8	4	14	3
Vector data	Preparatory stages	**17**	12	0	5	13	4
	Fieldwork	**9**	4	0	5	6	3
	Data analysis	**10**	6	0	4	5	5
	Data dissemination	**12**	7	2	3	8	4
	Other purposes	**3**	1	1	1	3	0
	Not used	**22**	11	5	6	10	12
GPS coordinates	Preparatory stages	**9**	5	0	4	6	3
	Fieldwork	**4**	1	0	3	3	1
	Data analysis	**6**	1	2	3	6	0
	Data dissemination	**5**	2	1	2	5	0
	Other purposes	**2**	1	1	0	1	1
	Not used	**27**	16	6	5	16	11
Digital layer boundaries	Preparatory stages	**18**	14	0	4	11	7
	Fieldwork	**11**	8	0	3	8	3
	Data analysis	**15**	10	1	4	11	4
	Data dissemination	**22**	12	5	5	16	6
	Other purposes	**3**	1	0	2	2	1
	Not used	**17**	9	4	4	9	8
Ortho-photography	Preparatory stages	**17**	11	0	6	9	8
	Fieldwork	**10**	6	0	4	7	3
	Data analysis	**5**	2	0	3	5	0
	Data dissemination	**4**	1	0	3	4	0
	Other purposes	**2**	2	0	0	1	1
	Not used	**24**	12	8	4	17	7
Digital topographic maps	Preparatory stages	**10**	7	0	3	6	4
	Fieldwork	**5**	2	0	3	3	2
	Data analysis	**4**	2	0	2	3	1
	Data dissemination	**6**	3	1	2	4	2
	Other purposes	**2**	1	1	0	2	0
	Not used	**29**	17	6	6	17	12
Remote sensing	Data analysis	**1**	1	0	0	0	1
	Not used	**39**	22	8	9	26	13

Preparation of IT infrastructure

As is the case in any element of the census operation, the development of any technological solutions requires adequate time for planning, system testing and the necessary training of staff. A half of the responding countries (24 out of 49), and two thirds of those with a register-based census, required less than two years for such preparations (see Table 3.10). It was generally the case that those countries with more traditional elements to the data collection processes required a longer period. Nine countries with traditional census took up to three years in preparation and six required a further two years. The United States (traditional), Belgium (register-based) and Germany and Israel (combined approach) all reported a period of more than five years in their preparations.

Table 3.10
Length of time for preparation of IT infrastructure (number of countries)

Length of time for preparation:	Total countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Less than 1 year	**9**	4	3	2	7	2
1-2 years	**15**	10	3	2	11	4
2-3 years	**13**	9	1	3	6	7
3-5 years	**8**	6	1	1	4	4
More than 5 years	**4**	1	1	2	2	2

Outsourcing

The complexity of much of the new software and the infrastructure required for many of the new and emerging technologies go beyond the current technical capabilities of many census agencies. It was clear in the 2010 round that significant components of the census operation needed to be outsourced in many countries. The value of doing so is that external suppliers bring with them considerable technical experience and expertise which would otherwise be unavailable to census takers, and allows NSIs to focus on their main task of carrying out the census rather than developing in-house procedures and skills that are not part of their core competencies. Furthermore, the 5 or 10-year cycle for the traditional census activities, the short processing timetable and extensive data systems required, mean that outsourcing provides the opportunity for efficiencies and value for money.

This is now widely recognised across the UNECE region in which 38 of the 39 responding countries indicated that they contracted out to external agencies the provision of one or more services or activities for the census operation. Only one country (Turkey) did not do so. Of the 11 countries that did not respond to the outsourcing section of the UNECE survey, nine were those countries that carried out a full register-based census, in which the opportunities for effective outsourcing are clearly much reduced — if one considers that the creation and maintenance, by external agencies, of the registers from which the census information is extracted, is not "outsourcing" in the generally accepted meaning of the concept.

The printing of questionnaires and other documentation required for a field enumeration, and the publicity campaign were, by far, the most often reported activities to be outsourced. More than three quarters of the outsourcing countries did so. And more than half the countries outsourced the translation, delivery and collection of questionnaires and other field documentation, and the primary data capture and coding processes. Table 3.11 ranks the top 20 activities that were either fully or partially outsourced by the proportion of countries doing so. But there was a range of other outsourced activities that one in ten or fewer countries reported, including payment of field staff, tabulation, printing of reports, data archiving, data linkage, the production of digital media, and contract management.

Of course, some countries outsourced more than others. The Russian Federation led the field by outsourcing 21 different activities (although they had to report that not all services were delivered successfully within the contracted times), and the United Kingdom also undertook an extensive outsourcing programme with some 19 different activities (although in their case many of these were subsumed under a single contract). At the other end of the scale, Israel reported outsourcing only one activity, and (with the proviso noted above) Albania and Turkey reported none at all.

Table 3.11
Census activities that were either fully or partially outsourced

	Countries that outsourced the activity (out of 37)	
Activity	**Number**	**Per cent**
Printing of questionnaires	30	81
Printing of other field documents/materials	29	78
Publicity	29	78
Delivery of questionnaires/field documents	24	65
Primary data capture and coding	21	57
Translation of field material	19	51
Collection/return of questionnaire/field documents	19	51
Mapping field operation (enumeration) areas	17	46
Questionnaire destruction	17	46
Call centre/telephone help line	12	32
Design and provision of online response technology	11	28
Online/web access design	9	24
Data storage	8	22
Recruitment and training of field staff	7	19
Design and provision of questionnaire tracking	7	19
Mapping of output/dissemination areas	7	19
Data editing	7	19
Evaluation	7	19
Imputation	6	16
Data quality assurance	5	13

But why did countries outsource? As noted above, the main value of doing so is that external suppliers bring with them considerable technical experience and expertise which would otherwise be unavailable to census takers. In their responses to the survey many countries acknowledged this.

Some 26 countries (70 per cent of those that responded) cited the utilisation of resources and expertise not otherwise available as a reason for outsourcing. Outsourcing also clearly provides an opportunity to reduce operational timescales — some 23 countries (62 per cent) reported this — and to reduce costs (16 countries, 43 per cent). The improvement of data quality was reported as reason for outsourcing by 12 countries (32 per cent). These results are summarised in Table 3.12.

Table 3.12
Reasons for outsourcing and main gain/benefits achieved (number of countries and percentage)

Reasons for outsourcing	Aim		Gain/benefit achieved	
	Number	Per cent	Number	Per cent
Utilise resources/expertise not otherwise available	26	70	29	78
Save time	23	62	23	62
Gain knowledge	n.a.	n.a.	21	57
Reduce costs	16	43	19	51
Improve data quality	12	32	12	32
Improve coverage Improve response	4	11	6 4	16 11
Improve public perception/trust	1	3	6	16

But was the strategy successful? Did outsourcing achieve its aims? Table 3.12 also shows the main gains and benefits achieved by those countries that outsourced their activities.

The striking result to note is that even more countries (29) reported achieving a gain from the utilization of resources/expertise not otherwise available than had reported this as a main aim (26). This is clearly shown to be the biggest gain from outsourcing. But more countries also reported actual costs savings (19) than had been anticipated (16) showing that this, too, was a major benefit. The same number of countries (23) both planned to save time by outsourcing and achieved this gain.

But were those countries that outsourced for a particular reason the same countries that also achieved a gain/benefit from doing so? Some 21 countries (more than half) reported "gaining knowledge" as a gain/benefit from outsourcing. Unfortunately this aim was not included in the survey question on the reason for outsourcing. Therefore it is not possible to tell whether countries would also have reported this as purpose as well as an achieved gain. However for most of the other factors the same countries that outsourced for a particular purpose also achieved the anticipated gain/benefit (more or less).

With regard to the utilisation of resources, several countries reported a benefit that they had not initially expected — Armenia, Estonia, Georgia, Luxembourg, Malta, and the Russian Federation.

When considering the time-saving factor, neither Poland nor Serbia achieved the gain that they had anticipated, while Cyprus was alone among the countries that saved unplanned time.

Cost saving showed a similar pattern, but here only Tajikistan did not reduce costs in the way they it had planned, while Armenia, France, Georgia and Spain all reported reduced costs that had not been anticipated.

When it came to improving data quality, the situation was less predictable. Although Table 3.12 shows the same number of countries (12) expected and achieved improvement, they were not all the same countries. France, Romania, and Spain planned to improve data quality through outsourcing, but did not report that they had done so, whereas the reverse was the case for Estonia, Ireland, the Russian Federation and the United States.

Despite the fact that some 19 countries reported that they achieved cost reductions through outsourcing, the cost of outsourcing so was perceived by nine countries, particularly Canada and the United States, to be on the biggest disadvantages — even though other benefits had been gained through doing so. The effect of outsourcing on the overall management of the census operation was also seen as detrimental, and again, nine countries reported this as a disadvantage — though no country had reported both.

Other factors associated with outsourcing that were reported as being a disadvantage covered: the creation of a negative public perception (this was a particular problem in Ireland, the United Kingdom and Canada, where contracted suppliers were widely reported in the press to have had military associations); and a detrimental effect on data quality (reported by Armenia, Italy, Kazakhstan and Romania). Indeed, Romania also reported that they considered that response to the census had also suffered as the result of outsourcing.

Table 3.13 identifies what the main challenges were when countries considered the overall strategy of outsourcing. Keeping to (an often tight) schedule emerged as the most challenging aspect in the 2010 round, and was identified as such by two thirds of responding countries. Managing the contract(s) with suppliers also proved difficult for almost half the countries, reflecting the advice given in the 2010 Recommendations that outsourcing should only be considered if the census agency "….has sufficient skills to manage the process" and "… the ability to manage complex development projects".

Many countries (17) reported three or more challenges, including the United Kingdom and the United States who, even with their extensive experience of managing outsourced operations, reported five aspects where there were challenges. Top of the poll, however, was Latvia who reported six. Romania, despite the suggestion above, only reported two.

Table 3.13
Main challenges from outsourcing

Main challenges	Countries responding (out of 35)	
	Number	Per cent
Keeping to schedule	24	69
Contract management	16	46
Keeping to budget	15	43
Integrating systems	12	34
Managing data quality	10	29
Managing change control	10	29
Meeting user needs	9	26
Managing press and public perception	7	20

Innovations

Innovation has always been an integral part of census taking. The census of population and housing is often the largest and one of the most important statistical programmes carried out by most countries. By its nature, important resources are allocated to it, in all aspects of the statistical process. This creates the opportunity to innovate. Different factors inherent to census taking are also conducive to the introduction of innovations, such as the sheer size and cost of the operation, privacy and confidentiality issues and, of course, technological developments. Thus, the UNECE survey also enquired into the aspects of innovation both in the 2010 round and looking forward to the 2020 round (see also Chapter 23).

Of the 45 countries that responded only four (Armenia, Denmark, Liechtenstein and Romania) reported that they did not introduce any key innovations in the 2010 round. Methodological innovations were reported in total by 27 countries – more than half the responding countries - the most significant, of course, being the use of registers by the six countries that moved to an entirely

register-based census and the nine responding countries that adopted a combined approach (Table 3.14). But, as has already been noted, many of the traditional census countries also used administrative data for the first time to either support or monitor the census process – eight did so. In all, half the responding countries used registers in an innovative way for one or other purpose in the census. Sampling was reported as an innovation by half the countries adopting a combined approach census, where surveys were used to provide information on those census characteristics not available from administrative sources. And coverage surveys were introduced for the first time in five traditional censuses.

Table 3.14
Range of key innovations in the 2010 round (number of countries)

Innovations	Total countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Methodological innovations	**27**	**12**	**6**	**9**	**20**	**7**
Use of registers	23	8	6	9	20	3
Sampling	9	3	1	5	5	4
Rolling estimates	1	1	0	0	1	0
Coverage surveys	5	5	0	0	2	3
Data collection innovations	**28**	**14**	**5**	**9**	**21**	**7**
Internet	16	9	0	7	14	2
Hand held devices	6	2	0	4	3	3
Long form/short form	4	3	0	1	2	2
Administrative data/registers	14	1	5	8	11	3
Data processing innovations	**21**	**15**	**1**	**5**	**11**	**10**
Scanning	10	9	0	1	2	8
Intelligent character recognition	13	11	0	2	5	8
Automatic coding	16	11	0	5	8	8
Edit and imputation	17	10	1	6	8	9
Mapping innovations	**25**	**17**	**1**	**7**	**15**	**10**
GIS	22	15	1	6	13	9
GPS	6	2	0	4	4	2
Dissemination innovations	**28**	**17**	**4**	**7**	**15**	**13**
Internet (web data access)	25	15	3	7	12	13
Disclosure control	14	8	3	3	9	5

Data collection process is clearly another area where there is potential for significant innovation and 28 countries introduced one of more innovations into this operation. As has already been discussed, the internet was used by many countries to collect data online, 16 countries did so innovatively including seven out of the nine responding combined-approach countries. And in most of these cases, where data was not collected online, registers were used in the countries as an alternative data source. Even Canada (where online data collection is now well-established) reported further innovative use of the internet for data collection. Six countries reported using hand-held devices for the first time as a means of recording data in the field.

In the realm of data processing, innovation was also reported by many countries (21 in all), but particularly among the non-EEA countries amongst whom almost half reported using scanning, intelligent character recognition, automatic coding and edit/imputation techniques for the first time. The scope for such innovation among register-based censuses is clearly far more restricted, and only one such country (Austria) reported any such data processing developments – in the field of editing and imputation.

More than half of the responding countries (25 in all) also reported innovations in the use of mapping. This proportion was slightly higher for countries with a traditional census where 17 out of 28 did so, but only one country with register based census (Slovenia) reported such innovation. Some 22 countries reported innovative use of a GIS, and six countries used a GPS for the first time (see also above).

How many innovations were introduced by countries in the 2010 round? The survey results on this are presented in Table 3.15. On average countries adopted between three and four of the key innovations itemised in the survey (and identified in Table 3.14). Of course, some countries innovated more than others. While as many as 14 countries reported none of the key innovations (spread evenly though not proportionately across the three methodological approaches), 6 countries reported introducing 8 or more such innovations.

Table 3.15
Number of key innovations introduced in the 2010 round (number of countries)

Number of innovations	Total countries	Type of census		
		Traditional	Register-based	Combined
0	14	6	4	4
1	3	2	0	1
2	10	6	3	1
3-4	6	4	1	1
5-7	9	7	1	1
8 or more	6	4	0	2

In addition to the areas of activity specifically identified in Table 3.14 a range of other census activities in which significant innovations were introduced were also reported by countries. These included, for example: the introduction of electronic questionnaires and laptop technology; outsourcing field staff recruitment, staff training and pay; mail-out of questionnaires; creation of purpose-built address registers; monitoring field operation in real time; form tacking technology; and online data visualization.

Chapter 23 describes how countries reported possible innovations for the next census round.

4. OPERATIONAL FRAMEWORK I: FIELD OPERATIONS, COMMUNICATIONS AND PUBLICITY

Introduction

For most people, the epitome of a census is an enumerator calling on each household and either conducting a door-step interview or delivering a census form for the household members to complete and return. And indeed for the majority of countries this is still the way that the data collection phase of a census is carried out – in the traditional way. As noted in Chapter 2 some 35 countries in the UNECE region carried out a 'traditional census' involving a full field enumeration, and in a further 10 countries the census involved some element of data collection in the field. For such countries the field operation and the supporting communications and publicity activities are key elements of the census operation. This chapter reports on these elements in respect of those countries that responded to the UNECE survey[8].

Field operations

Out of 50 responding countries, 41 reported some form of field operations. They include 31 countries with traditional census (included among whom is France's unique rolling census methodology) and 10 countries with a combined methodological approach that employs some elements of data collection on the field. By definition, countries with a wholly register-based census did not conduct any field operations, and so these are excluded from the following analyses. However, the use of registers to support the field operation was not uncommon even in traditional censuses.

Table 4.1 shows that an address register was used in support of field operation by 17 countries (41 per cent). This practice was much more common among countries with a combined census (in which 8 out of 10 used such a register) than among countries with a traditional census (in which less than a third did so).

Almost all countries with field operations (88 per cent) employed more than one level of field staff. In 17 countries there were three levels of field staff, and in 16 countries there were four or more levels, while in 3 countries there were only two levels. Liechtenstein and Switzerland reported that there was no field staff, as the questionnaires were primarily mailed.

The overall field operation was managed by the central statistical office in 30 countries, while regional or local offices managed field operations in 29 countries. In 22 countries field operations were managed both at the national level by the central office and at the local level by regional or local office. Regional or local government agencies (such as municipalities, communes, local authorities) were involved in 27 countries. In the Czech Republic, for example, the field operations were managed by the central statistical office and the Czech Post Office, which provided a source of enumerators, together with logistical support on the form of accommodation, transport and specific elements of information technology (IT) support.

[8] The material in this chapter has been taken largely from reports of the UNECE survey prepared by Paolo Valente (UNECE) on field operations, and Ian White (UK Office for National Statistics) on communication s and publicity, and presented to the Joint UNECE-Eurostat Work Session on Population and Housing Censuses in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

Table 4.1
Aspects of the field operation in the 2010 round (number of countries and percentage)

	Total (41 countries)		Type of census			
			Traditional (31 countries)		Combined (10 countries)	
	Count	%	Count	%	Count	%
Use of an address register	17	41	9	27	8	80
Employment of more than one level of field staff (enumerators, supervisors, etc.) — levels:	36	88	31	100	5	50
2 levels of field staff	3	7	2	6	1	10
3 levels of field staff	17	41	14	45	3	30
4 or more levels of field staff	16	39	13	42	3	30
Overall field operation managed by central statistical office	30	73	22	71	8	80
Field operations managed by regional or local offices	29	71	23	74	6	60
Involvement of regional or local government agencies (such as municipalities, communes, local authorities)	27	66	22	71	5	50

Questionnaires and other field documentation

A variety of types of questionnaire was used in the 2010 round of census, and different modes of delivery/collection deployed. Table 4.2 shows that paper questionnaires were used in 35 countries. In 32 countries a single long form was used, while Canada, Italy and the United States used a long form and a short form. Switzerland used only a short form, but much of its census data was collected using register-based sources as part of a combined census.

In the majority of countries using the long form, enumerators were used as primary delivery method (in 25 countries), and primary collection method (in 24 countries) for paper questionnaires; but in only 21 of these countries were enumerators used as the primary means for both delivery and collection. In 15 of these countries (located mainly in East and South-East Europe, Caucasus and Central Asia) enumerators actually conducted an interview and filled in the forms. In the remaining 6 countries, the forms were self-compiled by the household members. The mail was used as primary delivery method by 6 countries (Canada, Italy, Liechtenstein, Spain, the United Kingdom and the United States), while Malta used enumerators and the mail as the main delivery methods.

The mail was the primary collection method for paper questionnaires in 4 countries (Canada, Spain, the United Kingdom and the United States), while in 4 countries (the Czech Republic, Germany, Malta and Spain) both enumerators and the mail were used as main collection method. In Italy, questionnaires were delivered by mail and collected by a multi-mode data collection, that is they could be completed on the internet either returned by mail or to a Municipal Collection Centre.

Table 4.2
Types of questionnaires used, and how they were delivered and collected (number of countries and percentage)

	Total (41 countries)		Type of census			
			Traditional (31 countries)		Combined (10 countries)	
	Count	%	Count	%	Count	%
Paper questionnaire — Long-form (or single form) — main delivery and collection methods:	35	85	31	100	4	40
delivered primarily by enumerator	25	61	24	77	1	10
delivered primarily by mail	6	15	4	12	2	20
delivered by enumerator or mail	1	2	1	3	0	0
collected primarily by enumerator	24	59	23	74	1	10
returned primarily by mail	4	10	3	10	1	10
collected by enumerator or returned by mail	4	10	2	6	2	20
other delivery or collection methods	1	2	1	3	0	0
Paper questionnaire — Short-form — main delivery and collection methods:	4	10	3	10	1	10
delivered primarily by enumerator	0	0	0	0	0	0
delivered primarily by mail	4	10	3	10	1	10
delivered by enumerator or mail	0	0	0	0	0	0
collected primarily by enumerator	0	0	0	0	0	0
returned primarily by mail	3	7	2	6	1	10
collected by enumerator or returned by mail	0	0	0	0	0	0
other delivery or collection methods	1	2	1	3	0	0
Electronic questionnaire — Long-form (or single form)	19	46	11	35	8	80
Electronic questionnaire — Short-form	5	12	2	6	3	30

Electronic versions of the long forms were used in 19 countries, including 5 countries where paper questionnaires were not used at all (Cyprus, Estonia, Iceland, Latvia and Poland) and in a short form version in 5 countries. All countries adopting a combined census approach and 11 of the 31 countries with traditional census (35 per cent) used electronic questionnaires (long and/or short).

Three countries used short and long version of the electronic questionnaires (Canada, Italy and Poland), two countries used only a short electronic questionnaire (Israel and Switzerland), and sixteen countries used only a single electronic questionnaire.

Table 4.3 shows what other materials and documentation were used by field staff during the enumeration. Maps or photographs of enumeration areas were used in 34 countries (83 per cent), including, not surprisingly, practically all countries with a traditional census, but only 4 of the countries with a combined census. Estonia and Poland provided enumerators with maps and documentation in digital form.

Field manuals or instruction books were used in 38 countries (93 per cent), including basically all countries with field operations except Liechtenstein and Switzerland (where as previously noted there was no field staff) and Luxembourg.

The large majority of countries (32 in total, or 78 per cent) used summary report forms to record numbers of population (26 countries), households (25 countries), dwellings (25 countries) and buildings (18 countries).

Table 4.3
Other documentation and materials used by field staff during the enumeration (number of countries and percentage)

	Total (41 countries)		Type of census			
			Traditional (31 countries)		Combined (10 countries)	
	Count	%	Count	%	Count	%
Maps or photographs of enumeration areas	34	83	30	97	4	40
Field manual or instruction book	38	93	30	97	8	80
Summary report form to record numbers of (indicate all that apply):	32	78	26	84	6	60
Population	26	63	22	71	4	40
Households	25	61	22	71	3	30
Dwellings	25	61	21	68	4	40
Buildings	18	44	14	45	4	40

Field staff recruitment and training

Field staff recruitment in 22 countries was carried out only regionally or locally, in 14 countries both centrally and regionally/locally, and in two countries only centrally (Greece and Latvia) (Table 4.4).

Field staff training was carried out more often both centrally and regionally/locally (25 countries), normally with the higher level staff trained centrally and lower level staff trained regionally/locally. In 11 countries training was carried out only regionally or locally, and in two, geographically compact, countries (Luxembourg and Malta) only centrally.

The length of the training for enumerators/interviewers also varied across the UNECE region. It was less than a week in 24 countries, one week in 8 countries, two weeks in 5 countries, and three weeks in 2 countries (Azerbaijan and Kazakhstan). It might have been expected that longer periods training would be required in those countries conducting field interviews on the basis that learning interview techniques is significantly more difficult than just delivering or collecting forms. However, some countries using interviewers only required short training periods, of one week or even less (Albania, Armenia, Croatia, Kyrgyzstan, the Republic of Moldova, the Russian Federation, Serbia, Tajikistan).

Table 4.4
Field staff recruitment and training (number of countries and percentage)

	Total (41 countries)		Type of census			
			Traditional (31 countries)		Combined (10 countries)	
	Count	%	Count	%	Count	%
Field staff recruitment carried out:						
Centrally	2	5	1	3	1	10
Regionally or locally	22	54	18	58	4	40
Both centrally and regionally/locally	14	34	11	36	3	30
Field staff training carried out:						
Centrally	2	5	2	6	0	0
Regionally or locally	11	27	10	32	1	10
Both centrally and regionally/locally	25	61	18	58	7	70
Length of field staff training before the enumeration						
Less than a week	24	58	20	65	4	40
1 week	8	20	6	19	2	20
2 weeks	5	12	3	10	2	20
3 week	2	5	2	6	0	0
More than 3 weeks	0	0	0	0	0	0

Pre-enumeration tests and checks, and storage of completed questionnaires

Pre-enumeration census tests, pilots or rehearsals were carried out in almost all countries (38, or 93 per cent) (Table 4.5). They were not carried out in Luxembourg, while Lichtenstein and Kyrgyzstan did not provide any information. Most countries (31) carried out only one test/pilot; of these, 13 countries carried out their test two years before the census, 9 countries did so one year before the census, while 7 countries carried out their test/pilot less than one year before the census. Only two countries conducted their only test/pilot more than two years before the census. But seven countries conducted more than one such test/pilot at different times before the census.

Pre-enumeration checks of the Enumeration Areas were carried out by field staff in 35 countries out of 41 (85 per cent) (Table 4.5). In 14 countries they were carried out only by enumerators and in 11 countries only by field managers, while in 7 countries this activity was carried out jointly by all levels of field staff. In Croatia these checks were done by the State Geodetic Administration, and in the United States by designated 'listers'. In the United Kingdom pre-census check of a sample (15 per cent) of addresses were carried out by specially trained field staff six month before the census.

Countries used different strategies to store completed questionnaires after collection by enumerators/interviewers and before despatch to the processing site. The most common strategy, adopted by 17 countries, was to store them locally in specially provided secure accommodation. Five countries recorded and stored the data electronically and then uploaded them to a central site.

Most of the other countries (12 countries) used strategies in which data were stored in different ways and different locations (including, in addition to those mentioned, enumerators' or managers' homes, or the immediate despatch to the regional/central office) at different stages of the data collection phase.

Table 4.5
Pre-enumeration activities and storage of completed questions (number of countries and percentage)

	Total (41 countries)		Type of census			
			Traditional (31 countries)		Combined (10 countries)	
	Count	%	Count	%	Count	%
Were pre-enumeration census tests, pilot or rehearsals carried out?						
Yes:	38	93	29	94	9	90
Less than a year before the census	*8*	*20*	*6*	*19*	*2*	*20*
1 year before the census	*14*	*34*	*9*	*29*	*5*	*40*
2 years before the census	*19*	*46*	*15*	*48*	*4*	*40*
More than 2 years before the census	*9*	*22*	*7*	*23*	*2*	*20*
No	1	2	1	3	0	0
Were pre-enumeration checks of the Enumeration Areas carried out by field staff?						
Yes, only by field managers	11	27	7	23	4	40
Yes, only by enumerators	14	34	11	35	3	30
Yes, by all levels of field staff or by others	10	24	10	32	0	0
No	5	12	3	10	2	20
If completed questions were collected by enumerators/interviewers, how were these stored before despatch to the processing site?						
Stored by enumerators in their own homes	12	29	11	35	1	10
Stored by census managers in their own homes	6	15	5	16	1	10
Stored locally in specially provided secure accommodation	23	56	22	71	1	10
Immediately despatched to regional or central office	5	12	5	16	0	0
Data recorded and stored electronically and uploaded to Census office	8	20	2	6	5	50
Other	2	5	1	3	3	30

Post-enumeration surveys

A post-enumeration survey (PES) to check coverage was carried out in 25 countries out of 41 (61 per cent) (Table 4.6). This technique, originally developed for the traditional census, was used in 23 of the 31 countries using this approach (74 per cent), but in only 2 of the 10 countries with a combined census (Poland and Switzerland).

Among those countries that did carry out a post-enumeration coverage check, the large majority (17) conducted the survey less than a month after the census, 3 countries did so between one and two months after the census, and 5 countries more than two months after the census. Fourteen countries did not conduct a post-enumeration coverage check, that is an activity considered in many countries as being essential to enable an independent estimate of the under-coverage to be made.

Similar number of countries (23) - and in most cases (21) the same countries – carried out a post-enumeration survey to check on quality. In four countries (Canada, Cyprus, Malta and Switzerland), PES was carried out to check coverage only. In two countries (Germany and Turkey) PES was carried out to check quality only. In Germany, the PES focused on the quality of the household sample survey. Turkey specified that PES was planned and organized independently from the main survey, with interviewers for the PES appointed by the regional offices and controllers appointed from central office. In Latvia, no PES was carried out, but approximately 3 per cent of addresses visited by enumerators were checked during the period of the field work.

Table 4.6
Post-enumeration checks on coverage and quality (number of countries and percentage)

	Total (41 countries)		**Type of census**			
			Traditional (31 countries)		Combined (10 countries)	
	Count	%	Count	%	Count	%
Was a post-enumeration survey carried out to check coverage?						
Yes	25	61	23	74	2	20
….. less than a month after the census	*17*	*41*	*16*	*52*	*1*	*10*
….. between 1 and 2 months after the census	*3*	*7*	*3*	*10*	*0*	*0*
….. more than 2 months after the census	*5*	*12*	*4*	*13*	*1*	*10*
No	14	34	6	19	8	80
Was a post-enumeration survey carried out to check quality of the responses?						
Yes	23	56	20	65	3	30
….. less than a month after the census	*17*	*41*	*15*	*48*	*2*	*20*
….. between 1 and 2 months after the census	*4*	*10*	*3*	*10*	*1*	*10*
….. more than 2 months after the census	*2*	*5*	*2*	*6*	*0*	*0*
No	16	39	9	29	7	70

Post-census evaluation

Post-enumeration debriefings for field staff were organized in 20 out of 41 countries (49 per cent) (Table 4.7). In 15 countries, field staff was required to attend as part of the job. In 5 countries they were invited but not required to attend.

An evaluation of the field operation was (or will be) carried out in almost all countries (35 out of 41, or 86 per cent), with no significant difference between countries with traditional or combined censuses. In 20 countries a report was (or will be) published as part of the census output programme while in the other 15 countries a report was not (or will not be) published.

Table 4.7
Post-enumeration debriefing and evaluation of field operation (number of countries and percentage)

	Total (41 countries)		Type of census			
			Traditional (31 countries)		Combined (10 countries)	
	Count	%	Count	%	Count	%
Were field staff required or invited to attend a post-enumeration debriefing?						
Yes, required as part of job	15	37	12	39	3	30
Yes, invited but not required to attend	5	12	4	13	1	10
No	19	46	13	42	6	60
Was an evaluation of the field operation carried and report published?						
Yes, carried out and a report was/will be published	20	49	15	48	5	50
Evaluation carried out but a report not published	15	37	11	35	4	40
No evaluation carried out	4	10	3	10	1	10

Communications

An effective communication strategy together with far reaching publicity and information campaigns play an essential role in ensuring the success of the census. This is especially so for those countries adopting a field enumeration methodology, either wholly or in part, where the general public is expected to actively participate in the census activities as respondents and, possibly, as temporary employees as part of either the field staff or the data processing operation. But even among countries adopting an entirely register-based approach where direct contact with the public may be minimal, communication with key stakeholders is nevertheless important to ensure that acceptable levels of quality for such components as relevance and accessibility can be achieved.

In the planning phases of the census, consultation with a wide range of stakeholders is necessary to ensure that user requirements are met, questionnaire design is effective, the methodology is accepted, working partnerships are forged, and that technical specifications are well understood.

During the operational phase, publicity and information campaigns are usually necessary to inform the public that a census is taking place and also to provide the necessary information to allow and encourage them to participate. Special attention is often given to identifying and targeting hard-to-reach population groups in order to ensure consistent levels of response across the country. In essence, the aim of these is to engage, educate, explain, and encourage, and (if absolutely necessary) enforce participation.

The UNECE survey aimed to collect information on the key stakeholders involved in such communications, the scope and content of the campaigns, and the means and media of delivery. The main focus was on those countries adopting traditional or combined methodologies where effective public information and publicity would be expected to be relatively more important. Attention here is, therefore, given only to those countries.

Of the 39 responding countries that conducted censuses with a traditional or combined methodology, only 4 (13 per cent) reported that they did not carry out a strategic communications programme (see Table 4.8). All 4 countries (Bosnia and Herzegovina, Cyprus, Georgia and Serbia) carried out a traditional census, a methodology for which the dialogue with users and other key stakeholders is generally considered as an important element of the census planning. Only one of these countries was in the European Economic Area (Cyprus). In Serbia, although a strategic communication programme was not officially adopted, various consultations and initiatives were organized with different groups of census users and stakeholders.

Table 4.8
Communications and publicity campaigns (number of countries)

	Total	Type of census		EEA countries
		Traditional	Combined	
Communication strategy adopted				
Yes	**35**	26	9	19
No	**4**	4	0	1
Publicity campaign adopted				
Yes	**38**	30	8	20
No	**2**	1	1	0

More countries reported consulting with users on their requirements for information (88 per cent) and on the design of questionnaires (82 per cent) than on any other aspect of the census (Table 4.9). Two thirds of countries (68 per cent) consulted on the census methodology to be adopted, and a little under two thirds (65 per cent) on the enumeration of hard-to-reach populations. Half, or more than half, of the responding countries consulted on the design, content and dissemination of outputs (59 per cent) and on community liaison, outreach campaigns and language issues (50 per cent). Similar patterns were seen among the EEA countries except that proportionately more consulted on the enumeration of hard-to-reach populations (82 per cent), and proportionately fewer on user requirements (76 per cent) and questionnaire design (72 per cent). It should be noted, however, that there are likely to be many common elements in the consultation on 'user requirements' and on the 'design, content and dissemination of outputs'.

Table 4.9
Aspects of the census on which countries consulted (number of countries and percentage)

Aspect	Countries responding*		EEA countries	
	Number	Per cent	Number	Per cent
User requirements	30	88	16	76
Questionnaire design	28	82	15	72
Census methodology	23	68	11	52
Enumerating hard-to-count and special populations	22	65	17	82
Design, content and dissemination of outputs	20	59	11	52
Language, community liaison and outreach	17	50	11	52
Field operations	13	38	8	39
Confidentiality and/or statistical disclosure	13	38	7	33
User satisfaction/public opinion survey	10	29	3	14
Data quality	9	27	4	19
Post census evaluation	4	12	2	10
Other issues	4	12	0	0

* Not including register-based countries

Barely more than a quarter of countries (27 per cent) consulted on data quality issues (even fewer, proportionately, among EEA countries, with just 19 per cent), although engagement on field operations and on confidentiality and/or statistical disclosure issues was a little more extensive (38 per cent in both cases). Almost a third of countries (29 per cent) have carried out a user satisfaction review or public opinion survey (or intend to do so), while barely one in ten (12 per cent) consulted with users on their post-census evaluation programme. Other *ad hoc* issues on which a number of countries consulted with stakeholders included publicity, media monitoring, internet access, modernizing census system and harmonizing registers.

In an extensive communications programme, the Russian Federation, the United Kingdom and the United States consulted users and other stakeholders on as many of 10 of the issues specifically identified in Table 4.9, while four other countries (Estonia, France, Italy and Kazakhstan) consulted on 8 issues. On the other hand countries such as Germany and Malta consulted on just 2 of the issues, and another six countries on just 3 issues.

Table 4.10 shows those stakeholder groups with which the responding countries reported consultations. As it could be expected — given the importance of the results of the census in shaping central government policy — all responding countries reported government departments and organizations as being among their key stakeholders. But not so with local government authorities or organisations, with whom two countries (Estonia and Turkey) reported no such consultation. For Estonia this was perhaps a little surprising given the wide scope of the content of its consultation programme as noted above.

Table 4.10
Key user groups and stakeholders consulted (number of countries and percentage)

User group/stakeholder	Countries responding*		EEA countries	
	Number	Per cent	Number	Per cent
Central government	35	100	19	90
Local government	33	94	18	86
Academics and education service providers	33	94	17	81
Ethnic/racial/faith communities	22	63	11	52
Press and the media	22	63	11	52
Other public service providers	20	57	8	38
Disability groups	15	43	10	48
Health service providers	14	40	4	19
Market researchers	13	37	6	29
Business, retailers and other commercial sectors	13	37	7	33
Housing groups/associations and the homeless	7	20	2	10
Other stakeholders	5	14	1	5

* Not including register-based countries

Academic and education service providers are also generally regarded as an important user/stakeholder group with whom, again, all but two countries consulted (this time Germany and Malta did not do so). Other groups seen as key to the census process include those representing the ethnic/faith communities and the press and the media (both 63 per cent of countries consulted), and other public service providers (57 per cent). Only 14 countries (40 per cent) reported engaging with health service providers, and only 15 countries (43 per cent) with disability groups.

Some 13 countries (37 per cent) reported consultations both with businesses and the commercial sector and with market researchers; these two groups of users (though they are commonly regarded as single stakeholder group) are now increasingly seen as providing a potentially valuable market for census outputs, particularly in the lucrative field of geo-demographics and business insight. Consultations with bodies concerned with housing and the homeless were reported by only 7 countries (20 per cent).

Again, reflecting the extensiveness of their consultation programme, the Russian Federation, the United Kingdom and the United States, together with Bulgaria, consulted with all the groups identified in Table 4.10. And, again, Germany had a limited consultation programme, reporting consultations with only central and local government organisations. Other key stakeholders not identified in the table included labour market institutions (reported by Switzerland) and the general public (the Russian Federation). But with respect to this latter group, many countries have engaged with the public indirectly through information regularly provided via their own national statistical websites.

Publicity

All of the countries that reported that they carried out a programme of stakeholder engagement also carried out a publicity campaign. In addition, so did Bosnia and Herzegovina, Cyprus and Serbia. Of the responding countries, only Switzerland did not do so. It should be recalled that Switzerland carried out barely any field activity at all.

Countries reported on the methods and media that they used during their campaign. The results are shown in Table 4.11.

All of the 38 responding countries used the national press in their publicity campaigns, and all but Germany also used national radio. Only Canada and Turkey did not use national TV.

Regional and local media were adopted only slightly less frequently in the publicity campaigns. Some 36 countries (95 per cent) used their regional or local press (only Cyprus, Spain did not), 35 countries utilised both regional and radio stations (only Cyprus, Germany and Spain did not) and all but four countries (Canada, Cyprus, Ireland, and Luxembourg) used local TV networks.

Some 31 countries (82 per cent) included a paid advertising element in their publicity campaign, and 28 countries (74 per cent) took advantage of free advertising opportunities; only Georgia, Kyrgyzstan, Romania and Turkey used neither method.

Table 4.11 shows also the extent to which a range of other methods and media were adopted. It is particularly interesting to note the extensive usage made of the internet and social media for raising awareness of the census — all but five countries took advantage of these developing media, reflecting the increasing parallel use made of the internet to collect the census data. SMS texting, in contrast, was only used by nine countries.

Publicly distributed or displayed leaflets and posters, while they might represent old fashioned technology, still continue to provide popular means of publicising the census — more than four in five countries used them; and billboards, too, were widely used (by more than two thirds).

Table 4.11
Methods and media used in the publicity campaign (number of countries and percentage)

Methods/media	Countries responding*		EEA countries	
	Number	Per cent	Number	Per cent
National press and magazines	38	100	20	100
National radio	37	97	19	95
National TV	36	95	20	100
Regional or local press	36	95	18	90
Regional or local radio	35	92	17	85
Press conferences	35	92	20	100
Regional or local TV	34	89	17	85
Leaflets	33	87	19	95
Internet and social media	33	87	18	90
Posters	32	84	17	85
Paid advertising	31	82	16	80
Free advertising	28	74	17	85
Public meetings and events	27	71	11	55
Billboards	26	68	16	80
Call centre (telephone helpline)	26	68	11	55
School promotions	19	50	11	55
Community-based media	15	39	9	45
Audi tapes, CDs DVDs	15	39	9	45
SMS texting	9	23	3	15
Other promotions/activities	8	21	6	30

* Not including register-based countries

Of the 19 separately identified elements of the publicity campaigns listed in Table 4.11, the campaigns in Malta, Montenegro, the United Kingdom and the United States adopted 18 of the elements. On average 14 of the elements were used both across the UNECE region generally and among the 20 responding EEA countries.

Other events or promotional activities that were reported by countries, but not included in the specific elements listed in Table 4.11 included the setting up of mobile census help points (Italy and the United Kingdom), a public opinion survey (the Russian Federation), and an online video game (Census Man) and rap song (the United Kingdom).

Information on the locations and sites where the publicity campaign was implemented in the various countries is shown in Table 4.12. The most frequently used locations were: local government offices (reported by 31 of the 36 responding countries); colleges and universities (23 countries), reflecting the fact that older students tend to be among the hardest-to-reach groups; and schools (23 countries). But the table shows that a variety of other locations — likely to attract different types of public presence — were used to promote and publicise the census. The pattern shown by EEA countries was broadly similar but with proportionately more use made of local information help points.

In addition to those listed, several countries cited other types of locations, such as: shopping centres, markets and other commercial premises (Belarus, Malta, Poland and the United States); on public transport (Hungary and the Russian Federation); sports arenas (the Russian Federation); and on internet and Facebook sites (Hungary). In general the range of publicity outlets in the 2010 round was far greater than was the case ten years earlier.

Table 4.12
Locations used in the publicity campaigns (number of countries and percentage)

Location	Countries responding*		EEA countries	
	Number	Per cent	Number	Per cent
Regional and local government offices	31	86	19	90
Colleges and universities	23	67	11	52
Schools	23	64	11	52
Banks, post offices, police stations and other public use facilities	20	56	11	52
Stations, airports and seaport	15	42	5	24
Libraries	14	42	7	33
Local information help points	14	42	11	52
Places of religious worship	11	31	6	29
Factories and other workplaces	6	17	2	10
Bars, pubs, theatres and other places of entertainment	4	11	2	10
Other locations	9	25	6	29

* Not including register-based countries

Choice of location and the content of the publicity material often reflected the need to attract the attention of particular hard-to-reach groups. Table 4.13 shows particular target populations at which countries specifically aimed different elements of their publicity campaigns. As noted above, schoolchildren and students (particularly older students living away from home) are notoriously difficult to reach in a census with a traditional field enumeration. It is not surprising then that more countries identified this group (64 per cent) than any other as a key target in their publicity campaign. Particular ethnic/racial/religious minority communities were targeted in the publicity campaigns in 56 per cent of the countries. Young men (particularly those in urban areas), the elderly, the infirm or disabled and recent immigrants also represented population groups that are generally hard to enumerate, which were targeted in the publicity campaigns in about 40 per cent of the countries. Furthermore, many parents often forget to include recently born babies in their census returns, and consequently 39 per cent of countries reported targeting these particular families.

A number of countries (10) reported that their publicity campaign had not targeted specific groups but had been aimed at the whole population. In contrast, seven countries reported that elements of their campaign had addressed each one of those groups listed in Table 4.13.

Furthermore nine countries reported that they had targeted other particular populations not specifically identified in the table. These covered such as groups as: workers (Estonia); the homeless (France); the press and data protection lobbyists (Germany — though the aim of such publicity was slightly different in that it was aimed at mitigating against specific objections to the census); immigrants in general (Greece and Italy); internet users (Hungary); young mobile people, those providing care for the elderly and disabled, and people with literacy and language problems (Ireland); and inner city populations (the United Kingdom).

Table 4.13
Population groups specifically targeted in the publicity campaigns (number of countries and percentage)

Target groups	Countries responding*		EEA countries	
	Number	Per cent	Number	Per cent
Schoolchildren and students	23	64	13	62
Particular ethnic/racial/religious minority communities	20	56	11	52
The elderly	17	47	9	43
Recent immigrants	15	42	8	38
Parents of very young babies	14	39	7	33
Young adult males	14	39	7	33
Visually impaired, deaf and other disabled	12	33	7	33
Other population groups	9	25	8	19

* Not including register-based countries

Countries were also asked to report what were, in general, the main aims of their publicity campaign, and in particular to identify the sequential elements of:

(a) Engagement: to make people aware of the census;

(b) Education: to tell people about the benefits (to them and to the country) of the census;

(c) Explanation: to tell people what to do and when;

(d) Encouragement: to persuade people who had not yet responded to do so;

(e) Enforcement: to remind people about their legal obligation and duty to take part if they persistently refused to do so;

(f) Expression of thanks for taking part; and

(g) Extolment of the value of the data and to encourage people to use the published results.

Table 4.14 shows to what extent these various aims were attempted. It can be clearly seen from this that countries put more emphasis into meeting those aims that helped manage the field operation part of the enumeration process — to engage the public, to educate them, to explain what they had to do, and to encourage response. More than four fifths of responding countries reported all these aims.

Other aims were seen as less important perhaps. Fewer countries, for example, attempted to publicise the enforcement element of participation, either because there were no penalties for refusal to do so (as in the case of Slovakia for example), or because initial response was sufficiently high for such a campaign to be unnecessary. Additionally countries such as Bulgaria, Canada and Portugal put much emphasis in their publicity on encouraging response online, and Germany was particularly concerned to send messages that would ensure public confidence in data protection.

Table 4.14
Aims of the publicity campaigns (number of countries and percentage)

Aims	Countries responding*		EEA countries	
	Number	Per cent	Number	Per cent
Engage	34	92	17	81
Educate	35	95	20	95
Explain	33	89	19	90
Encourage	31	84	16	76
Enforce	21	57	13	62
Express thanks	24	65	13	62
Extol	14	38	5	23
Other aims	3	8	3	19

* Not including register-based countries

And finally, the survey asked countries to report the slogans they used to accompany their publicity campaigns. These are presented (in their nearest English language translations) in Table 4.15. References to themes such as “the future” and “counting” remain as popular as ever. (A number of countries whose censuses had not yet taken place had not decided on their slogan at the time of the survey).

Table 4.15
Publicity slogans

Country	Publicity slogan
Albania	I am living in Albania
Armenia	Let's be counted for Armenia
Azerbaijan	Population census is the nationwide activity which serves every citizen of our country
Belarus	Census 2009: it is necessary for me, my family, my country!
Bulgaria	I am part of the census
Canada	Complete the census. It's the law
Croatia	For country is made of people
Cyprus	To know how many we are, what we are, and how we can better organise the future
Czech Republic	The future counts
Estonia	Everyone counts!
France	Population census: each one of us counts
Germany	Census 2011 — Germany needs the modern census
Greece	The census begins! We all participate because we all count
Hungary	Respond for the future
Ireland	Make your mark with Census 2011
Israel	You were selected to influence
Italy	The Italy of the future starts here
Kazakhstan	Everyone is important
Latvia	Answer for a common future
Lithuania	Where are you?
Luxembourg	We count on you!
Malta	Census 2011 — Your contribution counts
Poland	Enumerate yourself for the future of Poland
Portugal	Portugal counts with us. We count upon you
Romania	Because everyone counts!
Russian Federation	Everyone is important to Russia!
Serbia	Census is a note for the future
Slovakia	Answers to our future
Spain	Your answer is the most important
Turkey	We are surveying Turkey
United Kingdom	2011 Census: help tomorrow take shape
United States	(1) It's in our hands (2) Ten questions, ten minutes

5. OPERATIONAL FRAMEWORK II: LEGISLATION, SECURITY, CONFIDENTIALITY AND DISCLOSURE CONTROL

Introduction

In most countries, the preparation and conduct of a census and/or the collection and compilation of statistical data from administrative sources requires a legal basis, regulating issues such as: the allocation of funds for the census operations; the obligation of citizens to provide census information; the relationships between the agency responsible for the census and other public administrations involved in the census operations; the uses and linkage of registers to produce census data or to support field operations; and data security and confidentiality.

The last of these elements is particularly important. The census collects information on each person and household in the country. In its uses it is not concerned with facts about individuals as such. Its purpose is to provide statistics about the community, and groups within the community, as a whole. The public, therefore, has a right to expect, and needs to be assured that, personal information provided in confidence will be respected. The confidentiality requirement, whether enshrined in legislation or not, encompasses the whole census operation, ranging from the security of the completed census questionnaires both in the field and during processing, to the protection of the information contained in the outputs and made publicly available.

This chapter reports on both the legislative framework underpinning the 2010 round censuses in the ECE region and the practices adopted by countries to ensure the security and confidentiality of the information collected[9].

Legislation

In many countries, a specific census act or appropriate regulations are approved before each census, both to authorise the topic content and to deal with the issues mentioned above. In some countries, however, more general statistics legislation includes all the necessary provisions required for the conduct of a population census and/or the production and dissemination of statistical data thereby obviating the need for specific census legislation.

One of the main issues covered in census and statistics acts is data confidentiality. In an increasing number of countries, specific data-protection laws have been approved to regulate this field. In some cases, data-protection laws include all necessary provisions to cover the specific needs of censuses, including for instance the possible use of register data for censuses, or specific measures to be applied to census enumerators. In others cases, specific provisions on data confidentiality have to be included in the census acts, to take into account aspects, which are specific to the census.

Table 5.1 shows that regardless of the census methodology adopted, all countries that responded to the UNECE survey question (49) either reported or were known to have appropriate legislation in force to allow the collection of information necessary for the production of census statistics in the 2010 round.

[9] The material in this chapter has been taken largely from reports of the UNECE survey prepared by Ian White (UK Office for National Statistics) on legislation and security and Eric Schulte Nordholt (Statistics Netherlands) on confidentiality and disclosure control, and presented to the Joint UNECE-Eurostat Work Session on Population and Housing Censuses in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

Table 5.1
Census legislation in UNECE countries, by type of census

Countries	EEA member	Type of legislation		Data protection legislation	Status of legislation	
		Census	General Statistics		Permanent	Unique/ revised
Traditional census						
Albania		X		X		X
Armenia		X		X	X	
Azerbaijan			X	X		X
Belarus		X		X		X
Bosnia and Herzegovina		X		X		X
Bulgaria	✓	X		X		X
Canada			X	X	X	
Croatia		X		X		X
Cyprus	✓		X	X	X	
Czech Republic	✓	X		X		X
France	✓	X		X	X	
Georgia			X	X	X	
Greece	✓	X		X		X
Hungary	✓	X		X		X
Ireland	✓		X	X	X	
Italy	✓	X		X		X
Kazakhstan			X	X		X
Kyrgyzstan		X		X		X
Luxembourg	✓	X		X		X
Malta	✓	X		X	X	
Montenegro		X		X		X
Portugal	✓	X		X		X
Republic of Moldova		X		X		X
Romania	✓	X		X		X
Russian Federation		X		X		X
Serbia		X		X		X
Slovakia	✓	X		X		X
Tajikistan		X		X		X
United Kingdom	✓	X		X	X	
United States			X	X	X	

(continues on next page)

Countries	EEA member	Type of legislation		Data protection legislation	Status of legislation	
		Census	General Statistics		Permanent	Unique/ revised
Register-based census						
Austria	✓	X		X	X	
Belgium	✓		X	X	X	
Denmark	✓		X	X	-	-
Finland	✓		X	X	X	
Iceland	✓		X	X	X	
Netherlands	✓		X	X	X	
Norway	✓		X	X	X	
Slovenia	✓		X	X	X	
Sweden	✓		X	X	X	
Combined census						
Estonia	✓		X	X	X	
Germany	✓		X	X		X
Israel		X		X		X
Latvia	✓	X		X	X	
Liechtenstein	✓	X		X		X
Lithuania	✓	X	X	X		X
Poland	✓	X		X		X
Spain	✓	X		X		X
Switzerland		X		X	X	
Turkey			X	X	X	
Total countries:						
Total UNECE	**49**	**31**	**19**	**49**	**21**	**27**
Total EEA	30	18	13	30	15	14
Total EU	27	17	11	27	13	13
Total traditional	30	23	7	30	9	21
Total register-based	9	1	8	9	8	0
Total combined	10	7	4	10	4	6

Legislation that was specific to the census was in force in 31 countries in total (63 per cent of the countries that responded) – with a similar proportion (60 per cent) among the 30 countries of the EEA. This includes the United Kingdom where specific census legislation exists in Scotland and Northern Ireland, but where in England and Wales several elements of its long-standing Census Act of 1920 have now been amended by the provisions of newly introduced statistics legislation (The Statistics and Registration Service Act 2007). Some 19 countries (39 per cent) had in place other, more general, legislation providing for the collection of population and other statistics, of which 13 were in the EEA (43 per cent of EEA countries). In Israel specific provisions relating to each census are added to its more general statistics legislation as and when they are required.

In comparing the type of current legislation in countries adopting different census methodologies it is perhaps not surprising to note that 23 out of 30 countries adopting a traditional approach (77 per cent) have legislation specific to the census (with 12 out of 14 in the EEA), whereas among the nine register-based countries all but one carry out their censuses under more general statistics legislation. Where countries adopt a combined methodology, incorporating elements of both traditional field enumeration and the use of administrative data sources, the split is similar to that for countries with traditional census: 7 countries out of 10 have legislations specific to the census, and in the other 3 countries the general statistics legislation covers the census.

In 21 of the 48 responding countries (44 per cent) the legislation governing their census is a permanently enshrined enactment, while in 27 countries (56 per cent) the relevant legislation either has to be amended or revised afresh for each successive census or was unique to the census in the 2010 round. The respective numbers among the 28 responding EEA member states were pretty evenly split at 15 and 14. Although the UK reported that its relevant primary (framework) legislation is permanent, it should be noted that secondary legislation, in the form of regulations, is required each time in order to implement particular elements of the census operation, covering such aspects as the duties of the field staff sand the inclusion of some topics on the census questionnaire. A similar legislative framework exists in Ireland.

Security, confidentiality and disclosure control

In all responding countries, there is legislation of some form in place (be it specific to statistical confidentiality or to data protection more generally) that protects the confidentiality of personal information collected for census purposes (Table 5.1). Moreover, all but one country (Georgia, where the census is planned to take place in 2014) reported having a formal policy and/or strategy for ensuring the security and confidentiality of such information – although in seven countries (three of which undertake solely register-based censuses) the details of the policy is not in the public domain.

In about half of the responding countries personal census information or microdata is made accessible to persons outside the NSI for the purpose of scientific or statistical research while it remains closed to public inspection. Different conditions and restrictions nevertheless apply to such access in different countries (see Chapter 6). In particular it will be noted from Table 5.2 that among countries adopting a traditional census a small majority offer no access to microdata, while eight out of the nine countries conducting a wholly register-based census do so. The split among the ten countries adopting a combined approach methodology is even.

Of those countries that make such personal census information or microdata accessible for scientific or statistical research, all countries imposed safeguards to protect the security and confidentiality of the data. As well as the imposition of appropriate IT safeguards and security procedures, such measures included ensuring that field staff and data processing staff were made fully aware of their legal obligations and the penalties for any infringement of confidentiality rules. In the United States for example, all people employed on the census were required to take an oath to protect personal data from disclosure and to undertake annual refresher training.

Table 5.2
Access of personal census information or microdata (number of countries)

Accessibility to personal census information or microdata	Total countries	Type of census		
		Traditional	Register-based	Combined
Yes	26	13	8	5
No	24	18	1	5

Furthermore, most countries take measures to protect the statistical confidentiality of published output from the census. Post-tabular methods were reported as being more commonly adopted than pre-tabular methods irrespective of census methodology or region (Table 5.3). It should be noted that a similar enquiry undertaken by Eurostat in 2012 into protection measures being adopted in EU member states showed a number of countries had not taken final decisions on the precise way of protecting their census outputs. In a follow-up survey by Eurostat in 2013 this was still the case.

Table 5.3
Measures to protect the statistical confidentiality (number of countries)

Measures to protect the statistical confidentiality of published output from the census	Total countries	Region	
		EEA	Non-EEA
Pre-tabular measures only	8	7	1
Post-tabular measures only	17	13	4
Both pre-tabular and post-tabular measures	21	9	12
No measures	2	0	2

Table 5.4 notes the specific measures that countries reported having planned to protect the statistical confidentiality of published output from the census. Restricting the number of output categories into which a variable may be classified in any table implies introduction of global recodes and is the most popular (post-tabular) method (36 countries adopted this process). Global recodes are very commonly applied to the age variable in aggregating single years of age into broader groups, but could be applied in principle to any census variable. Applying minimum population and/or household thresholds for outputs for small areas was also adopted by almost as many countries (33).

Among the methods used to modify the data, cell suppression is the most commonly adopted (by 18 countries). In contrast, small cell adjustments, which was a source of annoyance of users of the UK census in 2001, was adopted by only two countries (Malta and Poland).

The method of statistical disclosure control adopted by countries does not appear to be a correlated to any degree by either their census methodology or whether or not they are in the EEA.

Table 5.4
Statistical disclosure protection measures (number of countries)

Measures planned to protect the statistical confidentiality of published output from the census	Total countries	Region	
		EEA	Non-EEA
Restricting the number of output categories into which a variable may be classified in any table (such as aggregated age-groups)	36	23	13
Applying minimum population and/or household thresholds for outputs for small areas	33	19	14
Modifying the data in one or more ways (indicate all that apply)	22	17	5
Cell suppression	*18*	*12*	*6*
Rounding	*9*	*7*	*2*
Record swapping	*6*	*4*	*2*
Over-imputation	*2*	*0*	*2*
Small cell adjustment	*2*	*2*	*0*

The UNECE survey on this topic concluded by asking countries to report whether or not they had commissioned an independent review or reviews of the measures taken to protect the physical security and/or statistical confidentiality of census information, and whether or not such reviews were or would be published. Most countries (30 out of 47) had not undertaken any such review.

6. OPERATIONAL FRAMEWORK III: DISSEMINATION, DOCUMENTATION, METADATA AND ARCHIVING

Introduction

A census is not complete until the information collected is made available to users in a form and to a timetable that is suited to their needs. In short, it must be fit for purpose. Furthermore, an important component of any country's programme of dissemination is a comprehensive portfolio of supporting documentation and metadata to help explain, clarify, and enhance the value of the statistical outputs, particularly with regards to making comparisons with previous censuses and other data sources.

The UNECE survey therefore investigated the form and other characteristics of the dissemination programme adopted by countries in the 2010 round. The results are presented in this chapter, which also briefly reports on how countries keep and maintain their census records in the long-term[10].

Dissemination

The 2010 CES Recommendations noted that there are several ways of making the results of a census available to the user:

(a) As printed reports containing standard and pre-agreed tabulations, usually at the national, regional or local district area level, that may be obtained from government agencies or directly from booksellers;

(b) As unpublished reports (often referred to as abstracts) comprising standard tables but produced for either smaller geographies or population sub-groups not otherwise included in the published reports – these may often be requested by users who may have to contribute towards a proportion of the marginal costs of their production;

(c) As commissioned output produced from a database, comprising customised cross-tabulations of variables not otherwise available from standard reports or abstracts; and

(d) As micro-data, usually available in restricted format only and supplied under strictly controlled conditions.

However, due to their ever increasing production costs, printed publications may become less the preferred choice for the dissemination of the main census results, though paper still provides a media that does not readily deteriorate and does not require the user to have any particular hardware, software or technical skills. Concurrent release of outputs may, however, be made possible only by distribution through the use of high capacity electronic media.

Table 6.1 shows the various method of dissemination adopted by UNECE countries in the 2010 census round. The questionnaire asked countries to select one main or primary method and to report on any other methods used in addition. The move from paper copy to web-based access is clearly in evidence.

[10] The material in this chapter has been taken largely from a report of the UNECE survey prepared by Ian White (UK Office for National Statistics), and presented to the Joint UNECE-Eurostat Work Session on Population and Housing Censuses in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

Over a third of the responding countries (19) use websites as the prime medium for static outputs either in html, pdf or Excel formats, but 30 other countries (60 per cent) use this medium as an additional means of dissemination. Interactive online databases provide the main means of dissemination in 15 countries. Use of the latter was more prevalent among the register-based countries, over half of whom reported this as their primary method of dissemination.

Table 6.1
Dissemination methods used (number of countries and percentage)

Dissemination method	Total countries				EEA countries			
	Main method		Other methods		Main method		Other methods	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Paper/hard copy publications	9	18	33	66	3	10	20	67
CD-ROM/DVD	0	0	26	52	0	0	0	0
Static web pages	19	38	30	60	8	27	19	63
Interactive online databases	15	30	21	42	13	43	10	33
The EU Census Hub	5	10	28	56	5	17	23	76
GIS web-based mapping tools	1	2	19	38	1	3	12	40
Other method(s)	1	2	6	12	0	0	0	0

Only nine countries (eight of whom undertook traditional censuses) reported the continued use of paper copy publications as their main dissemination method, although it will be noted that 33 other countries (two thirds) continue to use these as a supporting medium. The results showed that of the nine countries that no longer publish outputs in paper format at all, six have a register-based census, in which there is now less focus on the "census" as a specific and readily identifiable data source.

Within the EEA the pattern is a little different, with interactive online databases providing the prime means of dissemination for the greatest proportion of countries (43 per cent), and the EU Census Hub (not surprisingly) being used by over three quarters of countries as supporting media. Indeed, the EU Census Hub (in full operation from March 2014) was reported by five countries as the prime method of dissemination; four are register-based countries, Belgium, Denmark, the Netherlands and Sweden, plus Romania. Four non-EU/EEA member states also reported their intention to use the Hub to disseminate census data; these were Albania, Bosnia and Herzegovina, Croatia (member of the EU from July 2013) and Montenegro. One EU member states (Luxembourg) reported that they do not intend using the Hub at all. But evidence from EU sources suggests that this may be a reporting error.

Results from the survey clearly indicate that different media suit different output products. Large amounts of detailed, small area data may only be suitable for dissemination in Excel files via the web (as reported by Ireland), whereas the United States' online American FactFinder was reported as being the only data dissemination tool for both 2010 Census and American Community Survey; it includes data downloads for datasets and interactive requests for tables and geography. At the other end of the scale, access to anonymised - but still potentially disclosive - microdata files might be made available, for example, only to approved researchers in secure, controlled "laboratory" conditions.

Indeed, microdata is becoming an increasingly valuable vehicle for the dissemination and manipulation of data not otherwise accessible from aggregated census tabulations. Some 20 countries

(40 per cent) reported that microdata samples are, or would be, available to selected bona fide users (Table 6.2). And almost a quarter of countries (11) reported that such samples — though perhaps less detailed in content — would be available to all users. Similar patterns of microdata usage were reported (a) among EEA countries, and (b) by countries regardless of census methodology.

Several countries reported that use of microdata samples is restricted to scientific and social research purposes only and may not be used commercially. However, a number of countries specifically reported that they plan to make microdata available for academic research through the University of Minnesota's IPUMS project[11].

Only 10 countries reported no plans to produce microdata. Though the United Kingdom's response to the survey was that it had not yet made any decisions, it subsequently announced plans for three levels of microdata ranging from: a 1 per cent 'public use' sample, to be made available via the internet; a 5 per cent 'safeguarded' sample accessible to registered users through a secure portal; and a 10 per cent 'secure' sample, accessible only in a controlled isolated environment on site, from which no data can be removed without vetting for statistical disclosure.

Table 6.2
Dissemination of microdata samples (number of countries)

	Total countries	EEA	Type of census		
			Traditional	Register based	Combined
Microdata disseminated	**31**	**19**	**18**	**7**	**6**
To all users	11	7	7	2	2
To selected users under specific conditions	20	12	11	5	4
Microdata not disseminated	**10**	**7**	**5**	**2**	**3**
Not yet decided	**9**	**4**	**8**	**0**	**1**

The three quarter of countries (39), reported that they provide dedicated in-house services to supply ad hoc or commissioned census data or other relevant information that is not otherwise available to customers, either through the media identified in Table 6.1 or as microdata. Only eight countries (including two register-based countries — Denmark and the Netherlands) reported that they do not provide such services. Measures are generally taken in the provision of commissioned output to ensure that the data complies with the countries' particular confidentiality rules (see Chapter 5).

Where such data has to be specially created to fulfil a customised request there is often a charge levied to provide the service; more than half the countries (27) reported that they demand a fee to provide such information — but not where the request is for a standard product. Three countries (Iceland, Kyrgyzstan and Sweden) reported that they charged a fee regardless of the product. But a quarter of the countries (12) provide their customer services free of any charge whatsoever.

To investigate more specific characteristics of the census dissemination programmes, countries were asked what is the lowest geographic level at which any census data is disseminated. The results are shown in Table 6.3. More countries (22, or 44 per cent) adopted the Local Administrative Unit (LAU) 2 level (equivalent to communes) as their lowest level geography. This is also the minimum level of output geography that is demanded by EU Census Regulation[12], and a third of the 30 EEA

[11] Information on the Integrated Public Use Microdata Series (IPUMS) initiative is available at: http://www.ipums.org/

[12] See: EU legislation on the 2011 Population and Housing Censuses - Explanatory Notes, European Union, Luxembourg, 2011 (http://epp.eurostat.ec.europa.eu/portal/page/portal/population/publications/census)

members recorded this as their lowest level. Romania, however, reported that its smallest geography was at a higher level than this. Lowest levels of output geography do not seem to be dependent on the type of census methodology.

Areas created specifically for the census operation, particularly among the traditional census taking countries, are often the basis for the smallest output geography. Thus eleven countries reported that enumeration districts or specifically designed statistical areas are their lowest level of geography. In the United Kingdom, for example, the Output Area (OA) (containing as few as 150 households in some cases) was introduced in the 2001 Census to rationalise the ever-changing boundaries of the country's several layers of administrative geographies, and thus to provide some comparability between censuses. These OAs then build up to larger Super Output Areas which, in turn nest into higher administrative and other geographies on a best-fit basis. Interestingly, two register-based countries (Belgium and Norway) also reported this level of geography as the lowest that is recognised in the dissemination of data — even though such areas are not specifically created for the collection of the information. The census block, long-time used in the United States, is also the smallest geography for dissemination for four other countries.

Table 6.3
Lowest level of geography for which any census data is disseminated (number of countries)

Lowest level of geography	Countries responding		EEA countries	
	Number	Per cent	Number	Per cent
Census block (area bounded on all sides by streets)	5	10	3	10
Smallest geographical unit used in census	11	22	10	33
1 km square grid	1	2	1	3
Local Administrative Unit Level 2	22	44	10	33
Administrative unit larger than LAU2	3	6	1	3
Other geographic level	7	14	4	13

Only Estonia reported using the 1 km square grid as the lowest level of geography, specifying that some census results are made available to the users using 100m squares grid or lowest level of geography, when needed because of data protection. Several other countries noted in their responses the use of other levels of grid square geographies, such as 250 m squares (Finland), or 100 m squares (Austria, Slovenia and Switzerland). In other countries the settlement, canton or quarter was reported to be the lowest geographic level.

But a restraining factor in deciding practicality of the lowest level of such geography is the issue of disclosure — the smaller the area, the higher the risk. Many countries therefore apply minimum population thresholds for the release of census data for their smallest geographic areas — a third did so (Table 6.4) — but for some countries the level of such thresholds often depends on the sensitivity of the variable being measured. So, for example, Canada does not release census demographic and other information, generally for areas with a population less than 40, but raises this threshold to 250 in the case of income-related tables. Ireland on the other hand imposes a lower limit of 25 households or 75 persons regardless of the variable. The United Kingdom adopts a similar policy but has a more stringent threshold of 100 persons and 40 households. France reported that great majority of its census data are available for zones of at least 2,000 inhabitants, but that certain significant variables that would increase the risk of disclosure are available only for zones of more than 500,000 inhabitants.

Table 6.4
Application of minimum population thresholds for the release of census outputs and the lowest level of geography (number of countries)

Application of threshold	Total countries	EEA	Type of census		
			Traditional	Register based	Combined
Yes	18	12	10	4	4
No	31	18	20	5	6

Five countries reported a threshold so low (3–5 counting units) as to present virtually no protection at all against disclosure (Greece, Montenegro, Norway, Romania and Serbia). Over half of the countries in the UNECE region (31), and over a half of those countries adopting a register-based census, reported that they impose no such thresholds at all — though Iceland added that it might do so when its disclosure rules had been decided. It might be supposed, therefore, that those countries with no thresholds would generally have higher levels of lowest output geography (and therefore less risk of disclosure) than the countries that did impose thresholds. But the results of the survey suggest that that is not necessarily the case. The lowest level of geography for almost a half of these countries (13) were at levels below LAU2 level, where the risk of disclosure, particularly in tables where more than simple univariate counts are given, starts to become real.

In conclusion the survey asked countries to report whether or not their dissemination programme would include official reports specifically on the general evaluation of the census operation as a whole, and on the quality of the data. Some 29 countries (58 per cent) reported that they have published, or intend to publish an evaluation report, and 31 countries (62 per cent) similarly reported with respect to a quality report (Table 6.5).

Only 17 countries (a third) reported both, but it may that in some of these cases a country's general evaluation report also includes relevant data quality aspects. Seven countries however (14 per cent) reported publishing neither. Three of these (Denmark, Finland and Sweden) are register-based countries, and four of them (the fourth is Malta) are in the EEA, which means that they should be expected under EU Regulations to report to Eurostat on data quality issues. Georgia has not yet finalised its plans. The next chapter reports more widely on how countries assessed and measured coverage and quality more specifically.

Table 6.5
Plans to publish general evaluation and data quality reports (number of countries and percentage)

Plans to publish reports	Total countries		EEA countries	
	Number	Per cent	Number	Per cent
Publish general evaluation report	29	58	15	50
Publish data quality report	31	62	22	73
Publish both	17	34	11	37
Publish neither	7	14	4	13

Documentation and metadata

As noted above, an important component of any country's programme of dissemination is a comprehensive portfolio of supporting documentation and metadata to help explain, clarify, and enhance the value of the statistical outputs, particularly with regards to making comparisons with previous censuses and other data sources.

The UNECE survey accordingly asked countries to report on the range of documentation and metadata that had been, or will be, produced to support the dissemination of outputs. The results are shown in Table 6.6.

Most of the 50 responding countries (44) produced, or will produce, explanatory notes to accompany the statistical tables from the census. Some countries (such as Denmark, Israel, Kazakhstan, the Netherlands and Tajikistan) reported that they do not, however the Netherlands specified that metadata are produced as part of the European census programme, and this may apply also to some of the other countries. Moreover, seven countries reported that they had not prepared definitions of terms and concepts used, and four countries produced neither. But just less than half (44 per cent) reported that they had produced data dictionaries or glossaries of terms used in the outputs. Lack of such metadata is particularly prevalent among register-based countries, of which only a third (Austria, Finland and Iceland) did so.

Such documentation could be particularly important where the underlying methodology has changed since the previous census (as in the case of Poland and Sweden, for example). Such changes are likely to affect the definitions and concepts used. This will also be the case for those countries that did not conduct a census in the 2000 round and where the definitions used in the previous census carried out are likely to have changed significantly. However, of the 22 countries not reporting such documentation, 5 were countries where either the methodology had indeed changed.

A small number of countries (four) reported limited production of documentation or metadata (identifying less than three of the separate items listed in Table 6.6) to support the statistical outputs. Generally it was the case that the EEA countries tended to have higher proportions reporting the availability of the various metadata products; this was particularly evident where such metadata referred to imputation. But the proportion of EEA countries that had prepared metadata on the census questions was smaller than for all countries (less than two thirds compared with three quarters) reflecting, no doubt, a high proportion of register-based censuses in the EEA for whom such metadata is not relevant.

In preparing explanatory documentation and metadata it is important to consult those users of census data whom the information is designed to help. However, only half (25 of the 50 responding countries) reported that they did so. This proportion was even lower (just over a third) for EEA countries, reflecting the fact that only 2 out of the 9 register-based countries reported such consultation. However, not surprisingly perhaps, among the traditional census countries, where metadata tends to be more extensive, more than half (61 per cent), consulted with users.

Table 6.6
Documentation and metadata produced to support the census outputs (number of countries and percentage)

Documentation/metadata	Countries responding		EEA countries	
	Number	Per cent	Number	Per cent
Explanatory notes to tables	44	88	27	90
Definitions of terms and concepts used	43	86	27	90
Methodological papers/reports	40	80	26	87
Data visualisation (maps, graphs, charts...)	38	76	22	73
The census questions	37	74	19	63
Changes to definitions etc. since previous census	27	54	14	47
Levels of response	27	54	15	50
Levels of imputation (of which…)	27	54	20	67
……..Overall	*26*	*52*	*18*	*60*
……..For each topic	*22*	*45*	*16*	*53*
……..For each area	*5*	*10*	*3*	*10*
……..For each level of geography	*4*	*8*	*4*	*13*
Data dictionary/glossary of terms	22	44	14	47
User guides	18	36	10	33
Comparisons with other data sources	15	30	13	43
Commentary	14	28	10	33
Coverage adjustments	13	26	9	30
Confidence intervals	9	18	8	27
Other documentation/metadata	4	8	1	3
None of the above	1	2	0	0

In planning their output from the census, almost all responding countries (47 out of 49) adopted national and or international standards and guidelines on the preparation of metadata. Only France (whose rolling census methodology is unique to that country) reported that it did not follow any such international guidelines, but did adopt national standards. Two countries (Israel and the United States) adopted neither.

The use of international guidelines in this way was reflected also by countries' reference to international recommendations in the planning and preparation of their censuses. As shown in Table 6.7, 44 out of the 50 countries that responded used the 2010 CES Recommendations in this way. Only Belgium and Denmark (of the countries with register-based census), Liechtenstein (with combined census), and Kyrgyzstan, France and the United States (traditional census) chose not to, but the latter two countries adopt census methodologies that no longer fit neatly into the 'traditional' model. Of the six countries that did not refer to the CES Recommendations, three were EEA member states that referred to other UNECE or Eurostat documentation, which probably include the explanatory notes that accompanied the EU Census Regulations that prescribe the topics and classifications for which outputs are required to be provided to Eurostat.

Some 32 countries reported that they had referred to the second revision of the United Nations' Principles and Recommendations for Population and Housing Censuses, but only Iceland and Slovenia of the register-based countries had done so. Fewer countries (just 22) had referred to the United Nations companion Handbook on Census Management for Population and Housing Censuses (none of the nine register-based countries, for which the handbook is probably of limited erelevance).

Table 6.7
Recommendations and other documentation referred to (number of countries)

Recommendations/documentation	Total countries	EEA	Type of census		
			Traditional	Register-based	Combined
Total responding	**50**	**30**	**31**	**9**	**10**
CES Recommendations 2010 round	44	26	28	7	9
Other UNECE/Eurostat documentation	30	21	18	6	6
United Nations Principles and Recommendations	32	14	22	3	7
United Nations Handbook on census management	22	7	17	0	5
Other United Nations documentation	3	1	3	0	0
None of the above	3	2	2	0	1

Archiving

Finally, the survey enquired about the archiving policy and how long countries kept either the individual census records (or any images of them), or, in the case of register-based censuses, any linked data based on unit records. The responses are shown in Table 6.8.

Some countries gave more than one response to the survey where the retention period of paper and electronic images or data files are different. But the figures here refer to the longer period of retention in such cases. Some 23 countries either retained the returns/unit record files either only for

as long as they are required for data processing or up to five years after the census. And in a further six countries the records are destroyed within 6-10 years, usually before the next census is taken. Only four countries keep the census returns for a longer period before destroying them. Countries that adopted a register-based methodology tend not to retain the individual unit records for any significant length of time after the census.

Of those ten countries that adopt a policy of making the individual census returns publicly available for either socio-historical or genealogical research, most do so only after 75 years — with 100 years being the most commonly adopted closure period. Iceland and Norway are the only countries with register-based census that do so. This policy ensures that in the clear majority of cases the number of publicly accessible records that would refer to living individuals is minimised.

Table 6.8
Length of time completed census returns or lined data bases are kept after the census (number of countries and percentage)

Length of time	Total countries		EEA countries	
	Number	Per cent	Number	Per cent
Kept only for as long as they are required for data processing, then destroyed	11	22	6	20
Destroyed 1-5 years after census	12	24	5	17
Destroyed 6-10 years after census	6	12	2	7
Destroyed after 20 years	4	8	3	10
Made open to the public after 30-50 years	1	2	0	0
Made open to the public after 51-75 years	1	2	0	0
Made open to the public after 76-100 years	5	10	4	13
Made open to the public after more than 100 years	3	6	3	10
No decision yet on length of time	6	12	5	17

7. COSTS, BENEFITS, QUALITY AND COVERAGE

Managing and monitoring census costs

Introduction

Population censuses are the largest statistical operation undertaken in the context of any official statistical system. They are also - at least as far as traditional census taking is concerned - the most expensive one, and since census expenses are usually concentrated during a short period of time, census costs may appear to be greater than if they were spread evenly over a decennial period.

One of the main reasons for the high cost of traditional censuses is that they require information from everyone in a country and so they are labour-intensive, particularly in the collection stage. During the collection stage large numbers of temporary employees are hired for relatively short periods of time, varying from several days or weeks to a few months.

Automation of census processing started at the end of the 19th century with the introduction of automatic sorters and accelerated with the introduction of computers around the mid 20th century. Computerization spread from being mainly dedicated to data entry and processing, to the whole range of the census activities, including, in the most recent census round, geographic information systems, internet data collection and data visualization of outputs.

There continues to be a growing need for better and more intensive census publicity to increase the chances of a successful census, and this has brought an added and growing item to census costs.

Managing census costs is an important aspect of the organization of any census. This emerged clearly in the 2000 census round, when countries developed a variety of approaches to reduce census costs - or at least to avoid their increase - and is for the 2010 census round even more a key issue in a time of global economic constraint. Consequently the UNECE survey paid attention to learning about the level and profile of national costs, investigating what effect innovations have had on both cost and benefits, and how the investment put into the census has benefited users. This section presents the results of the survey[13].

But a word of warning here. As the UNECE report on the practices of countries in the 2000 round noted, the analysis of data con census costs should be considered with some caution. The comparison of census costs across countries is affected by many factors. One of them is the complexity of comparing costs across currencies and different points in time (the reported censuses across the region were conducted over a timeframe of five years, during the period 2008-2013). In another case it may be that enumerators already employed in some other capacity by the state, are used in the census field operation but not charged directly to the census. A further important factor arises from the difficulties of categorizing census expenses across countries in a standard way to allow meaningful comparisons.

[13] The material in this chapter has been taken largely from the paper prepared by the UNECE Task Force on Costs and Benefits, led by Alistair Calder (of the UK's Office for National Statistics) and which was presented at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, in Geneva from 30 September to 3 October 2013
(http://www.unece.org/stats/documents/2013.10.census1.html)

The main goal of the present analysis is to describe only the broad experiences of the reporting countries using relatively simple standardization techniques. Accordingly, whilst broad comparisons can be made, detailed comparisons between particular countries should be made only with caution. The significant differences in the costs of census carried out by different methodologies are, however, drawn out.

Measures of census costs

Two different measures to compare census costs on a *per capita* basis across the different UNECE countries are used. For each country, the costs have been calculated as close as possible to the census year for that country (though, as noted above, they refer to a period of expenditure spread over different lengths of time for different countries). While the results are presented on a *per-capita* basis to allow better comparison, this also can be misleading. This is because there are many census costs (such as computing and infrastructure costs) that are not totally dependent on population size.

The first measure is the simple conversion of the reported *per capita* costs in local currency, into a common currency (US dollars) calculated at the year of the census. This measure does not reflect the differences in purchasing power across countries. However, as some firms that provide outsourced services to NSIs may be internationally based, and some components of the census equipment such as computers are produced and sold in the international market, it may be considered relevant for some purposes.

The second measure is the conversion of the *per capita* costs in the census year into 'purchasing power parity' (PPP) units in US dollars (USDs). This measure provides a more internationally comparable estimate of costs. It is based on the purchasing power in the different countries standardized into one common measuring unit. Table 7.1 shows the two cost measures, together with the total costs as reported by the countries, ranked by PPP cost, within methodological type.

Total census costs across countries

Some 42 out of the 51 countries taking part in the survey provided information on the total costs of their census, 25 of which were from EEA countries. Of the countries carrying out a traditional census, Cyprus, the Czech Republic, Georgia, and Kazakhstan did not provide detail for their costs, neither did Belgium and Iceland among the countries with register-based census, nor Israel where a combined census was conducted.

Table 7.1 shows that the United States (which conducted a full field enumeration in 2010 with annual sample updates) had the highest cost, both in terms of total cost, and PPP by a long way (as was also the case in the 2000 round). However, when considering the unadjusted per capita cost, Lichtenstein (whose combined census approach involved a full field enumeration for selected variables) appears to have been highest. Among the traditional census taking countries, Azerbaijan reported the lowest cost both in terms of *per capita* and PPP, while Turkey's combined census seems to have represented very good value at just $0.19 *per capita*. The lowest cost, by any of these measures was Slovenia's register-based census at just $0.03 *per capita.*

Among the countries with a combined census, those which conducted a full enumeration (Liechtenstein, Estonia, Latvia and Lithuania) had generally higher *per capita* census costs compared to those that collected only sample data. In this latter group, Germany had a higher *per capita* cost compared to the other countries.

Table 7.1
Different measures of countries' census cost, by census methodology

COUNTRY	CENSUS COST (in 2011 US dollars)		
	TOTAL COST	PER CAPITA	PER CAPITA (PPP)
Traditional census			
Azerbaijan	9,428,371	1.03	1.45
Kyrgyzstan	6,100,000	1.12	2.40
Armenia	5,126,000	1.57	2.78
Tajikistan	10,084,000	1.31	3.09
Belarus	14,489,003	1.53	3.63
Republic of Moldova	7,655,902	2.15	3.69
Bulgaria	13,443,758	1.83	3.79
Russian Federation	544,800,000	3.81	4.79
France	405,066,815	6.22	5.16
Romania	62,716,391	2.93	5.28
Malta	2,053,167	4.93	6.33
Croatia	21'000'000	4.77	6.55
Portugal	65,732,758	6.23	7.06
Luxembourg	5,567,929	10.74	8.33
Greece	95,440,015	8.45	8.50
Serbia	34,131,389	4.70	8.85
Slovakia	40,747,494	7.55	10.21
Montenegro	3,458,416	5.57	10.51
Hungary	75,755,615	7.60	11.70
UK	807,349,666	12.87	11.82
Italy	840,842,149	13.85	12.49
Albania	19,487,751	6.10	13.42
Bosnia and Herzegovina	29,231,626	7.61	14.33
Canada	658,235,748	19.09	15.34
Ireland	83,357,494	18.21	15.64
United States	12,520,538,000	40.17	40.17
Combined census			
Turkey	13,961,764	0.19	0.31
Switzerland	21,297,327	2.69	1.65
Spain	118,318,486	2.56	2.56
Poland	136,533,906	3.54	5.59
Lithuania (full enumeration)	11,953,508	3.94	6.01
Latvia (full enumeration)	10,663,976	5.18	7.24
Germany	1,043,986,637	12.76	11.41
Estonia (full enumeration)	18,735,013	13.98	18.56
Liechtenstein* (full enumeration)	1,670,379	47.09	28.80
Register based census			
Slovenia	69,599	0.03	0.04
Denmark	375,835	0.07	0.05
Netherlands	1,948,775	0.12	0.10
Finland	1,280,624	0.24	0.18
Norway	2,465,200	0.50	0.31
Sweden	6,698,218	0.71	0.51
Austria	13,780,624	1.64	1.39

*For Liechtenstein, costs are calculated using PPP values for Switzerland, whose currency it uses.

However, in order to compare the cost for each type of census more generally, Table 7.2 presents the median values of the indicators presented in Table 7.1 for each census type. (Median values have been used here rather than the mean as they are less influenced by extreme values).

As expected, for all indicators of census costs, the median values of the register-based censuses are by far lower than those for the traditional or combined censuses, though it should be noted perhaps that the lower costs reported for register-based censuses reflect only the marginal cost of the production of census statistics – not the full cost of building and maintaining the registers (which might be shared between applications).

The median value of the total cost for countries with combined census ($ 18.7m) is much lower than the median value for countries with traditional census ($ 31.7m), while the difference is smaller (although still significant) for the *per capita* cost indicators.

Table 7.2
Median cost of 2010 census by type of census (in US dollars)

	All countries	Type of census		
		Traditional	Register based	Combined
Total cost (millions)	**16.6**	31.7	1.9	18.7
Per capita cost	**4.32**	5.84	0.24	3.94
Per capita cost (PPP)	**5.80**	7.70	0.18	6.01

Period of time to which costs relate

The UNECE survey enquired into the period of time to which the reported total census costs related. Some 44 countries provided responses to this question (86% of the total asked). All the countries that had reported their total costs also provided the details of the timeframe, plus the Czech Republic and Iceland.

On average EEA countries reported a slightly longer period of time for which the census costs relate than do non-EEA countries whether measured by using the mean or median length of time (Table 7.3). But when comparing the result by type of census method it is difficult to draw any useful conclusions from them. It might have been expected that the relevant period for countries with a register-based census might have been significantly shorter than for those countries having to plan a field operation. But this was not evidently the case. It seems possible therefore that the small differences are more influenced by length of time taken to report the results than by any real differences in methodological approach.

Table 7.3
Period of time that the costs relate to by type of census and region

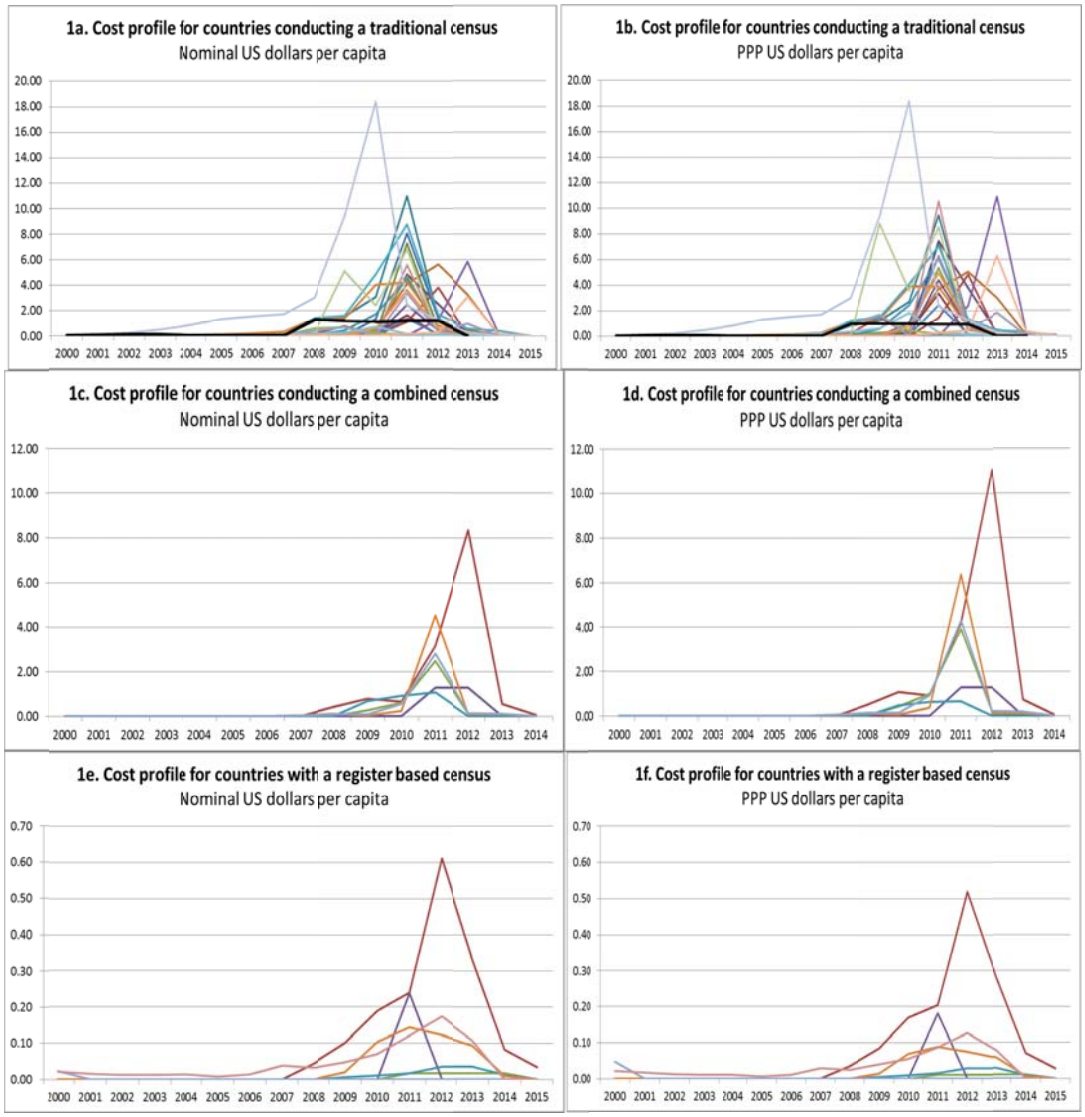
	All countries	Type of census			Region	
		Traditional	Register based	Combined	EEA	Non-EEA
Minimum (years)	0.5	1.0	1.0	0.5	0.5	1.0
Maximum (years)	14.0	13.5	14.0	10.0	14.0	13.0
Mean (years)	5.6	5.8	5.6	5.0	5.9	5.0
Median (years)	5.1	5.0	4.6	5.5	5.8	4.3

However, the graphs in Figure 7.1 provide a better insight by showing the actual profile of expenditure around the census year for each country. These costs are expressed in US dollars per capita, with charts on the right hand side being adjusted for PPP. (For the years 2012 onward, costs are normalised using figures frozen at 2011 values for population PPP and exchange rates.)

Although the levels of cost are broadly comparable between countries using traditional and combined census (especially after adjustment for PPP), the scale of cost for countries using a register based census (Figure 7.1e and 7.1f) is radically lower.

PPP adjustment makes relatively little difference to the results for countries using combined and register based census, due to these countries having more similar cost of living than for many of those using the traditional census.

Figure 7.1
Cost profile by type of census, in nominal and PPP-adjusted US dollars per capita



Within those countries with traditional census (Figures 7.1a and 7.1b) the United States is particularly notable as having a far higher cost *per capita* than any other country, even once PPP is taken into account. The flatness of cost profile for France (the heavy black line) is due to the fact that the costs of its rolling census are evenly distributed over time (by design). Indeed, its inclusion in the 'traditional' group of censuses in this report is merely for the convenience of reporting the analysis of its adherence to the CES recommendations in general. Its unique cost profile alone sets it apart from other census methodologies.

France's census apart, the profiles of spend obviously vary by country but are broadly similar across census types. Although there are exceptions, costs in many countries rise slowly to a peak around 2011 or 2012 – and then drop off more sharply. Even the register-based censuses show a similar profile in many cases. Again this may reflect the fact that what was requested here was the extra cost associated with producing the census statistics – not the ongoing cost of maintaining the whole register system.

Elements of census costs

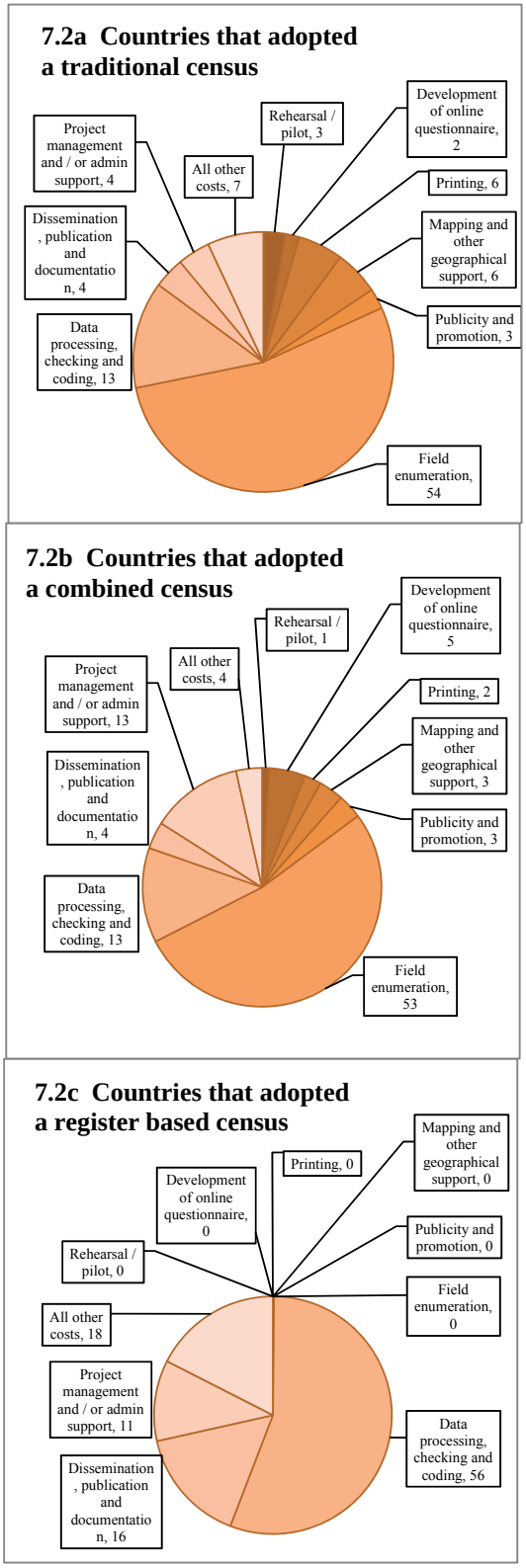
But what was the money spent on? The UNECE survey asked countries to estimate the proportion of their total costs that were allocated to a number of specific key census activities, and to identify other activities of major expenditure. However, only three quarters of the countries taking part in the survey (39) responded, suggesting that in many cases even an estimation of the spread of census costs was not readily available. The key census activities identified in the survey are listed in Table 7.4 together with minimum, maximum and median proportions in each case. The overall profiles of spend for each of the three main census methodologies are shown in Figures 7.2a-c.

Among those countries that undertook a traditional census in the 2010 round, the activity demanding the biggest proportion of census costs remains, as expected, the field enumeration, while for all but two of countries that undertook a register-based census the biggest proportion of costs was for data processing. Surprisingly perhaps, data processing was the only activity for which all countries reported that they incurred some costs – all other activities had at least one country stating that there were no costs involved. But this is perhaps understandable (at least as far as register-based countries were concerned) bearing in mind the guidance that accompanied the survey to include only those costs incurred specifically and exclusively in respect of the census.

Table 7.4
Percentage spent on different activities

Census activity/operational area:	Minimum (%)	Non-zero minimum (%)	Maximum (%)	Median (%)
Rehearsal / pilot	0	1	18	1
Development of online questionnaires	0	1	12	1
Printing	0	1	19	3
Mapping and other geographical support services	0	1	21	2
Publicity and promotion	0	1	7	2
Field enumeration	0	20	85	52
Data processing, checking and coding	2	2	100	13
Dissemination, publication and documentation	0	1	46	2
Project management and / or administrative support services	0	1	30	5
All other costs	0	1	50	5.5

Figure 7.2
Average cost breakdown by census method (% of total spend)



As might be expected, under a traditional census approach (Figure 7.2a) field costs absolutely dominate – making up an average of 54 per cent of the costs across the region and ranging from 85 per cent in Greece to just 28 per cent in Slovakia. Data processing costs represented the next biggest investment, making up a further 13 per cent of the total cost on average. However, even among traditional census countries, the profile of spend varied considerably across the other activities. For example, Azerbaijan and Slovakia spent 18 per cent and 15 per cent of their budget respectively on pilots and rehearsal where nobody else spent more than 8 per cent.

But on the other hand, Slovakia spent only 1 per cent on printing compared with 19 per cent in Italy and 17 per cent in Tajikistan. Azerbaijan also spent heavily on mapping (as did Bosnia and Herzegovina), on which a fifth or more of their budget was invested compared with more or less nothing in Luxembourg and Serbia.

The overall profile of costs for the combined approach (Figure 7.2b) is remarkably similar in breakdown to the traditional one reflecting the dominance of any sort of field enumeration activity. However, Poland's paperless census enabled a much reduced expenditure on printing (0 per cent) and field costs (42 per cent). And, indeed, Switzerland was able to reduce its enumeration costs to just 20 per cent by having virtually no field activity whatsoever.

Under the register-based census (Figure 7.2c), data processing, checking and coding dominated to a similar extent, making up, on average, 56 per cent of the costs. Norway reported only 2 per cent for this cost category, but specified that data processing costs are not considered in the census costs. Here other costs such as rehearsal, printing, mapping and development of the online questionnaire which contribute to the cost under the other census options are virtually wholly missing.

The effect of innovation on costs and benefits

As noted in Chapter 3 most countries had made innovations in the design and execution of their censuses in the 2010 round. The survey showed that in most cases these resulted in a reduction in overall cost (Table 7.5). Among the responding countries, the greatest number of reports of cost savings, came from data integration from registers (not surprisingly with register-based and combined methodology censuses) and from improvements in statistical methodology (more so with traditional censuses). Outsourcing also either reduced costs or made little difference.

Table 7.5
Count of countries by innovation and impact on cost and benefit

IMPACT ON CENSUS COST					
Innovation	**Increased total cost**	**Limited impact**	**Decreased total cost**	**N/A (no innovation)**	**TOTAL**
Use of internet collection	5 (19%)	2 (8%)	8 (31%)	11 (42%)	26 (100%)
Use of scanning	1 (4%)	5 (19%)	5 (19%)	16 (59%)	27 (100%)
Use of other technology	8 (32%)	2 (8%)	3 (12%)	12 (48%)	25 (100%)
Outsourcing services (e.g. recruitment, scanning)	1 (4%)	7 (27%)	8 (31%)	10 (39%)	26 (100%)
Statistical methodological improvements (e.g. estimation)	1 (4%)	5 (19%)	10 (37%)	11 (41%)	27 (100%)
Data integration from registers	1 (4%)	7 (25%)	12 (43%)	8 (29%)	28 (100%)
Other main innovation	7 (32%)	2 (9%)	2 (9%)	11 (50%)	22 (100%)
IMPACT ON CENSUS BENEFIT					
Innovation	**Increased total benefit**	**Limited impact**	**Decreased total benefit**	**N/A (no innovation)**	**TOTAL**
Use of internet collection	15 (58%)	0 (0%)	0 (0%)	11 (42%)	26 (100%)
Use of scanning	6 (22%)	3 (11%)	2 (7%)	16 (59%)	27 (100%)
Use of other technology	11 (44%)	2 (8%)	0 (0%)	12 (48%)	25 (100%)
Outsourcing services (e.g. recruitment, scanning)	11 (42%)	5 (19%)	0 (0%)	10 (39%)	26 (100%)
Statistical methodological improvements (e.g. estimation)	14 (52%)	2 (7%)	0 (0%)	11 (41%)	27 (100%)
Data integration from registers	14 (50%)	4 (14%)	1 (4%)	9 (32%)	28 (100%)
Other main innovation	10 (46%)	1 (5%)	0 (0%)	11 (50%)	22 (100%)

A half of those countries that made use of internet collection found that it decreased their total costs, but even more encouraging is that all that did so reported an increase in total benefit. Innovations in statistical methodological and data integration from registers are the next most positive in terms of benefit – and also led to lower costs.

It will be noted from Table 7.5 that the two categories of innovation that were reported by countries to have increased their costs - the use of 'other' technology and 'other main innovations' - were those that nevertheless, in majority of cases, produced an increase in total benefit. Clearly decisions have been made to invest in technology so as to gain benefits elsewhere – perhaps in terms of quality. Such 'other' technologies and innovations have not been specified here but included the use of: GIS for mapping, laptops and handheld devices in

the field, address registers, field management systems, automatic coding, and the move away from mainframe data processing.

But cost alone should not be the discriminating factor in determining the relative value of a census. What is more relevant is its 'cost effectiveness'. This is, of course, far more difficult to measure quantitatively, but the UNECE survey nevertheless asked countries to report whether or not, as part of either the justification/business case for the census or the evaluation of the outcome of the census, they had identified any financially quantifiable benefits. Only a few countries (11) reported that they had done so, and of these only six (France, Ireland, Latvia, Slovenia, Switzerland and the United Kingdom) had reported on such benefits. It is clear, therefore, that any assessment of benefits is complex and variable. However, while national situations will vary it seems likely that there would be value for many countries in doing more.

Countries were, however, particularly responsive in the survey when it came to identifying the main users who would benefit from the census. From the wide range of different types of user, countries were asked to identify the four most important. But the UNECE offered no guidance or criteria to determine how such users should be selected, preferring to leave that to the opinion of the countries themselves.

Only one country did not report on the key users (Israel), and among the 49 that did the patterns were fairly consistent. Figure 7.3 shows that most countries, regardless of census methodology, ranked users in central government departments and local government authorities as the most important, and 36 countries included their own NSI (perhaps as feeds to other statistics) among their top four. Academics and education service providers, the general public and international organisations such as UNECE and the European Commission form the next most important group of users.

But there is no implication here that other uses are not important – their lower scores being the result of the fact that countries were asked to select only four user groups. Indeed, the fact that as many as six countries (12 per cent) identified the press and four countries (8 per cent) included business and commercial users shows what a wide complex range of users benefit from the census. The fact that only less than five per cent of countries identified health service providers and other users collectively in their topic four and that no countries included community groups, religious organisations and charities should not be taken to mean that the census does not also benefit such communities.

Figure 7.3
Main users that benefit from the census by region

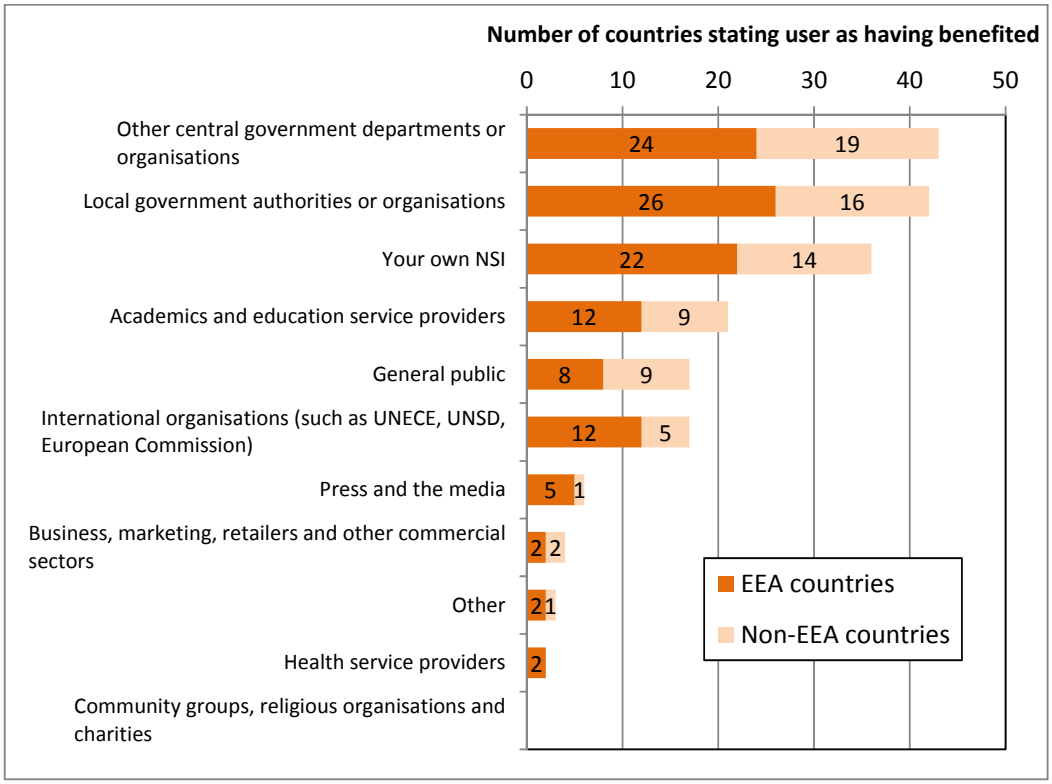
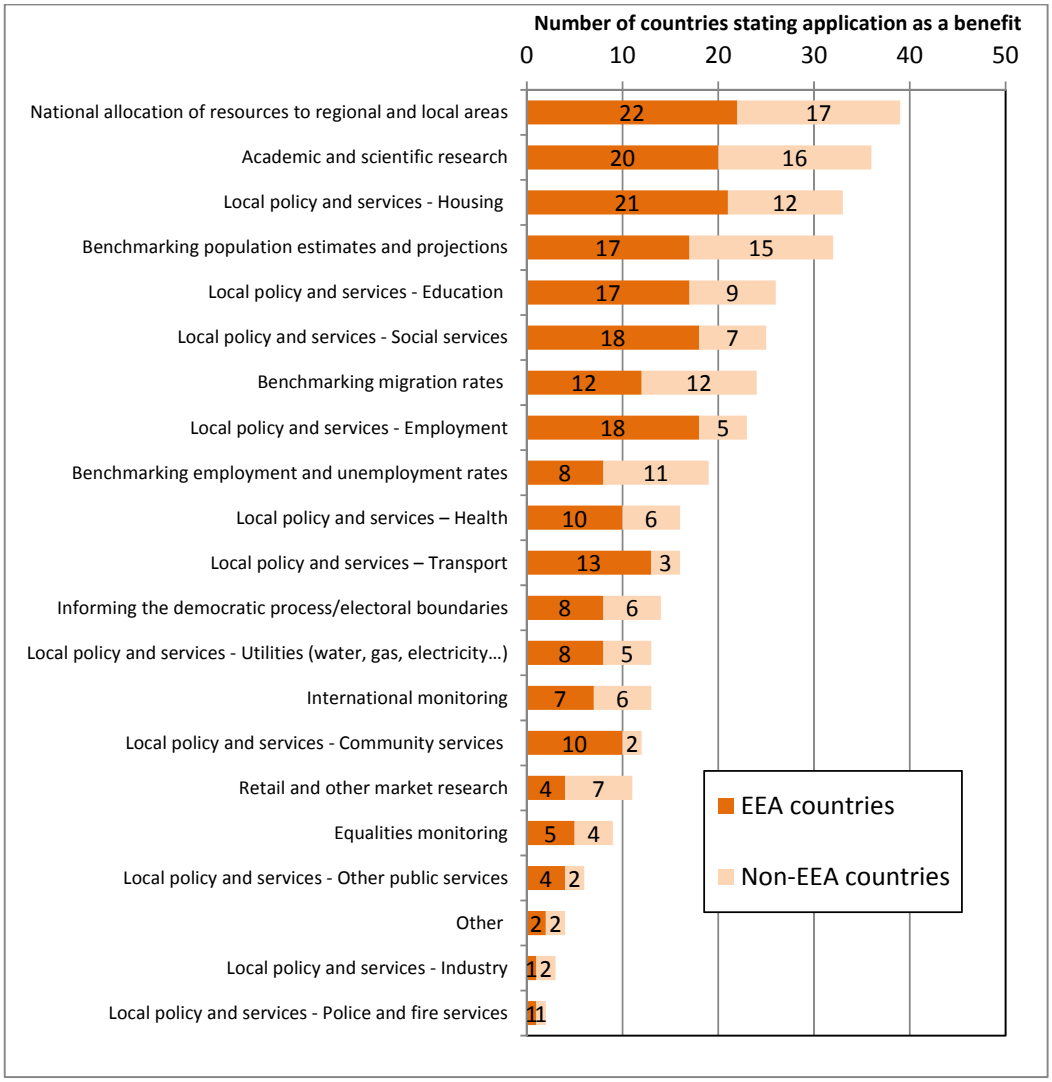


Figure 7.4 goes on to show what are the main benefits of the census to these users.

National resource allocation dominates with four fifths of responding countries identifying it as a key benefit, but a whole range of other benefits arising from the use of census data are apparent. The importance of such data in academic research is highlighted (three quarters) as is its role in developing, delivering and monitoring local policy and in providing a benchmark for other statistics such as population estimates and projections, and fertility and mortality rates (two thirds).

In providing information on specific benefits, countries were not restricted by the survey to identifying just four categories; thus the extent of a range of other uses is illustrated in the chart.

Figure 7.4
Main benefits by region



Assuring data quality and measuring coverage

Introduction

The product of any census of population and housing is data, and therefore confidence in the quality of that data is critical. Thus a quality assurance programme must be an element in the overall census programme and should touch on all activities during planning, the development period, operations like data collection and processing through to evaluation and dissemination of results. The 2010 CES Recommendations noted at paragraph 71 that

"*Because of the size and complexity of census operations, it is likely that errors of one kind or another may arise at any stage of the census. These errors, whether in planning, development or in operations, can easily lead to serious coverage or content errors, cost overruns or major delays in completing the census. If not anticipated and controlled during design and implementation they can introduce non-sampling error to the point of rendering results*

useless. To minimize and control errors at various stages of a census, it is good practice to devote a part of the overall census budget to quality assurance and control programmes."

During the discussions on the census at the Conference of European Statisticians plenary session in Paris in June 2012, concerns were raised about the impact that different approaches to census taking could be having on the comparability of population statistics across countries in the UNECE region. In particular the CES discussion focused on the potential differences that might occur between countries that undertake a field-based enumeration and those with a population register-based approach.

The CES called for the establishment of a Task Force on Coverage and Quality to consider how the 2010 recommendations should be developed for the 2020 census round to help address these concerns. Accordingly, and because of its importance to the success of the census, the measurement of quality and coverage was the focus of part of the UNECE survey. This section reports particularly on the elements of measuring the accuracy of the data collected in the census by each country[14].

Defining data quality

It is generally accepted that, with particular relevance to the census, there are six dimensions of data quality. These are set out at paragraph 76 of the CES Recommendations, namely:

a) The *relevance* of statistical information reflects the degree to which it meets the needs of users. The challenge for a census programme is to balance conflicting user requirements so as to go as far as possible in satisfying the most important needs within resource constraints. This dimension of quality is particularly important in census content development and in dissemination.

b) The *accuracy* of statistical information is the degree to which the data correctly describes the phenomena it was designed to measure. It is usually characterized in terms of error in statistical estimates and is traditionally broken down into bias and variance. In a census context, variance only applies in situations where a longer, more detailed, questionnaire is used for a sample of persons or households, or where only a sample of records is processed. Accuracy can also be described in terms of major sources of error (for example coverage, sampling, non-response, response, data capture, coding).

c) *Timeliness* refers to the delay between the time reference point (usually census day) to which the information pertains and the date on which the information becomes available. Often for a census there are several release dates to be considered in a dissemination schedule. Typically there is a trade-off against *accuracy*. T*imeliness* can also affect *relevance*.

d) The *accessibility* of statistical information refers to the ease with which it can be obtained. This includes the ease with which the existence of information can be ascertained, as well as the suitability of the form or medium through which the information can be accessed. Even though censuses are conducted primarily to meet the needs of central government, the data obtained are of great value to many secondary users including local administrations, private organizations and the public at large.

[14] This section is mainly based on a paper prepared by the Task Force on Coverage and Quality, led by Peter Benton (of the UK's Office for National Statistics), and which was discussed at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013.

e) The *interpretability* of statistical information reflects the availability of supplementary information and metadata necessary to interpret and use it [this dimension is associated with the similar dimension of *comparability* with previous censuses and other data sources]. This information usually covers the underlying concepts, definitions, variables and classifications used, the methodology of data collection and processing, and indications of the accuracy of the information.

f) *Coherence* reflects the degree to which the census information can be successfully brought together with other statistical information within a broad analytic framework and over time. The use of standard concepts, definitions and classifications – possibly agreed at the international level – promotes coherence. The degree of quality on *coherence* can be assessed via a programme of certification and validation of the census information as compared to corresponding information from surveys and administrative sources.

The UNECE survey asked each country to report on those dimension for which management processes were established and whether or not the findings were (or are to be) published. Some 47 countries responded. All those in the EEA did so, but three non-EEA countries (Kyrgyzstan, Tajikistan, and Turkey) did not. The Republic of Moldova (where the census had not yet taken place) reported that the concept of quality assurance was still in development at the time of the survey, so was too early for it to answer to the question.

Table 7.6 shows the number of countries that managed each dimension showing whether or not they have published any findings. More countries managed accuracy (all except Denmark) than any other dimension, whereas relevance was the quality dimension that was managed by the least number of countries (85 per cent).

On the whole, where countries managed a particular dimension it was fairly evenly split as to whether they published relevant information or not. For example, for the accuracy dimension 23 countries published information compared to 22 who did not. The largest difference was for the comparability dimension, where of those that managed comparability twice as many published information about it as did not.

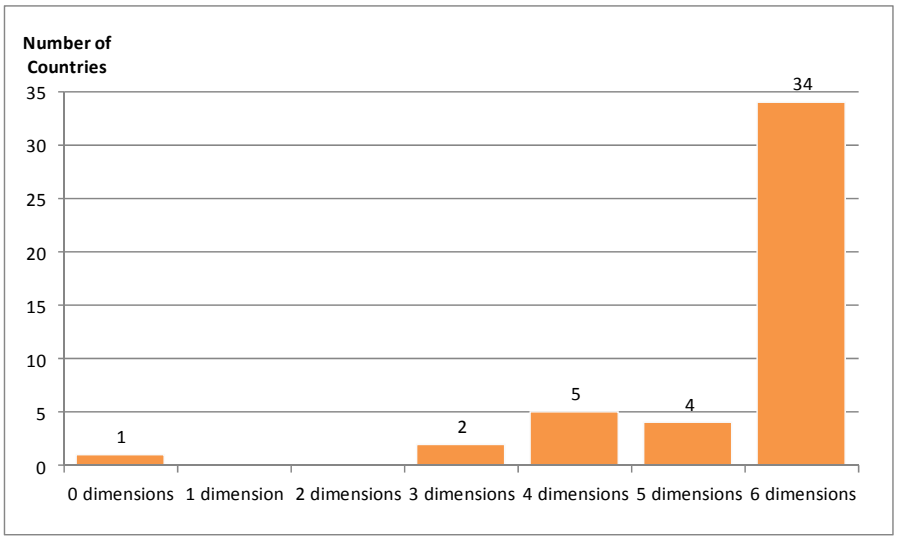
Table 7.6
Count of countries managing quality dimensions

Quality dimensions	*Managed and published (or plan to publish)*	*Managed only (not published)*	*Managed total (either published or not)*	*Not managed and not published*
Accuracy	23 (50%)	22 (48%)	45 (98%)	1 (2%)
Timeliness	21 (46%)	23 (50%)	44 (96%)	2 (4%)
Comparability	28 (62%)	14 (31%)	42 (93%)	3 (7%)
Coherence	24 (54%)	17 (39%)	41 (93%)	3 (7%)
Accessibility	19 (43%)	21 (48%)	40 (91%)	4 (9%)
Relevance	17 (38%)	21 (47%)	38 (85%)	7 (15%)

Percentages are of the dimension total

Figure 7.5 below shows that of those that responded to the survey question, one country did not manage any quality dimensions whilst the remaining countries managed at least three dimensions. Some 34 countries (72 per cent) managed all six dimensions (whether or not they had published or would be publishing their finding) and, encouragingly, this was the modal number of dimensions managed. There were six comments made in response to the survey, the main theme being that EU countries stated that they would be including their findings in the quality report to Eurostat, as required under the EU Census Regulations.

Figure 7.5
Number of quality dimensions managed



Measuring accuracy

The key issue discussed at the 2012 CES plenary session referred to above was that of the *accuracy* of population statistics. Accordingly this became the focus of the quality section of the UNECE survey. In particular, countries were asked to report on those statistical methods used to measure accuracy of the census statistics and whether they were used to measure under-coverage, over-coverage, and/or variance.

Forty nine countries (96 per cent of the total asked) provided some sort of responses to this enquiry. Again, all those in the EEA did so, but Kyrgyzstan, Tajikistan, and Turkey did not. Table 7.7 breaks the overall response rate down into the various methods used to measure accuracy, and shows of those countries responding whether or not these methods were used in the measurement of under-coverage over-coverage, and/or variance.

Demographic analysis was the method used by the greatest number of countries (76 per cent) for the measurement of under-coverage, over-coverage and/or variance. 'Other forms' of coverage survey were used by the least number of countries (24 per cent). In all but one case, where a particular method was used, the largest number of countries used the method for the measurement of under-coverage, with variance being the least reported use.

Table 7.7
Methods used by countries to measure accuracy (number of countries and percentage)

Method	Total countries using method	Of which:			Method not used
		Used for under-coverage	Used for over-coverage	Used for variance	
Independent post-enumeration coverage survey	19 (41%)	19 (41%)	18 (39%)	10 (22%)	27 (59%)
Other form of coverage survey	10 (24%)	8 (19%)	6 (14%)	2 (5%)	32 (76%)
Comparison with aggregate administrative datasets	22 (51%)	17 (40%)	17 (40%)	9 (21%)	21 (49%)
Comparison with unit record administrative datasets	24 (56%)	18 (42%)	17 (40%)	7 (16%)	19 (44%)
Comparison with existing surveys (LFS etc.)	31 (72%)	16 (37%)	13 (30%)	19 (44%)	12 (28%)
Analysis of questionnaire return rates	12 (30%)	11 (28%)	9 (23%)	5 (13%)	28 (70%)
Demographic analysis	35 (76%)	26 (57%)	24 (52%)	19 (41%)	11 (24%)
Other approaches	6 (26%)	5 (21%)	4 (17%)	2 (8%)	17 (71%)

These responses can be further analysed by type of census methodology; the results are shown in Table 7.8. These show clear differences in approach among countries adopting different census methodologies.

Among those countries adopting a traditional census a larger proportion of countries used an independent post-enumeration coverage survey and/or demographic analysis than any other method. This applied to each of the measurements of under-coverage, coverage and variance. In the case of measuring variance, these countries also used comparisons with existing surveys among other methods (with the second highest response of 46 per cent).

Among the countries with a register-based census, more used comparisons with aggregate administrative datasets and comparisons with existing surveys than any other method for each of the measurements.

For countries with a combined approach, comparison with unit level administrative datasets, analysis of questionnaire return rates and demographic analysis were the more popular methods in the case of measuring under-coverage and over-coverage. However, when measuring variance the more popular methods used were comparisons with unit record administrative datasets, comparisons with existing surveys and analysis of questionnaire return rates.

The only common factor amongst countries adopting different census types was that comparisons with existing surveys was the highest or second highest reported method for measuring variance.

Table 7.8
Count of countries by method used to measure under-coverage, over-coverage and variance, by type of census

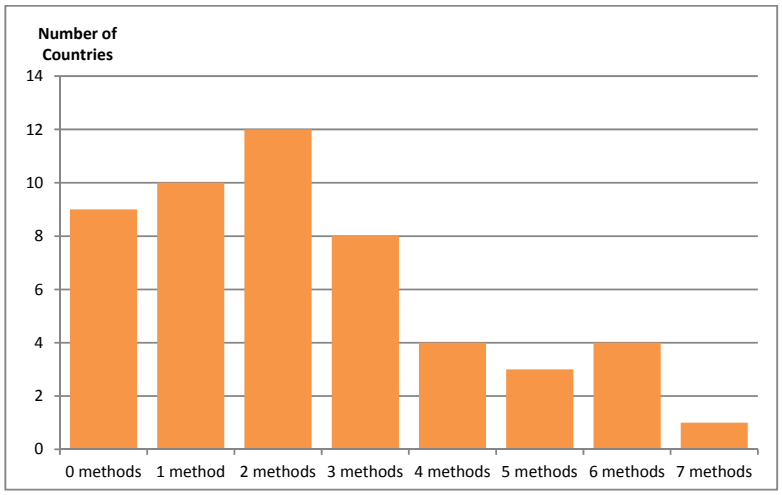
Under-coverage	Traditional (31 countries)	Register-based (9 countries)	Combined (10 countries)
Independent post-enumeration coverage survey	**16 (56%)**	0 (0%)	3 (30%)
Other form of coverage survey	6 (25%)	0 (0%)	2 (22%)
Comparison with aggregate administrative datasets	10 (40%)	**3 (33%)**	4 (44%)
Comparison with unit record administrative datasets	9 (36%)	2 (22%)	**7 (78%)**
Comparison with existing surveys (LFS etc.)	7 (29%)	**4 (44%)**	5 (50%)
Analysis of questionnaire return rates	5 (23%)	0 (0%)	**6 (67%)**
Demographic analysis	**18 (64%)**	2 (22%)	**6 (67%)**
Over-coverage			
Independent post-enumeration coverage survey	**15 (56%)**	0 (0%)	3 (30%)
Other form of coverage survey	4 (17%)	1 (11%)	1 (11%)
Comparison with aggregate administrative datasets	9 (36%)	**4 (44%)**	4 (44%)
Comparison with unit record administrative datasets	7 (28%)	3 (33%)	**7 (78%)**
Comparison with existing surveys (LFS etc.)	5 (21%)	**4 (44%)**	4 (40%)
Analysis of questionnaire return rates	4 (18%)	0 (0%)	**5 (56%)**
Demographic analysis	**16 (57%)**	2 (22%)	**6 (67%)**
Variance			
Independent post-enumeration coverage survey	**9 (33%)**	0 (0%)	1 (10%)
Other form of coverage survey	2 (8%)	0 (0%)	0 (0%)
Comparison with aggregate administrative datasets	6 (24%)	**2 (22%)**	1 (11%)
Comparison with unit record administrative datasets	4 (16%)	1 (11%)	**2 (22%)**
Comparison with existing surveys (LFS etc.)	**11 (46%)**	**4 (44%)**	**4 (40%)**
Analysis of questionnaire return rates	3 (14%)	0 (0%)	**2 (22%)**
Demographic analysis	**16 (57%)**	**2 (22%)**	1 (11%)

Percentage of respondents by data collection method

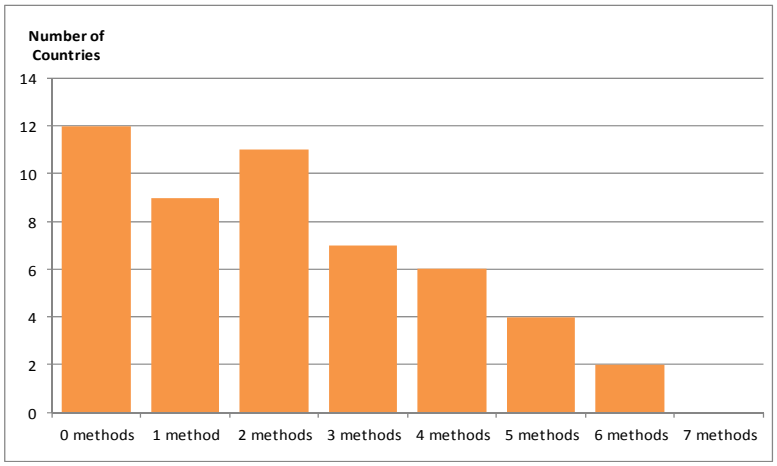
The responses to the survey also enable an analysis of how many methods countries used for measuring under-coverage, over-coverage and variance, and these are shown in Figure 7.6. Most countries used two or fewer methods in each case. The mean number of methods for each measurement was 2.4 for under-coverage, 2.1 for over-coverage, and 1.4 for variance, while the respective modal numbers were 2, 0 and 0 respectively.

Figure 7.6
Number of methods used to measure accuracy

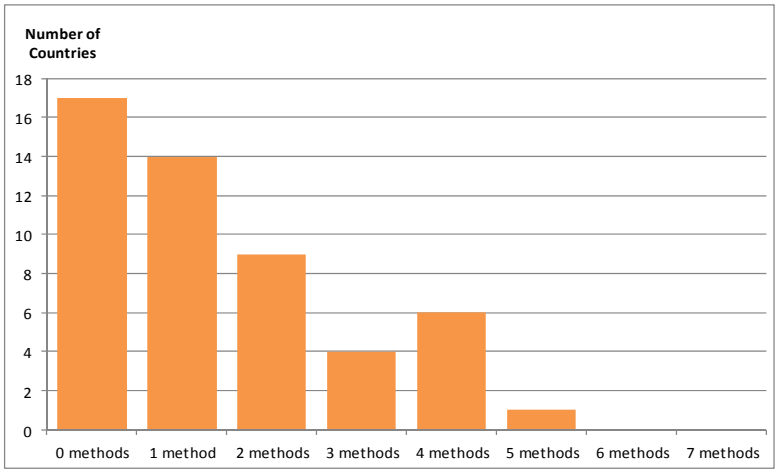
(a) Under-coverage



(b) Over-coverage



(c) Variance



The survey went on to ask if countries set and published targets for the accuracy of their census statistics. Thirty three countries (a three quarters of all those that measured accuracy) reported that they did not set targets. Of those that did, slightly fewer (5) published their target than did not (7) (see Table 7.9 below).

Target setting varied more considerably overall between the different census methodologies. Countries that adopted a combined census approach had the largest proportion of countries setting targets (44 per cent), although only one country (Germany) chose to publish these targets. For those countries conducting a traditional census there was the greatest difference in the number of countries setting targets (8) and not setting them (20). No countries adopting register-based censuses set such targets at all.

Table 7.9
Count of countries that set and published targets for accuracy

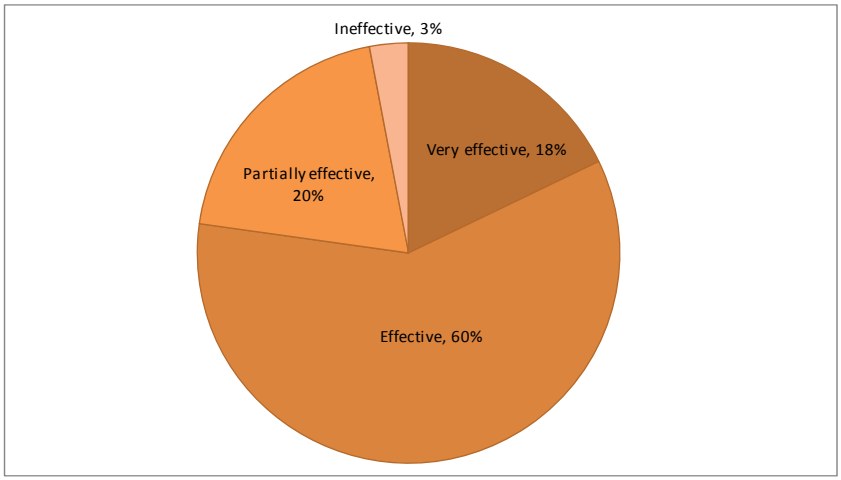
	Total countries	Type of census			Region	
		Traditional	Register based	Combined	EEA	Non-EEA
No	33 (73%)	20 (71%)	8 (100%)	5 (56%)	22 (76%)	13 (69%)
Yes – set targets but did not publish	7 (16%)	4 (14%)	0 (0%)	3 (33%)	4 (14%)	3 (19%)
Yes – set and published targets	5 (11%)	4 (14%)	0 (0%)	1 (11%)	3 (10%)	2 (13%)
Total	45 (100%)	28 (100%)	8 (100%)	9 (100%)	29 (100%)	16 (100%)

Percentage is of the total in the respective column

Effectiveness of the methods used to measure accuracy

In response to a somewhat subjective enquiry, over three quarters of countries (31) reported that the methods they used to measure accuracy were either 'effective' (24) or 'very effective' (7). Only one country (Latvia) admitted that it considered its methods to be ineffective (Figure 7.7). But in response to this part of the survey a number of countries (including Germany, Iceland, Moldova and Poland) noted that it was too early to assess the effectiveness of the methods used to measure accuracy and/or that such an assessment would be made at the end of the processing of census results. The United Kingdom elaborated on its answer by responding that: "*Users have commented that this was the most successful census of recent decades*".

Figure 7.7
Overall effectiveness of methods used to measure accuracy



Making adjustments to the census figures

The UNECE survey included a number of questions to enquire into the extent to which countries made adjustments to the recorded census counts to take account of errors and inconsistencies in the responses and for under- and over-coverage.

The majority of countries (40, equivalent to 89 per cent of all those that responded) applied editing procedures to enable them to adjust for errors and inconsistencies. Only five countries did not, including Luxembourg with traditional census, and Denmark and the Netherlands among the register-based countries – although it should be noted that the latter reported that in case where different register showed inconsistent values it chose "…. *the best one available according to the metadata and the quality framework*".

A number of different methods used to adjust the data for missing information were identified. As can be seen from Table 7.10 imputation was the method that was used by a clear majority countries that made adjustments for missing data (82 per cent overall) in both the EEA (79 per cent) and non-EEA (88 per cent) region, and regardless of census methodology.

Many of the countries that reported that they had adopted methods other than those specifically identified in the survey question, added a note of clarification to their responses. Thus, for example, among those countries with a combined census approach, Poland reported that: "*Calibration procedures have been employed to improve quality of data collected both from the sample census and from the registers and other administrative sources*", while Estonia and Liechtenstein noted that data from registers was used where they were available.

Table 7.10
Count of countries that adjusted for missing values, by method

Adjustment method	Total countries	Region	
		EEA	Non-EEA
Imputation (filling in values for missing scores)	37 (82%)	23 (79%)	14 (88%)
Weighting (adding a variable to weight the possible selective sample to the population)	7 (16%)	4 (14%)	3 (19%)
Other methods	7 (16%)	6 (21%)	1 (6%)
No adjustments for any missing values	4 (9%)	3 (10%)	1 (6%)

Percentage is of the total number of countries in the region

Adjustment method	Total countries	Type of census		
		Traditional	Register based	Combined
Imputation (filling in values for missing scores)	37 (82%)	23 (85%)	7 (88%)	7 (70%)
Weighting (adding a variable to weight the possible selective sample to the population)	7 (16%)	2 (7%)	1 (13%)	4 (40%)
Other methods	7 (16%)	1 (4%)	1 (13%)	5 (50%)
No adjustments for any missing values	4 (9%)	4 (15%)	0 (0%)	0 (0%)

Percentage is of the total of countries in the data collection method category

Finally, for those countries that managed accuracy, it was fairly even split between those that subsequently made adjustments to their census statistics before publication to take account of under- and/or over-coverage and those that did not. Some 22 countries reported that they did make such adjustments (21 of whom reported that they had published, or would publish, only the adjusted figures, while Slovakia reported that it would publish both adjusted and unadjusted figures), but slightly more (25 countries) reported that they did not make such adjustments. This more or less even split applied to both to countries with a traditional and combined census approach, but for register-based census, only half as many countries reported that they adjusted their figures (3) as did those that left their figures unadjusted (6).

8. CHALLENGES AND SUCCESSES

Introduction

In the last census round – as in previous censuses – many changes were introduced by many countries to reflect, among other things, the need to reduce costs and improve efficiency and quality, and to take advantage of developing technologies and methodologies. Such changes may, or may not, bring with them success but all present challenges. This chapter notes some of the key difficulties faced by countries in the 2010 round as reported in the UNECE survey, but also shows the other side of the coin by commenting on some of the successes[15].

Challenges

The survey asked countries to assess and rank some 28 different challenges or obstacles in conducting their 2010 census. For each challenge, respondents were asked to indicate one of four levels of difficulty from 'most challenging' to 'not a challenge', or to indicate if a challenge was not applicable for whatever reason (for example, where a particular activity or process was not relevant to the census methodology adopted by the country - such as improving/maintaining participation rates or response rates in the case of a wholly register-based census). No criteria were provided to define the scale, so responses were, to some extent, subjective. Only Georgia did not respond – although some countries also did not respond to particular individual challenges. Table 8.1 shows the results.

Quality-related issues were the ones that seem to have presented the most widespread difficulties across the region. Some 44 countries reported at least some level of difficulty in implementing quality control and/or assurance checks, and 43 countries similarly reported challenges with maintaining or improving levels of quality, particularly during data processing and tabulation. It can be noted from Table 8.1, however, that only in eight or fewer cases were such issues ranked as the most challenging, with the majority of countries rating them only as a 'medium' challenge. However, although the survey provided an opportunity for countries to add comments to their responses, no information was provided which expanded on any particular reasons for such quality-related difficulties.

One might expect to see timeliness, financial resources, and keeping to budget as the most frequently reported challenges. Indeed timeliness, reported as a difficulty overall by 39 countries, was reported by 11 of these as being the most difficult; similarly financial resources, reported overall by 38 countries, was reported by 10 countries as being the most difficult, although almost as many countries did not report these issues as being a challenge at all.

[15] The material in this chapter has been taken largely from a paper on field operations, legislation and lessons learned from the 2010 census round prepared by the UNECE Steering Group on Censuses and presented at the Meeting on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html). The text presented in this chapter was drafted by Arona Pistiner (US Census Bureau).

Table 8.1
Challenges faced in the 2010 round of censuses (number of countries reporting challenges)

Challenge	Countries reporting as challenge	Of which, by level of challenge:			Not a challenge	Not applicable
		Most difficult challenge	Medium challenge	Least difficult challenge		
Implementing quality control/assurance checks	**44**	*6*	*16*	*22*	4	1
Improving/maintaining data quality	**43**	*7*	*25*	*11*	4	1
Improving data processing/tabulation	**43**	*6*	*16*	*21*	6	0
Timeliness	**39**	*11*	*22*	*6*	8	0
Financial resources	**38**	*10*	*18*	*10*	9	1
Public privacy concerns	**38**	*6*	*13*	*19*	10	1
Process reengineering/Infrastructure	**37**	*9*	*15*	*13*	7	3
Data dissemination	**36**	*4*	*15*	*17*	12	0
Insufficient staff resources/expertise	**35**	*9*	*15*	*11*	11	2
Improving/maintaining response rates	**35**	*8*	*16*	*11*	5	9
Improving data collection	**35**	*5*	*17*	*13*	9	5
Keeping to budget	**35**	*3*	*20*	*12*	11	2
Improving/maintaining participation rates	**34**	*9*	*15*	*10*	6	9
Public confidentiality concerns	**34**	*4*	*14*	*16*	13	1
Contract management	**33**	*3*	*15*	*15*	8	7
Project management	**33**	*2*	*22*	*9*	13	1
Balancing user needs against respondent burden	**33**	*2*	*14*	*17*	7	9
Identifying residential addresses	**32**	*8*	*12*	*12*	9	7
Public perception	**31**	*9*	*13*	*9*	14	4
Stakeholder acceptance	**31**	*0*	*19*	*12*	14	3
Mapping	**30**	*7*	*14*	*9*	6	13
Recruitment of sufficient number of field staff	**30**	*4*	*11*	*15*	10	9
Managing regional and local infrastructures	**29**	*2*	*15*	*12*	5	15
Improving/maintaining coverage rates	**28**	*4*	*14*	*10*	10	8
Stakeholder privacy and confidentiality concerns	**25**	*2*	*8*	*15*	18	2
Geography (terrain)	**22**	*1*	*10*	*11*	12	14
Legal authority/Governmental support	**23**	*0*	*11*	*12*	22	4
Overcoming cultural barriers	**18**	*0*	*9*	*9*	15	13

Of those other issues that represented overall challenges to more than half the countries, eight or more countries reported the most challenging difficulties with:

- public perception,
- improving/maintaining participation rates,
- improving/maintaining response rates,
- insufficient staff resources/expertise,
- process re-engineering/infrastructure, and
- identifying residential addresses,

although, in several of these cases as many, or more, countries did not consider them to be a challenge at all. Indeed, several countries reported that many of the issues highlighted in the survey had not presented a challenge in the 2010 round.

As noted above, countries that conducted a solely register-based census reported that many of the issues were not applicable to their circumstances. This could have been expected for some of issues such as the 'recruitment of field staff', 'improving participation rates', and 'contract management', but less for other, more basic, issues such as 'mapping', which seven out of the nine register-based countries did not regard as being applicable to their census, or 'improving data collection' which was similarly reported by five of the register-based countries (though this might have been interpreted by those countries as referring solely to data collection in the field).

It should be noted that some countries carrying out a traditional or combined census reported as being not applicable some issues (such as mapping, managing local infrastructures, overcoming cultural barriers, and the geographical terrain) that would seem, on face value, to be relevant issues to any country undertaking some form of field data collection operation.

Criteria for a successful census

In undertaking a census each country will set their own success criteria based on past census experience, new challenges, and the improvements they wish, or are required, to make. It is possible to define a successful census as being one that meets a pre-defined number of the success criteria. The survey enquired into those several criteria that countries had identified as being relevant for measuring success. All countries responded. The results are shown in Table 8.2 ranked by the number of countries reporting each criterion.

More countries overall (32) identified gaining 'user and stakeholder support' as being key to achieving success than any other single criterion. This was followed by 'public support' (31 countries) and 'improved outputs' (30). Other criteria cited by more than half the countries included 'cost savings', 'improved response/participation rates', 'improved coverage rates', 'gaining staff expertise', and 'use of software' (though the survey itself was not clear in determining what specific aspect of software was being considered here).

The ranked order of success criteria differs, however, between the three main census methodologies. The pattern of overall responses is, of course, dominated by the higher proportion of traditional census countries in the UNECE region compared with the other two methodological types, so it is not surprising therefore that among the traditional censuses the same pattern of success criteria was reported: 'user and stakeholder support' (reported by 24 countries), 'public support' (23 countries), 'improved coverage rates (21 countries), and 'government support' and 'increased public trust' (20 countries) being the most commonly reported.

However for those countries with a register-based census 'cost savings' (together with 'government support') was the most commonly reported, with only Denmark, Finland and Sweden not citing this as a success criterion. This could have been expected, since many of these countries moved to a register-based methodology also in an attempt to reduce census costs. 'Improved outputs' and 'staff expertise' were both reported by five countries.

For countries with a combined census the most commonly cited success criteria were 'improved response/participation rates' (reported by eight countries), 'user and stakeholder support', 'public support', 'cost savings' (six), and 'improved coverage rates' (five).

The survey also provided the opportunity for countries to report other criteria not specifically identified in the questionnaire. One of Germany's targets, for example, was to minimise the burden on the public, while France's new annual rolling census approach was aimed, among other things, to improve timeliness of the results. Sweden prime focus was to conduct a register based census for the first time, while Denmark - who reported on none of the criteria listed in Table 8.2 - did report that success would be measured by the level of compliance with the Eurostat programme of tabulations prescribed by EU legislation.

Table 8.2
Criteria for defining a successful census (number of countries)

Success criteria	Total countries	Type of census		
		Traditional (out of 32)	Register-based (out of 9)	Combined (out of 10)
User and stakeholder support	**32**	24	2	6
Public support	**31**	23	2	6
Improved outputs (i.e., formats, accessibility)	**30**	20	5	5
Cost savings	**27**	15	6	6
Improved response/participation rates	**27**	19	0	8
Improved coverage rates	**27**	21	1	5
Staff expertise	**27**	18	5	4
Software	**27**	17	6	4
Increased public trust	**25**	20	1	4
Governmental support	**24**	20	1	3
Time savings	**24**	17	4	3
User acceptability	**22**	16	3	3
Infrastructure	**20**	12	4	4
Hardware	**18**	13	3	2
Good management of financial resources	**15**	13	1	1
Use/Increased use of Project Management Methods/Tools	**14**	10	1	3
Use/Increased use of Process Improvement Methods/Tools	**13**	8	3	2
Justified business case	**4**	2	0	2

But just how successful were the censuses of the 2010 round in the UNECE region? With the key success criteria in mind, countries were also asked to report (again on a purely subjective basis) on those aspects of their census operation that they considered to be successful. This time 48 countries responded. The results are shown in Table 8.3

Some 33 countries across the region (more than two thirds) reported that they had kept within budget, although it was noticeable that less than half of the register-based countries (four out of the nine) did so. But some care should be taken in interpreting these and the other figures in Table 8.3. For example, although among the register-based countries Belgium, Denmark, Finland, Slovenia and Sweden did not report keeping within budget as a success, this does not necessarily mean that they did not keep within their budget. Instead it could just mean that keeping to budget was not regarded, within the context of the survey, as a measure of success, or that it was too early for an assessment of success to be made (as was the case in Denmark and Iceland).

Table 8.3
Successes in the 2010 round of censuses (number of countries)

Successes	Total countries	Type of census		
		Traditional (out of 32)	Register-based (out of 9)	Combined (out of 10)
Kept within budget	**33**	22	4	7
Improved/maintained data quality	**33**	22	4	7
Met deadlines	**32**	22	3	7
Improved census methodologies	**31**	17	5	9
Improved information technologies	**30**	20	2	8
Improved data dissemination	**26**	18	4	4
Improved/maintained response/participation rates	**23**	16	0	7
Improved logistics and coordination	**22**	17	0	5
Overcoming public resistance	**13**	9	0	4
Implementation of project management methods/tools	**11**	7	1	3

As many countries (but not all the same countries) reported that improving or maintaining data quality was regarded as successful. Other factors such as meeting deadlines, use of information technology, and improving the census methodology were also regarded as successful operations by a good majority of countries, and particularly so in the latter case for five of the register-based countries.

Some of the various ad hoc successes reported by countries through their additional comments to the survey included:

- outsourcing information system maintenance (Estonia);
- reducing the public burden (Turkey);
- conduct a totally register-based census for the first time (Norway and Sweden);
- changing the law to ensure improvements in coverage and quality (Russian Federation); and
- internet collection showed that the medium was viable for other data collection applications (United Kingdom).

Finally, although it is not evident from the overall figures shown above, an analysis of the survey responses from individual countries provides a picture of the extent to which each country adopted both the success criteria set out in Table 8.2 and achieved success in the activities set out in Table 8.3. Thus, for example Greece reported adopting all of the 18 criteria in Table 8.2 as being key to measuring success, and also reported success in each of the areas noted in Table 8.3, while at the other end of the scale, Denmark and Sweden reported on none in both cases.

On average, however, responding countries overall adopted 8.2 of the 18 success criteria. For countries with traditional census this average was 9.3, but this fell to just 5.3 for countries with register-based census (for whom, however, many of the criteria were not applicable). For countries with a combined census the average was 7.1.

When looking at the actual successes achieved, for all those countries that had carried out their censuses, the average figures was 5.1 out of the 10 measures identified, and the corresponding average for the three types of census were 5.5 (traditional), 2.6 (register-based) and 6.1 (combined).

PART 2 CENSUS TOPICS

9. INTRODUCTION

Part 2 of this publication reviews the practices in the UNECE region in relation to the census topics included by countries in the 2010 census round, as determined by the responses to the UNECE survey. Not only is the extent to which each topic was included in the census assessed, but the survey also enquired into how well countries conformed to the concepts and definitions recommended by the CES for the 2010 round, and whether or not the suggested classification for each topic (where appropriate) were adopted.

The review is therefore entirely based on answers provided by 51 countries to the online questionnaire. In some cases, however, where responses to the survey were ambiguous or clearly erroneous, reference was made the countries' census questionnaires, where these were available, or through follow-up enquires.

Topics for which data was to be collected

The CES Recommendations included a list of the characteristics to be collected in censuses, related to persons, groups of persons (households or family nuclei), living quarters or buildings containing dwellings. These characteristics were divided into core topics and non-core topics. 'Core' topics were those for which the information is of fundamental interest and value to countries. These were recommended to be included in the 2010 round of population and housing censuses (unless the relevant data were available from other sources). The topics designated as being 'non-core' were those for which information, though important and often valuable in combination with other core topics, were not considered as being essential for the purposes, and which countries were given more latitude as to whether information on them should be collected.

The list of core and non-core topics included some topics, which were referred to as 'derived' topics. These were those for which information could be obtained indirectly or inferred from the responses to other census topics or combinations of other topics, and therefore were not required to be collected separately. Examples of such topics that could be deduced in this way include: *household status* and *family status* (derived from the information collected on sex, age, marital status and relationship); *socio-economic group* (derived from the information on occupation and employment status); and *urban/rural status* (derived from the total population living in a locality, which is itself a derived topic).

The list of topics (core, non-core and derived topics) from the 2010 CES Recommendations is presented in Table 9.1.

Table 9.1
Topics for the 2010 Population and Housing Censuses, from the CES Recommendations

CORE TOPICS	NON-CORE TOPICS
Population to be enumerated	
Place of usual residence	
Total population (derived)	
Geographic characteristics	
Locality (derived)	*Urban and rural areas (derived)*
Location of place of work	Location of school, college or university
	Mode of transport to work
	Mode of transport to school, college or university
	Distance travelled to work and time taken
	Distance travelled to school, college or university and time taken
Demographic characteristics	
Sex	De facto marital status
Age	Total number of children born alive
Legal marital status	Date(s) of legal marriage(s) of ever married women: (i) first marriage and (ii) current marriage
	Date(s) of the beginning of the consensual union(s) of women having ever been in consensual union: (i) first consensual union and (ii) current consensual union
Economic characteristics	
Current activity status	Usual activity status
Occupation	Providers of unpaid services, volunteers
Industry (branch of economic activity)	Type of sector (institutional unit)
Status in employment	Informal employment
	Type of place of work
	Time usually worked
	Time related underemployment
	Duration of unemployment
	Number of persons working in the local unit of the establishment
	Main source of livelihood
	Income
	Socio economic groups (derived)
Educational characteristics	
Educational attainment	Educational qualifications
	Field of study
	School attendance
	Literacy
	Computer literacy
International and internal migration	
Country/place of birth	Country of previous usual residence abroad
Country of citizenship	Total duration of residence in the country
Ever resided abroad and year of arrival in the country	Place of usual residence five years prior to the census
Previous place of usual residence and date of arrival in the current place	Reason for migration
	Country of birth of parents
	Citizenship acquisition
	Persons with foreign/national background (derived)
	Population groups relevant to international migration (derived)
	Population with refugee background (derived)
	Internally Displaced Persons (IDPs) (derived)

(continues on next page)

CORE TOPICS	NON-CORE TOPICS
Ethno-cultural characteristics	
	Ethnicity
	Language
	Religion
Disability	
	Disability status
Household and family characteristics	
Relationships between household members	*Same-sex partnerships (derived)*
Household status (derived)	*Extended family status (derived)*
Family status (derived)	*Type of reconstituted family (derived)*
Type of family nucleus (derived)	*Type of extended family (derived)*
Size of family nucleus (derived)	*Generational composition of private households (derived)*
Type of private household (derived)	Single or shared occupancy
Size of private household (derived)	Rent
Tenure status of households	Durable consumer goods possessed by the household
	Number of cars available for the use of the household
	Availability of car parking
	Telephone and internet connection
Agriculture	
	Own-account agricultural production (household level)
	Characteristics of all agricultural jobs during the last year (individual level)
Living quarters, dwellings and housing arrangements	
Housing arrangements	Availability and characteristics of secondary, seasonal and vacant dwellings
Type of living quarters	Occupancy by number of private households
Location of living quarters	Type of rooms
Occupancy status of conventional dwellings	Hot water
Type of ownership	Type of sewage disposal system
Number of occupants	Kitchen
Useful floor space and/or number of rooms of housing units	Cooking facilities
Density standard (derived)	Main type of energy used for heating
Water supply system	Electricity
Toilet facilities	Piped gas
Bathing facilities	Air-conditioning
Type of heating	Position of dwelling in the building
Dwellings by type of building	Accessibility to dwelling
Dwellings by period of construction	Lift
	Dwellings by number of floors in the building
	Dwellings by materials of which specific parts of the building are constructed
	Dwellings by state of repair of the building

Organization and contents of the following chapters

The following chapters note in detail the extent to which countries in the UNECE region complied with the CES Recommendations. Each chapter is devoted to a particular topic or a set of closely related characteristics, and follows closely the order in which these topics are set out in the CESR. In summary, it can be reported here that in the clear majority of cases countries complied with the recommendations not only on the inclusion of topics but in the adoption of the concepts, definitions and classifications. The percentage of countries that included each of the core topics in their census (as reported in the UNECE survey) is shown in Table 9.2 ranked by level of compliance. In some cases the compliance with the CES Recommendations was partial, and these are discussed in more detail in the following chapters. There were generally, however, as might be expected, lower levels of compliance with the non-core topics. (The derived core topics are shown in italics.)

Table 9.2
Level of compliance with CES Recommendations: inclusion of topics* by core status

Core topics	Percentage compliant**	Core topics	Percentage compliant**
Place of usual residence***	100	Previous place of usual residence	86
Sex	100	*Type of household*	86
Age	100	*Family status*	86
Year of arrival from abroad	100	*Type of family nucleus*	86
Location of living quarters	100	Occupancy status	86
Employment status	98	Bathing facilities	86
Educational attainment	98	Type of building	86
Country/place of birth	98	*Household status*	84
Country of citizenship	98	Useful floor space	84
Relationship between household members	98	Locality	82
Current activity status	96	Toilet facilities	82
Occupation	96	*Density standard (floor space)*	80
Industry	96	Water supply system	78
Type of household	96	Ever resided abroad	75
Type of ownership	96	Date of arrival from previous usual residence	67
Tenure status (of household)	94	Density standard (rooms)	57
Period of construction	94		
Legal (de jure) marital status	92		
Workplace	92		
Housing arrangements	92		
Type of living quarters	92		
Type of heating	92		
Number of rooms	92	(non-core topics are presented on next page)	

* Only those topics covered by the UNECE survey are included
** Of those that responded to the survey
*** Coverage of this topic not included by the survey but assumed to be 100 per cent

Table 9.2 (continues from previous page)
Level of compliance with CES Recommendations: inclusion of topics* by core status

Non-core topics	Percentage compliant**	Non-core topics	Percentage compliant**
Urban/rural status	92	Socio-economic group	27
Unoccupied dwellings	86	Car availability	27
De facto marital status	84	Type of place of work	27
Language	71	*Time taken to travel to place of education*	*25*
School attendance	69	Date of current marriage	24
Children born alive	69	Lift	24
Disability status	67	5-year migration	22
Ethnicity	63	Air-conditioning	22
Country of previous usual residence	62	Total duration of residence in the country	20
Main type of energy for heating	58	Own account agricultural production (household)	20
Religion	55	Duration of unemployment	18
Kitchen	52	Computer literacy	18
Literacy	49	Car parking	18
Multi-occupancy	48	Country of birth of parent(s)	16
Hot water	48	Type of rooms	16
Mode of transport to work	45	Size of workforce at workplace	15
Location of place of education	44	Distance travelled to work	15
Number of floors in building	44	Date(s) of first marriage	14
Type of sewage disposal system	44	Citizenship acquisition	14
Single or shared occupancy	43	State of repair	14
Internet connection	43	Distance travelled to place of education	13
Main source of livelihood	42	Date of current consensual union	12
Field of study	40	Usual activity status	12
Availability of electricity	38	Type of sector (institutional unit)	12
Availability of piped gas	38	Income	12
Reason for migration	37	Cooking facilities	12
Construction materials	36	Durable consumer goods	12
Education qualifications	33	Accessibility to dwelling	8
Mode of transport to place of education	33	Agricultural work	8
Position of dwelling in building	30	Unpaid/voluntary work	6
Rent	29	Informal employment status	4
Telephone connection	29	Date(s) of first consensual union	2
Time usually worked	29	Time-related unemployment	2
Time taken to travel to work	29		

* Only those topics covered by the UNECE survey are included
** Of those that responded to the survey

10. DEFINING THE POPULATION BASE

This chapter reviews the definitions of the "usually resident population" and "total population" adopted by countries in the 2010 round, the practices regarding special population groups and some coverage (under and over-count) problems associated with enumeration[16]. There is some overlap with the issues discussed in Chapter 11 on the geographic characteristics of the population – in particular with respect to the place of usual residence - and in Chapter 16 on the characteristics of migrants.

The definition of the population is not only central to the census operation, but it is at the very heart of the institutional and socio-economic setting of a country. Defining the rules according to which a person is part or not of the population of a country has indeed far reaching consequences, first-hand examples being the allocation of parliamentary seats or the attribution of funds depending on the population size. The definition of the population is therefore a fundamental component of the statistical information of a country — if not its core — and the population census is the primary framework in which such choice is made.

This chapter recalls the main population issues dealt in the CES Recommendations for the 2010 census round (CESR), defines the population concepts that countries followed in the 2010 round, and reports on the extent to which these complied with the recommendations.

International definitions of place of usual residence

The population concept recommended by the CESR, and which was later incorporated in the European Union regulation on population and housing censuses, is based on the place of usual residence. The definition of place of usual residence is thus one of the most important and critical issues in a census since this definition, and the way it is applied during the census, directly influences the census results in terms of the total usually-resident population, at both the national level and at lower territorial levels. Broadly, the CESR defined the place of usual residence as the place where a person spends or intends to spend most of his/her daily night-rest over a continuous period of 12 months. However, the complexity of this definition has increased in the recent years, because of the increasing number of persons who have multiple residences and the increased mobility of the population. More and more people move between different places for different reasons and with various frequencies (daily, weekly or yearly, as is the case for seasonal workers), and migration - including both legal and undocumented migration - is a phenomenon of increasing importance in most countries. For persons that may have more than one place of residence, the decision about what should be considered their place of usual residence is often not easy.

The concept recommended by the CES is in fact one of the two options proposed at the global level by United Nations Statistics Division (UNSD) in its Principles and Recommendations for Population and Housing Censuses[17], which states that:

"1.461. In general, "usual residence" is defined for census purposes as the place at which the person lives at the time of the census, and has been there for some time or intends to stay there for some time.

1.462. Generally, most individuals enumerated have not moved for some time and thus defining their place of usual residence is clear. For others, the application of the definition can lead to many interpretations, particularly if the person has moved often.

[16] The material in this chapter has been taken largely from a paper prepared by Giampaolo Lanzieri (Eurostat) and discussed at the Meeting on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

[17] Principles and Recommendations for Population and Housing Censuses - Revision 2, Department of Economic and Social Affairs, Statistics Division, Statistical papers Series M No. 67/Rev.2, United Nations, New York, 2008 (http://unstats.un.org/unsd/publication/seriesM/seriesm_67Rev2e.pdf)

1.463. It is recommended that countries apply a threshold of 12 months when considering place of usual residence according to one of the following two criteria:

The place at which the person has lived continuously for most of the last 12 months (that is, for at least six months and one day), not including temporary absences for holidays or work assignments, or intends to live for at least six months;

The place at which the person has lived continuously for at least the last 12 months, not including temporary absences for holidays or work assignments, or intends to live for at least 12 months."

It is of interest to see how the concept has evolved over time. Its roots are in the UN recommendations for migration statistics published in 1998[18] where, recalling a concept already used in previous international recommendations on population censuses by UNSD, it stated that:

"32.…A person's country of usual residence is that in which the person lives, that is to say, the country in which the person has a place to live where he or she normally spends the daily period of rest. Temporary travel abroad for purposes of recreation, holiday, business, medical treatment or religious pilgrimage does not entail a change in the country of usual residence."

and then the relevant time specification is given:

"*36.With regard to the time element, when the definition of international migrant presented in paragraph 32 is compared with the definition of international visitor presented in paragraph 34, it is clear that if a distinction is to be made between the two, the change of country of usual residence necessary to become an international migrant must involve a period of stay in the country of destination of at least a year (12 months)…"*

Here, the concept of usual residence adds a period specification (12 months) to the identification of place of usual residence (where the person spends the daily period of rest). It is also interesting to note that, according to the same recommendations: *"33.…the place of usual residence may be the same as, or different from, the place where the person was found at the time of the census or his/her legal residence; that is to say, the place of usual residence need not be the place of legal residence of the person concerned…"*

Therefore, for migration statistics there is a clear conceptual difference between place of usual residence and legal or registered residence.

In the CESR the definition of total usually resident population becomes as follows: *"171. A total usually resident population count for each territorial division would normally be compiled by adding persons who are usually resident and present and persons who are usually resident but temporarily absent…"*

which in turn is based on two previous paragraphs, where the concept of place of usual residence is defined: *"158. Place of usual residence is the geographic place where the enumerated person usually resides. This may be:*

The place where he/she actually is at the time of the Census; or

His/her legal residence; or

His/her residence for voting or other administrative purposes."

together with the relevant time specification that: *"159. Only those persons:*

who have lived in their place of usual residence for a continuous period of at least twelve months before Census Day; or

[18] Recommendations on Statistics of International Migration - Revision 1, Department of Economic and Social Affairs, Statistics Division, Statistical Papers Series M, No. 58, Rev. 1, United Nations, New York, 1998 (http://unstats.un.org/unsd/publication/SeriesM/SeriesM_58rev1e.pdf)

who have arrived in their place of usual residence during the twelve months before Census Day with the intention of staying there for at least one year should be considered as usual residents of the relevant geographic or administrative subdivision… Persons who have been temporarily absent for a short period from their place of usual residence over the previous twelve months for reasons such as work or holiday travel should be included."

Therefore, the CESR defined how the period of time should be assessed (continuous period) and the nuance in the difference between place of usual residence and legal/registered residence is set out.

Finally, the concept of usual residence is also taken on board by the EU regulation on population and housing censuses implemented in 30 countries (the European Economic Area, composed by the 27 Member States of the European Union plus Iceland, Liechtenstein and Norway). In that regulation the usual residence is defined as follows: *"Art.2(d): 'usual residence' shall mean the place where a person normally spends the daily period of rest, regardless of temporary absences for purposes of recreation, holidays, visits to friends and relatives, business, medical treatment or religious pilgrimage.*

The following persons alone shall be considered to be usual residents of the geographical area in question:

(i) those who have lived in their place of usual residence for a continuous period of at least 12 months before the reference date; or

(ii) those who arrived in their place of usual residence during the 12 months before the reference date with the intention of staying there for at least one year.

Where the circumstances described in point (i) or (ii) cannot be established, 'usual residence' shall mean the place of legal or registered residence;"

where in fact an identity is set between "place of usual residence" and "place of legal or registered residence", the latter not being further defined.

Defining population concepts

The definition of population is as complex as it is fundamental. While it may be safely assumed that there is a large awareness about the importance of the usual residence concept, it is also true that its implementation is not always straightforward, and that full clarification was provided in the CESR.

First of all, a distinction should be made between the concept of enumerated population on the one hand (where the "enumeration" is understood to be the act of counting/listing/naming each unit in turn, or as the process of collecting information about units, as implicit in the definition of census, as set out in paragraph 19 of the CESR), and, on the other, the population used for statistical purposes in aggregated outputs. In this chapter, the latter meaning is used and is referred to as "population count" or "population base", while the former may be referred to as the "enumeration base".

In the context of a population census, a country is free to enumerate (in the sense of collecting statistical data on) any person in its territory, as well as to define population counts which meet national needs. For the latter task, the country may filter the total list of enumerated units according to defined principle(s) in order to select the persons to be counted in the aggregation process. For international comparison purposes, however, the population definition must be harmonised across countries.

In order to identify the population counts adopted in the country, the UNECE survey questionnaire defined a set of criteria. In fact, various principles might be followed in deciding whether or not to include a person in the population count, all relating to the specific census reference moment (usually midnight of the census reference date). There are:

a) the presence in the territory of the country at the census reference date;

b) having lived in the territory of the country for a given period;

c) the intention of living in the territory of the country for a given period;

d) the legal rights of a person to settle in the country (by citizenship, residence or visa permit, or any other legal system); and/or

e) the fact of being listed in a register (such as a population register).

The criteria listed above are independent from each other. For example, a person: may be present in a country, but not living there during the census reference moment; or can be present/resident without having any legal right to stay in the country; or can be included in a population register even if not present at the time of the census and has not lived in the country for longer than the defined period of time.

The concept of 'usual residence' is identified by three conditions:

a) the person has lived, or intends to live, in the country;

b) the duration of stay is at least one year;

c) the stay is without interruptions (continuous period of time),

where the concept of a "continuous period of time" takes account of the usual exceptions of short-term absences for such purposes as holidays, foreign business trips, etc.

Another popular concept of population (often referred to as the 'present population', or the 'de facto population') corresponds simply to the application of the first principle in the list above (presence in the territory of the country at the census reference date). Often confused with the usually resident population, according to the Latin etymology, the de jure population should instead be based on the fourth principle (legal right of stay). This population would be composed of all persons that, at the census reference time, either hold the national citizenship, or are granted a residence permit or a visa (a more restrictive interpretation would limit the population to the national citizens). It should be noted that such concept would not necessarily require the presence or even the residence of the person in the country, unless it is combined with the relevant principles set above.

Table 10.1 cross-classifies some of the population concepts which may be identified using the set of principles listed above. These principles do not necessarily define the geographical place to which a member of the population is allocated, but they do define who is included in, and who is excluded from, the population of a country. For instance:

- the usually resident definition allocates the person to the place of usual residence (within the country) or, in other words, a person is member of the usually resident population if and only if (s)he has a place of usual residence within the country (but note, that there are exceptions to this rule as well as problematic cases, as can be seen below);
- the de jure definition does not formally require any physical place of usual residence (that is to say the population is composed of all national citizens regardless of where they actually live), although specifications may be given such as the official address in the country or abroad; or
- the rules for geographical allocation could be multiple, such as when a person is included in the population of a country (again regardless of the actual presence in the country at any moment) because (s)he is listed in, for example, a tax register, the registered address may refer to the place of his/her economic activity, or because (s)he is listed in the population register, where the address is the one the person declared at the time of the registration.

Table 10.1
Examples of definition of population concepts

Population concept	Principle 1: Presence at census date	Principle 2: Having lived in the country	Principle 3: Intention of stay	Principle 4: Legal right of stay	Principle 5: Listing in registers	Period	Modality
Usually resident		X	X			1 year	continuously
De facto / Present	X					none	none
De jure / (National)				X		none	none
Former usually resident		X				1 year	continuously
Registered					X	none	none
Legally resident		X		X		1 year	continuously
Legally present	X			X		none	none
Legally registered				X	X	none	none
Usually resident and present	X	X	X			1 year	continuously

Therefore, being included in the population count according to these principles does not always univocally define a person's geographical allocation. There are indeed two conceptually different issues to understand: the first step is to clarify who is member of the population; the second — and subordinate to the membership — is to determine the geographical distribution. The usually resident population is one of the cases where there is a one-to-one relation between membership and geographical allocation.

Compliance with the CES recommendations: the results of the survey

The 'usual residence' is the concept of reference for the population count in the latest census round: some 38 out of 50 countries (76 per cent) reported using the usually resident population concept, with a further two countries using a definition expanded to cover the legal or registered population as prescribed in the EU census regulations. Thus, only one out of five countries has not defined their population counts based to some degree on the "usual residence" concept.

However, multiple population counts are used in several countries. Some 19 countries used two population counts, and five countries (Greece, Hungary, Ireland, Russia and Switzerland) even three. The 'usually resident' population is regarded as the most relevant count by 35 countries, with the second most commonly adopted count being the 'registered' population (by seven countries). Other qualifying labels of population reported by countries were:

- present;
- legally resident;
- permanently resident;
- non-permanently resident;
- apportionment;
- usually resident and present;
- usually resident, legal or registered;
- domiciled;
- household members;
- temporarily resident; and
- national serving abroad.

Some of these labels, however, are clearly referring to a specific sub-group of the population, and are intended as a concept to be used to represent the whole population of the country.

Of the 50 countries that reported that they produced a national population count based on the concept of usual residence, 33 (66 per cent) were fully compliant with the CES Recommendations, and a further 14 (28 per cent) were compliant with the concept of usual residence expanded to cover legal or registered residence, while the remaining countries (Canada, Italy and the United States) were still compliant but with some peculiarity. This outcome seems in contradiction with the initial statement above about the quota of countries adopting the usually resident population. A possible reason is that behind the national label, the population concept adopted in practice may vary. A comparison based on the labels used at national level is thus quite difficult.

Using the information in the responses to the survey, it is possible to identify objectively the population counts which are based on the concept of usual residence, as well as on other concepts. As reported in the Table 10.2, by strictly applying all the three criteria for the usually resident population identified above, only 10 countries meet the requirements: Armenia, Azerbaijan, Georgia, Greece, Ireland, Montenegro, Portugal, Romania, and the United Kingdom using a traditional census approach, and Estonia using a combined methodology.

Table 10.2
Number and list of countries adopting selected population counts (defined according to the criteria in Table 10.1)

Population count	Number (%) of countries	Countries
Usually resident	10 (20%)	ARM, AZE, EST, GBR, GEO, GRC, IRL, MNE, PRT, ROU
De facto / Present	7 (14%)	ARM, GRC, IRL, ITA, MKD, PRT, TJK
De jure / (National)	0 (0%)	none
Former usually resident	4 (8%)	BLR, MDA, SVK, TJK
Registered	2 (4%)	DNK, GRC
Legally resident	2 (4%)	KGZ, RUS
Legally present	1 (2%)	KGZ
Legally registered	5 (10%)	HUN, LIE, SVK, SVN, SWE
Usually resident and present	5 (10%)	BIH, CYP, IRL, MLT, SRB
Others	28 (56%)	ALB, AUT, BEL, BLR, CAN, CHE, CZE, DEU, ESP, FIN, FRA, HRV, HUN, ISL, ISR, ITA, KAZ, LTU, LUX, LVA, MKD, NLD, NOR, POL, RUS, SVN, TUR, USA

The majority of countries have population concepts which need clarification or proper labelling. The results in the Table 10.2 would certainly be modified if more "flexible" concepts of usual residence were to be dropped/extended, such as the duration or the continuity in time of the residence in the country, or the length of intention of stay. For instance, as shown in Table 10. 3, most of the countries — but not all — use a qualification period of at least one year in combination with "continuous time" for the population count considered the most relevant for the country.

Table 10.3
Number of countries by duration and modality of residence for the most important population count (population count 1)

	Duration					
Modality of residence:	Less than 3 months	At least 3 months	At least 6 months	At least 1 year	Not required	**Total**
Continuous	1	2	1	24		**28**
Most of the time			5	3		**8**
Not defined			1	3		**4**
Not required					10	**10**
Total	**1**	**2**	**7**	**30**	**10**	**50**

Such differences between the number of countries reporting population counts based on the usual residence concept and that derived from the application of objective criteria are indicative of the intricacy of the concept that, although intuitive, faces a number of challenges when implemented. For instance, when it comes to the definition of the period of time, the countries using a traditional approach are in principle better placed to properly implement the concept of usual residence, while the countries with registers-based censuses are instead more at risk of adopting some other time criterion – or more than one - defined for administrative purposes. Table 10.4 however shows that even countries with traditional methodology do not always comply with the 12-month criterion.

Table 10.4
Number of countries by duration of residence and type of census for the most important population count (population count 1)

	Duration					
Type of census:	Less than 3 months	At least 3 months	At least 6 months	At least 1 year	Not required	Total
Traditional			3	22	6	**31**
Registers based		2	2	2	3	**9**
Combined	1		2	6	1	**10**
Total	**1**	**2**	**7**	**30**	**10**	**50**

Geographical allocation of usually resident persons within a country

So far, the analysis has focused on the national level. Israel, the Russian Federation and the United Kingdom reported to have applied other criteria for the definition of 'usual residence' for the geographical distribution of the total population within the country. In particular, Israel adopted the address of 'primary residence' at census day, while in the United Kingdom persons were regarded as being resident in institutions/collective living quarters if they had been living there or were intending to live there for more than six months (that is, for the greater part of that year.) In fact, the complexity of the concept of usual residence can raise doubts about the geographical allocation of specific groups of persons, and therefore particular care is required for a proper identification of their place of usual residence. Table 10.5 shows the number of countries where specific criteria were adopted for certain population groups. The most problematic category seems to be 'students', particularly those in tertiary education and studying within the country, for which three out of four countries have issued special provisions.

In comparison to the previous census round, in general the percentage of countries which have issued instructions has decreased, in particular for persons in institutions (25 percentage points fewer) and persons with multiple residences (18 percentage points fewer). In contrast, the case of children who alternate between two households has received much more attention (39 percentage points more in the 2010 round). The issue of specific rules does not, however, guarantee the classification of those population groups in compliance with CES Recommendations. Nor does the lack of specific instructions necessarily imply difficulties. However, uniformity of rules of classification across countries would help the comparability of census results.

Table 10.5
Number of countries adopting specific criteria for the place of usual residence of selected population groups

Category (sorted by decreasing number of cases)	Count	% of 50 countries	% in census 2000
Students in tertiary education (International Standard Classification of Education (ISCED) levels 5–6) who are away from home while at college or university within the country	34	68	70*
Persons who work away from their homes during the week and return at weekends	28	56	57
Students in primary and secondary education (ISCED levels 1–4) who are away from home during the school term	27	54	70*
Children who alternate between two households	24	48	9
Persons who have been an inmate of a hospital or hospices, old persons in nursing homes, prisoners, juvenile detention centres, etc.	23	46	71
Persons who regularly lives in more than one residence during the year	23	46	64
Homeless or roofless persons, nomads	22	44	57
Students in tertiary education (ISCED levels 5–6) studying abroad but returning home at weekends	21	42	-
Persons in military service	19	38	52
Persons working for international organisations (not including diplomats or military forces)	12	24	-
Refugees and asylum seekers	11	22	-
Others: New-borns in the hospitals (BLR) Bargemen, i.e. persons living in a boat all the year for professional reasons (FRA) Persons without dwelling but with fictitious legal permanent residence only — so called administrative residence (SVN)	4	8	-

* There was no distinction in the 2000 round between students in primary/secondary and in tertiary education.

Inclusion/exclusion of selected population groups

Another important issue in determining the usually resident population is the inclusion/exclusion of specific sub-population categories. Table 10.6 identifies various population groups for which there is often some uncertainty as to whether or not they should be included in the usually resident population: students in tertiary education studying abroad, foreign military, naval and diplomatic personnel, and short-term international immigrants should, for example, be excluded. All the other 11 categories should be included, provided that the qualifying conditions of duration of residence are met.

It should be noted that no one category has been included by all countries (or conversely, has been excluded by all countries). This may be seen as a problem of coverage rather than of breach of the usual residence concept, although the inclusion of certain categories of persons may actually depend on the adoption of that concept. For example, illegal migrants would not, by definition, be part of the legally resident population, and therefore their exclusion would not be a problem if the population concept of reference was based on the legal right of stay. However, if the adopted criterion is, instead, 'usual residence' then they should indeed be part of the usually resident population if they meet the conditions of duration of residence.

Table 10.6
Number of countries including selected population groups in the usually resident population

Category (sorted by decreasing number of cases)	Count	% of 50 countries	% in 2000 round
Homeless or roofless persons	47	94	86
Civilian residents who cross a frontier daily to work in another country, but retuning home every day or at weekends	43	86	-
Students in tertiary education who study in another country, but retuning home every day or at weekends*	40	80	-
Holders of temporary residence permit (and their families) staying in the country for more than 12 months	40	80	-
National military, naval and diplomatic personnel and their families, located outside the country	37	74	72
Persons living in remote areas	34	68	-
Merchant seamen and fishermen resident in the country but at sea at the time of the census (including those who have no place of residence other than their quarters aboard ship)	33	66	83
Persons who have applied for or been granted refugee status or similar types of international protection	32	64	67
Foreign persons working for international organisations (not including diplomats or military forces) located in the country	30	60	-
Asylum seekers	29	58	52
Nomads or other travelling people	24	48	55
Illegal, irregular or undocumented migrants	19	38	41
Short-term international migrants (staying in the country less than 12 months)*	8	16	35
Foreign military, naval and diplomatic personnel and their families temporarily located in the country*	7	14	23

* Groups to be excluded from the usually resident population according to the CESR.

The category closest to universal inclusion is that of homeless persons. Despite the difficulties in collecting information about them, homeless persons (meaning, here, the 'roofless' - often referred to in some countries as 'persons sleeping rough' – as opposed to the 'rootless', colloquially referred to as 'sofa-surfers', or people who have no home address of their own but regularly sleep overnight with family or friends) were included in all but three countries. Those three countries have carried out a field enumeration within the combined methodological approach to their census, whilst all the countries with a register-based census included the homeless. However, it should be noted (as was reported by the United Kingdom) that:

"Measuring the count of homeless (that is 'roofless') persons proved difficult, and in practical terms no real attempt was made to do so. Estimates were made on the basis of those persons using day centres on census day. However, persons with no permanent place of usual residence who were recorded at an address on census night (that is the 'rootless') were regarded as being usually resident at that address".

The next most commonly included categories are those persons who regularly cross a border for work or study reasons. Among the countries which do not include cross-border workers are the island states (Cyprus, Iceland and Malta), for whom this population group is obviously less relevant. As with the case of the students, according to CES Recommendations these persons should actually be excluded from the usually resident population (see CESR paragraph 162, item c); however, this is in contradiction with the classification of workers who are otherwise part of the usually resident

population, while having similar migratory characteristics. The bulk of countries seem instead to apply consistently the same rule, regardless of the reason for the crossing of the borders: some 37 countries include both workers and students, while three exclude them. Of the remaining 11 countries, seven are fully compliant with the CES Recommendations because they include the cross-border workers and exclude the cross-border students, while for the other four the opposite applies.

Two other categories whose inclusion should be quite unambiguous are holders of residence permits staying for at least one year, and national military and diplomatic personnel located outside the country; however, respectively, 20 per cent and 26 per cent of the countries did not include them in the usually resident population. Another unexpected outcome is the exclusion of persons living in remote areas. While such people are generally of limited concern for census takers in most of the European countries, even some countries with register-based censuses have not included this category, which would appear to be very unlikely unless those persons do not comply with the national requirements about registration. At least for those countries with small territories, it is likely that the response to that specific item should be interpreted as "not applicable" rather than negative.

Some uncertainty about the interpretation of the CES Recommendations also seems to apply to asylum seekers and refugees. While CESR paragraph 175 clarifies that they should be considered as being no different to any other person (thus subject to the same criterion of duration of time continuously spent in the country), in 42 per cent of the countries they are nevertheless excluded from the usually resident population (as had been previously recommended for the 1990 round of censuses). Confusion about CES Recommendations implementation may also be the reason of the exclusion in 20 countries (40 per cent) of foreign persons working for international organisations who, unlike foreign diplomats and military forces, should actually be included in the total population count.

As for nomads and other travelling people, the low share of countries including them in the usually resident population may simply reflect the operational difficulties typical of this difficult-to-reach population group. The methodology chosen for the census does not seem to be relevant, given that almost the same percentage of countries (about half) did not include them, regardless if their census was registers-based or traditional. The situation is even worst for another difficult-to-reach group, the illegal migrants, who, according to CESR paragraph 174 should be included, but who are excluded in a large majority (62 per cent) of countries, including all the countries with a register-based census.

For the category of seamen, the overall percentage of inclusion is higher (two thirds of all countries), but still revealing operational difficulties to identify this population group. However, the coverage of this last category has diminished over time. Indeed, in comparison to the 2000 round of censuses, as shown in the last column of Table 10.6, seamen show the second largest difference (in terms of percentage points) of all groups (17 percentage points fewer). On the other hand, the situation has remarkably improved for the short-term immigrants, who are now excluded (as they should be) in a much larger proportion of countries (19 percentage points fewer in the 2010 round). For the asylum seekers, for whom the recommendations have changed, and for nomads the coverage has also improved (an increase of 7–8 percentage points) across countries. In contrast, the situation for illegal migrants (for whom there were no clear recommendations for the 2000 round) remains problematic, as is also the case, but to smaller extent, for national armed forces and refugees.

In summary, no country fully follows the CES Recommendations regarding the inclusion/exclusion from the usually resident population of the listed categories. Six countries (Bosnia and Herzegovina, Georgia, Greece, Ireland, Portugal and Romania) include all 11 categories which should be part of the usually resident population, but they also include one or two that should be excluded; at the other extreme, Austria, the Czech Republic and Malta include only 3 out of those 11 categories. However, Austria specified that for them it was not possible to report on whether some population groups are included or not because it depends on whether a person is registered or not. But for most of the listed groups it can be assumed that the persons normally are registered in the population register, except foreign military and diplomatic personnel and their families, and illegal or undocumented migrants.

Population bases other than usually resident population

Additional population bases have been used in some countries (but not in the majority of cases). As shown in Table 10.7, the most popular addition is the one based on the place of work. The countries with more additional bases are Ireland and the United Kingdom, both with five additions, and the Czech Republic and Hungary, with three additional population bases each.

Table 10.7
Number and list of countries with additional population bases

Additional population basis	Number (%) of countries	Countries
Persons with a workplace in an area	15 (29%)	AUT, AZE, CAN, CZE, ESP, FIN, GBR, HRV, HUN, IRL, ITA, NLD, NOR, SVN, USA
Students in an area	11 (23%)	AUT, AZE, CZE, ESP, EST, GBR, IRL, ITA, MDA, NOR, SVN
Visitors (non-residents) enumerated in an area at the time of the census	6 (12%)	ALB, CZE, GBR, IRL, ITA, ROU
Daytime population — persons usually present in an area during the day in the period Monday – Friday (in the week before the census)	2 (4%)	GBR, HUN
Others: Population aged 15 or more, living in private households (CHE) Short-term migrants (persons not born in the United Kingdom intending to stay more than 3 months but less than 12 months (GBR) Population living in institutional households in an area (HUN) Persons in private households (IRL) Persons in non-private households (IRL) Persons occupying collective living quarters (POL) Homeless (POL)		
None	25 (49%)	ARM, BEL, BGR, BIH, BLR, CYP, DEU, DNK, FRA, GRC, ISL, KAZ, LIE, LTU, LUX, LVA, MLT, MNE, PRT, RUS, SRB, SVK, SWE, TJK, TUR

Furthermore, several other counting bases may be used for census tabulations. Table 10.8 shows that a majority of countries have used additional bases other than persons. The country with the largest number of additional basis is Ireland (6), followed by other 13 countries which have used four bases other than population: Albania, Austria, Bosnia and Herzegovina, Finland, Germany, Hungary, Kyrgyzstan, Liechtenstein, the Republic of Moldova, Portugal, Slovakia, Spain and the United States.

Table 10.8
Number and list of countries using bases other than persons

Additional population basis	Number (%) of countries	Countries
Households in an area	37 (82%)	ALB, ARM, AUT, AZE, BEL, BGR, BIH, BLR, CAN, CYP, CZE, DEU, ESP, FIN, GBR, GRC, HRV, HUN, IRL, ISL, KAZ, KGZ, LIE, MDA, MLT, MNE, NLD, NOR, PRT, ROU, RUS, SRB, SVK, SVN, TJK, TUR, USA
Families in an area	29 (64%)	ALB, ARM, AUT, BEL, BIH, BLR, CAN, CYP, DEU, ESP, FIN, GBR, HRV, HUN, IRL, ISL, KGZ, LIE, MDA, MNE, NLD, NOR, PRT, RUS, SRB, SVK, SVN, TUR, USA
Dwellings in an area	40 (89%)	ALB, ARM, AUT, AZE, BEL, BGR, BIH, BLR, CAN, CHE, CYP, CZE, DEU, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ITA, KGZ, LIE, MDA, MLT, MNE, NLD, NOR, PRT, ROU, RUS, SRB, SVK, SVN, SWE, TJK, USA
Buildings in an area	20 (44%)	ALB, AUT, BGR, BIH, CHE, CZE, DEU, ESP, EST, FIN, GRC, HUN, ITA, KGZ, LIE, MDA, PRT, ROU, SVK, TJK
Others: Federal Buildings and Dwellings Register (CHE) Group quarters population in an area (USA) Sewerage tanks by area (IRL) Broadband by area (IRL) Central heating by area (IRL)		
None	7 (14%)	DNK, GEO, ISR, LTU, LVA, MKD, POL

11. GEOGRAPHIC CHARACTERISTICS

Introduction

One of the distinguishing features of censuses of population and housing is the extent to which a comprehensive classification of geographic characteristics can be undertaken. Once the population basis has been determined (see Chapter 10), it is then possible to examine how this population is geographically distributed. The UNECE Survey thus included a number of questions to enquire into the extent to which the geographic characteristics of each country's population were covered in the respective census. This chapter presents an analysis of these results[19].

There are three geographically-related core topics in the CES Recommendations (CESR): 'place of usual residence', 'locality', and 'location of place of work'. This first of these has already been dealt with extensively in the previous chapter. Here, the results of the responses to the survey with respect to the other two will be examined.

The chapter also refers to a number of non-core topics that require an underlying geographic base. The non-core topic 'urban and rural areas' is derived from the classification of 'locality', while the remaining topics can, together with 'location of place of work', be collectively considered as 'commuting' topics.

The chapter concludes with a summary of the extent of countries' compliance with the CES recommendations, making some comparisons with the 2000 round of censuses.

In total 51 member countries responded to the UNECE survey. Not all countries, responded to all questions. Here, non-response is reported for each topic. In general, results are reported in accordance with the answers as given by countries. In a few cases the responses have been corrected where it was evident that there were errors, omissions or inconsistencies (for instance when a country reported that a topic was not included but where information on definitions and classifications used were nevertheless provided) and where it has been possible to verify the actual situation.

Comparability between countries

The main reason for establishing the CES Recommendations on population and housing censuses is to facilitate international comparison of census results. In this respect, geographic characteristics are among the more difficult topics. When it comes to geography, the UNECE countries are indeed very different in size and population distribution. Regional divisions and subdivisions, even if formally on the same level, may vary substantially in size between countries. This is even the case with the NUTS (Nomenclature of territorial units for statistics) classification that is adopted extensively throughout the European Economic Area (EEA). As a consequence, definitions and classifications for geographic characteristics should not be too specific. For some topics the CES Recommendations just state that the "smallest possible civil division" should be used. For the topic "locality", in particular, three different definitions of population clusters are given. Therefore, even when countries apply definitions and classifications in compliance with the CES Recommendations, the statistics produced may not, in fact, be directly comparable between countries.

[19] The material in this chapter has been taken largely from a paper prepared by Harald Utne (Statistics Norway) and discussed at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

Locality (derived core topic)

The definition of 'locality' in the CESR (paragraphs 181–182) is: *"For census purposes, a locality is defined as a distinct population cluster, that is, the area defined by population living in neighbouring or contiguous buildings. Such buildings may either:*

Form a continuous built up area with a clearly recognizable street formation; or

Though not part of such a built up area, comprise a group of buildings to which a locally recognized place name is uniquely attached; or

Though not coming within either of the above two requirements constitute a group of buildings, none of which is separated from its nearest neighbour by more than 200 metres."

Of the 49 countries that responded (Israel and Kyrgyzstan did not do so), only nine reported that they were not able to produce data on locality of usual residence as defined above (Table 11.1). None of these were countries with register-based censuses, suggesting perhaps that it is generally the case that data taken from registers are geographically well-defined. Of the nine, only Liechtenstein offered a reason for not doing so (disclosure control) and noted that the smallest geographical unit for which census data is made available is the commune (see below). Seven of the others are geographically located in Eastern and South Eastern Europe.

Table 11.1
Definition of 'locality' in the 2010 round (number of countries)

	Total		Type of census			Region	
	Per cent	Number	Traditional	Register-based	Combined	EEA	Non-EEA
Total	**100%**	**49**	**31**	**9**	**9**	**30**	**19**
No data about locality	18%	9	7	0	2	2	7
Data about locality produced	82%	40	24	9	7	28	12
Data about locality based on CES definition	61%	30	17	9	4	21	9
a) A continuous built-up are with a clearly recognizable street formation	14%	7	6	1	0	3	4
b) A group of buildings to which a locally recognized place name is uniquely attached	20%	10	6	1	3	6	4
c) A group of buildings, none of which is separated from its nearest neighbour by more than 200 metres	27%	13	5	7	1	12	1
Data about locality based on definition different from those listed in the CES Recommendations	16%	8	5	0	3	6	2
Definition not specified	4%	2	2	0	0	1	1

Although Malta also reported no such data produced, it noted in its response that information on enumeration areas (group of streets) could be produced but that such areas would not comply with any of the CES Recommendations criteria for defining localities as such. In this they would join seven other countries.

More countries (13) adopted criterion (c) above, including 7 of the 9 register-based countries, and the majority of these (12) were countries in the EEA. Some 10 other countries adopted criterion (b) and 7 adopted criterion (a). Iceland and Ireland both reported adopting each of the three criteria for different circumstances.

Of the 8 countries that applied a different definition from those listed in the CES Recommendations, 7 reported as reasons for doing so the need to reflect legislative impositions or the need for comparability with other data sources and previous censuses.

Of the 40 countries that reported producing data on locality of usual residence, all were able to classify the population by size of locality according to the CES Recommendations classification in which the highest category was a million or more residents and the lowest was less than 200 (paragraph 187). Even Israel, who had not responded to the enquiry about whether or not information on locality was provided, reported that localities with less than 2,000 inhabitants were classified as rural (see below) but were not then subdivided by size. This suggests that the country did, in fact, provide at least some data on localities according to CES Recommendations.

It is to be noted however, that the UNECE survey did not specifically enquire into the lowest administrative unit, or civil division, for which data on place of usual residence was collected in the 2010 round of censuses. The EU Census Regulations prescribes that this should be the LAU2 level, and it is presumed therefore that at least all EEA countries have complied with that minimum requirement regardless of their census methodology – though some countries such as the United Kingdom have provide data for a much smaller usual residence geography, subject to statistical disclosure constraints (see Chapter 5).

Urban and rural areas (derived non-core topic)

The CES Recommendations notes (at paragraph 189) that: "*For national purposes, as well as for international comparability, the most appropriate unit for distinguishing urban and rural areas is the locality [as defined above]. However, it is left to countries to decide whether to use the locality or the smallest civil division as the unit of classification.*"

Urban areas were defined by CESR as localities with a population of 2,000 or more inhabitants, and rural areas as localities with a population of less than 2,000 and other sparsely populated areas.

The great majority of countries (46 out of 50) reported that they produced data for areas classified as either 'urban' or 'rural', though some countries defined their 'urban areas' using other concepts such as administrative boundaries, built-up areas, areas for which certain services are provided, or functional areas. All four countries that did not report adopting an urban/rural classification of areas are in EEA (Germany, Liechtenstein, Luxembourg, and the Netherlands). Because of general nature of the country's terrain, Liechtenstein classifies all the units of its smallest geography as "rural" regardless of size.

Among countries that do produce data on urban and rural areas, 21 use the locality as the basis of the classification (Table 11.2(a)). This classification is more prevalent among countries conducting register-based censuses, with 7 out of 8 that did so, compared with just 12 out of 31 countries with traditional censuses. Another 15 countries (12 of which conduct traditional censuses), use the smallest administrative unit as the basis of their classification.

Although seven countries reported that they used other geographies as the basis of their classifications, the comments provided in the survey suggests that: Turkey in fact uses localities but defines "urban" on the basis of a population of more than 20,000; and that for four of the other countries the classification was based on administrative territorial divisions. The United Kingdom bases its classification on its census-specific output area (OA) geography, creating urban areas from contiguous 'urban' OAs.

In total, 15 out of 47 responding countries used a population threshold to distinguish urban and rural areas (Table 11.2(b)). Among these 12 were EEA countries. More than half of these (9) conducted either register-based or combined censuses.

Table 11.2(a)
Provision of data on urban and rural areas (number of countries)

`	Total		Type of census			Region	
	Per cent	Number	Traditional	Register-based	Combined	EEA	Non-EEA
Total	**100%**	**50**	**32**	**9**	**9**	**29**	**21**
No data on urban and rural areas	8%	4	1	1	2	4	0
Data on urban and rural areas	92%	46	31	8	7	25	21
Classification by locality	42%	21	12	7	2	17	4
Classification by smallest administrative unit	30%	15	12	1	2	5	10
Another classification unit	14%	7	4	0	3	3	4
Classification not specified	6%	3	3	0	0	0	3

Table 11.2(b)
Criteria used to distinguish urban and rural areas (number of countries)

`	Total*		Type of census			Region	
	Per cent	Number	Traditional	Register-based	Combined	EEA	Non-EEA
Total	**100%**	**47**	**31**	**8**	**8**	**26**	**21**
Population size	32%	15	6	6	3	12	3
Population density	4%	2	2	0	0	1	1
Legal act	51%	24	20	0	4	9	15
Other	13%	6	3	2	1	4	2

*Question answered by 46 countries producing data on rural and urban areas and one country with non-response in Table 11.2(a).

The CESR recommended (at paragraph 190) that 2,000 should be the threshold, and several countries such as Austria, Greece and Israel reported that this was indeed the case. But elsewhere thresholds ranged from as low as 200 in countries such as Iceland and Norway, to as high as 10,000 in the United Kingdom, and even 20,000 in Turkey.

Only two countries used a threshold determined by population density (Malta and the United States). However, the United States, in fact, uses a combination of population size and density thresholds to classify types of urban areas but determines rural areas on the basis of a population threshold of 2,500.

More than half of the countries (24 in total) used criteria based on legal acts. Almost all of these (22) conducted traditional censuses, and most of these are geographically situated in the Eastern part of the UNECE region.

Six countries reported that they used other criteria, but elements of a population threshold were adopted by three of them.

Reflecting the fact that the classification of areas into urban and rural categories is not a core topic in the CES Recommendations, it is not surprising perhaps that there is little possibility for any degree of comparability in their definition across the UNECE region.

Location of place of work (core topic)

The location of place of work is defined in the CESR (at paragraph 196) as: "*The precise location in which a 'currently employed' persons performs his/her job and where a 'usually employed' person currently performs or last performed the job. The location should be coded to the smallest possible civil division.*"

Most countries (47 out of 51) collected data on location of place of work. Two EEA countries (the Czech Republic and Iceland) and two non-EEA countries (Armenia and Georgia) did not do so (Table 11.3).

Half the countries that did (25) applied a definition based on actual place in which the employed person performed his/her job during census week. Among these countries, 14 used this definition only. But this definition was less often adopted in countries conducting register-based censuses (only 2 out of 9) than in countries with traditional or combined censuses.

Slightly more countries (26), including 7 of the register-based countries, applied a definition based on the address of the local unit for which the employed person was working during census week. But fewer countries used only this definition (10).

Some 18 countries applied a definition based on the headquarters to which the employed persons usually report (for mobile workers). But this definition only refers to that small proportion of the labour force whose workplace is not fixed and was therefore only adopted in combination with one or more of the other definitions. Indeed many countries (19) reported that they adopted more than one definition (reflecting the different circumstances of some workers), and 5 countries - Denmark, Montenegro, Serbia, Spain and Sweden - adopted all three.

A handful of countries (four) applied other definitions. Two of these countries, Poland and Spain, however, used one or more of the listed definitions as well, and Slovenia used the address of business or local unit in the business register, which relates closely to the second definition listed in the table. In summary, all countries, possibly with one exception, applied at least one of the listed definitions based on actual place of work or address of local unit or a definition very similar to one of those.

Table 11.3
Definition of location of place of work (number of countries)

	Total		Type of census			Region	
	Per cent	Number	Traditional	Register-based	Combined	EEA	Non-EEA
Total	**100%**	**51**	**32**	**9**	**10**	**30**	**21**
No data on location of place of work	8%	4	3	1	0	2	2
Data on location of place of work collected	92%	47	29	8	10	28	19
Definitions applied:							
The actual place in which the employed person performed his/her job during census week	47%	25	18	2	5	13	12
The address of the local unit for which the employed person was working during the census week	51%	26	13	7	6	17	9
The depot or headquarters to which the employed person usually reports (i.e. for drivers, delivery workers, and other outdoor workers)	35%	18	11	4	3	12	6
Other definition(s)	8%	4	1	1	2	3	1

For some groups of employed persons it may be difficult to define the location of place of work, and in such cases specific criteria were applied by four fifths of all countries (Table 11.4). The group most frequently reported (by more than half of the countries) is persons with no fixed place of work. Similarly, persons with more than one workplace require special rules to determine a single place of work — and 20 countries reported that they did so.

Some countries identified workers such as sailors, fishermen, offshore workers and persons with unknown employers as presenting particular difficulties. In some countries, mobile workers and persons with no fixed place of work are considered to work from/at home.

For people working abroad only the country of workplace is generally collected, since the area of workplace is not a particularly relevant item of geographic information.

According to the CES Recommendations, data on place of work should be coded to the smallest possible civil division. Data may be collected directly on this level or collected on a lower level with the possibility to be coded to smallest civil division.

Table 11.4
Criteria for specific groups of employed persons (number of countries)

	Total		Type of census			Region	
	Per cent	Number	Traditional	Register-based	Combined	EEA	Non-EEA
Total	**100%**	**47**	**29**	**8**	**10**	**28**	**19**
No criteria applied	4%	2	2	0	0	0	2
Not applicable	13%	6	5	1	0	2	4
Criteria applied for the following groups	83%	39	22	7	10	26	13
Persons with no fixed place of work	55%	26	16	4	6	18	8
Persons with several work places during census week	43%	20	13	1	6	12	8
Persons with more than one job during census week	40%	19	12	4	3	13	6
Persons working at home for some or all of the days during census week	34%	16	13	1	2	10	6
Persons working abroad	43%	20	13	3	4	10	10
Other specific groups	9%	4	2	1	1	2	2

Precise address (or coordinates) is the lowest geographical level possible for data collection and this, of course, provides for the most flexible data. Some 15 countries collected data at this level (Table 11.5). This is the most common level for countries with a register-based census but is used by only 5 countries adopting a traditional approach. Among the latter, the LAU2 was more commonly used as the lowest geographic level for data collection. Census blocks were reported as the lowest level by 2 countries only (Azerbaijan and Kyrgyzstan). Square kilometre grids were used only by Ireland.

Six countries reported that their lowest level geography for workplace data was higher than the LAU2. The Russian Federation reported such data at the 'locality' level and the former Yugoslav Republic of Macedonia at the 'settlement' level.

Other lowest geographies that were reported by countries included the settlement (by Bosnia and Herzegovina and Serbia) the locality (by Greece) and the postcode (by the United Kingdom).

Based on detailed information reported by countries with 'administrative units on a higher level' and 'other level', the total proportion of countries where data have been collected at the level of the commune or lower can be estimated to be at least four fifths.

Table 11.5
Place of work, lowest geographical level for data collection (number of countries)

	Total		Type of census			Region	
	Per cent	Number	Traditional	Register-based	Combined	EEA	Non-EEA
Total	**100%**	**46**	**28**	**8**	**10**	**28**	**18**
Precise address or coordinates	33%	15	5	6	4	9	6
Census block (area bounded on all sides by streets, roads, streams, railroad tracks, etc.)	4%	2	2	0	0	0	2
1 Km^2 grid	2%	1	1	0	0	1	0
Local administrative unit (LAU2) (communes)	33%	15	9	1	5	12	3
Administrative units on a higher geographical level	13%	6	6	0	0	2	4
Other	15%	7	5	1	1	4	3

Location of school, college or university (non-core topic)

By including this topic in their census, countries can extend the scope of their data on commuting patterns to cover pupils and students in addition to the coverage of the employed provided by place of work. The CESR does not, however, offer a precise definition for this topic, but suggests only that, for comparability with area of workplace, data should be coded to the smallest possible civil division (paragraphs 198).

Less than half the countries in the UNECE region (22) included this non-core topic in their census (Table 11.6). The coverage rate is almost the same for register-based, combined and traditional censuses.

Table 11.6
Location of school, college or university (number of countries)

	Total		Type of census			Region	
	Per cent	Number	Traditional	Register-based	Combined	EEA	Non-EEA
Total	**100%**	**51**	**32**	**9**	**10**	**30**	**21**
Topic included	43%	22	14	4	4	16	6
Definition fully compliant with CES Recommendations	39%	20	14	4	2	14	6
Classification fully compliant with CES Recommendations	27%	14	9	3	2	8	6
Main data source used:							
Full enumeration	27%	14	13	0	1	9	5
Sample data	6%	3	1	0	2	2	1
Registers/administrative records	10%	5	0	4	1	5	0

Mode of transport to work and/or to school, college or university (non-core topic)

This non-core topic in the CESR recommendations relates to the daily journey made (paragraphs 199 and 201). The suggested classification for both journeys comprises the following modes of transport:

1.0 Rail
- 1.1 National/international rail network
- 1.2 Metro/underground
- 1.3 Tram/light railway

2.0 Bus, minibus or coach

3.0 Car or van
- 3.1 Driver
- 3.2 Passenger

4.0 Other modes
- 4.1 Motor cycle
- 4.2 Pedal cycle
- 4.3 Walk
- 4.4 Board or ferry
- 4.5 Other

Furthermore, the CESR offered guidance that for people making several journeys or using more than one mode of transport, the mode used for the greatest distance in the daily journey should be the one recorded.

In respect of the journey to work this topic was included by 22 countries (Table 11.7); more than half of all countries with a traditional or combined census included this topic, but none of the countries with register-based censuses did so. And those countries with a combined census that included this topic collected the information from either full enumeration or sample data. This seems to suggest that 'mode of transport' is not a topic that can be readily retrieved from registers.

Less than half of the countries that included this topic applied a classification that was in full compliance with the CES Recommendations. From the comments given it is clear that most deviations are at the two-digit level. However, some countries also have a different classification on the one-digit level, for instance by grouping together all kinds of public transportation.

Fewer countries (only 16) included the topic with respect to the journey to a place of education, and for less than half of these was the classification fully compliant with the CES Recommendations. Almost all countries used the same classification as for the mode of transport to work.

Table 11.7
Mode of transport (number of countries)

	Total		Type of census			Region	
	Per cent	Number	Traditional	Register-based	Combined	EEA	Non-EEA
Total	**100%**	**51**	**32**	**9**	**10**	**30**	**21**
Journey to work							
Topic included	43%	22	17	0	5	13	9
Definition fully compliant with CES Recommendations	37%	19	17	0	2	11	8
Classification fully compliant with CES Recommendations	20%	10	10	0	0	4	6
Main data source used:							
Full enumeration	27%	14	13	0	1	9	5
Sample data	16%	8	4	0	4	4	4
Registers/admin. records	0%	0	0	0	0	0	0
Journey to place of education							
Topic included	31%	16	13	0	3	10	6
Definition fully compliant with CES Recommendations	25%	13	13	0	0	8	5
Classification fully compliant with CES Recommendations	14%	7	7	0	0	3	4
Main data source used:							
Full enumeration	25%	13	12	0	1	8	5
Sample data	6%	3	1	0	2	2	1
Registers/admin. records	0%	0	0	0	0	0	0

Distance travelled to work/to school, college or university and time taken (non-core topics)

Very closely associated with mode of transport to work/place of education is the distance travelled. Accordingly, the CESR suggests that countries may wish to collect information on the distance travelled and the time taken with a view to monitoring the extent to which persons are living at greater distances from their place of work or place of education and the impact which traffic congestion has on the time taken by such journeys (paragraphs 202–203).

With regard to distance travelled to work, the topic was included by seven countries only, four with traditional censuses, two with combined censuses and one country with a register-based census (Belgium) (Table 11.8). Unlike 'mode of transport', distance to work can be derived from register-based information, by for example, estimating the distance by using the coordinates of the place of residence and the place of work (but bearing in mind that the address from which the journey starts may not necessarily be the person's usual residence). Indeed, Belgium reported using Euclidean geometry to compute this.

Only six countries included this topic with regard to distance travelled to place of education, five of whom collected information on both journeys.

Table 11.8
Distance travelled (number of countries)

	Total		Type of census			Region	
	Per cent	Number	Traditional	Register-based	Combined	EEA	Non-EEA
Total	**100%**	**51**	**32**	**9**	**10**	**30**	**21**
Journey to work							
Topic included	14%	7	4	1	2	4	3
Definition fully compliant with CES Rec.	12%	6	4	0	2	3	3
Classification fully compliant with CES Rec.	10%	5	4	0	1	2	3
Main data source used:							
Full enumeration	6%	3	3	0	0	2	1
Sample data	6%	3	1	0	2	1	2
Registers/admin. records	2%	1	0	1	0	1	0
Journey to place of education							
Topic included	12%	6	3	1	2	3	3
Definition fully compliant with CES Rec.	6%	3	2	0	1	1	2
Classification fully compliant with CES Rec.	6%	3	2	0	1	1	2
Main data source used:							
Full enumeration	6%	3	3	0	0	2	1
Sample data	2%	1	0	0	1	0	1
Registers/admin. records	2%	1	0	1	0	1	0

Journey time is clearly a supplement to distance travelled, but is one where information can only be collected from an enumeration or survey. Surprisingly perhaps, 14 countries included this topic with respect to the journey to work (more than double the number that collected information on distance travelled) (Table 11.9). All but 3 of these countries applied a definition that fully complied with the CES Recommendations. Some 12 countries collected information on time taken to travel to place of education; all of these collected information on both journeys.

Table 11.9
Time taken for journey (number of countries)

	Total		Type of census			Region	
	Per cent	Number	Traditional	Register-based	Combined	EEA	Non-EEA
Total	**100%**	**51**	**32**	**9**	**10**	**30**	**21**
Journey to work							
Topic included	27%	14	10	0	4	9	5
Definition fully compliant with CES Recommendations	22%	11	9	0	2	7	4
Classification fully compliant with CES Recommendations	12%	6	5	0	1	2	4
Main data source used:							
Full enumeration	16%	8	7	0	1	6	2
Sample data	12%	6	3	0	3	3	3
Registers/administrative records	0%	0	0	0	0	0	0
Journey to place of education							
Topic included	24%	12	9	0	3	8	4
Definition fully compliant with CES Recommendations	16%	8	7	0	1	6	2
Classification fully compliant with CES Recommendations	8%	4	3	0	1	2	2
Main data source used:							
Full enumeration	18%	9	8	0	1	6	3
Sample data	6%	3	1	0	2	2	1
Registers/administrative records	0%	0	0	0	0	0	0

Compliance with the CES Recommendations

An important goal for the UNECE survey was to identify differences in the level of compliance with the CESR between countries that adopted different census methodologies. In this concluding section some of the findings are summarized, together with some comparisons with the level of compliance in the 2000 census round.

In this analysis (Table 11.10) those countries (among the 51) that did not respond to questions about a particular topic/definition/classification have been regarded as not including that topic in the censuses or not to have adopted a definition/classification in compliance with the CES Recommendations.

Table 11.10
Geographic characteristics: topics included, definitions and classifications

	Topic included				Full compliance, definition				Full compliance, classification			
	Total	Traditional	Register-based	Combined	Total	Traditional	Register-based	Combined	Total	Traditional	Register-based	Combined
Number of countries												
Locality	40	24	9	7	30	17	9	4	40	24	9	7
Location of place of work	47	29	8	10	36	22	7	7	n/a	n/a	n/a	n/a
Urban and rural areas	46	31	8	7	36	24	8	4	n/a	n/a	n/a	n/a
Location of school, college or university	22	14	4	4	20	14	4	2	14	8	3	2
Mode of transport to work	22	17	0	5	19	17	0	2	10	10	0	0
Mode of transport to school, college or university	16	13	0	3	13	13	0	0	7	7	0	0
Distance travelled to work	7	4	1	2	6	4	0	2	5	4	0	1
Time taken for travel to work	14	10	0	4	11	9	0	2	6	5	0	1
Distance travelled to school, college or university	6	3	1	2	3	2	0	1	3	2	0	1
Time taken to travel to school, college or university	12	9	0	3	8	7	0	1	4	3	0	1
Percentage of countries												
Locality	78	75	100	70	59	53	100	40	78	75	100	70
Location of place of work	92	91	89	100	71	69	78	70	n/a	n/a	n/a	n/a
Urban and rural areas	90	97	89	70	71	75	89	40	n/a	n/a	n/a	n/a
Location of school, college or university	43	44	44	40	39	44	44	20	27	28	33	20
Mode of transport to work	43	53	0	50	37	53	0	20	20	31	0	0
Mode of transport to school, college or university	31	41	0	30	25	41	0	0	14	22	0	0
Distance travelled to work	14	13	11	20	12	13	0	20	10	13	0	10
Time taken for travel to work	27	31	0	40	22	28	0	20	12	16	0	10
Distance travelled to school, college or university	12	9	11	20	6	6	0	10	6	6	0	10
Time taken to travel to school, college or university	24	28	0	30	16	22	0	10	8	9	0	10

Core topics

Locality

Locality is defined as a distinct population cluster; three different types of clusters are listed in the CES Recommendation. Some 40 countries out of 51 (78 per cent) included this topic. The coverage rate in the 2000 census round was 73 per cent[20].

All countries with register-based censuses included the topic. For countries with traditional censuses the coverage rate was 75 per cent, for countries with combined censuses it was 70 per cent.

Countries are regarded to have fully complied with the CES Recommendations when one of the three listed definitions is used. Some 30 countries, 59 per cent, met this criterion. This is an improvement from the 2000 census round where the corresponding figure was only 39 per cent.

The compliance of the definition used with the CES Recommendations for register-based censuses was 100 per cent, for traditional censuses 53 per cent, but for combined censuses 40 per cent only.

However, from the comments given it is clear that several countries have applied a definition quite close to those recommended, for instance by combining elements from two of the definitions. If using the main CES recommended definition in paragraph 181 only, and thereby accepting other types of clusters than listen in paragraph 182, more than these 30 countries could be regarded as having used a definition in compliance with the recommendation.

The recommended classification is by size of location. Hence, it is possible to comply with this classification without fully complying with the definition. All 40 countries that included this topic were in full compliance with the classification.

Location of place of work

This topic was included by 92 per cent of all countries as compared to 73 per cent in the 2000 round. The coverage rate was 100 per cent for combined censuses and approximately 90 per cent for traditional and register-based censuses.

According to the definition, location of place of work should be coded to the smallest possible civil division. Definitions are regarded to be in compliance with the CES recommendation if data are collected for precise address or coordinates, census blocks, one kilometre square grids, or communes (LAU2), in total 33 countries. For countries that adopted other definitions the compliance has been estimated from the specifications given, and 3 more countries have been added. In total, 71 per cent of all countries applied definitions in compliance with the CES Recommendations. The coverage rate was highest for combined censuses and lowest for traditional censuses.

Non-core topics

Urban and rural areas

This topic was included by 90 per cent of all countries, 46 out of 51. The coverage rate in the 2000 round was 82 per cent. In 2010 the coverage rate is lowest for countries with a combined census.

According to the CES Recommendations, the most appropriate unit of classification is 'locality', but classification by smallest civil division is also acceptable. Countries that used one of these criteria were regarded as having a definition in compliance with the recommendations. In total,

[20] UNECE (2008): Measuring Population and Housing. Practices of UNECE countries in the 2000 round of censuses. United Nations, Geneva.

71 per cent of all countries applied a definition that complied, and 42 per cent applied the preferred criterion based on location. In the 2000 round of censuses, 64 per cent of all countries applied a definition in compliance with the CES Recommendations, but only 25 per cent used the criterion based on location. There has clearly been a shift towards using location instead of smallest civil division as the criterion for distinguishing urban and rural areas.

Commuting topics

Location of school, college or university was included by 43 per cent of all countries and the coverage rate is much lower than for the core topic 'location of place of work'. The coverage rate is more or less independent of census methodology.

Mode of transport to work was included by 43 per cent of countries, the same percentage as in the 2000 round. None of the countries with a register-based census included this topic, suggesting that this kind of information cannot be retrieved from registers. The rate for full compliance for classification is rather low. However, comments given indicate that more countries have used a classification in compliance with the recommendations on a one-digit level.

Mode of transport to school, college or university was included by 31 per cent of countries.

Distance travelled to work/school, college or university is included by very few countries, 14 and 12 per cent respectively. These are the lowest coverage rates for geographic characteristics.

Time taken for travel to work/school, college or university was included by 27 and 24 per cent of countries respectively. The coverage rates are somewhat higher than for distance travelled. None of the countries with a register-based census included this topic.

12. DEMOGRAPHIC CHARACTERISTICS

This chapter reviews the practices in the 2010 census round regarding the demographic characteristics of persons (sex, age and marital status - including both legal and de facto marital status), and the characteristics relating to marriage and fertility of women. Some comparisons with the 2000 census round are also made[21].

Age and sex (core topics)

Age and sex are the two census topics for which the recommended definitions are the most clear, since it is the basic prerequisite for any census - however conducted - to record these characteristics for each person.

With regard to age, the CES Recommendations required the collection of information on date of birth, which allows the data to be tabulated in two ways – by year of birth and/or by completed years of age. In the UN Principles and Recommendations two methods were presented for collecting information on age; the date of birth – recommended as the method that produces the most precise and unambiguous information and also provides a means of estimating age at different reference periods throughout a year - and a direct question on age at the person's last birthday. The second method yields less accurate responses and was therefore recommended to be used only when people cannot provide a birth year.

Fifty-one countries replied to the survey with respect to age. Of these, 40 used the date of birth and derived the age at the time of the census; 11 countries derived the age from both date of birth and age.

All nine countries conducting a register-based census derived the age from the date of birth. Among the countries conducting a traditional census, 24 countries used this method while 8 used a combination of both exact age and deriving the age from the date of birth.

No country reported that there had been any serious issue raised about the collection of data on sex (that is on males and females only) although both Canada and the UK commented on concern expressed by some user groups about the lack of transgender/transsexual categories.

Legal marital status (core topic)

The CES Recommendations included two distinct topics for marital status: legal (core topic) and de facto marital status (non-core topic).

Legal marital status is defined by the CESR (as paragraph 209) as: *"The (legal) conjugal status of each individual in relation to the marriage laws (or customs) of the country (that is, the de jure status).*

Moreover CESR recommended (at paragraph 210) that: *"Information on the legal marital status of each person should be collected at least for persons aged 15 and over. However, since the minimum legal age (or the customary age) for marriage varies between countries and since the population may also include young persons who have been married in other countries with lower minimum ages, some countries may find it useful to collect the data for persons under 15 as well."*

[21] The material in this chapter has been taken largely from a paper prepared by Howard Hogan (US Census Bureau) and presented at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

The following classification of the population by marital status is recommended:

1.0 Single (that is, never married)

2.0 Married

3.0 Widowed and not remarried

4.0 Divorced and not remarried

Moreover, the CESR recommended (at paragraph 212) that those persons living in consensual unions be classified in accordance with their de jure (legal) status regardless of their de facto status.

The CES Recommendations also provided an option (at paragraph 213) for additional status categories with respect to registered partnerships or same-sex marriages where such can exist lawfully, as well as for a separate category for 'legally separated' where national legislation includes provisions for this status in addition to 'married' or 'divorced.'

Out of the 51 countries that responded to the survey, 48 collected data on legal marital status, while 3 (Georgia, Kazakhstan and Liechtenstein) did not. Though the United States also reported that it did not ask a question on 'marital status' in its decennial censuses it does so in its American Community Survey - though guidance to the respondent on how to answer is only available in the associated help items and the question is usually interpreted by respondent to mean 'legal status'.

In eight countries (Belgium, Denmark, Finland, Greece, Hungary, Sweden, Switzerland and the United Kingdom), there were additional categories for persons in registered partnerships, which distinguished those currently in such partnerships and those whose legal partnership had terminated due to death or legal dissolution. Some countries included categories for legally separated persons. Armenia, Azerbaijan, Belarus, Kyrgyzstan, the Russian Federation and Tajikistan used a classification that mixed legal and de facto marital status (see Table 12.1).

Most countries were thus able to provide data on legal marital status complying with the CES Recommendations, though the inclusion of registered partnerships in the marital status classification in several countries does affect the comparability to some degree with other countries.

Twenty-six countries recorded legal marital status for persons of any age, whilst 17 countries recorded it only for persons aged 15 and above, and 4 countries (Croatia, Malta, the Republic of Moldova and the Russian Federation) for persons aged 16 and above.

De facto marital status (non-core topic)

De facto marital status is defined by the CESR (at paragraph 217) as the marital status of each individual in terms of his or her actual living arrangements within the household enumerated. Implicitly this is irrespective of the person's legal status. The suggested, and very basic, classification is:

1.0 Person living in a consensual union

2.0 Person not living in consensual union

with the specification that "two persons are taken to be partners in a consensual union when they have usual residence in the same household, are not married to each other, and have a marriage-like relationship to each other" (CESR paragraph 218-219).

Table 12.1
Countries that used a classification of legal marital status different from the recommended classification

Country	Notes
Armenia	Mixed classification with de facto marital status: never married, married (registered), married (not registered), marriage carried out only with church canonical ritual, widowed, divorced (registered), separated (not registered).
Azerbaijan	Persons who indicated married were asked whether their marriage is registered.
Belarus	Mixed classification with de facto marital status: never married, married, in common-law marriage, widow(er), officially divorced.
Belgium	Extra categories exist for: • In a registered partnership • Registered partnership ended with the death of partner (and not married or in a new registered partnership) • Registered partnership legally dissolved (and not married or in a new registered partnership).
Canada	An extra category exists for separated, but still legally married.
Denmark	The definition also included persons in registered partnerships and persons in registered partnerships ended with death or legally dissolved.
Finland	Extra categories exist for: • Partner in a registered partnership • Divorced from a registered partnership • Widowed after a registered partnership.
Greece	Extra categories exist for: • Separated • Partner in a registered partnership • Divorced from a registered partnership • Widowed after a registered partnership.
Hungary	Extra categories exist for: • Partner in a registered partnership • Divorced from a registered partnership • Widowed after a registered partnership.
Kyrgyzstan	Mixed classification with de facto marital status: never married, in a registered marriage, in an unregistered marriage, widow(er) (regardless of whether the marriage with the deceased partner was registered or not), divorced, separated (either from an unregistered or registered marriage and in the latter case, not legally divorced).
Russian Federation	Persons in a marriage were asked additional questions: registered marriage. In addition to officially divorced (divorce registered) additional information were given as: separated (those who are in official marriage broke up and divorce is not officially registered, and those who were not in wedlock and divorced).
Sweden	Extra categories exist for: • Partner in a registered partnership • Divorced from a registered partnership • Widowed after a registered partnership.
Switzerland	More detailed classification: Single, Married, Widowed, Divorced, Unmarried, In a registered partnership, Partnership dissolved.
Tajikistan	Mixed classification with de facto marital status: never married, in a registered marriage, in an unregistered marriage, widow(er), divorced, separated.
United Kingdom	Extra categories for persons in a civil (same sex) partnership or who whose former civil partnership had ended through death or dissolution

De facto marital status is a non-core topic which is most of interest for countries that have experienced increases in the number of persons living in consensual unions. Information on de facto marital status is most often derived from information collected on topics related to household and family characteristics of persons, characteristics of family nuclei and characteristics of private households, based on the relationship to the reference person question or the full household relationship matrix in countries where the matrix is used.

Forty-eight countries collected or derived information on de facto marital status, including Sweden and the Netherlands that reported that this information was not collected but was imputed using register data. In Albania, the Czech Republic, Germany, and Latvia, and Tajikistan this information was not collected at all.

The most common approach to the measurement of de facto marital status was through information collected on the relationship within the household. Some 21 countries used for this purpose the relationship either to a single specific household reference person or to all other household members. The proportions doing so were broadly similar regardless of census methodology. Fifteen countries used information collected from a specific question on de facto status, while eleven countries used a general question on marital status in which information was collected on both de facto and de jure status (Table 12.2). Seven of the nine countries with register-based census estimated or derived the information from administrative data sources relating to household composition. Several countries used more than one method to obtain the relevant information.

A quarter of the countries that reported that they collected information on de facto marital status (11) also reported that they used a classification that differed, in varying degrees, from the CESR recommendation. In some cases the difference was because of use of a combination of both de facto and de jure categories, but in others the difference was more fundamental. The United Kingdom noted, for example, that the category 'not living in a consensual union' was ambiguous since, by definition, it included persons who were living in a married couple or same-sex registered partnership or living alone. It added, however, that persons living in a consensual union (as defined by the CESR) were identified.

The practice of using the same question to obtain data on legal and de facto marital status has been discouraged because the resulting data on legal marital status would not be known for those who indicate living in a consensual union (denoted “unregistered marriage” in some countries). The data from the countries with such practice is thus not fully comparable.

Table 12.2
Countries that collected data on de facto marital status, by means of doing so and compliance with the CES Recommendations (number of countries)

Means of collecting information on de facto marital status	Total	Type of census			Region	
		Traditional	Register based	Combined	EEA	Non-EEA
Did not collect information	5	3	0	2	3	2
Collected information	46	29	9	8	27	19
by means of:						
a specific question	15	15	0	0	5	10
a general question on marital status	11	10	0	1	3	8
the relationship to the reference person	21	13	2	6	12	9
some other method	6	1	7	0	6	0
Definition compliant with CESR	35	21	7	7	22	13

Marriage and fertility topics (non-core)

Associated with the data collected in the census on marital status, but considered as non-core topics in the CESR, is information relating to the timing and duration of marriage and the fertility history of women. This information is often collected in countries where there is no universal system of vital registration and where, as a consequence, the census provides the only comprehensive source of information about fertility and population growth.

The CESR recommended that the 'total number of children born alive' - if included in the census - should be asked of all women (CESR paragraph 222) and should include all children born alive during the women's lifetime (including those born in previous marriages) up to the census date, but should not include stillbirths (paragraph 223).

Of the 51 countries that answered this survey question, just over two thirds (35) reported that they collected information on the total number of live-born children. Among countries with a traditional census this proportion was significantly higher (three quarters) compared with just a third of those countries with a register-based census. At first it might seem, therefore, that countries using administrative registers have more difficulties in collecting fertility data for census purposes. But, conversely, it may be that such countries have sufficiently good vital registration data not to require this (non-core) information to be collected specifically for the census.

Thirty-four of the 35 countries collected information on all live-born children to a woman over her lifetime. In Finland, where data are available from registers, information on children born abroad and who had not immigrated with their parents is not collected. Belarus only collected data on children born in the current marriage who were alive on census day.

Nine out of the 35 countries (Azerbaijan, Bosnia and Herzegovina, the Czech Republic, Finland, Georgia, Greece, Kazakhstan, Malta and Turkey) reported that they collected data related to the age or date of birth of the woman's children. In Lithuania and the Russian Federation, only the date of birth of first child was asked. In Serbia information on the year of birth for the first three children and year of birth of the youngest child (if the woman gave birth to more than three children) was collected. Liechtenstein provided information concerning the year of birth of up to the four eldest children and of the youngest.

Only three countries - Finland (register-based census), Tajikistan (traditional census) and Turkey (combined census) - reported that they collected information on the age at death or date of death of children. In the case of Tajikistan the information on date of death was collected only for the children aged up to 5 years who had died in the year before the census, and in Finland, dates of birth and death were not available if the children had died before 1970.

Notwithstanding the CESR recommendation above, only seven countries collected fertility information on women of all ages (Table 12.3). Furthermore, although Serbia did so, it reported that for confidentiality reasons only data relating to women aged 14 or over are published. The majority of countries (21 out of the 35) referred to women aged 15 or over, and the bulk of these were countries outside the EEA, including mostly countries in Eastern Europe and the CIS.

With the purpose of extending the knowledge that can be derived from data on number of live born children, it was suggested by the CES Recommendations that information could be collected relating to the duration of marriage of ever married women, stressing that, if relevant, both first marriage and current marriage dates should be recorded. And reflecting the increase in consensual unions, the collection of comparable data on the duration of such unions was also recommended. In the event however, only 15 countries attempted to collect one or more items of this information in the 2010 round of censuses (Table 12.4).

Table 12.3
Age of women on whom countries collected fertility-related information (number of countries)

Age of women	Total	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Information not collected	16	7	6	3	13	3
Information collected	35	25	3	7	17	18
....On women aged						
……16 and over	1	0	0	1	1	0
……16-49	1	0	0	1	1	0
……15 and over	21	16	1	4	5	16
……12 and over	1	1	0	0	1	0
……11 and over	1	1	0	0	0	1
……10 and over	2	2	0	0	2	0
……All ages	7	5	2	0	6	1
……Age not stated	1	0	0	1	1	0

Table 12.4
Countries that collected dates of marriages and/or consensual unions, and whether current or first marriage/union was collected

Country	Type of census	Date of marriage		Date of consensual union	
		First	Current	First	Current
EEA countries					
Belgium	Register-based	X	X		
Czech Republic	Traditional		X		X
Finland	Register-based		X		
Hungary	Traditional		X		X
Iceland	Register-based	X	X		X
Italy	Traditional		X		
Lithuania	Combined	X			
Malta	Traditional	X			
Poland	Combined		X		X
Romania	Traditional	X	X		X
Slovakia	Traditional		X		
Non EEA countries					
Azerbaijan	Traditional		X		X
Israel	Combined	X	X		
Kazakhstan	Traditional	X		X	
United States	Traditional		X		
TOTAL		**7**	**12**	**1**	**6**

The most commonly collected item was the date of current marriage (12 countries). Romania and Iceland collected three out of the four items (but neither sought to collect information on first consensual union), and seven countries collected two of the items, of whom Kazakhstan was the only country to report collecting information on first consensual union.

Summary conclusions and comparisons with the 2000 round

Age (core): Only one country (out of 51) did not collect information on date of birth in order to estimate age. In 2000 two countries (out of 39 respondents) did not do so.

Sex (core): As was the case in the 2000 round, all countries complied with the CES Recommendations. Concern about the lack of responses categories to cater for transgender/transsexual persons was not perceived to be a serious issue.

Legal (de jure) marital status (core): In the 2010 only 4 countries (out of 51) did not specifically collect information on legal marital status. And of those that did, only one did not fully comply with the CESR classification. This represents a significant improvement on the 2000 round when only 23 countries (out of 44) used the CESR classification and 19 used either different classifications or a mix of legal and de facto categories (this approach – not recommended – was used by 6 countries in the 2010 round). The use of additional categories to identify the status of legally recognised same-sex partnerships or marriages was adopted by 8 countries. In the 2000 round only 2 countries did so.

De facto marital status (non-core): In the 2010 round, some 45 (out of 51) countries collected or derived information on de facto marital status (compared with 35 out of 44 in the 2000 round). The most common means of doing so was by establishing the relationship of each person to a household reference person and/or to other household members; some 21 countries adopted this approach, but the proportion doing so fell from the level in the 2000 round when 20 countries of out 44 used the relationship information.

Total number of live-born children (non-core): Two thirds of countries (35) reported that they collected information on the total number of live-born children, and all but one collected this information with respect to the whole lifetime of the woman. Nine of these countries reported that they collected data related to the age or date of birth of the woman's children. Notwithstanding the CESR recommendations, only seven countries collected fertility information on women of all ages. There is no directly comparable information from the 2000 round.

Duration of marriage/consensual union (non-core): Only 15 countries reported the collection of any information relating to the duration of marriage or consensual union, of which the most commonly collected data item was the date of current marriage (12 countries).

13. ECONOMIC CHARACTERISTICS

Introduction

As was noted in the 2010 CES Recommendations, statistics on the economic characteristics of persons are needed from population censuses for many reasons. Information on the number and characteristics of the employed, unemployed and economically inactive persons are needed in detail at the same reference point of time that other demographic and social items are being measured so that a comprehensive picture of the socio-economic situation is available. Such statistics might be obtained from other sources such as household-based labour force surveys or administrative records, but these other sources have certain limitations. Data obtained from labour force surveys are subject to sampling error and, therefore, rarely provide reliable estimates for small areas, or for detailed groups of industries and occupations. Administrative records may not necessarily have the same quality of occupational and industry coding, nor the same comprehensiveness in population coverage.

Other personal, household and dwelling characteristics that are included in the range of census topics (such as education, income level, literacy, type of dwelling, etc.) are strongly related to economic activity of the household members. It is, therefore, desirable to collect or link information on the economic characteristics of household members in the census so that cross-relationships between these data items can be examined.

This chapter reports, in turn, on four distinct aspects of measuring the economic characteristics of the population. Information on activity status determines whether or not a person is employed or unemployed, or is economically inactive for whatever reason. For those persons that are employed information is then collected on several further characteristics, in particular on employments status, in order to distinguish employers from employees (and other categories), on occupation referring to the type of work done in a specific reference period prior to the census date, and the industry in which the person is employed during that same reference period. Each of these four topics was classified as core in the CESR.

The chapter also reports on the extent to which countries collected information on a number of other non-core topics, that were also recommended for inclusion in the census[22].

Economic activity status

Information collected in the census on activity status is aimed at classifying the population into those that are economically active or inactive. The economically active population is defined in the CESR (at para. 28) as comprising: *" …all persons who provide the supply of labour, as employed or as unemployed, for the production of goods and services."*

Reflecting the universal importance of this topic, all censuses in the UNECE region in the 2010 round collected information on economic activity. Some 29 of the 32 countries adopting a traditional census did so using a full field enumeration; sample data was collected in France's rolling census, and on the long census forms used in Canada and the United States. In addition, 4 of the 10 countries using a combined methodology also collected the information from a full enumeration.

[22] The material in this chapter has been taken largely from a report prepared by the UNECE Task Force on Economic Characteristics led by Jari Nieminen (Statistics Finland) and discussed at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

Age limits

The CESR recommended (at paragraph 232) that information on activity status should be collected for each person at or above a minimum age set in accordance with the conditions in each country, but that the minimum school-leaving age should not automatically be taken as the lower age limit. Most countries reported that they complied, more or less, with this recommendation, with 43 using 15 years as the minimum age limit. In Spain and the United Kingdom the limit was set higher at 16 years, whereas Kyrgyzstan reported 12 years as the limit. Five countries (three of them with register-based census - Austria, Finland and Iceland - and two with traditional census - Greece and Slovakia) reported no minimum age limit for data collection, although Finland went on to qualify this by reporting that there was a limit of 18 years for employed persons, and Austria specified that for the topic "current activity status" there is an age limit for employed and unemployed persons which is 15 years.

The situation with regards the imposition of an upper age limit for the collection of economic activity information was less consistent. For this the CESR noted that: *"…. use of a maximum age limit for measurement of the economically active population is not recommended, as many people continue to be engaged in economic activities beyond their normal retirement age and because the numbers involved are likely to increase as a result of factors associated with the "ageing" of the population".*

The Recommendations suggested, however, that countries might wish to balance the cost of collecting and processing information relating to the economic activity of elderly persons (those aged 75 years or more) and the additional response burden imposed on them against the significance and reliability of the information provided.

Most commonly, countries (39) reported no upper limit for data collection, but, additionally, 7 did not respond to the survey question, and it might be assumed that there was no limit in these countries also. Only 3 countries reported an explicit maximum age limit: Armenia and Sweden (75 years), and the Russian Federation (72 years).

A handful of countries qualified their maximum age limit. Poland and Romania for example reported an upper age threshold of 74 years but only for the unemployed, the Netherlands reported a threshold of 75 years only for the 'economically active' population, while Slovenia reported different age limits for different type of economic activity that were determined by the definitions of register-based data sets (15-74 for the employed, 15-49 for students, and 40 and over for the retired).

Exceptional population sub-groups

Notwithstanding the CESR recommendation that economic activity status should be recorded for all persons that were qualified by age, ten countries reported that there were some population sub-groups on which the information was not collected.

Two countries reported that information was not collected on the population living in collective households/institutions such as prisons or nursing homes (Germany and the Russian Federation); the Russian Federation also specifically reported that it did not collect the information relating to the homeless (but they were probably not alone in that). Foreign nationals working in the offices of foreign states or international organizations were excluded in Kyrgyzstan, and Norway's registers did not hold complete information relating to residents working abroad. Sweden reported that no information was held on contributing family workers. In Lithuania all person aged 15 and older were asked about their economic activity status, and "economically inactive pupils, students, pensioners, person unemployed due to disability, homemaker, persons not having a job one week before the census and persons who never worked before" were considered as not working during the reference week.

Alternative concepts of activity status

But 'economic activity status' is not a simple concept. The CESR allows two possible alternative approaches to be adopted: current activity status, which is the core topic, and usual activity status, designated as non-core.

Current activity status was defined by CESR (at paragraph 237) as: *"…the current relationship of a person to economic activity, based on a brief reference period such as one week or one day"*.

The use of the current activity concept (more closely aligned to the country's 'labour force') was considered more appropriate for countries where the economic activity of people is not strongly influenced by seasonal or other factors causing variations over the year. This was the definition recommended as the core topic, and use of a time-reference period of one week rather than one day was preferred, either as recent fixed calendar week, or the last complete calendar week or the last seven days prior to the census.

The clear majority of responding countries (45), regardless of the type of census, used the concept of currently active population, and of these 36 adopted a reference period of one week (Table 13.1), 5 countries used a period of one day (Liechtenstein, Luxembourg, Malta, Slovakia and Switzerland), and 5 countries (Iceland, Kyrgyzstan, the Netherlands, Sweden, and the former Yugoslav Republic of Macedonia) adopted another specific time frame, such as two weeks or a month. In the Netherlands a reference period of one week is used for employees, and a reference period of one day for self-employed.

Table 13.1
Concept of activity status adopted (number of countries)

Concept of activity status	Total countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Current activity status	**45**	**28**	**9**	**8**	**28**	**17**
Reference period of 1 day	5	3	0	2	4	1
Reference period of 1 week	36	23	6	7	21	15
Some other reference period	5	2	3	0	3	2
Usual activity status	**6**	**3**	**1**	**2**	**2**	**4**
Reference period of 1 year	4	2	1	1	1	3
Some other reference period	1	1	0	0	1	0
Some other concept	**2**	**2**	**0**	**0**	**2**	**0**

Two countries (Israel and the United States) used the alternative concept of 'usual' activity status, defined in the CESR (at paragraph 251) on the basis of a reference period of one year before the census. Additionally, Kyrgyzstan and Sweden collected information using both concepts. France's unique rolling census methodology required an alternative reference period – not specified in the survey - to be adopted.

Two countries reported adopting a different concept altogether: Ireland did not specify any qualifying reference period; and in Malta persons who were unemployed at the time of the census had to indicate whether they had ever worked in their life.

Problematic cases

Regardless of which concept of 'activity status' is used, it is sometimes difficult to know whether to include particular sub groups of the population as economically active or inactive. The UNECE survey thus identified a number of specific groups which are known to be particularly problematic, and asked countries to report whether or not they were counted as economically active (as they all should have been). The results are presented in Table 13.2.

Table 13.2
Problematic cases assigned as 'economically active' (number of countries)

Problematic cases	Assigned as "economically active"	Total countries	Type of census			Region	
			Traditional	Register-based	Combined	EEA	Non-EEA
Contributing (unpaid) family workers	*Yes*	**42**	28	6	8	24	18
	No	**6**	2	2	2	5	1
Never employed	*Yes*	**44**	29	8	7	27	17
	No	**4**	1	0	3	2	2
Armed forces	*Yes*	**45**	29	8	8	28	17
	No	**2**	1	0	1	0	2
Part-time workers	*Yes*	**47**	28	9	10	29	18
	No	**2**	2	0	0	1	1
Domestic servants	*Yes*	**49**	30	9	10	29	20
	No	**1**	1	0	0	1	0

The CESR recommended (at paragraph 245) that **'contributing family workers'** should be considered to be economically active on the same basis as other self-employed persons, irrespective of the number of hours worked during the reference period. Nevertheless, in six countries (Denmark, Lithuania, Malta, Spain, Sweden and the United States) such persons were not considered as economically active. Two of these carried out wholly register-based censuses and two combined censuses, suggesting perhaps that it may be difficult in some cases to collect information on unpaid work (and other unofficial activities) from administrative data.

The **'never employed'**, that is those unemployed persons (those who are without work and currently available for work) and who had never previously worked, were considered economically inactive in four countries (Estonia, Israel, Lithuania, and the Former Yugoslav Republic of Macedonia).

Only two countries, Israel and the Russian Federation, reported that they did not count members of the **'Armed Forces'** as economically active. However, the Russian Federation qualified their response by adding that although economic activity information was not collected for the persons living on military camps, persons in military service who were enumerated at their own households were considered as economically active. Greece added a note to its response to the effect that those fulfilling their national service were not classified as economically active despite the CESR recommendation that the Armed Forces should include both regular and temporary members.

'Part-time workers', even though they may spend most time in non-gainful activities, were considered economically active in almost all countries. Only Croatia and Ireland (both traditional census countries) reported that this was not the case. However, both countries qualified their responses to the survey. Croatia added that part-time workers were considered active if they worked at least one hour for profit in cash or in kind in the week preceding the census, and Ireland noted that

part-time workers were classified as economically inactive only if they were reported to be students or some other inactive category at the time of the census. Thus the CES Recommendations seem to have been universally adopted, more or less, in both these countries.

'Domestic servants' were considered economically active in all countries except the Czech Republic.

Recommended classification

The classification recommended by CESR for assigning persons their activity status (either current or usual) was:

(1.0) Economically active
- (1.1) Employed
- (1.2) Unemployed, of which
  - (1.2.1) Previously in employment
  - (1.2.2) Never worked before

(2.0) Not economically active
- (2.1) Persons below the minimum age limit
- (2.2) Students
- (2.3) Pension or capital income recipients
- (2.4) Homemakers and others
  - (2.4.1) Homemakers (optional)
  - (2.4.2) Others

Some 14 countries (28 per cent overall) reported that they were not able to comply with either of these activity classifications. This proportion was fractionally higher (33 per cent) among the EEA member states where, despite the requirement of the EU regulation, 10 out of the 30 countries were not able fully to do so. These included all but one of the countries that undertook their censuses using only information taken from administrative registers. Only Belgium of the EEA register-based countries reported that they fully adopted the recommended classification.

Several of the 14 countries that did not fully comply were, however, able to identify most of the recommended output categories. For countries using register data some deficiencies were necessarily imposed by the limitations of data available from registers. For example Austria and Finland reported that they had no access to information on recipients of capital income, so that such people are included with 'Homemakers and others' rather than with 'Pensioners'; Austria, Denmark, Norway, Spain and the United States were unable to identify the optional category 'Homemakers', and these would therefore be included with 'Others' (but this is sufficient to comply with the EU regulations). Albania, Finland, the Netherlands and the United States do not distinguish the unemployed who have never worked. Greece does not classify people doing compulsory military service (draft) as economically active.

Definition of 'employed' and 'unemployed'

Notwithstanding the extent to which countries were able to comply with the CESR classification of activity status, the essential element underlying the classification itself is the level of international agreement on the definition of what constitutes employment and unemployment. The CESR (at paragraph 239) defined 'employed' persons as comprising: *"…. all persons above the*

minimum age specified for measurement of the economically active population who during the short reference period of preferably one week:

(a) performed some work for pay or profit, in cash or in kind, or

(b) were temporarily absent from a job in which they had already worked and to which they maintained a formal attachment, or from a self-employment activity such as a farm, a business enterprise or a service undertaking".

In this context 'work' is defined as "engagement in economic activities" as previously defined. The CESR went on to clarify that employees who were temporarily not at work in the reference period should be considered as being in paid employment provided they had a 'formal job attachment'. Such temporary absences might be because of:

a) illness or injury;

b) holiday or vacation:

c) strike or lock-out;

d) educational or training leave;

e) maternity or parental leave;

f) reduction in economic activity;

g) temporary disorganisation or suspension of work due to such reasons as bad weather, mechanical or electrical breakdown, or shortage of raw materials or fuels; or

h) other temporary absence with or without leave,

and that the 'formal job attachment' should be determined on the basis of one or more of the following criteria:

- a continued receipt of wage or salary;
- an assurance of return to work following the end of the contingency, or an agreement as to the date of return; or
- the elapsed duration of absence from the job which, wherever relevant, may be that duration for which workers can receive compensation benefits without obligations to accept other jobs.

The CESR also advised that self-employed persons (excluding contributing family workers) should be considered as 'employed' and 'with an enterprise, but not at work' if their absence from work was temporary but their enterprise meanwhile continued to exist.

Only 9 of the 51 countries that responded to the survey question reported that they were not able to fully apply the recommended definition to identify 'employed' persons. Of those 9 countries, 6 carried out a register-based census, and the others 3 were countries whose 'traditional' census has undergone much transformation since the 2000 round – France, Canada and the United States.

The most frequently reported exception was that the 'one-hour's employment' criterion was not used (in Finland, Iceland, the Netherlands, Norway and Slovenia for example). France used the self-definition of 'employed' in response to the question "What is your main situation?" or an affirmative response to the question "Are you currently employed?" Canada's definition was: *"Persons aged 15 years and over, who, during the week of Sunday, 1 May to Saturday, 7 May 2011 (a) did any work at all at a job or business, that is, paid work in the context of an employer-employee relationship, or self-employment (it also includes persons who did unpaid family work, which is defined as unpaid work contributing directly to the operation of a farm, business or professional practice owned and operated by a related member of the same household) or (b) had a job but were not at work due to factors such as their own illness or disability, personal or family responsibilities, vacation or a labour dispute (this category excludes persons not at work because they were on layoff or between casual*

jobs, and those who did not then have a job, even if they had a job to start at a future date)", while the United States used a four-week reference period.

On the other hand, 'unemployed' persons were defined by the CESR (as para. 247) as comprising: *"… all persons above the minimum age specified for measurement of the economically active population who during the reference period were:*

a) 'without work', that is were not in wage employment or self-employment as previously defined;

b) 'currently available for work', that is were available for wage employment or self-employment during the reference period; and

c) "seeking work", that is had taken specific steps in a specified recent period to seek wage employment or self-employment".

Among the 51 countries from which information was received, 44 reported that they fully applied the recommended definition to identify unemployed person and, in particular, the criteria 'without work' + 'available for work' + 'seeking work'.

Only 6 countries reported that they deviated from the recommended definition: Finland, France, Ireland, Liechtenstein, the Netherlands, and Norway. The Netherlands indicated that the criteria "available for work" and "seeking work" were not taken into account since they derived unemployment in the census from data held on registers. In Finland the unemployed labour force was defined on the basis of those persons aged 15-74 who were unemployed on the last working day of the year and were not undergoing military or non-military service. Austria and Norway specified that the deviation from the recommendation concerned those 'seeking work' which applied only if they were registered as a job seeker by labour market authorities. In general terms it can be assumed that all countries with register-based census used register-based employment definitions, and therefore could not ask people whether they were available for work and seeking work.

Liechtenstein, on the other hand, reported that its census questionnaire asked if the person was 'seeking work' with explanation that a person seeking work and at the same time in gainful employment would be considered to be employed. But this in fact complies with the CES definition of employed.

Employment status (core topic)

As defined in the CESR (at paragraph 279) the concept of 'status in employment' refers to: "….*the type of explicit or implicit contract of employment with other persons or organizations, which the person has in his/her job*", and the following classification of the economically active population (using the International Classification by Status of Employment – ICSE-93) was recommended:

(1.0) Employees, among whom it may be possible to distinguish 'employees with stable contracts' (including 'regular employees')

(2.0) Employers

(3.0) Own-account workers

(4.0) Contributing family workers

(5.0) Members of producers' co-operatives

(6.0) Persons not classifiable by status

The same ICSE classification was also prescribed in the EU Census Regulation except that 4.0 and 5.0 were combined into a single category (although EU members were nevertheless asked to provide these data separately to Eurostat on an optional basis).

Information on employment status was collected in 50 countries in the 2010 census round. Only the United States did not do so. All but two of the countries carrying out a traditional census collected the information from a full enumeration (France and Italy used sample data only), and four out of the ten countries using a combined census methodology also collected information on the whole population. Thirty-three countries (including two thirds of all the EEA countries) reported that their definition of status in employment fully complied with the CES recommendations (the full details of which were set out in paragraphs 280-288 of the CESR).

Some 27 countries (62 per cent) used the recommended employment status classification (ICSE-93), while 17 reported using some other classification for this topic. The most common difficulty reported in conforming to the CESR related to identifying either or both of the categories 'members of producers' co-operatives' and 'contributing family workers'. It was not possible to collect specific information on these categories in Denmark, Finland, Ireland, Latvia, Lithuania, the Netherlands, Norway, Sweden, Switzerland and the United Kingdom. In Croatia it was possible to collect information on 'contributing family workers', but not on 'members of producers' co-operatives'. Some countries (such as Finland and the Netherlands) made only a basic distinction between employers and employees. However, 30 countries out of 39 reported that they were able to provide data compatible with ICSE-93. Countries that reported that they were not able to do so included Azerbaijan, Belarus, Estonia, Finland, Ireland, Liechtenstein, Norway, Sweden and the United Kingdom.

Occupation (core topic)

The CESR defined 'occupation' (at paragraph 270) as: "*…..the type of work done in a job, where 'type of work' is described by the main tasks and duties of the work*", and recommended that, for the purposes of international comparisons, countries should prepare tabulations in accordance with the latest revision of the International Standard Classification of Occupations (ISCO) available at that time (2005). This was the revision that had been adopted by the Governing Body of the International Labour Organisation (ILO) in 1988 (ISCO-88[23]). Countries belonging to the European Economic Area were recommended to refer to ISCO-88 (COM)[24].

The results of the UNECE survey showed that information on occupations was collected in 48 countries. Of those responding only the Russian Federation did not do so. Twenty-eight countries collected data primarily from full enumeration (24 of which adopted a traditional census methodology) and 14 countries collected information on a sample basis. Six of the nine register-based countries used only registers to collect information on occupation while the other three (Belgium, Iceland and the Netherlands) used data from existing labour force surveys. Only 2 of the 48 countries reported that the definition used did not comply fully with the CES Recommendations.

Some 24 countries reported using ISCO-08 classification (adopted in 2008) for coding occupation, while ISCO-88 was used in 13 countries. Ten countries used other usually national classifications which were based on, or at least compatible with, ISCO-08 or ISCO-88. Ten countries are able to provide data classified only by ISCO-88, and only one country (Armenia) reported they are not able to provide data according to either ISCO-08 or ISCO-88.

[23] International Standard Classification of Occupations, ISCO-88, approved by the ILO Governing Body in 1988 (http://www.ilo.org/public/english/bureau/stat/isco/isco88/index.htm)
[24] International Standard Classification of Occupations ISCO 88 (COM) - European Union variant of ISCO-88 (http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_unemployment_lfs/documents/ISCO_88_COM.pdf)

Industry (core topic)

The CESR refers to 'Industry' (at paragraph 274) as: "*… the kind of production or activity of the establishment or similar unit in which the job of the economically active person was located*", and recommended for the purposes of international comparability, that countries compile the industrial characteristics of economically active persons according to the latest revision of the International Standard Industrial Classification of All Economic Activities (ISIC) available at the time of the census. At the time that the CES Recommendations were approved, the third edition of ISIC[25], adopted by the United Nations Statistical Commission at its twenty-fifth session in 1989, was the latest revision available, although this was being revised. Countries belonging to the European Economic Area we recommended to refer to NACE Rev.1[26].

As with occupation, the collection of information on industry in the 2010 round was almost universal (47 countries); only the Russian Federation did not do so. Some 28 countries reported collecting information on industry from a full enumeration of the population. These included 24 countries adopting a traditional census methodology and 4 countries adopting a combined approach.

As was the case with information on occupation, sample data were most commonly used in countries with the combined method where six out of ten did so. But four countries with a traditional census also used only sample data to collect the information (Canada, France, Italy and the United States).

Among those countries with a register-based census all nine collected information on industry using administrative data. Unlike the case for occupation, no survey data were used to collect information on industry in Belgium, Iceland and the Netherlands (in these countries survey data is used if no complete registers information is available).

The definition used for industry was fully compliant with the CES Recommendations in 40 countries out of 47, whereas 6 counties (Canada, Finland, Latvia, Liechtenstein, Malta and Switzerland) used a definition that was not fully compliant (and Tajikistan did not respond).

The classification used was the ISIC Revision 4 in 17 countries and Revision 3.1 in 4 countries. More countries (23) reported using a classification different from ISIC, which for 14 countries was the European Classification of Economic Activities (NACE) revision 2. Canada and the United States used the North American Industrial Classification System (NAICS 2007), although Canada reported also having a concordance table available for NAICS 2007 and ISIC Revision 4. But there were 6 countries that reported that they cannot provide data in ISIC at all (Liechtenstein, Belgium, Denmark, the Netherlands, Azerbaijan, and Latvia). Armenia, Belarus, the Czech Republic, Israel, the Republic of Moldova, and Sweden are able to convert industry in ISIC Rev.3.1 but not in ISIC Rev.4.

Non-core and other economic-related topics

The 2010 CESR suggested a number of other economic economic-related topics that countries might consider including in their census on a non-core basis. While many countries did include one or more of these, there was no topic that was included by more than half all countries in the region. Information on "Main source of livelihood" was the most commonly collected (by 21 countries), although specific information on "Income" was collected by only 6 countries (3 of which - Finland, Israel and Norway - were countries using administrative data held in registers).

Information on "Time usually worked" (in the reference period prior to the census) or "Full-time/part-time working" was collected by 14 countries, "Type of place of work" was collected by 13 countries, and "Duration of unemployment" by 9 countries. But for none of the other topics was

[25] International Standard Industrial Classification of All Economic Activities, Statistical Papers, Series M, No. 4, Rev. 3, United Nations, New York, 1990.
[26] NACE Rev.1, Statistical Classification of Economic Activities in the European Community, Eurostat, Luxembourg 1996.

information collected by more than seven countries (see Table 13.3) and it may, therefore, be timely to reconsider whether or not some of these topics (recommended primarily because of their inclusion in the United Nations global Principles and Recommendations for Population and Housing Censuses) should be recommended for the UNECE region in the next census round.

It should be noted however, that 13 countries reported deriving some form of socio-economic classification from information collected on such topics as occupation, industry, status in employment, supervisor status, and main source of livelihood.

Table 13.3
Number of countries collecting information on non-core economic topics

Topics	Total countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Main source of livelihood	21	17	1	3	7	14
Time usually worked	14	7	2	5	11	3
Type of place of work	13	10	1	2	7	6
Socio economic groups (derived topic)	13	8	1	4	10	3
Duration of unemployment	9	5	2	2	9	0
Number of persons working at workplace	7	3	2	2	6	1
Income	6	3	2	1	2	4
Type of sector (institutional unit)	6	2	3	1	6	0
Providers of unpaid services, volunteers	3	2	0	1	1	2
Informal employment	2	2	0	0	0	2
Time-related underemployment	1	0	0	1	1	0
Other economic topic(s) not included in the CES Recommendations	5	3	1	1	3	2

14. EDUCATIONAL CHARACTERISTICS

Introduction

This chapter briefly reviews the practices regarding the collection of educational characteristics in the last census round, based on the responses from 50 countries to the UNECE survey[27].

Educational attainment (core topic)

As noted at paragraph 331 of the CESR the core topic of 'educational attainment' refers essentially to "*…. the highest level successfully completed in the educational system of the country where the education was received*."

The CESR also recommended that all education which is relevant to the completion of a level should be taken into account even if this was provided outside of a formal school or university. Furthermore it was recommended that such information should be collected for all persons aged 10 years or over, but that in order to permit international comparisons, outputs should at least distinguish persons aged less than 15 years from those aged 15 years or over.

The use of the latest available version of the International Standard Classification of Education (ISCED-97[28]) was recommended for the classification of highest level of attainment.

Compliance with CES recommendation on educational attainment was the most consistent of all topics across all countries in the UNECE (apart from demographic variable of 'sex' – See Chapter 11). All countries with the exception of the United Kingdom collected information on the topic. The UK, instead, included in its census a question on 'highest level of educational qualification obtained' and this provides sufficient data for outputs to be modelled, using an algorithm, to produce an approximation of the standard International Standard Classification of Education (ISCED-97) as recommended:

(a) Level 1 Primary (first stage of basic education)

(b) Level 2 Lower secondary (second stage of basic education)

(c) Level 3 Upper secondary education

(d) Level 4 Post-secondary, non-tertiary education

(e) Level 5 First stage of tertiary education

(f) Level 6 Second stage of tertiary education

This represented a clear improvement from the situation in the 2000 round, in which only 35 out of 42 countries included the topic in their census - though of those that did not, 6 had collected information on educational qualifications from which attainment could at least be approximated.

The level of compliance with the CESR definition in 2010 was almost as good. With the exception of the UK (for the reason noted) and Armenia and Tajikistan (who did not indicate their compliance in their response to the survey), only Finland reported that it did not fully adopt the CESR definition of the topic.

[27] The material in this chapter has been taken largely from a report prepared by the UNECE Task Force on Educational Characteristics led by Jari Nieminen (Statistics Finland) and discussed at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

[28] International Standard Classification of Education ISCED 1997, UNESCO (http://www.unesco.org/education/information/nfsunesco/doc/isced_1997.htm)

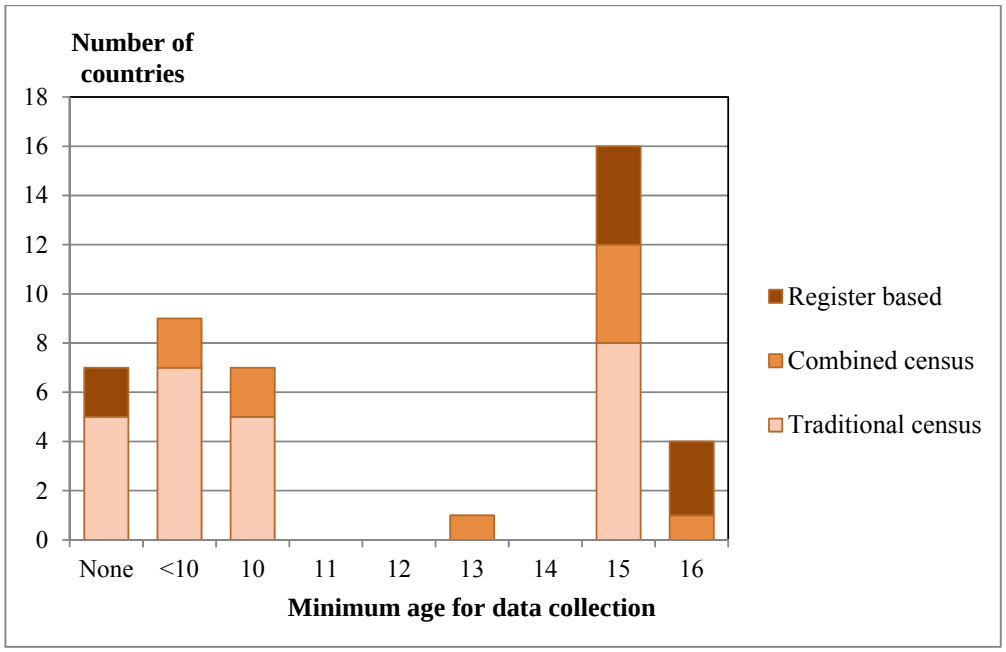
But, despite this, and along with the UK, Finland nevertheless reported that it was able to provide data in accordance with the ISCED-97 classification. However, it should be noted that Finland reported that educational attainment and degrees undertaken abroad are not fully registered and thus there was likely to be significant under-coverage of educational data of the foreign population. No other register-based country reported significant definitional difficulties with this topic. Only Tajikistan (who did not respond) and Kazakhstan reported that they could not provide data according to the ISCED classification.

Although the CES Recommendations suggested that data on educational attainment should be collected for all persons aged 10 or over, only 23 of the responding countries (48 per cent) did so. As noted above, to allow international comparisons, CES recommended that the minimum age should be at least 15 (this is also the minimum requirement for the EU purposes.). Here at least there was greater compliance, and only 4 countries (3 in EEA) did not do so — where, in each case, the minimum age was 16 (Figure 14.1). There seems to be no particular correlation between the minimum age and type of census methodology, except perhaps that 7 out of the 9 countries with register-based census adopted a minimum age of 15 or 16.

The clear majority of responding countries (62 per cent) collected information on educational attainment by means of a full enumeration. Sample data were collected by a further 10 countries (21 per cent) 4 of which adopted a traditional census, 5 used a combined census methodology and one (the Netherlands) used data from registers. Excluding the 9 countries with register-based censuses, the clear majority of the other responding countries (three quarters, 30 out of 40) collected information on educational attainment by means of a full enumeration. The other 10 used either a partial enumeration or sample survey data to do so.

It is evident that in the nine register-based countries there are generally sufficient administrative data sources to provide information on this topic, although in the Netherlands the relevant data on attainment was collected from existing survey data, considered of better quality than register data.

Figure 14.1
Number of countries by minimum age for data collection on educational attainment and type of census



Other non-core educational topics

The CES Recommendations identified a number of other (non-core) education-related topics that could be considered for inclusion in international censuses. These covered:

- **Educational qualifications**, defined at paragraph 340 of the CESR as: "…. the degrees, diplomas, certificates, etc. which have been conferred on a person by educational authorities, special examining bodies or professional bodies in his/her home country or abroad on the successful completion of a course of full time, part time or private study".
- **Field of study**, defined by ISCED at paragraph 342 of the CESR to mean: "... the subject matter taught in an education programme".
- **School attendance**, defined at paragraph 348 of the CESR as: "...regular attendance at any accredited educational institution or programme, public or private, for organized learning at any level of education".
- **Literacy**, defined at paragraph 353 of the CESR as: "... the ability both to read and to write. If this topic is included in the census, the information collected should be designed to distinguish persons who are literate from those who are illiterate. A person who can, with understanding, both read and write a short, simple statement on his everyday life is literate. A person who cannot, with understanding, both read and write a short, simple statement on his everyday life may be considered to be illiterate.
- **Computer literacy**, defined at paragraph 358 of the CESR as: "... the ability to use basic computer applications to accomplish everyday tasks, particularly the ability to use word processing, spreadsheet, e-mail and web-browsing applications".

Many countries collected at least some of the non-core educational topics, most commonly school attendance, collected by 34 countries, and literacy (25 countries) (Table 14.1). Data on such topics are often not available from administrative sources, except for field of study which may often be recorded on school and university registers, and this is borne out by the figures in the table.

Table 14.1
Numbers of countries including non-core educational topics in the census

Non-core topics	Total countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
School attendance	34	25	3	6	19	15
Literacy	25	19	0	5	10	14
Field of study	19	12	5	2	13	6
Educational qualifications	16	13	2	1	9	7
Computer literacy	9	9	0	0	2	7
Length of school attendance (not in the CES Recommendations)	2	1	0	1	1	1
Other educational topic(s) not included in the CES Rec.	8	5	0	3	5	3

Usually such information can only be collected from either a traditional census questionnaire or sample survey, and it is notable that between them, Iceland, the Netherlands, Norway and Sweden collected any such information in only two instances, whereas ten of the traditional census countries (Albania, Azerbaijan, Canada, the Czech Republic, the Former Yugoslav Republic of Macedonia, Hungary, Ireland, Montenegro, and Serbia) together with Poland and Spain were each able to collect information on four of these topic.

Additionally, other education topics reported in the survey but not individually recorded in the table, included: completed years of schooling (Albania); whether attending school in the year before the census (Canada); age at which full time education ceased (Ireland); type of school, and special education (Poland); studies being undertaken in the week before the census (Spain); and attendance at pre-primary/nursery school (Turkey).

Another feature of Table 14.1 worthy of some note is that it was generally the case in the 2010 round that proportionately more non-EEA countries collected information on education topics than was the case among countries in the EEA (particular so in the case of computer literacy). This may reflect greater concerns among a number of non-EEA countries about the need to measure and improve levels of education generally.

15. DISABILITY STATUS

Introduction

A census can provide valuable information on disability in a country, although the sensitivity of this topic make the collection of this type of information in a census relatively complex, and may affect the quality of the results. For countries that do not have regular special population-based disability surveys or disability modules in on-going surveys, the census may be the only source of information on the frequency and distribution of disability in the population at national, regional and local levels. Countries that have a registration system providing regular data on persons with the most severe types of impairments, may use the census to complement these data with information related to the broader concept of disability based on the International Classification of Functioning Disability and Health (ICF)[29]. Furthermore, census data can be utilized for planning programs and services (prevention and rehabilitation), monitoring disability trends in the country, evaluation of national programs and services concerning the equalization of opportunities, and for international comparison of the disability prevalence in countries.

This chapter present the main results of the UNECE survey with regard to the collection of data on disability in the 2010 census round in UNECE countries[30].

Definition of disability status (non-core topic)

According to the CES recommendations, disability status characterises the population into those with and without a disability. Persons with disabilities are defined by the CESR (paragraph 446) as those persons: *"….who are at greater risk than the general population for experiencing restrictions in performing specific tasks or participating in role activities. This group would include persons who experience limitations in basic activity functioning, such as walking or hearing, even if such limitations were ameliorated by the use of assistive devices, a supportive environment or plentiful resources. Such persons may not experience limitations in the specifically measured tasks, such as bathing or dressing, or participation activities, such as working or going to church, because the necessary adaptations have been made at the person or environmental levels. These persons would still, however, be considered to be at greater risk for restrictions in activities and/or participation than the general population because of the presence of limitations in basic activity functioning and because the absence of the current level of accommodation would jeopardise their current levels of participation".*

The CES recommended that the at least the four of the six domains recognised by the Washington Group on Disability Statistics (WG) as being essential in determining disability should be identified. These are:

i. Walking;
ii. Seeing;
iii. Hearing; and
iv. Cognition

and are often referred to as the Washington Group Short Set of questions on Disability (WG Short Set). But the CESR also suggested that if countries wished they could consider self-care and

[29] International Classification of Functioning, Disability and Health (ICF), Geneva, World Health Organization, 2001.

[30] The material in this chapter has been taken largely from the paper prepared by Paolo Valence (UNECE) at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

communication as two additional domains. It is generally the case, however that the full set of WG questions is not practicable in a census context where questionnaires are often designed for self-completion and where there is intensive competition with a wide range of other core and non-core topics for space on the questionnaire.

Compliance with the CES Recommendations

Information on disability was collected in the census by almost half of the UNECE countries, 24 out of 51 responding countries (see Table 15.1). In most cases (17 countries) the information was collected mainly from a full enumeration, as part of either a traditional census or — as in the case of Estonia — a combined census. In 6 countries, information on disability was collected mainly from sample data. Only in one country (Iceland) was information on disability collected primarily from registers.

Countries that collected information on disability were asked whether they used the WG Short Set. The WG Short Set is based on a series of questions on the degree of difficulty that the respondents may have doing those activities covered by the four key domains identified above. For example the recommended question and response categories for the 'seeing' domain are: *"Do you have difficulty seeing, even if wearing glasses?*

(a) No — no difficulty.

(b) Yes — some difficulty.

(c) Yes — a lot of difficulty.

(d) Cannot do at all."

About half of the countries that collected information on disability used the WG Short Set (13 countries), as recommended, and in almost all cases with no significant changes (12 countries, Turkey being the exception). Portugal, however, used the WG Short Set questions but combined the first two response categories.

Two countries (Estonia and Montenegro) that adopted the WG Short Set simplified their response categories by using only Yes/No options. This response approach was also used by other countries not using the WG Short Set (for example Hungary, Ireland, Malta, and the United States). Canada and Kazakhstan for their questions on the difficulties in doing certain activities, used three categories (Yes, sometimes; Yes, often; No).

Among the countries that used questions on whether performing everyday activities was limited due to health problems, Poland adopted four response categories similar to those recommended by the WG (Yes, entirely limited; Yes, considerably limited; Yes, moderately limited; No, it is not limited), while Bulgaria and the United Kingdom condensed these to just three for their questions on long-term illness or disability, and to just two (Yes/No) by Scotland and Northern Ireland for their questions on specific disability.

The questions on disability reported by the countries not fully adopting the Washington Group Short Set of questions are presented in Table 15.1.

Table 15.1
Questions on disability used by countries not adopting the Washington Group Short Set of questions

Country	Question
Armenia	Is there a person(s) in the household with disability status defined by the State competent authorities? Yes (note the number in the list) No.
Bulgaria	During the last 6 months, have you been limited in performing your everyday activities due to health problems? (1) Assigned by a Medical commission percentage of reduced working capacity (persons 16 and over); (2) Assigned by a Children' medical commission reduced capacity for social adaptation (persons under 16).
Canada	The questions used were the same filter questions previously used called the "Activity Limitation" questions. They are as follows: 1. Does this person have any difficulty hearing, seeing, communicating, walking, climbing stairs, bending, learning or doing any similar activity? 2. Does a physical condition or mental condition or health problem reduce the amount or the kind of activity this person can do: at home? At work or school? In other activities, for example, transportation or leisure? The response categories are: Yes, sometimes Yes, often; No.
Hungary	What disability do you have?
Ireland	Two related questions were used on disability. Both had Yes/No response categories. 1 Do you have any of the following long-lasting conditions or difficulties? (a) Blindness or a serious vision impairment; (b) Deafness or a serious hearing impairment; (c) A difficulty with basic physical activities such as walking, climbing stairs, reaching, lifting or carrying; (d) An intellectual disability; (e) A difficulty with learning, remembering or concentrating; (f) A psychological or emotional condition; (g) A difficulty with pain, breathing or any other chronic illness or condition. For the purpose of this question a 'long lasting condition or difficulty' was one which has lasted or was expected to last 6 months or longer, or that regularly re-occurs. 2 If "Yes" to any of the categories specified do you have any difficulty in doing any of the following? (a) Dressing, bathing or getting around inside the home; (b) Going outside the home alone to shop or visit a doctor's surgery; (c) Working at a job or business or attending school or college; (d) Participating in other activities, for example leisure or using transport.
Kazakhstan	Do you have difficulties in walking, with hearing, vision and speaking? Yes, sometimes; Yes, not often; No
Malta	Three questions were used: 1. Do you have any long term illness, disease and/or chronic condition? (Yes/No). 2. Do you have any of the following disabilities/conditions? • mental health condition • deafness or partial hearing loss • blindness or partial sight loss/ • intellectual disability • specific learning difficulty • development disorder • physical disability • other-open ended. 3. Specify your main type of disability/difficulty.
	(continues on next page)

Country	Question
Poland	Has your ability to perform usual activities (learning at school, professional activity, running a household, self-service) been limited due to health problems (disability or chronic disease) for 6 months or longer? Yes, entirely limited; Yes, considerably limited; Yes, moderately limited; No, it is not limited; I don't want to answer this question.
United Kingdom	A question was included on whether a person's day-to-day activities were affected by a long-term health problem or disability without specifying particular disabilities. Yes, limited a lot Yes, limited a little No In Scotland and Northern Ireland there was also a question that asked about a number of different "conditions" that were expected to last 12 months. In Scotland these separately covered: a) deafness or partial hearing loss; b) blindness or partial sight loss; c) learning disability (for example Down's syndrome); d) learning difficulty (for example dyslexia); e) development disorder (for example, Autistic Spectrum Disorder or Aspergers's Syndrome); f) physical disability difficulty; g) mental health condition; h) long-term illness or condition; i) other condition; j) no condition. In Northern Ireland these separately covered: a) deafness or partial hearing loss; b) blindness or partial sight loss; c) communication difficulty (speaking or making yourself understood); d) mobility or dexterity (that limits, activities such as walking, climbing stairs, lifting or carrying); e) learning or intellectual difficulty, or social or behavioural difficulty; f) emotional, psychological or mental health condition; g) long-term pain or discomfort; h) breathing difficulty, shortness of breath; i) frequent periods of confusion or memory loss; j) chronic illness (such as cancer, HIV, diabetes, heart diseases or epilepsy); k) other condition; l) no condition.
United States	Is this person deaf or does he/she have serious difficulty hearing? Yes/ No. Is this person blind or does he/she have serious difficulty seeing even when wearing glasses? Yes/ No Because of a physical, mental, or emotional condition, does this person have serious difficulty concentrating, remembering, or making decisions? Yes/ No Does this person have serious difficulty walking or climbing stairs? Yes/ No. Does this person have difficulty dressing or bathing? Yes/ No. Because of a physical, mental, or emotional condition, does this person have difficulty doing errands alone such as visiting a doctor's office or shopping? Yes/No.

Coverage

The large majority of countries (19 out of the 23 responding countries) collected information on disability for all members of the household, with no minimum age, or other limits.

Four countries had a minimum age for collecting information on disability, that was 6 years in Italy, 5 years in Israel and the United States, and 3 years in Turkey (but in the latter case questions on seeing and hearing were asked of all persons).

No country reported in the survey having used a systematic filter or screening question. However, some countries such as Croatia, Montenegro and Romania used questions such as *"Does the person have difficulties in performing activities of daily living due to a long term illness, disability or old age?"* to screen out negative respondents. Hungary asked the question "*In what areas do you have difficulties because of your disability?*" to collect additional information.

Difficulties in collecting disability data

There has been a general perception, historically, among some countries that collecting reliable data on disability in a census context is difficult. For example, the United Kingdom, despite a long tradition of asking a question about mental disability throughout the second half of 19th century eventually abandoned the idea after the 1911 Census because it was accepted at that time that such a question was too sensitive and the resulting data too inaccurate. As the Chief Statistical

Superintendent at the General Register Office, William Ogle, reported in commenting on the accuracy of the 1881 Census figures: *"It is against human nature to expect a mother to admit her young child to be an idiot, however she may fear this to be true. Openly to acknowledge the fact is to abandon all hope."*

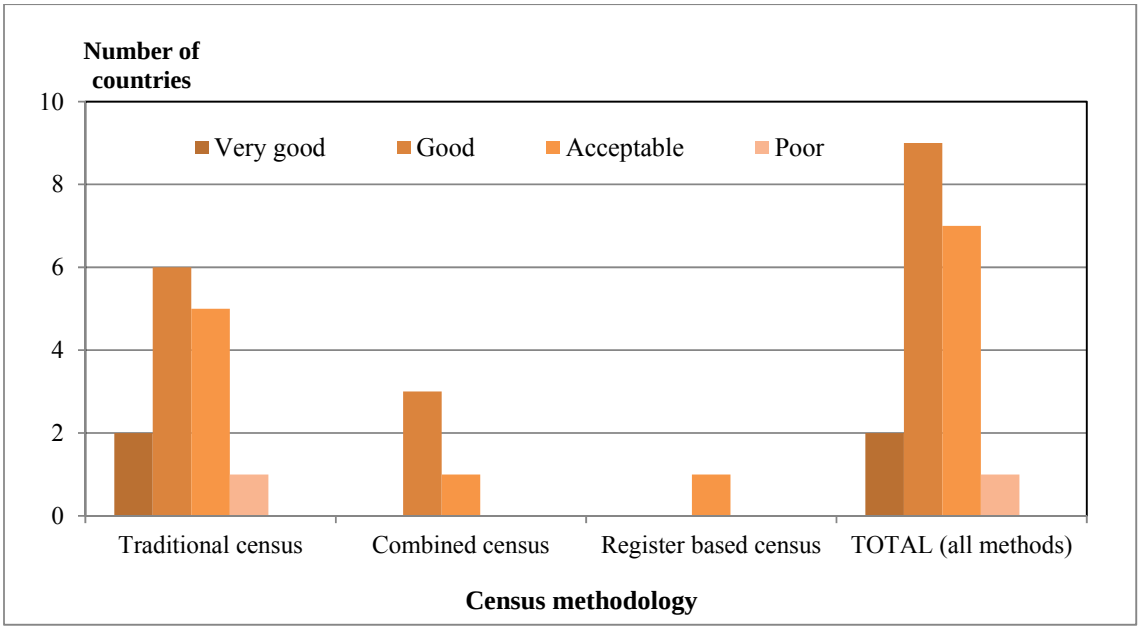
But have things improved since then?

About half of the countries that collected data on disability reported no particular difficulties (13 countries). Poor understanding of the questions was reported as a difficulty by 5 countries, including countries that used the WG Short Set with no changes (Albania and Portugal), with some changes (Malta and Turkey) or that use other questions (Kazakhstan). Difficulties in interpreting responses were reported by 3 countries (Kazakhstan, Malta and Turkey). Bulgaria reported low response, as did Poland where the question was voluntary. Albania reported specific difficulties in collecting information on children. Finally, Romania noted that the questions were not well received by the public and mass-media, which considered them to be too intrusive and not relevant to the purpose of the census.

Nevertheless, overall, countries that attempted to collect information on disability seem to be more satisfied with the quality of the responses than not. The information was considered to be 'good' or 'very good' by 11 countries and 'acceptable' by 7 more (Figure 15.1). Only Kazakhstan - with its unique question on difficulties in walking, hearing, vision and speaking - rated the resulting data as being of 'poor' quality.

It should be noted, however, that these responses were generally based on a subjective perception by the responding countries. Several countries noted that more information on data quality will be available later, when evaluation activities will have been completed.

Figure 15.1
Rating of quality of information on disability (number of countries, by census methodology)



16. MIGRATION

Introduction

Migration in general, and international migration in particular, plays an important role in shaping the demographic and socio-economic profiles of most, if not all, countries in the UNECE region. In many countries the population census is not only a primary statistical source, but it also has a pivotal function for the range of definitions and classifications it produces. It was therefore important that common definitions and concepts should have been adopted in the last census round in order to provide consistent and comparable migration information, and especially for the identification of migrants stocks.

This chapter looks at the way that countries in the UNECE region used the census to identify two different aspects relevant for the measurement of migration:

(a) the measurement of stocks of *international* migrants and other groups relevant to international migration, with information on timing and geographical patterns of their international migration flows; and

(b) the measurement of stocks of *internal* migrants, with information on timing and geographical patterns of their internal migration flows.

In relation to the immigrant stocks the CESR included two core topics that allowed the identification of those born abroad ('Country/place of birth') and those with foreign citizenship ('Country of citizenship'). And to aid the measurement of international migration flows the core topic of 'Ever resided abroad and year of arrival in the country' and the non-core topics of 'Country of previous usual residence abroad' and 'Total duration of residence in the country' were also recommended. Additional (non-core) topics would allow the identification of additional groups that may or may not belong to the immigrant stock: 'Citizenship acquisition' and 'Country of birth of parents', and, to some extent, 'Ethnic group', 'Religion' and 'Language' (the latter three being covered in the next chapter).

Internal migration stocks and information about timing and geographical patterns of internal movements are primarily collected using the core topic 'Previous place of usual residence and date of arrival in the current place of residence' and the non-core topic 'Place of usual residence five years prior to the census'.

One further recommended non-core topic that can provide additional information about both international and internal migration is the 'Reason for migration'.

This chapter reviews the extent to which the CESR for each of these topics in turn were adopted by UNECE countries in the 2010 round.[31]

[31] The material in this chapter has been taken largely from a paper prepared by the UNECE Task Force on Migration and Ethno-Cultural Characteristics, led by Jane Badets (Statistics Canada) and presented at the at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

International migration

Definition of an international migrant

Put simply, a migrant to any specified area is someone who is living in the area having previously changed his/her place of usual residence from outside that area. Using this basic concept, the CESR defined (at paragraph 365) an international migrant as

"....*any person who changes his or her country of usual residence*"

and for the purposes here, the concept of 'usual residence' is as set out in Chapter 10 in which the inclusion or exclusion of specific population groups in the total usually-resident population is discussed. The term 'ever-international migrants' is used synonymously, and the stock of such people in any country will include all foreign-born individuals plus those native-born persons who have ever (usually) resided abroad.

Country/place of birth (core topic)

Numbers of the stock of foreign-born residents (who by definition must all be migrants) is derived in the census using information on country or place of birth. All countries that responded to the UNECE survey except Tajikistan collected information on this core topic. However, the CESR allows place of birth to be collected according to either the geographical unit in which the birth took place or to the place of usual residence of the mother at the time of the birth (paragraph 373). Of the 50 countries that did collect this information, 32 adopted the first criterion and 25 adopted the second, with 7 countries adopting both (Table 16.1). This overall proportional spread was not the case, however, among those countries adopting a register-based census where marginally more countries adopted the second criterion.

Interestingly, although both criteria were offered in the 2010 CESR, more countries used the second option than did so in the 2000 round (when only 19 did so) even though this was the only criterion recommended by the CES at that time.

It is also interesting to note (see Table 16.2 below) that among the ten countries using a combined methodology for their census, four countries relied on a full field enumeration to collect the information, and two used sample survey data. This seems to suggest that country of birth is not universally recorded on administrative registers. Indeed only four of the ten countries adopting a combined census derived this information using such registers.

Table 16.1
Information collected on country/place of birth (number of countries)

Information collected	Total number of countries	Type of census		
		Traditional	Register-based	Combined
No	1	1	0	0
Yes	50	31	9	10
Country of actual birth only	25	15	4	6
Country of residence of mother only	18	10	5	3
Both	7	6	0	1
National boundaries as at census	37	25	4	8
National boundaries as at birth	10	3	5	2
Other definition	3	3	0	0

The CESR also recommended (at paragraph 374) that for the purposes of international comparability, as well as for internal use, information on country of birth should be collected on the basis of international boundaries existing at the time of the census. Most countries (37) complied with this (Table 16.1). However, 10 countries (half of whom carried out a register-based census) collected information on the national boundaries at the time of birth, suggesting that data on persons born in countries where there have been subsequent changes of national borders may not necessarily be comparable. Additionally, 3 countries (Azerbaijan, Ireland and Kyrgyzstan) reported some other definition for determining boundaries. Ireland for example reported that in the census itself no reference was made to boundaries, and the instruction on the questionnaire was to state the place where the mother lived at the time of the birth. It might be assumed that, as the only border change that would have been relevant was that with the United Kingdom (the border with Northern Ireland), the same approach was adopted as in the UK itself (which was to assign country of birth as at the time of the census).

Two thirds of all responding countries (33) coded country of birth information based on the three-digit alphabetical codes according to the classification issued by the UN Statistical Division. Of those that did not, most were in the EEA and referred instead to the classification prescribed by the EU Census Regulations.

Table 16.2
Source of information collected on country of birth and country of citizenship (number of countries)

	Total number of countries	Type of census		
		Traditional	Register-based	Combined
Total responses	**51**	**32**	**9**	**10**
Country of birth				
Information collected	**50**	**31**	**9**	**10**
… mainly from a full enumeration	*32*	*28*	*0*	*4*
… mainly from sample data	*5*	*3*	*0*	*2*
… mainly from admin. records or registers	*13*	*0*	*9*	*4*
No information collected	**1**	**1**	**0**	**0**
Country of citizenship				
Information collected	**50**	**32**	**9**	**9**
… mainly from a full enumeration	*33*	*29*	*0*	*4*
… mainly from sample data	*5*	*3*	*0*	*2*
… mainly from admin. records or registers	*12*	*0*	*9*	*3*
No information collected	**1**	**0**	**0**	**1**

Country of citizenship (core topic)

In the 2000 census round, the only countries that did not collect information on country of citizenship were Israel and the United Kingdom. The UK had long resisted the pressure from UNECE to do so citing, as justification, a general lack of public understanding of the concept of citizenship, defined at paragraph 375 of the CESR as: "*... the particular legal bond between an individual and*

his/her State, acquired by birth or naturalization, whether by declaration, option, marriage or other means according to the national legislation".

The British public's understanding was no better in 2011 but at least a compromise was reached and the UK sought at last to collect proxy information by asking a question on country of passport held and/or deriving the information using a combination of responses to the questions on country of birth, national identity and age. Thus in the 2010 round only Israel did not collect information on citizenship (Table 16.2).

The UK was not alone, however, in not fully adopting the CESR definition of 'citizenship' in its census. Ireland collected information on 'nationality' instead, and in accordance with the Russian Federal Law 'citizenship' is defined as "the sustainable and legal relationship of the person with the Russian Federation, expressed by their rights and obligations". The differences are in both cases only very subtle.

The sources of data for most countries were very much the same as for country of birth. Registers were used by only three countries adopting a combined methodology.

The CES recommendation that information on dual or multiple citizenship should be collected where it is relevant was adopted by 31 countries (62 per cent). This proportion was somewhat higher among countries with a traditional census (72 per cent) where such information is more readily recordable, than among countries with a register-based census, of whom only Finland and Sweden were able to do so. Among the countries that recorded dual/multiple citizenship, two thirds were able to do so for all respondents, while in 9 countries the information related only to national citizens, and in Sweden only to foreigners.

Forty-four countries used the same classification of country of citizenship as they did for country of birth.

Ever resided abroad and year of arrival in the country (core topics)

Not all migrants are identified from information collected on country of birth or country of citizenship. Native-born residents may also be international migrants if they have ever lived abroad. The CESR therefore introduced these two core topics for the 2010 round in order to focus on all persons who have ever resided outside the country of usual residence.

More than three quarters of countries (40) reported collecting information relating to whether or not residents had ever resided abroad (Table 16.3), although in the case of two register-based countries data from administrative sources were only available from the date that the register was established. Of these 40, 38 countries also collected information on the year of arrival.

The CES recommended (at paragraph 380) that the year (and month if possible) of the most recent arrival should be collected to provide a measure of duration of residence. The Recommendations argued that it is preferable to measure duration using the time of arrival rather than the number of years elapsed since arrival in the country because time of arrival is likely to yield more accurate information. Furthermore the year of last arrival to the country was recommended rather than the year of first arrival since it provides unequivocal information. When using information on year of last arrival, the derived duration of residence refers to an uninterrupted stay in the country, whereas information is not generally available on periods of residence abroad when the year of first arrival is used. The year of last arrival can also provide useful information on recent immigration flows.

Table 16.3
Countries collecting information on year (and month) of arrival in country, total duration of residence, and country of previous usual residence abroad

	Total number of countries	Type of census		
		Traditional	Register-based	Combined
Total responses	**51**	**32**	**9**	**10**
Ever resided abroad	40	23	8	9
Collected year of arrival	38	23	7	8
Most recent arrival	*38*	*23*	*7*	*8*
Year only	24	13	5	6
Year and month	14	10	2	2
First arrival	*4*	*1*	*3*	*0*
Year only	3	1	2	0
Year and month	1	0	1	0
Total duration of residence	10	6	3	1
Country of previous usual residence abroad	32	22	6	4

The year only of most recent arrival was collected by 24 countries, while 14 others collected details of both year and month. Three countries with a register-based census also collected information on date of first arrival; Norway and Slovenia provided year only, while Iceland (with seemingly the most comprehensive registers related to this topic) was able to record information on both year and month (although subject to the restriction that information was available only for all who had arrived in the country after February 1986). Canada was the only country to report collecting year of first arrival according to permanent resident status by asking the question "*In what year did the person first become a landed immigrant*?" Duration of residence in Canada before becoming a permanent resident was excluded in the data capture.

Reflecting the statutory requirement of EU member states to provide Eurostat with data on year of arrival, a rather higher proportion of EEA countries collected this information (87 per cent – only Austria, the Czech Republic, Finland, and France did not) compared with two thirds of non-EEA countries.

Total duration of residence in the country, and country of previous usual residence abroad (non-core topics)

To provide information on duration of residence for those multiple or circular migrants who have established a residence in the country more than once, the CES also recommended that countries should collect information on total duration of residence in the country, being defined (at paragraph 383) as:

"…. *the total number of years that the ever-international migrant has resided in the country, taking into account all periods of residence including the last one*".

Information on this non-core topic was, however, collected by only 10 countries (Table 16.3).

Information on country of previous usual residence abroad provides a key characteristic of international migration flow. Even though it was recommended by CES for inclusion only as a non-core topic some two thirds of countries collected this information (Table 16.3) - a proportion which was the same irrespective of census methodology.

The UNECE survey also enquired specifically of countries that were formerly members of a federation or union whether they treated movements between countries while they were still part of the federation or union as international or internal. Of the 20 countries that identified themselves as being such former members, 17 had regarded such movements for the purposes of the census as international migrations, while 2 (the Czech Republic and Slovakia) had regarded movements before 1st January 1993 (Day of the Establishment of the Slovak Republic and Czech Republic) as internal.

Internal migration

The CESR went (at paragraphs 371-372) to define what is meant, for census purposes, by the term 'internal migrant' and the level of national geography at which information on internal migration should be collected. The basic definition of an internal migrant may be repeated here as being:

"… *a person who is usually resident in a particular geographical area and who has previously been resident in another geographical area in the country*".

The CESR went on to explain that in operational terms for the purposes of measuring internal migration the geographical area is identified as the smallest civil division. 'Internal migrants' were, therefore, defined as:

"… *those persons who are usually resident in a civil division within the country at the time of the census and who have previously been resident in another civil division within the country, where the civil division is identified at the smallest civil level*".

In order to provide relevant information on internal migration, a detailed classification was recommended that should distinguish local, intra-regional or inter-regional moves. However, the CESR suggested that movements *within* the smallest civil division should be considered as 'residential mobility', rather than internal migrations as total population counts would be unaffected by such moves.

Persons who are international immigrants – who, regardless of country of birth or citizenship, have at some point in their lives been usually resident in another country – may, of course, also be counted as internal migrants if, in addition to their international move, they also moved internally and they were resident elsewhere in the country prior to the census.

Place of previous usual residence and the date of arrival in the current place of usual residence (core topic)

The principle means measuring internal migration in the census is by collecting information on place of previous usual residence and the date of arrival in the current place of usual residence. This was assigned as a single core topic in the CESR. However, recognising the different possible approaches that countries could adopt in collecting the relevant information the CESR recommended that, in practical terms, one of two modes could be employed:

(a) **the 'extensive mode'**, effected by using information on year and month of arrival in the current place of usual residence plus the previous place of usual residence; or

(b) **the 'reduced mode'** effected by ascertaining place of usual residence one year prior to the census.

If adopting the 'extensive mode' the CES recommended that the date of arrival should be the calendar year and month when the person most recently established residence in the current place of usual residence, but that in order to reduce the burden on respondents' the month of arrival could be asked only of those who arrived in the calendar year before the census. From the joint use of the two items of information it is possible to analyse patterns and timing of internal migration. As noted above the previous place of usual residence would generally be defined in terms of the smallest civil

division, but if this was outside the country, identifying just the country of residence would be sufficient.

The 'reduced mode' is primarily intended to allow patterns of recent migration to be studied, but otherwise the classification relating to the place of usual residence one year prior to the census remained the same as for place of previous usual residence. However, for countries adopting the reduced mode the CESR went on to propose that information on 'Place of usual residence five years prior to the census' could also be collected (as a non-core topic). This extension of the time interval allows the capture of a much larger number of moves but at the cost of an increased uncertainty about the exact timing of the migration.

How well did countries collect this key information in the 2010 round?

Table 16.4 shows what information relating to either the extensive or reduced mode was collected by each country. Looking at the first three rows it will be noted that 39 countries collected information on place of previous usual residence and 33 countries collected information on year of arrival, but not all of these countries collected both. Outside of the EEA area 84 per cent of countries that collected place of previous usual residence also collected year of arrival (16 out of 19), but within the EEA the corresponding proportion was only 65 per cent (13 out of 20) Thus only 29 countries were able to use the extensive mode for measuring internal migration.

Things were somewhat better however when it came to the reduced mode, for which two thirds of the countries (34 out of 51) collected data specifically on the place of usual residence one year prior to the census as recommended by the CES. In addition, 11 countries collected the information with respect to a period of five years before the census (9 of which collected information on both periods) while 5 others collected the information relating to a period of ten years (generally referring to the date of the previous census).

Table 16.4
Countries collecting information on previous usual residence and date of arrival using either the extensive or reduced mode

	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Extensive mode						
Place of previous usual residence	39	27	4	8	20	19
Date of arrival (year only)	18	11	1	6	9	9
Date of arrival (year and month)	15	10	4	1	8	7
Reduced mode						
Information on place of previous usual residence, collected…						
1 year prior to the census	*34*	*19*	*8*	*7*	*24*	*10*
5 years prior to the census	*11*	*7*	*1*	*3*	*4*	*7*
10 years prior to the census	*5*	*4*	*0*	*1*	*2*	*3*
Some other period prior to the census	*4*	*2*	*1*	*1*	*2*	*2*
Did not collect the information	11	8	1	2	5	6

Across all census methodologies the reduced mode seems to have been the more viable option, although 11 countries collected a sufficient range of information to satisfy both modes. Table 16.4 also shows the number of countries by census type that collected information on place of usual residence at some time prior to the census. Eight out of the nine countries with a register based census were able to comply with the reduce mode – a higher proportion than amongst the traditional census countries of whom only 19 of the 32 did so. As noted above, some countries collected more than one item of information, but, in all, 44 countries collected at least one item.

Level of geography used for measuring internal migration

As noted above, in order to provide relevant information on internal migration, the CES recommended that countries should distinguish local, intra-regional or inter-regional moves. Accordingly, the UNECE survey asked countries to report whether or not they identified moves both within and between the country's major and minor civil divisions in any period of time prior to the census (the reduced mode). The results are shown in Table 16.5(a). Most of the 44 countries that collected information on previous place of usual residence were able to record whether the person was living in the same or another civil division. However, neither Kyrgyzstan nor Tajikistan reported on this information, so the base of the table is 42 countries.

Internal migrations within and between minor civil divisions were recognized by a majority of countries. Some 29 reported collecting information on moves within the same minor civil division and 31 reporting moves between minor divisions, the majority of whom (29) collected information on the name of the area of origin thus allowing an analysis of migration flows to be made possible.

Fewer countries reported collecting information on movements between the higher level geography of major civil divisions despite the CESR recommendation to collect information on regional migration. At this level only 25 counties collected information of whom, again, only two did not record name of the area of origin. Other responses included Finland's who reported that the relevant data was obtained from its population register in which the coordinates of place of both previous and current usual residence are recorded.

Table 16.5(a)
Number of countries collecting information on geographic level of internal migration (reduced mode)

	Total number of countries	Type of census		
		Traditional	Register based	Combined
Responding countries	**42**	**26**	**9**	**7**
Information collected on whether or not the person was living in:				
The same dwelling where the person was resident at the time of the census	20	13	5	2
The same minor civil division where the person was resident at the time of the census	29	17	6	6
Another minor civil division (name of the civil division asked)	29	18	6	5
Another minor civil division, but the name of the civil division was not asked	2	2	0	0
The same major civil division	17	10	6	1
Another major civil division (name of the civil division asked)	23	16	4	3
Another major civil division, but the name of the civil division was not asked	2	0	2	0
Another country (name of the country asked)	31	21	4	6
Another country, but the name of the country was not asked	4	0	4	0
Other responses	6	4	1	1

Only four of the 35 countries that collected information on country of previous usual residence through this mode did not record the name of the country – all conducted register-based censuses.

Information was also collected in the survey on the level of geography used for measuring internal migration in those 39 countries using the extensive mode of data collection. The equivalent results are shown in Table 16.5(b). Two countries did not report and thus the base of this table is 37. The pattern of geography at the level of the major and minor civil division is shown to be very similar. However it should be noted that the distinction between the two modes of measuring internal migration was, perhaps, not made sufficiently clear in the survey questions, resulting in some possible duplication of response in some cases due to lack of understanding of the underlying concepts.

Table 16.5(b)
Number of countries collecting items on the previous place of residence (extensive mode)

	Total number of countries	Type of census		
		Traditional	Register based	Combined
Responding countries	**37**	**26**	**4**	**7**
Information collected whether or not the person was living in:				
Another dwelling in the same minor civil division where the person was resident at the time of the census	10	7	1	2
Another minor civil division, and the name of the civil division was asked	23	16	3	4
Another minor civil division, but the name of the civil division was not asked	1	1	0	0
The same major civil division	12	10	2	0
Another major civil division and the name of the civil division was asked	23	17	3	3
Another major civil division, but the name of the civil division was not asked	1	1	0	0
Another country, and the name of the country was asked	30	21	3	6
Another country, but the name of the country was not asked	0	0	0	0
Other responses	5	3	1	1

Reason for migration (non-core topic)

Bearing in mind that the CESR propose that reason for migration be included only as a non-core topic, some 19 countries adopted the recommendation and included the topic in the census (Table 16.6). None of the countries carrying out a register-based census were able to do so (although Norway reported that such information was available in other population statistics, but not was considered to be a 'census' variable). What is not shown in the table is that 13 of these countries were outside the EEA indicating the importance that some countries with significant emigration in Eastern, South-Eastern Europe and the CIS attach to understanding international migration patterns.

The CESR suggested (at paragraph 391) that this topic should refer to only the *main* reason that drove the respondent to undertake the most recent *international* move and that only *one* such reason should be recorded, but the survey recognised that most countries that collected such information were likely to have done so for a range of reasons and, accordingly, asked countries to report all such reasons. Indeed, nine countries reported on five or more of the reasons identified in the table (plus some others); Belarus and Greece reported on seven reasons.

Table 16.6
Main reasons for international migration (number of countries)

Information collected on reason(s) for migration	Total number of countries	Type of census		
		Traditional	Register-based	Combined
Responding countries	**51**	**32**	**9**	**10**
No	32	17	9	6
Yes	19	15	0	4
Reasons (multiple response allowed):				
……Employment	18	14	0	4
……Education	18	14	0	4
……To join family members	14	13	0	1
……Refugee (forced migration)	9	9	0	0
……Health/medical	4	2	0	2
……Asylum	4	4	0	0
……Return after emigration	4	4	0	0
……Other reasons	14	11	0	3

All but one of the countries (18) reported that employment and education factors were the key drivers for international migration. The reason "to join family members" was also significant in 14 countries, and 6 countries reported other family or marriage–related reasons. Four countries (Azerbaijan, Belarus, Greece, and the Former Yugoslav Republic of Macedonia) specifically reported return migration as a key reason, while Lithuania reported the 'wish to live in native land' as another reason.

Other migration topics covered by the UNECE survey

The CES Recommendations covered a number of other non-core topics that aimed to supplement the information collected in the census through the recommended core topics.

Thus the CESR suggested that countries with a significant number of immigrants may want to collect information on the 'country of birth of parents'. Such information could, for example, provide information on the ethnic background of second generation immigrant populations in countries where no data on ethnic group is available. The recommendation was that information relating to both parents should be collected and in the case of adopted children reference should be made to the legal parents.

Only 14 countries reported collecting this information relating to both parents in the 2010 round (comprising half the countries with a combined census, four of the nine countries with register- based census but only 15 per cent of countries with a traditional census). One country (Greece) collected the information on the mother only, and Israel did so for the father only (and then only for children born in the country). Norway reported that information on country of birth of parents is available from registers, but is not used as a census variable.

To supplement the information collected on country of citizenship the CESR suggested that countries with a significant number of naturalized persons might want to collect information on the 'acquisition of citizenship' by identifying if this was by, for example, birth, marriage, naturalization or other means according to the national legislation. Only seven countries (the Czech Republic, Greece, Italy, Luxembourg, Malta, Spain and United States) reported that they collected such information. All except Spain conducted a traditional census. In addition, however, Poland collected

information only on citizenship acquired from birth, and Switzerland did so on citizenship acquisition by birth and by naturalization.

In responding to the survey enquiry into information collected on other migration-related topics, five countries reported that they collected information on 'emigration' (Albania, Estonia, Hungary, Poland and Serbia) plus Norway who again noted that such information that was available from its registers were used only for the purpose of other population statistics rather than the census.

Four countries (Estonia, Poland, Serbia and the United Kingdom) reported that they collected information on 'short-term international migrants' – the UK did this by asking a question on length of intended stay for all persons born outside the country. Poland also collected information the 'work performed by immigrants' in line with their qualifications, and Estonia asked a question on 'birthplace of grandparents', thereby expanding the ancestry information it collected through the question on parents' birthplace.

17. ETHNO-CULTURAL CHARACTERISTICS

Introduction

Data on ethno-cultural characteristics of the population are of increasing relevance to countries of the UNECE region in the context of migration, integration and equality policies. The 2010 CESR suggested that countries with a culturally diverse population may wish to collect information on the ethnic identity (or composition) of the population, on mother tongue, the knowledge and practice of languages as well as on religious communities and denominations. These are all characteristics which allow people the flexibility to express their identity in the way that they choose. Some countries may also wish to collect information on the ethno-cultural characteristics of parents and grand-parents (ancestry) in order to gain a deeper understanding of the origins of the population and of integration processes.

However, ethno-cultural characteristics have generally a subjective dimension as there is often no common understanding, nationally and internationally, as to what 'characteristic' or 'concept' is actually being measured in a particular census. Moreover, different countries may adopt different concepts. The characteristics can also often be politically sensitive and may apply to very small, yet identifiable, population sub-groups. The free and open declaration of the respondents is therefore of essential importance. Members of certain minority groups may be particularly vulnerable to discrimination on the grounds of ethnic group or religion. Consequently the 2010 CESR indicated that special care is required in census procedures and outputs relating to ethnic group and religion, in order to demonstrate to respondents that appropriate data protection and disclosure control measures are in place. In some cases it was suggested that countries should seek to collect such data on a voluntary basis if this is permitted by national legislation.

It is generally the case that data based on registers or administrative sources only are of limited relevance to these topics and can at best cover only certain aspects, such as the formal membership of a church or religious community or the official language of communication between the government and households in a multilingual environment.

For these reasons, together with the fact that the collection of information on topics such as ethnicity and religion may be prohibited by law in some UNECE countries, the 2010 CESR proposed that all the topics covered in this chapter should be non-core.

This chapter presents a review of the national practices in the UNECE region with regard to the collection of ethno-cultural characteristics in the censuses of the 2010 round[32].

Ethnicity and religion

Responses to census questions on ethnicity and, to some degree, religion are thus subjective in that persons must be free, on both counts, to respond in any way that they choose. That, added to the fact that information collected must inevitably vary from country to country across the UNECE region, means that these topics were included in the 2010 CES Recommendations as non-core (nor is the provision of data by EU Member States on either of them required under EU Regulations). It might be expected, therefore, that, as was the case in the 2000 round, a smaller proportion of countries would include such questions in their recent censuses compared with those of other topics. And this, indeed, was the case.

[32] The material in this chapter has been taken largely from a paper prepared by the UNECE Task Force on Migration and Ethno-Cultural Characteristics, led by Jane Badets (Statistics Canada), drafted by Ian White (Office for National Statistics, UK) and presented at the at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

Less two thirds of countries (31 out of 51, 61 per cent) reported that they collected information on ethnicity in their census (see Table 17.1). This was the same proportion as in the previous round. Slightly fewer (28 countries, 55 per cent) collected information on religion (compared with just half of the countries in the 2000 round). Some 23 countries collected information on both topics.

None of the nine countries with wholly register-based census reported that they were able to collect information on ethnicity, and only one of them collected information on religion (Finland). However, two other countries that adopted a combined methodology for their censuses reported that information on religion was collected mainly from registers (Germany and Israel), indicating that in some countries registers *can provide* such data. In some countries such as France and Belgium, however, the collection of data on ethnicity and religion is generally forbidden by statue.

Table 17.1
Number and percentage of countries that collected information on ethnicity and religion

	Ethnicity		Religion	
	Number	%	Number	%
Responding countries	**51**	**100**	**51**	**100**
Collected the information	**31**	**61**	**28**	**55**
Mainly from a full enumeration	28	55	22	43
Mainly from sample data source	3	6	3	6
Mainly from registers/administrative data	0	0	3	6
Did not collect information	**20**	**39**	**23**	**45**

The concept of ethnicity as defined by the 2010 Recommendations (at paragraph 419) refers to population groups that share such common characteristics as 'historical or territorial origins' or 'culture' or 'language' or 'religion' or 'specific customs and/or way of life'. This encompasses a wide spectrum of characteristics, and the survey revealed that of those countries that collected such data, three quarters (23 countries, all with traditional census) reported that the concept that they adopted fell within the UNECE definition. In addition, however, of the 8 countries that reported otherwise, 4 (Bulgaria, Canada, Israel and Poland) adopted concepts which could be broadly interpreted as falling within the UNECE definition.

Information on ethnicity was collected separately from that on nationality or citizenship in the majority of countries (23). Some 14 countries reported that they collected information on ethnicity using a combination of the concepts of ethnic or cultural group and nationality; some 12 countries used only the concept of ethnic or cultural group (however that was defined), while 6 countries used only the concept of nationality (Table 17.2). The questions in the United Kingdom and Ireland used a mix of pragmatic concepts covering racial groups, skin colour, national identity, and geographic origins. All but three countries (Canada, Kyrgyzstan and the United States) interpreted 'race' and 'ethnicity' synonymously.

Table 17.2
Distinction between ethnicity and nationality (number of countries)

	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Information on ethnicity collected separately from that of nationality or citizenship:						
Yes	23	20	0	3	9	14
No	8	4	0	4	3	5
Information collected referred to:						
Ethnicity/cultural group only	12	11	0	1	5	7
Nationality only	6	4	0	2	3	3
Combination of both	14	9	0	5	6	8

The survey similarly enquired into the definitional concept to which the information on 'religion or faith' referred. The CESR suggested (at para 437) that religion: "…*is generally regarded as a set of beliefs and practices, usually involving acknowledgment if a divine or higher being, power or principle, by which people order the conduct of their lives both practically and in a moral sense*".

Some 17 of the 28 countries that collected information on religion (61 per cent) did so with reference to an 'identification' with a particular religion or religious community; a further 10 (36 per cent) referred to 'religious belief' (Table 17.3).

In four countries the information related to a 'formal membership' of a church or religious community, and in Armenia a question was asked about the religion in which a person was brought up. In the United Kingdom, the situation was made complicated by the fact that different information was collected in Scotland (where the concept was the religious denomination in which the person 'belonged'), in Northern Ireland (where two concepts were used: (a) the belonging' concept, as in Scotland, and (b) the 'brought up in' concept as in Armenia), and in England and Wales (where no concept was adopted at all and persons were just asked 'What is your religion?'). The question asked in Canada was similar to England and Wales: "What is this person's religion?" Germany collected information on two concepts 'formal membership' and 'religious belief'.

Table 17.3
Nature of religious identification (number of countries)

Type of information collected	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Identification with a certain religion, religious community or denomination	17	14	0	3	9	8
Religious belief	10	7	0	3	6	4
Formal membership of a church or a religious community	4	1	1	2	2	2
Religion in which a person was brought up	1	1	0	0	0	1
Religious attendance	1	1	0	0	0	1
Other type of information	3	2	0	1	2	1

Religion clearly remains a topic on which is difficult to collect information on an internationally consistent basis. This is made doubly difficult by differences in the type of question that is used in traditional censuses. Countries were asked what formats of questions were used to collect information on ethnicity and religion. The responses are shown in Table 17.4. The most widely adopted approach for both ethnicity and religion (17 and 16 countries respectively) was the combined approach where pre-defined categories were identified for the most commonly anticipated responses but where there was also the facility to record write-in responses. Most countries that did not adopt this approach went with a completely open-ended write-in question, allowing the respondent to describe freely their ethnicity or religion (used in 12 countries for ethnicity and in 6 countries for religion). Not surprisingly, most countries that adopted one type of question for ethnicity also adopted the same type for religion (20 countries did so).

Those countries that included pre-defined categories for the ethnicity question were also asked to report the number of such categories from which the respondent was able to select a response. The average was 18.4 ranging from 1 (Estonia) to 189 (Poland). But this is perhaps a meaningless statistic as the advent of online returns allowed the opportunity for some countries to provide a drop-down menu of a large number of possible options from which the respondent could simply select a response. Poland and Hungary adopted this approach.

Table 17.4
Type of questions used to collect information on ethnicity and religion (number of countries)

	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Ethnicity						
Countries collecting information	**31**	**24**	**0**	**7**	**12**	**19**
Open-ended question with no pre-defined response categories	12	12	0	0	2	10
Combined question, with both pre-defined categories and write-in responses	17	11	0	6	9	8
Closed-ended question, with pre-defined response categories	1	1	0	0	0	1
Other format/method	1	0	0	1	1	0
Voluntary question	24	20	0	4	8	16
Mandatory question	7	4	0	3	4	3
Religion						
Countries collecting information	**28**	**20**	**1**	**7**	**15**	**13**
Open-ended question with no pre-defined response categories	6	6	0	0	1	5
Combined question, with both pre-defined categories and write-in responses	16	11	0	5	10	6
Closed-ended question, with pre-defined response categories	4	3	0	1	3	1
Other format/method	1	0	1	0	1	0
Voluntary question	24	19	0	5	12	12
Mandatory question	3	1	1	1	3	0

Although the 2010 CESR suggested that respondents should be free to indicate more than one ethnic affiliation, or a combination of such affiliations, only nine countries (30 per cent) reported that this option was provided in their census. However, the recommendation that countries should include questions on ethnicity and religion on a voluntary basis (or at least allow the respondent not to have to declare an ethnicity or religion) was followed by the majority of countries. Some 88 per cent of countries allowed responses to the question on religion to be voluntary. Only Finland (whose data came from a register) and Ireland (where there is a long tradition of including religion in the census) did not. In the case of Germany the information on formal membership was taken from a register and was therefore mandatory, but the information on religious belief, collected through a sample survey, was provided voluntarily.

A slightly smaller proportion (79 per cent) of countries collected the information on ethnicity only on a voluntary basis; six countries (Ireland, Latvia, Poland, Tajikistan, the United Kingdom and the United States) collected this information on a mandatory basis.

Because of the subjective nature of the topic, no classification of ethnicity was proposed by the 2010 CESR and the UNECE survey therefore made no attempt to ascertain what sort of classification each country adopted for analytical purposes, as there was likely to be little conformity across the region. This was not so much the case for religion, for which the CESR did propose a possible framework classification (at paragraph 444), comprising:

(1.0) Christianity
- (1.1) Catholic
- (1.2) Orthodox
- (1.3) Protestant (including Anglican, Baptist, Brethren, Calvinist, Evangelical, Lutheran, Methodist, Pentecostal, Pietist, Presbyterian, Reformed, and other Protestant groups)
- (1.4) Jehovah's Witnesses
- (1.5) Oriental Christian
- (1.6) Other Christian

(2.0) Islam
- (2.1) Alawit (Nusayris)
- (2.2) Ismaili (Seveners)
- (2.3) Ithna'ashari (Twelvers)
- (2.4) Shia
- (2.5) Sufi
- (2.6) Sunni
- (2.7) Zaydi (Fivers)

(3.0) Judaism

(4.0) Buddhism

(5.0) Hinduism

(6.0) Sikhism

(7.0) Other religious groups

(8.0) No religion

The UNECE survey was not able to enquire into the level of compliance with the recommended classification that countries were able to achieve. But it is known that at least one country (the United Kingdom) was able to comply fully at this one-digit level using the information from its questions that used a combination of tick-box and write-in response options.

Language

The 2010 CESR noted that multi-lingual countries and countries with significant immigrant populations may wish to collect data on languages that are currently written or spoken. Recognising that different information may be required depending on users' needs, the CESR recommended that one or more subtly different modes of question should be used:

(a) *Mother tongue*, which may be defined as the first language spoken in childhood at home;

(b) *Main language*, defined as the language which the person commands best;

(c) *Language most often spoken* at home and/or at work; and

(d) *Knowledge of languages*, defined as the ability to speak and/or write one or more languages.

Data on (a) and (b) are relevant to understanding the processes of language change and to determine language regions and language groups, while data on (c) and (d) are relevant to understanding language practices and knowledge of languages, including official languages and languages learned at school.

The CESR recommended that at least two questions be asked about language - one referring to topics (a), (b), or (c) and the other to topic (d).

More countries collected information on language (36 out of 51 countries, or 71 per cent) than did so for ethnic group or religion, and most of these (31) used a full enumeration to do so (Table 17.5). Sample and administrative data were rarely used to collect information on language, and only one country with register-based census (Finland) did so. Perhaps surprisingly given the increase in international migration since the last census round, the proportion of countries collecting information on language in the UNECE region fell slightly; in the 2000 round it was 75 per cent.

Table 17.5
Number of countries that collected information on language and main source of data

Source of information on language	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Collected information on language	**36**	**30**	**1**	**5**	**17**	**19**
Mainly from a full enumeration	31	27	0	4	14	17
Mainly from sample data (including census long form, ad hoc or existing survey)	4	3	0	1	2	2
Mainly from registers and admin. records	1	0	1	0	1	0
Did not collect information on language	**15**	**4**	**8**	**3**	**13**	**2**

The most commonly adopted mode of question used to collect information was 'mother tongue'; two thirds of the countries that collected information on language did so using this concept (Table 17.6). Information on language(s) spoken most often at home was collected by over half of the countries (20), and over a third of countries (13) collected information on knowledge of/ability in languages. Only five countries (Canada, Hungary, Ireland, the Russian Federation and the United Kingdom) reported collecting information on sign language.

Table 17.6
Mode of collecting language information

	Number of countries	Percentage (out of 36)
Mother tongue	24	67
Main language	11	31
Language(s) currently spoken at home	20	56
Languages most often spoken at work	3	8
Knowledge of/ability to speak and/or write one or more other languages	13	36
Knowledge of/ability in the official language(s) of the country	7	19
Sign language	5	14

Table 17.6 clearly shows that some countries collected information using more than one mode of question. Indeed, 21 countries did so (Table 17.7). Canada collected information on almost all of the categories identified in the table (six), and Kazakhstan on five categories. Azerbaijan, Hungary, Ireland, Lithuania and the Russian Federation each reported collecting information on four of the categories.

It is noticeable (from Table 17.5) that proportionately for more countries outside the EEA collected information on language (90 per cent) than did countries within the EEA (52 per cent), reflecting, no doubt, the multi-ethnic, multi-linguistic character of the communities living in many of the CIS countries.

Table 17.7
Countries that adopted more than one mode of collecting information on language

Country	Number of modes	Mother tongue	Main language	Spoken most often		Knowledge of		Sign language
				at home	at work	other language	official language	
Canada	6	✓		✓	✓	✓	✓	✓
Kazakhstan	5	✓	✓	✓		✓	✓	
Azerbaijan	4	✓		✓		✓	✓	
Hungary	4	✓		✓		✓		✓
Ireland	4			✓		✓	✓	✓
Lithuania	4	✓	✓	✓		✓		
Russian Federation	4	✓				✓	✓	✓
Belarus	3	✓		✓		✓		
FYR Macedonia	3	✓		✓		✓		
Georgia	3	✓	✓	✓				
Luxembourg	3		✓	✓	✓			
Montenegro	3	✓		✓		✓		
Slovakia	3	✓		✓	✓*			
Switzerland	3		✓	✓	✓			
United Kingdom	3		✓			✓		✓
Liechtenstein	2		✓	✓				
Armenia	2	✓				✓		
Kyrgyzstan	2		✓	✓				
Moldova	2	✓		✓				
Poland	2	✓		✓				
Tajikistan	2	✓				✓		
United States	2			✓			✓	

*Most frequently used language in public (not only language at work)

18. HOUSEHOLD AND FAMILY CHARACTERISTICS

The UNECE Recommendations for the 2000 round of censuses recognised major changes in the structure of households and families compared to the 1990 recommendations. One important change was that references to consensual unions were included systematically in the new 2000 recommendations. Other important revisions concerned *de jure*/*de facto* place of residence, the distinction between private and institutional households, the concept of child, and the concept of reconstituted family.

The significant changes in living arrangements and the emergence of new household types reported in many countries in the UNECE region seen in the previous decade have continued since the 2000 round. Trends have included, for instance, a later start of family life, increased cohabitation, larger numbers of one person households and lone-parent families as a result of divorce, more reconstituted families, and increased proportions of people living in more than one household.

The 2010 CES Recommendations noted that household and family composition can be examined from several different points of view. In considering topics related to households it is important that countries are aware of the different concepts relating to households and families. Some of the key issues (but by no means all) were specifically investigated in the UNECE survey, and this chapter reviews the practices in the 2010 census round regarding the adoption of a number of these concepts, definitions and classifications associated with the structure and characteristics of households (both private and institutional) and families[33].

Concepts and definitions of terms

Private and institutional households

The CES Recommendations offers two different concepts for defining **private households**. The so-called **housekeeping** concept defines (at paragraph 479) a household as being either:

"…. a one-person household, that is a person who lives alone in a separate housing unit or who occupies, as a lodger, a separate room (or rooms) of a housing unit but does not join with any of the other occupants of the housing unit to form part of a multi-person household as defined below; or

a multi-person household, that is a group of two or more persons who combine to occupy the whole or part of a housing unit and to provide themselves with food and possibly other essentials for living. Members of the group may pool their incomes to a greater or lesser extent."

Countries adopting this concept do not assume that the number of private households is equal to the number of housing units and thus the incidence of households living in 'shared' dwellings is possible.

However, some countries are unable to collect data based on the concept of the 'common housekeeping' of household members, in particular where they have to rely on register-based information. Many of these countries use the **household-dwelling** concept which considers all persons living in a housing unit to be members of the same household, such that there is one household per occupied housing unit.

The results of the UNECE survey showed that 36 of the responding countries (71 per cent) reported that they used the 'housekeeping' concept, whereas 15 reported using the 'household-dwelling' concept, of which only 3 (France, Liechtenstein and Spain) could estimate the number of private households according to the housekeeping concept.

[33] The material in this chapter has been taken largely from a paper prepared by Howard Hogan (US Census Bureau) and presented at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

The CESR went on define to (at paragraph 484) an **institutional household** as comprising:

"*… persons whose need for shelter and subsistence were being provided by an institution.*"

Most countries (90 per cent) broadly adopted this definition. Of those that did not, two reported that the definition used was imposed either by legislation (Germany) or by the register used as the data source (Norway), while the United Kingdom reported using a definition that better reflected the needs of its main data uses and provided for consistency with previous censuses and surveys (though in the bulk of cases the categories of institution recognised were broadly comparable with those recommended by the CES). In the Canadian census certain types of collective dwellings that were considered to be institutions in the CES Recommendations were classified as non-institutional collective dwellings, though the people living there were distinguished from people living in private households.

Indeed, all responding countries distinguished the population living in private households from those living in institutional or other households, although in the United Kingdom there was no attempt to collect information on private households and families living within communal institutions.

In some countries, people live in specialized housing estates in which the occupants live in a semi-independent arrangements but where various care services are provided in a centralized manner. In 13 countries, the population living in this kind of housing estate was classified as living in a private household, whereas in 17 countries the population was classified as living in an institutional household. In another 14 countries no such housing was reported. Six countries sometimes classify the population either as institutional or as living in private households depending on various criteria. For example, in Belarus, if meals were provided by Social Protection then the population was considered institutional, but where people pay for the services themselves, they were considered as living in a private household. In Canada, the level of care was used as a criterion. In the UK the proportion of the population with facilities to enable them to cook for themselves was the deciding factor.

In thirteen countries, information on 'other' households was collected. Seven countries included the 'homeless' population in this extracurricular group, while other population groups also treated separately included sailors and others living in boats or mobile/temporary living quarters (note that a more detailed review of the concept of 'homelessness' is reported in Chapter 19). Four countries reported that the population which was temporarily absent (for up to one year) were separately identified. Switzerland categorized persons who do not fit in the private or institutional category as 'administrative' households, while Canada identified the population in non-institutional collective dwellings.

Twenty-seven countries reported conducting a pre-census living quarters validation check for the purpose of, among other things, identifying the nature of the collective living quarters or the potential presence of private households living within institutions. Only two of the countries with register-based census (Iceland and Slovenia) reported doing this.

Child

The CESR gives (at paragraph 495) the definition of a 'child' as being: "*a blood, step- or adopted son or daughter (regardless of age or marital status) who has usual residence in a household of at least one of the parents, and who has no partner or own child(ren) in the same household. Grandsons and granddaughters who have usual residence in the household of at least one grandparent while there are no parents present may also be included*".

The CESR went on to note that foster children are not considered to be a child within this definition, nor are any (grand)son or (grand)daughter who lives with a spouse, with a registered partner, with a consensual partner, or with one or more own children.

All but five countries reported adopting this definition fully. In Israel, however, a child was defined as anyone under the age of 18 living in the household regardless of familial relations, while in the United States, any offspring of head of household was considered as a child regardless of whether or not they have a partner in the same household. In Bulgaria grandchildren as specified above were not included as children.

Couple

The CES Recommendations defines the concept of a 'couple' (at paragraph 496) to include: *"… married couples, registered couples, and couples who live in a consensual union. Two persons are understood to be partners in a consensual union when they have usual residence in the same household, are not married to each other, and report to have a marriage-like relationship to each other".*

All but four countries reported adopting this definition fully. Poland did not recognise people in same-sex relationships as couples. In Norway persons in same-sex marriages are included as couples, but not same-sex cohabitants (data are not available). Romania reported that the concept of a '*registered couple'* did not exist in national legislation at the time of the census. Kyrgyzstan did not respond on this issue.

The nuclear family

The CESR defined (at paragraph 493) a family nucleus as: "… *two or more persons who live in the same household and who are related as husband and wife, as cohabiting partners, as a married (or registered) same-sex couple, or as parent and child. Thus a family comprises a couple without children, or a couple with one or more children, or a lone parent with one or more children*".

The family concept as defined above limits relationships between children and adults to direct (first-degree) relationships, that is between parents and children. In some countries, numbers of 'skip generation' households, that is households consisting of grandparent(s) and one or more grandchild(ren), but where no parent of those grandchildren is present, are considerable. Therefore, countries may include such skip generation households in their family definition. The CESR went on to note that 'family nuclei' are usually identified at the processing stage on the basis of marital status, sex, age, and relationship to the reference member of the household. In the case of multi-family households, however, these data are often not sufficient to provide a reliable basis for allocating persons to particular family nuclei. It is left to countries to decide whether family nuclei in these households should be distinguished by asking the respondent to list the members of each family nucleus in consecutive order, or in some other way.

Four countries (Azerbaijan, Italy, the Russian Federation and the United Kingdom) reported in the survey that they used a different definition of a 'family' than the nuclear concept recommended by CESR. But a closer examination of their more detailed responses suggests that in each case the concepts are broadly compatible.

Three-generation household

The CES Recommendations defines the concept of a 'three-generation household' (at paragraph 496) to consist of: *"… two or more separate family nuclei or one family nucleus and (an)other family member(s), containing at least three generations and where the youngest two generations always constitute one family nucleus*".

The results of the survey showed that data on three-generation households as fully defined can be produced in 35 out of the 46 countries that responded. A number of countries reported specifically why they could not do so. Bulgaria, for example, noted the lack of interest at the national level in data on such households. Liechtenstein reported that a three-generation household could only be identified

if a member of the second generation was the head of the household; in the case where the head of the household was in the oldest generation, the grand-children would just be classified relatives of the head of the household. Conversely, the United States could identify three-generation households indirectly by the relationship question only when the head of household was a grandparent. Norway reported that although data could be produced from its registers, the topic was not considered to be a census variable.

Reconstituted family

The CES Recommendations defines the concept of a 'reconstituted family' (at paragraph 498) as being: *"… a family consisting of a married or cohabiting couple or a married (or registered) same-sex couple, with one or more children, where at least one child is a non-common child, that is the child of only one member of the couple".*

A little more than half of the countries (27) reported that data on reconstituted families can be produced from their census. Among these, 24 countries fully complied with CESR definition, including 5 out of the 9 with register-based censuses. Three countries adopted a definition that deviated slightly, including Canada where the 'step-family' concept used was a close approximation. Also, although the United Kingdom noted that data on stepchildren had been collected, reconstituted families were not produced as standard output of the census.

In reporting the method used to derive information on reconstituted families, 12 out of 27 countries referred the use of a household relationship matrix (including three of the countries with register-based census), and in 3 other countries a partial matrix had been used. Some 12 countries used the information about the relationship to the reference person – but only Norway of the register-based countries did so; 4 of these used it together with relationship matrix or partial matrix information (more details on the way countries collected information on relationship is given below). A unique method of matching based on birth dates of children was used in Hungary. In the register-based census of Slovenia the required information was also available in registers. In Poland and in Portugal, besides the relationship to the reference person, direct identification on parents was also used to produce data on reconstituted families.

The CESR went on to suggest (at paragraph 539) how reconstituted families might be classified, but an enquiry into the extent that such a classification was adopted in the 2010 round was not covered in the UNECE survey.

Extended family

The CESR suggested (at paragraph 501) that some countries may wish to derive information on 'extended families', data which can have certain advantages not only for studying the economic relationships of families as spending units, but also in classifying families from a demographic point of view. The CESR suggested that an 'extended family' be defined as: "… *a group of two or more persons who live together in the same household and who do not constitute a family nucleus but are related to each other (to a specified degree) through blood, marriage or adoption*".

Thirty-five countries out of 48 reported that extended families can be identified from their census data, though Belgium noted that the process was difficult, while in Latvia and in the United Kingdom data is available from the census but not produced in standard output. Four of the countries, however, reported some deviation from the CES recommend definition. Hungary developed an algorithm to do this, and in the United Stated, such families can, to a large extent, be identified based on data on the relationship to the head of household.

Canada explained that extended family members can be identified as those people who were in the same 'economic' family (related to each other) and who were not members of a 'census' family (that is they do not constitute a family nucleus as defined above). The economic family concept there

requires only that family members be related. By contrast, the census family concept requires that family members be a male or female married spouse, a male or female cohabiting partner, a male or female lone parent, or a child with a parent present. The economic family and its associated classifications and variables were derived according to the responses to the questions on sex, date of birth, marital status, cohabitation status, and relationship to the reference person. In addition, consideration was given to the order in which household members were listed on the questionnaire.

The CESR went on to encourage those countries that derived information on this type of family unit to use the suggested classifications proposed for the non-core topics 'extended family status' (see paragraph 532) and 'type of extended family' (paragraphs 543-544), but – as with the proposed classification of reconstituted families above - these non-core derived topics were not covered in the UNECE survey.

Collecting information on relationship within the household

The household and family status of persons within private households is primarily based on the information collected on the (core) topic of relationship between household members. The 2010 CESR noted (at paragraph 506) that in previous censuses, the selection of the one reference person in the household to whom all other household members report or designate their relationship was the recommended method for mapping household structures. When the household's reference person is chosen carefully, this method gives accurate information for most household and family types. In certain cases, however, such as in multiple family households, this method will not always give the precise information that is required. Therefore, a more elaborative method - the household relationship matrix approach - has been developed by some countries. This household relationship matrix allows for the collection of all relationships between all household members.

Some countries have good experience with the household relationship matrix method in their censuses. But other countries have noted problems with this approach, due to its complicated character. Therefore, the CESR recommended that countries consider the relationship matrix only as one possible method for mapping household structures.

The majority of countries (31 – almost two thirds) used information on the relationship to a single person — the household reference person (HRP) - to derive household relationship, while 12 countries (four each from those countries adopting a traditional, register-based or combined methodology) collected information on the inter-relationship between each household member using the more complex 'matrix' approach. In addition, three countries (Iceland, Lithuania and Tajikistan) reported using a combination of these two methods, and several others (such as Portugal, Romania, the Russian Federation and Spain) used the relationship to a single person but also collected information on the person's parents if they were living in the same household.

It might be expected that the 'matrix' approach would be more common among traditional census taking countries - where information might be more easily collected from such a specific question on a census form - but of these, only Bosnia and Herzegovina, Greece, Luxembourg and the United Kingdom did so. However, four of the nine register-based countries (Austria, Finland, Iceland and Sweden) reported using this method. On the other hand, Norway noted the difficulty of doing so by reporting that data from its registers identifies relationship between spouses, cohabitants and children/parents only, and that all other types of relationship were not known.

Although the CES Recommendations recommended that information on the relationship to the HRP should be collected, it was left to countries to choose among several different criteria to determine who the reference person should be. The 2010 CESR noted (at paragraph 513) that "… *the selection of the one reference person in a household to whom all other persons in the household report, or designate, their relationship requires careful consideration. In the past the person considered to be the 'head' of the household was generally used as the reference person, but this concept is no longer considered appropriate in many countries of the region. It has also sometimes*

been proposed that the person designated as the reference person should be the oldest person in the household or the one who contributes the most income."

However, the CESR went on to recognise that given that the primary purpose of such identification was to assign family status and to assign individuals into families, both of these approaches have weaknesses. The automatic selection of the oldest person, for example, may be undesirable because in multi-generational households the broadest range of explicit kin relationships can be reported where the reference person is selected from the middle generation. Similarly, the selection of the person with the highest income may be a person who will not solicit the broadest range of explicit kin relationships. The CESR noted that there was some evidence though to suggest that the following criteria for selection of the reference person would yield the most fruitful range of explicit kin relationships:

(a) Either the husband or the wife of a married couple living in the household (preferably from the middle generation in a multi-generational household);

(b) Either partner of a consensual union couple living in the household where there is no married couple present;

(c) The parent, where one parent lives with his or her sons or daughters of any age; or

(d) Where none of the above conditions apply, any adult member of the household may be selected.

The UNECE survey asked those countries that reported that they collected information on the relationship to the HRP to indicate how the HRP was selected from one of the following criteria:

1) The reference person was freely chosen by respondents, among the adults living in the household;

2) The reference person was the member considered as being the household head by all the other members;

3) The reference person was the member who contributed the most income;

4) The reference person was the one resulting from the Population or other administrative Register;

5) The reference person was identified according to criteria, such as age and family relationships, chosen to facilitate the family determination; or

6) Some other (specified) criteria.

Among those 31 countries that collected information on the relationship to an HRP, 16 reported that the HRP was freely chosen by the household members among themselves. Some 12 countries identified the household member who was considered, by the other household members, as being the 'household head' – though it should be noted that the response categories were not mutually exclusive and that 5 of these countries (Albania, Belarus, Cyprus, Montenegro and Slovakia) reported both of these criteria. Indeed several countries reported adopting more than one of the other criteria. For example, the person who contributed the most income was considered to be the HRP in three countries (Bulgaria, Malta and Montenegro) but each of these also selected option 2. Indeed, Montenegro reported that they applied four of the criteria. In cases where the information was taken from administrative registers the HRP was often already determined – and this was reported by Belgium, Italy, the Netherlands and Slovenia. In the United States the HRP was the person in whose name the living unit was owned or rented.

In order to facilitate identification of family nuclei and households, the CESR recommended (at paragraph 515) using the following classification of relationship to the HRP. The classification was recommended at the one-digit level and optional at the two-digit level.

(1.0) Reference person

(2.0) Reference person's spouse

(2.1) Husband or wife

(2.2) Same-sex registered partner

(3.0) Reference person's partner in consensual union (cohabiting partner)

(3.1) Opposite-sex cohabiting partner

(3.2) Same-sex cohabiting partner

(4.0) Child of reference person and/or of husband/wife/cohabiting partner

(4.1) Child of reference person only

(4.2) Child of reference person's husband/wife/cohabiting partner

(4.3) Child of both

(5.0) Husband/wife or cohabiting partner of child of reference person

(6.0) Father or mother of reference person, of spouse, or of cohabiting partner of reference person

(7.0) Other relative of reference person, of spouse, or of cohabiting partner of reference person

(8.0) Non-relative of reference person of the household

(8.1) Foster child

(8.2) Boarder

(8.3) Domestic servant

(8.4) Other

All the responding countries (31) identified the HRP (1.0), 30 countries identified the HRP's spouse (2.0) and 29 countries the HRP's child(ren) (4.0) and the parent of the HRP (6.0)(Table 18.1). The other categories were identified with lesser degrees of frequency. Thus 26 countries identified the HRP's partner in a consensual union (3.0), but only 23 identified the spouse or cohabiting partner of child of the HRP (5.0).

Table 18.1
Compliance with the CES Recommendation on classification of relationship to the Household Reference Person (number of countries)

Categories of CES classification of relationship to the Household Reference Person	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
(1.0) Reference person (HRP)	31	23	3	5	15	16
(2.0) HRP's spouse	30	23	3	4	15	15
(2.1) Husband or wife	29	22	3	4	13	16
(2.2) Same-sex registered partner	7	5	1	1	4	3
(3.0) HRP's cohabiting partner	26	19	3	4	15	11
(3.1) Opposite-sex partner	21	17	2	2	10	11
(3.2) Same-sex partner	12	11	0	1	5	7
(4.0) Child of HRP and/or of husband/wife/ cohabiting partner	29	21	3	5	15	14
(4.1) Child of HRP only	17	13	2	2	9	8
(4.2) Child of HRP's husband/wife/ cohabiting partner	16	13	1	2	7	9
(4.3) Child of both	16	13	1	2	9	7
(5.0) Husband/wife or cohabiting partner of child of HRP	23	17	2	4	12	11
(6.0) Father or mother of HRP, or of HRP's spouse or cohabiting partner	29	21	3	5	14	15
(7.0) Other relative of HRP or of HRP's, spouse or cohabiting partner	28	21	3	4	14	14
(8.0) Non-relative of HRP	26	20	2	4	11	15
(8.1) Foster child	6	6	0	0	1	5
(8.2) Boarder	5	5	0	0	2	3
(8.3) Domestic servant	5	3	0	2	3	2
(8.4) Other	10	8	1	1	4	6

Not surprisingly the optional (two-digit) categories were far less likely to be identified in the census data than the recommended one-digit categories, particularly where they relate to same-sex relationships; only seven countries, for example, collected information on same-sex registered partner (2.2). And only five countries (Canada, Cyprus, France, Israel and Liechtenstein) reported that they separately identified domestic servants.

In addition to their relationship to the HRP, information was also collected in 12 countries on the reference number within the household of one or both of the person's parents.

It should be noted, of course, that even those countries that used the matrix approach to collecting information on relationship needed to identify an HRP (since many household variables relate to the characteristics of that one person). The United Kingdom and Ireland, for example, assigned the person who was entered as 'Person 1' on the questionnaire as the HRP, but suggested to the respondent that that person should be the 'householder' - being the person who owns or rents the household's accommodation and/or was responsible for paying the household's bills.

In case where the household relationship matrix method is used, the CESR recommended a similar classification (again optional at the two digit level):

(1.0) Other person's husband or wife

(2.0) Other person's partner in consensual union (cohabiting partner)

- (2.1) Other person's opposite-sex cohabiting partner
- (2.2) Other person's same-sex cohabiting partner

(3.0) Other person's child

(4.0) Other person's father or mother

(5.0) Other person's other relative

(6.0) Non-relative of other person

- (6.1) Foster child
- (6.2) Boarder
- (6.3) Domestic servant
- (6.4) Other

For the 12 countries that adopted the matrix method (split equally between those adopting a traditional, register-based, and combined census methodology) the survey also enquired whether or not data from the census would be available for each category. The results are shown in Table 18.2.

All responding countries reported that they were able to produce data for the reference person's husband or wife, partner in consensual union (cohabiting partner), child(ren), and father or mother. But only 8 countries did so out for non-relatives, and none at all for domestic servants.

Table 18.2
Compliance with the CES Recommendation on the classification of inter-relationship within the household for countries using the relationship matrix approach (number of countries)

Categories of CES classification of relationship to other person	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
(1.0) Husband or wife	12	4	4	4	10	2
(2.0) Partner in consensual union (cohabiting partner)	12	4	4	4	10	2
(2.1) Opposite-sex partner	10	4	3	3	8	2
(2.2) Same-sex partner	10	4	3	3	8	2
(3.0) Child	12	4	4	4	10	2
(4.0) Father or mother	12	4	4	4	10	2
(5.0) Other relative	10	4	3	3	8	2
(6.0) Non-relative of other person	8	4	1	3	6	2
(6.1) Foster child	3	1	2	0	2	1
(6.2) Boarder	1	1	0	0	0	1
(6.3) Domestic servant	0	0	0	0	0	0
(6.4) Other	1	1	0	0	1	0

Household status

The CESR recommended (at paragraph 520) that information should be derived for all persons on their status or position in the household and, for persons in private households, whether they are living alone, in a nuclear family household or living with others. The following three-level classification of household status was recommended (at the three digit level):

(1.0) Person in a private household

- (1.1) Person in a nuclear family household
  - (1.1.1) Husband
  - (1.1.2) Wife
  - (1.1.3) Male partner in a consensual union
  - (1.1.4) Female partner in a consensual union
  - (1.1.5) Lone father
  - (1.1.6) Lone mother
  - (1.1.7) Child under 25 years of age
  - (1.1.8) Son/daughter aged 25 or older
  - (1.1.9) Other persons not member of the nuclear family, but in a nuclear family household
- (1.2) Person in other private households
  - (1.2.1) Living alone
  - (1.2.2) Living with relatives
  - (1.2.3) Living with non-relatives

(2.0) Person not in a private household

- (2.1) Person in institutional household
- (2.2) Primary homeless person
- (2.3) Other

Some 41 of 49 responding countries (84 per cent) reported that they classified household members by their status within the household, plus the Russian Federation who reported that it could if required to do so by users. The numbers of countries identifying each category within the recommended classification are shown in Table 18.3.

The countries that could not classify person by household status encompassed all three mains types of census methodology (though only Finland of the register-based countries could not do so). Table 18.3 shows that coverage for most categories was generally good, but that there were a few problematic categories. Fewer countries (36) reported that they could identify 'partners in a consensual union' (1.1.3/4) and 'other persons not a member of the nuclear family' (1.1.9) and only 32 could identify persons in non-nuclear family households 'living with relatives or non-relatives' (1.2.2/3).

However, and not surprisingly, identifying the primary homeless proved to be the most difficult for many countries, and particular so for those taking register-based census. Of the 11 countries that cannot report on the homeless, 5 adopted a register-based methodology, highlighting the deficiency of administrative data sources for identifying this particularly hard to reach sub-group of the population. But in fact enumerating this group successfully presents operational difficulties for all countries regardless of their census methodology.

Table 18.3
Compliance with the CES Recommendation on classification of household status (number of countries)

Categories of CES classification of household status	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
(1.0) Person in a private household	40	24	8	8	27	13
(1.1) Person in a nuclear family household	40	24	8	8	27	13
(1.1.1) Husband	39	25	7	7	24	15
(1.1.2) Wife	39	25	7	7	24	15
(1.1.3) Male partner in a consensual union	36	23	7	6	24	12
(1.1.4) Female partner in a consensual union	36	23	7	6	24	12
(1.1.5) Lone father	40	26	7	7	25	15
(1.1.6) Lone mother	40	26	7	7	25	15
(1.1.7) Child aged under 25 years	40	25	7	8	25	15
(1.1.8) Son/daughter aged 25 or older	39	25	7	7	24	15
(1.1.9) Other persons not member of the nuclear family but in a nuclear family household	36	23	6	7	23	13
(1.2) Person in other private household	38	22	8	8	26	12
(1.2.1) Living alone	39	24	7	8	25	14
(1.2.2) Living with relatives	32	21	4	7	19	13
(1.2.3) Living with non-relatives	32	21	4	7	19	13
(2.0) Person not in a private household	38	22	8	8	26	12
(2.1) Person in institutional household	40	24	8	8	26	14
(2.2) Primary homeless person	28	21	3	4	17	11
(2.3) Other person	13	8	2	3	7	6

Type of (private) household

The CESR recommends (at paragraph 548) that private households should be classified into the following types:

(1.0) Non-family households
- (1.1) One-person households
- (1.2) Multi-person households

(2.0) One-family households
- (2.1) Husband-wife couples without resident children
  - (2.1.1) Without other persons
  - (2.1.2) With other persons
- (2.2) Husband-wife couples with at least one resident child under 25
  - (2.2.1) Without other persons
  - (2.2.2) With other persons
- (2.3) Husband-wife couples, youngest resident son/daughter 25 or older

(2.3.1) Without other persons

(2.3.2) With other persons

(2.4) Cohabiting couples without resident children

(2.4.1) Without other persons

(2.4.2) With other persons

(2.5) Cohabiting couples with at least one resident child under 25

(2.5.1) Without other persons

(2.5.2) With other persons

(2.6) Cohabiting couples, youngest resident son/daughter 25 or older

(2.6.1) Without other persons

(2.6.2) With other persons

(2.7) Lone fathers with at least one resident child under 25

(2.7.1) Without other persons

(2.7.2) With other persons

(2.8) Lone fathers, youngest resident son/daughter 25 or older

(2.8.1) Without other persons

(2.8.2) With other persons

(2.9) Lone mothers with at least one resident child under 25

(2.9.1) Without other persons

(2.9.2) With other persons

(2.10) Lone mothers, youngest resident son/daughter 25 or older

(2.10.1) Without other persons

(2.10.2) With other persons

(3.0) Two or more-family households

Depending on national legislation and data needs, the CESR also suggested that countries might include registered (marital) same-sex couples in categories (2.1)-(2.3).

All but one of the responding countries (Estonia) reported that they classified private households by their compositional type. France noted that stepfamilies were not separately identified from other families, but was otherwise compliant with the CESR classification (Georgia did not respond).

However, not all countries were able to recognise all the recommended categories in their detailed classifications, particularly at the two-digit level. The figures in Table 18.4 show the types of households that are more problematic. The identification of cohabiting couples, particularly where the youngest child is aged 25 or older, is the least well recorded across the UNECE region as a whole.

The table shows also that there is little significant difference in the level of compliance with the recommended classification across the three different census methodologies.

Table 18.4
Compliance with the CES Recommendation on classification of type of household (number of countries)

Categories of CES classification of type of household	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
(1.0) Non-family households	47	29	9	9	28	19
(1.1) One-person households	47	29	9	9	28	19
(1.2) Multi-person households	46	28	9	9	28	18
(2.0) One-family households	47	29	9	9	28	19
(2.1) Husband-wife couples without resident children	44	26	9	9	27	17
(2.1.1) Without other persons	35	24	4	7	19	16
(2.1.2) With other persons	34	23	4	6	19	14
(2.2) Husband-wife couples with at least one resident child under 25	44	27	9	8	27	17
(2.2.1) Without other persons	34	24	4	6	19	14
(2.2.2) With other persons	33	23	4	6	19	14
(2.3) Husband-wife couples, youngest resident son/daughter 25 or older	42	25	9	8	27	15
(2.3.1) Without other persons	33	23	4	6	19	14
(2.3.2) With other persons	32	22	4	6	19	13
(2.4) Cohabiting couples without resident children	42	25	9	8	27	15
(2.4.1) Without other persons	34	23	5	6	20	14
(2.4.2) With other persons	33	23	4	6	19	14
(2.5) Cohabiting couples with at least one resident child under 25	41	25	9	7	27	14
(2.5.1) Without other persons	33	23	5	5	20	13
(2.5.2) With other persons	32	23	4	5	19	13
(2.6) Cohabiting couples, youngest resident son/daughter 25 or older	39	23	9	7	27	12
(2.6.1) Without other persons	31	21	5	5	20	11
(2.6.2) With other persons	30	21	4	5	19	11
(2.7) Lone fathers with at least one resident child under 25	44	27	9	8	27	17
(2.7.1) Without other persons	35	25	4	6	19	16
(2.7.2) With other persons	34	24	4	6	19	15
(2.8) Lone fathers, youngest resident son/daughter 25 or older	42	25	9	8	27	15
(2.8.1) Without other persons	33	23	4	6	19	14
(2.8.2) With other persons	32	22	4	6	19	13
(2.9) Lone mothers with at least one resident child under 25	44	27	9	8	27	17
(2.9.1) Without other persons	35	25	4	6	19	16
(2.9.2) With other persons	34	24	4	6	19	15
(2.10) Lone mothers, youngest resident son/daughter 25 or older	41	25	8	8	26	15
(2.10.1) Without other persons	33	23	4	6	19	14
(2.10.2) With other persons	32	22	4	6	19	13
(3.0) Two or more-family households	44	27	9	8	26	18

Family status

As was the case for household status, the CESR similarly recommended (at paragraph 525) that information should also be derived for all persons on their family status as either a partner, lone parent of child. The following classification was recommended, being optional at the third digit level:

(1.0) Partner

- (1.1) Husband in a married couple
- (1.2) Wife in a married couple
- (1.3) Male partner in a consensual union
- (1.4) Female partner in a consensual union

(2.0) Lone parent

- (2.1) Lone father
- (2.2) Lone mother

(3.0) Child

- (3.1) Child aged under 25
  - (3.1.1) Child of both partners
  - (3.1.2) Child of male partner only
  - (3.1.3) Child of female partner only
  - (3.1.4) Child of lone father
  - (3.1.5) Child of lone mother
- (3.2.) Son/daughter aged 25 or over
  - (3.2.1) Son/daughter of both partners
  - (3.2.2) Son/daughter of male partner only
  - (3.2.3) Son/daughter of female partner only
  - (3.2.4) Son/daughter of lone father
  - (3.2.5) Son/daughter of lone mother

Most countries (43) were able to classify household members according to their family status. But five countries with traditional census (Belarus, Kazakhstan, Malta, the Russian Federation, and Tajikistan) and Israel reported that they could not.

Although all countries noted that they have available data on partner (1.0) (Table 18.5), three countries stated that cannot provide information on whether it was husband or wife in a married couple (Germany, the Netherlands and Portugal). Also, those three countries, together with Azerbaijan, do not distinguish male/female partner in the consensual union. Azerbaijan was the only country without information on either lone parent (2.0).

Some information on children within the family is available from almost all countries that recorded family status, but not in every case was a distinction made between children aged under or over 25. In 40 countries information on children aged under 25 is available, but only in 37 countries is this the case for children aged 25 and over. Furthermore only 20 countries have information about whether a child aged under 25 in a two-parent family was a child of both partners, or child of the male or female partner only. The situation is similar for sons/daughters aged 25 or over. Of the 37 countries that collect this information, only 19 can determined whether the child was son/daughter of male or female partner.

Table 18.5
Compliance with the CES Recommendation on classification of family status (number of countries)

Categories of CES classification of family status	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
(1.0) Partner	43	23	9	9	29	14
(1.1) Husband in a married couple	40	24	8	8	26	14
(1.2) Wife in a married couple	40	24	8	8	26	14
(1.3) Male partner in a consensual union	38	23	8	7	26	12
(1.4) Female partner in a consensual union	38	23	8	7	26	12
(2.0) Lone parent	42	24	9	9	29	13
(2.1) Lone father	40	24	8	8	27	13
(2.2) Lone mother	40	24	8	8	27	13
(3.0) Child	41	23	9	9	29	12
(3.1) Child aged under 25	40	23	8	9	27	13
(3.1.1) Child of both partners	26	17	3	6	15	11
(3.1.2) Child of male partner only	20	11	3	6	12	8
(3.1.3) Child of female partner only	20	11	3	6	12	8
(3.1.4) Child of lone father	33	18	7	8	23	10
(3.1.5) Child of lone mother	33	18	7	8	23	10
(3.2) Son/daughter aged 25 or over	37	21	7	9	26	11
(3.2.1) Son/daughter of both partners	25	16	3	6	15	10
(3.2.2) Son/daughter of male partner only	19	10	3	6	12	7
(3.2.3) Son/daughter of female partner only	19	10	3	6	12	7
(3.2.4) Son/daughter of lone father	33	18	7	8	24	9
(3.2.5) Son/daughter of lone mother	33	18	7	8	24	9

Type of family nucleus

As was the case for households, the CESR recommended (at paragraph 534) that 'family nuclei' (as defined above) should be classified into the following types:

(1.0) Husband-wife family, not reconstituted family
- (1.1) Without resident children
- (1.2) With at least one resident child under 25
- (1.3) Youngest resident son/daughter 25 or older

(2.0) Cohabiting couple, not reconstituted family
- (2.1) Without resident children
- (2.2) With at least one resident child under 25
- (2.3) Youngest resident son/daughter 25 or older

(3.0) Lone father
- (3.1) With at least one resident child under 25

(3.2) Youngest resident son/daughter 25 or older

(4.0) Lone mother

(4.1) With at least one resident child under 25

(4.2) Youngest resident son/daughter 25 or older

(5.0) Reconstituted family

(5.1) With at least one resident child under 25

(5.2) Youngest resident son/daughter 25 or older

with the proviso that the category 5.0 is optional.

Forty-five countries reported that they classified families by type (the exceptions were France, Kyrgyzstan, Liechtenstein, and Tajikistan). The extent to which these countries recognised each of the recommended categories is shown in Table 18.6.

Ignoring the smaller number of countries that recognised (non-core) reconstituted families (only 23 were able to classify such family nuclei), the majority of countries were able to adopt the recommended classification at both the one- and two-digit level, but is clear that not all can distinguish between married and cohabiting couple families. Almost all, however, identified lone parent families in their classification.

Table 18.6
Compliance with the CES Recommendation on classification of type of family nucleus (number of countries)

Categories of CES classification of family nucleus	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
(1.0)Husband-wife family	35	21	6	8	24	11
(1.1) Without resident children	34	20	6	8	23	11
(1.2) With at least one resident child aged under 25	32	19	6	7	22	10
(1.3) Youngest resident son/daughter aged 25 or older	31	18	6	7	22	9
(2.0) Cohabiting couple	33	20	6	7	23	10
(2.1) Without resident children	33	20	6	7	23	10
(2.2) With at least one resident child aged under 25	33	20	6	7	23	10
(2.3) Youngest resident son/daughter aged 25 or older	31	18	6	6	22	14
(3.0) Lone father	40	23	9	8	26	14
(3.1) With at least one resident child aged under 25	37	21	9	7	25	12
(3.2) Youngest resident son/daughter aged 25 or older	36	20	9	7	25	11
(4.0) Lone mother	40	23	9	8	26	14
(4.1) With at least one resident child aged under 25	37	21	9	7	25	12
(4.2) Youngest resident son/daughter aged 25 or older	36	20	9	7	25	11
(5.0) Reconstituted family	23	14	4	5	16	7
(5.1) With at least one resident child aged under 25	22	13	4	5	16	6
(5.2) Youngest resident son/daughter aged 25 or older	22	13	4	5	16	6

Tenure

The CESR defines (at paragraph 556) the tenure status as:

"*…. the arrangement under which a private household occupies all or part of a housing unit*".

All but two countries (Israel and Sweden) collected information on this core topic.

The classification recommended by CESR (paragraph 557) and optional at the two-digit level is:

(1.0) Households of which a member is the owner of the housing unit

(2.0) Households of which a member is a tenant of all or part of the housing unit

(2.1) Households of which a member is a main tenant of all or part of the housing unit

(2.2) Households of which a member is a sub tenant of an owner occupier or main tenant

(3.0) Households occupying all or part of a housing unit under some other form of tenure

It can be seen from Table 18.7 that information on the main categories 1.0, 2.0 and 3.0 were collected by 44, 41 and 38 countries respectively. But these figures are a little deceptive in that in some cases national classifications adopted alternative or additional categories to those recommended (in order to meet particular national data requirements) that still enabled census data to be produced on a broadly compatible basis. Thus for example, the Russian Federation reported that it collected information on tenure status only for single family houses, and the United Kingdom reported that it did not adopt the CESR recommended classification but instead assigned households to one of the tenures in a more detailed classification from which it could derive the recommended categories.

It should be noted that 'tenure status' here is considered to be different from the concept of 'type of ownership' of the dwelling that is dealt with separately in Chapter 19 (although, in practice, in many countries information on both topics is obtained from the same question or data source).

Table 18.7
Compliance with the CES Recommendation on classification of tenure status of the household's accommodation (number of countries)

Categories of CES classification of tenure status	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Households of which a member is the owner of the housing unit	44	28	8	8	26	18
Households of which a member is a tenant of all or part of the housing unit	41	25	8	8	25	16
Households occupying all or part of a housing unit under some other form of tenure	38	25	7	6	23	15
Other types of 'tenure' adopted	5	2	1	2	5	0

Other (non-core) topics associated with households

The CESR suggested a number of other household-related non-core topics that might be included in a country's census. The UNECE survey enquired into the extent to which countries attempted to collect information on each.

Most commonly collected (by 22 countries) was information on 'single or shared occupancy' for which the CESR recommended that information on households living in unshared dwellings or in dwellings shared by more than one household should be distinguished (see Table 18.8).

Table 18.8
Other household-related topics on which information was collected in the census (number of countries)

Topics	Total number of countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Single or shared occupancy	22	17	2	3	11	11
Availability of Internet connection	22	19	1	2	10	12
Possession of a personal computer	20	18	1	1	8	12
Rent paid	15	10	2	3	6	9
Availability of fixed telephone	15	13	1	1	6	9
Number of cars available for the use by the household	14	10	3	1	10	4
Possession of television	11	9	1	1	4	7
Availability of car parking	9	7	1	1	7	2
Availability of mobile telephone	7	5	1	1	5	2
Possession of other consumer goods	6	4	1	1	3	3
Other topics	11	6	3	2	8	3

Twenty-two countries (not the same 22) also reported on the 'availability of internet access' within the housing unit, while 20 countries (all but two with traditional censuses) collected information on the 'possession of a personal computer'. Most of the latter, not surprisingly collected information on both these related topics, but the Czech Republic and Serbia did not. Conversely, 5 countries (Greece, Italy, Montenegro, the Russian Federation and Spain) collected information on access to the internet, but not on possession of a PC.

Over a quarter of countries collected information on the household's 'rent' (15 countries), the 'availability of a fixed (or land-line) telephone' (15), or the 'number of cars available to the household' (14). Fewer countries reported on the other topics identified in the survey.

In addition to these, various countries reported on the collection of information on a number of household facilities or amenities or other related topics not specifically referred to in the CESR. Thus:

Bulgaria reported that its census included information on: satellite aerial, aerial or cable TV, refrigerator/deep freeze, automatic washing machine, dish-washer, air conditioner; availability of motor vehicles (number was not asked); total number of telephones (including mobiles); and the possession of summer house;

Greece included questions on: recycling and dwelling insulation;

Israel on: DVD, laundry dryer, dishwasher, microwave, air-conditioning, solar water heater;

Malta on: air conditioning, central heating, fireplace, heater, roof insulation, wells, energy-efficient bulbs, photovoltaic panels, water heaters, solar water heater, cookers, refrigerators, freezers, dishwashers; and

The United States on: stoves and refrigerators, plus a question on telephones making no distinction between landlines and mobiles.

19. HOUSING

Introduction

All countries in the UNECE region that responded to the UNECE survey and conducted a population census in the 2010 round also collected information on housing. A few countries (for example Tajikistan) collected only very limited information on housing, while most countries collected detailed information on a number of housing topics selected from among those presented in the 2010 CES Recommendations.

This chapter presents a review of how countries in the UNECE region conducted their housing census in the 2010 round, and of the housing topics considered by the different countries[34].

How the housing census was taken – methodological approaches

Most countries collected housing census data by adopting the same broad methodology used to collect population census data (see Table 2.1 in Chapter 2), with just a few exceptions. Three countries that adopted a combined approach for their censuses (Germany, Liechtenstein and Spain) used combinations of data from registers and questionnaires to differing degrees, while three of the register-based countries that used existing surveys to collect some population information (Belgium, Iceland sand Netherland) relied entirely on administrative data for their housing information. And indeed more countries relied entirely on registers as the source of data for their housing census (10) than did so for their population census (6).

The focus of collecting information on housing in the census is mainly on measuring the relationship between the population (for which the conventional unit is the 'household') and the characteristics of their living quarters. But some information on the characteristics of the dwelling and/or the building containing the dwellings – irrespective of the households that live there – is also collected. The 2010 CESR identified a number of key housing topics of both kinds as core (such as type of ownership, number of rooms and occupancy status) or non-core (such as multi-occupancy, type of energy used, and position of dwelling in the building).

Compliance with the concepts

In order to assess the international comparability of housing censuses there needs to be a common understanding and agreement of what concepts are used to measure housing characteristics. The 2010 CESR introduced and defined, for example, some key terms such as 'living quarters', 'housing unit', 'building', 'dwelling' and 'room'. The UNECE survey aimed to find out if such concepts and definitions were adopted and, if not, what were the reasons for countries not doing so. The first two questions of the housing section of the survey dealt with this matter.

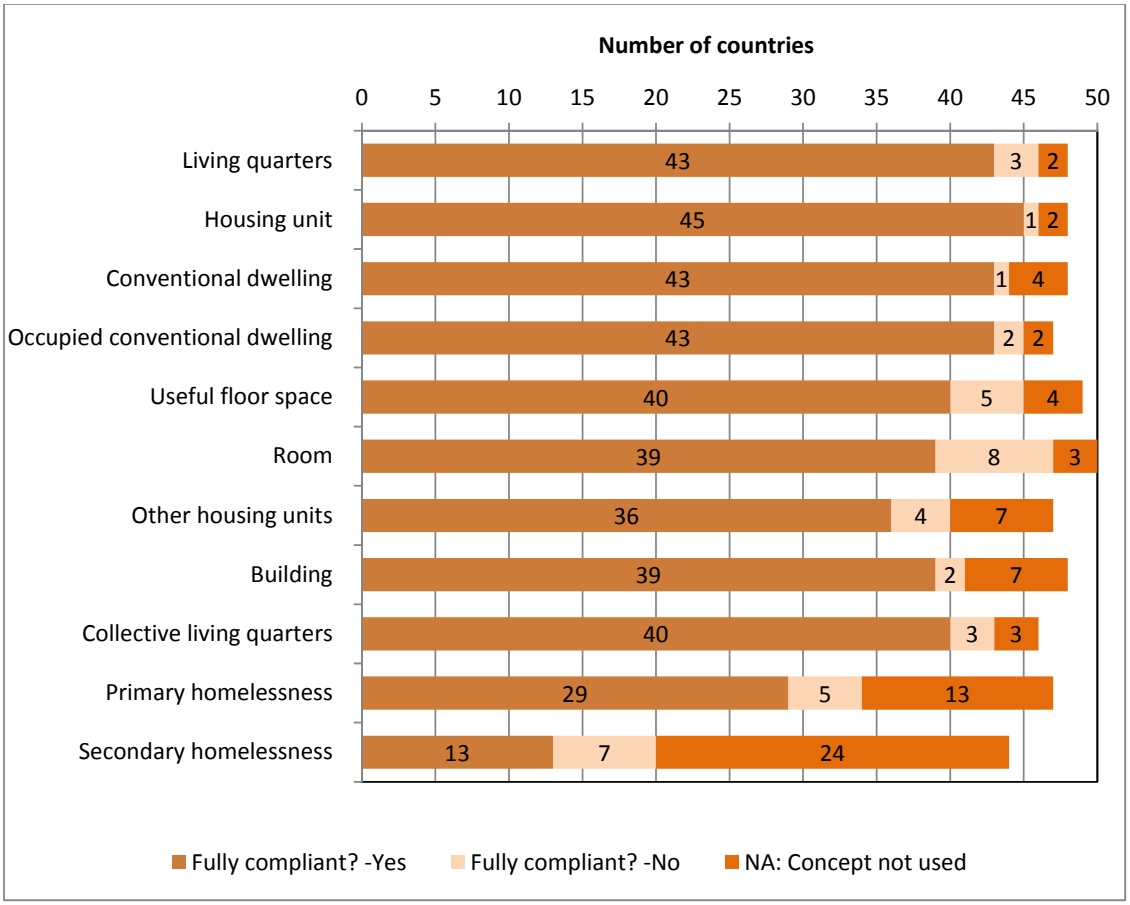
Among the 51 countries participating in the survey all but one (Kyrgyzstan) answered the question concerning the compliance of concepts with the CES Recommendations. However, not all countries provided information for all concepts and, as a result, 6 per cent of responses were missing.

As can be seen in Figure 19.1, the concepts 'Living quarters', 'Housing unit', 'Conventional dwelling' and 'Occupied conventional dwelling' had the most homogeneous definitions. More than 80 per cent of the surveyed countries indicated that the definitions of these concepts used in their censuses were fully compliant with the CES Recommendations. On the other hand, the concept related to the 'Secondary homelessness' was the least harmonized across the countries. Twenty-four

[34] The material in this chapter has been taken largely from a report of the survey results prepared by the UNECE Task Force on Housing Characteristics led by Adelheid Bauer (Statistics Austria) and discussed at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

countries did not use this concept in the census at all and only 13 countries (25 per cent) applied a definition compliant with the CES Recommendations. However, more than twice this number of respondents (29) had adopted a fully compliant definition of 'Primary homelessness'.

Figure 19.1
Compliance of housing concepts used with the CES Recommendations – All countries



Within the European Economic Area (EEA) region harmonization is higher than in the other UNECE countries. Seven out of 11 concepts were fully implemented by at least 75 per cent of EEA countries, ranging from 'Living quarters' (83 per cent) to 'Conventional dwelling' (97 per cent). But within the rest of the UNECE region the number of concepts for which at least 75 per cent of countries were fully compliant was only three ('Living quarter', 'Housing unit' and 'Room').

The level of harmonization of concepts was also slightly affected by the census methodology, but the differences were less significant. At least 75 per cent of countries with register-based census and combined census had fully implemented 6 out of the 11 concepts, whereas for countries with a traditional census 7 of the concepts were fully compliant for at least three quarters of the countries

In the following paragraphs attention is given to the countries which did not use the concepts of the CES Recommendations, or adapted the definitions, or even used other concepts.

Living quarters

The CESR defined 'Living quarters' (at paragraph 592) as: "….*those housing types which are the usual residences of one or more persons*". The concept was qualified by the definitions of the main categories into which living quarters are divided.

(1.0) Occupied conventional dwellings

(2.0) Other housing units – a hut, cabin, shack, caravan, houseboat, barn, mill, cave or other shelter used for human habitation at the time of the census

(3.0) Collective living quarters – a hotel, institution, camp, etc.

This recommended definition of living quarters differed from the one given in the previous Recommendations for the 2000 Censuses of Population and Housing in the ECE region, in which vacant conventional dwellings were also counted as part of living quarters.

Level of compliance with the CES Recommendations on this concept seems to depend very much on census methodology. Two thirds of the countries with a full register-based census (6 out of 9) implemented the concept, while Norway and Sweden used the concept with some adaptation (by excluding 'Other housing units'), and Finland applied it only to conventional dwellings.

For countries with a combined approach the distribution of survey responses was slightly different. Eight (out of ten) implemented the CESR concept, while Israel and Liechtenstein did not use the concept at all. Among those countries with a traditional census only Armenia reported that it did not adopt the concept (although the Czech Republic did not respond).

(Occupied) conventional dwellings

'Conventional dwellings' are defined by the CESR (at paragraph 596) as being: " …. *structurally separate and independent premises, which are designed for permanent human habitation at a fixed location and are not used wholly for non-residential purposes at the time of the census."*

The Recommendations went on to develop the concept by further defining a conventional dwelling (at paragraph 598) as: *"… a room or suite of rooms and its accessories (for example lobbies, corridors) in a permanent building or structurally separated part thereof which, by the way it has been built, rebuilt or converted, is designed for habitation by a single household all the year round, such as a house or apartment. It need not necessarily have a bathroom or toilet available for the exclusive use of its occupants".*

The definition of 'Conventional dwellings' was fully implemented by all register-based census countries and by all EEA countries except Liechtenstein. All these countries adopted the CESR definition of 'Occupied conventional dwellings'.

Among the non-EEA countries two thirds adopted the concepts of conventional and occupied conventional dwellings, though Turkey only derived information on occupied dwellings. Whereas three countries did not use the concepts: Belarus and Israel only collected information on occupied dwellings, and the United States census used only a concept of housing units which does not include any reference to 'conventional' dwellings as such.

Incidentally, with respect to the count of dwellings, the UNECE survey also specifically enquired separately if countries covered those occupied by persons not classified as usually resident. Some 32 of the responding 50 countries reported that they did so. Of these, 20 were EEA member countries, representing two thirds of all EEA countries. Proportionately more countries with a traditional methodology included such dwellings (71 per cent, 23 out of 32) compared with those with register-based censuses (only 4 out of the 9). However, a review of the responses to the survey led to the conclusion that this survey question may have been interpreted differently by some respondents.

'Other' housing units

Some housing units do not come fully within the category of a conventional dwelling either because they are mobile, semi-permanent or improvised, or are not specifically designed for human habitation, but they may be nevertheless used at the time of the census as the usual residence of one or more persons who are members of one or more private households. All these are grouped under the term 'other housing units'. Certain census topics will not apply to them. A detailed description of the types of habitation that are included is given at paragraph 603 of the CESR.

Seven responding countries (14 per cent) did not use the concept of 'Other housing units' in the 2010 census round and four countries (8 per cent) adopted the definition to some degree. The majority of these together were countries that adopted either a register-based or combined approach (Denmark, Finland, Norway, Sweden, Israel, Liechtenstein and Switzerland). Belarus and the United Kingdom were among the traditional census countries that did not collect any data on such housing units, while Canada and Malta reported a definition that was not fully compliant with the CES Recommendations.

Collective living quarters

The housing category 'collective living quarters' comprises those premises which are designed for habitation by large groups of individuals or several households and which are used as the usual residence of at least one person at the time of the census. This category covers (a) hotels, rooming houses and other lodging houses; (b) institutions; and (c) camps. Also this category differs from conventional dwellings in the range of census topics which apply to it. A detailed description of the types of accommodation that are included is given at paragraph 606 of the CESR.

The level compliance with the concept of 'collective living quarters' was less dependent on census methodology. But there was some correlation with membership to the EEA region where 90 per cent of countries (27 out of 30) adopted the concept, whereas the proportion for non-EEA countries was just two thirds (14 out of 21). Norway, the Russian Federation, and Switzerland used a definition not compliant with the CES Recommendations, while, Finland, Israel and the United States did not adopt the concept at all.

Buildings

The 'building' is an important unit since information on type of building and period of construction is required to describe the general characteristics of conventional dwellings within the building and for formulating housing programmes. For this purpose a 'building' is defined by the CESR (at paragraph 698) as: "*…any independent structure containing one or more dwellings, rooms or other spaces, covered by a roof and enclosed within external walls or dividing walls which extend from the foundations to the roof, whether designed for residential or for agricultural, commercial, industrial or cultural purposes or for the provision of services. Thus a building may be a detached house, apartment building, factory, shop, warehouse, garage, barn, etc.*"

The concept of a 'building' as a statistical unit was not used in the census by seven countries: Azerbaijan, Belarus, Canada, Cyprus and the Russian Federation among the traditional census countries; Denmark and Sweden among the register-based countries. But the CESR definition was not fully adopted in Armenia and the United Kingdom (where, in the latter case, the coverage of buildings in the census excluded those that were non-residential).

Homelessness

This issue of how to count persons who are 'homeless' in a census is not straightforward, and is arguably more a matter of population base or household composition structure than it is a characteristic of housing, since, by definition, many such persons (described, more generally, as the

'primary homeless') will have no housing characteristics attributed to them. The CESR defines (at paragraph 608) a homeless person as someone: "…*who, because of the lack of housing, has no other option than to sleep:*

(a) rough or in buildings which were not designed for human habitation;

(b) in emergency centres, or night shelters,

(c) in emergency accommodation in hotels, guest houses or bed and breakfast;

(d) in hospitals due to a lack of decent shelter; or

(e) *in accommodation temporarily provided by friends or relatives because of the lack of a permanent place to stay*."

'Homelessness' is dealt with more fully in the recommendations for household and family characteristics (See Chapter 18), where the following groups are identified:

(1.0) Primary homelessness (or rooflessness). This category includes persons living in the streets without a shelter that would fall within the scope of living quarters ; and

(2.0) Secondary homelessness (or rootlessness). This category may include persons with no place of usual residence who move frequently between various types of accommodations (including dwellings, shelters, institutions for the homeless or other living quarters). This category also includes persons living in private dwelling but report that they have no usual address.

With regard to any housing and population censuses both these categories (roofless homeless and secondary homeless) should only include persons who are not usual residents in any living quarter category. This means that such persons are not occupants in conventional dwellings, in other housing units or in collective living quarters in such a way that these living arrangements constitute their usual residence. The majority of these persons can be considered homeless.

Very often attempts are made only to identify the primary homeless in the census since the secondary homeless are often regarded as being resident at the accommodation where they are present on census day (if they have no other usual residence). Only 13 of the countries that responded implemented the concept of 'secondary homelessness' as defined in the CESR. Eight countries reported that they adopted some other definition that was not compliant with the CESR. But 24 countries did not use the concept at all. However, the concept of 'primary homelessness' was fully implemented by 63 per cent of EEA countries and 48 per cent of non-EEA countries. There is a significant difference between countries grouped by census methodology. The proportion of respondents stating that the concept used was fully compliant with the CES Recommendations was highest for countries with a traditional census (two thirds), and lowest among register-based census countries (one third), with those countries with a combined census falling half way (a half).

Useful floor space and/or Rooms

The CESR recommended two ways to measure the size of household's living accommodation: by using either useful (or more accurately, useable) floor space measured in square metres, or the number of rooms. The EU Census regulation adopted the corresponding line with Member States that information on either of these two core variables could be provided in the 2010 round of censuses.

The concept of neither 'floor space' nor 'rooms' is simple, resulting in the questions on this topic in traditional censuses or surveys often being the least well answered.

'Useful floor space' is defined in the CESR (at paragraph 645) in that document as either:

"… *the floor space measured inside the outer walls excluding non-habitable cellars and attics and, in multi-dwelling buildings, all common spaces*"

or "…*the total floor space of rooms falling under the concept of a room*"

and where a 'room' is defined as: "… *a space in a housing unit enclosed by walls reaching from the floor to the ceiling or roof covering, at least to a height of 2 metres above the ground, of a size large enough to hold a bed for an adult (4 square metres at least) and at least 2 metres high over the major area of the ceiling. Thus, normal bedrooms, dining rooms, living rooms, habitable cellars and attics, servants' rooms, kitchens and other separate spaces used or intended for habitation all count as rooms if they correspond to the definition above. A kitchenette (that is, a kitchen of less than 4 square metres), verandas, utility rooms (for example boiler rooms, laundry rooms) and lobbies do not count as rooms; nor do bathrooms and toilets (even if they are more than 4 square metres). Rooms without windows, for example cellars below ground – however large – should not generally be counted, unless they are functionally used for domestic purposes – which might include large lobbies with writing tables or internal bedrooms with no windows for example*".

Some 40 countries adopted the concept of 'useful floor space' and 39 countries adopted the concept of a 'room' as each was defined, and with two and eight countries respectively adopting the concepts but with different definitions, indicating pretty equal usage, overall, of the two variables despite the CESR recommendation that, if possible, the floor space variable should be used in preference.

Additional information provided in the survey showed that in some countries the minimum size given in the definition of a 'room' was different (Norway, Slovakia) or that no minimum size was prescribed (Canada). Belgium defined a 'room' as "a unit in the dwelling"; in Poland the room must have a window. Only in Denmark, Latvia, the Netherlands, and Sweden information on rooms was not collected, whereas for floor space this was the case in seven countries: Canada, Ireland, Israel, Malta, Turkey, the UK and the United States – none of whose censuses are register-based, indicating that information on this topic seems to be readily available from administrative data.

Inclusion of core housing topics in the census

A key aim of the UNECE survey was to evaluate to what extent information on the core housing topics was collected in the 2010 census round. Table 19.1 presents the numbers of UNECE countries that included the various topics in their census (out of the 50 countries responding to these questions in the survey), for all census methods and by the broad categories of methodological approach. Considering all census methods, all the core topics were included in the census by a high percentage of countries overall (88 per cent on average). Six core topics were included by over 90 per cent of countries: Type of ownership (96 per cent), Period of construction (94 per cent), Housing arrangements (92 per cent), Type of living quarters (92 per cent), Number of rooms (92 per cent) and Type of heating (92 per cent). The other six core topics were each included in the census by at least three-quarters countries: Occupancy status (86 per cent), Bathing facilities, (86 per cent), Type of building (86 per cent), Useful floor space (84 per cent), Toilet facilities (82 per cent) and Water supply system (78 per cent).

For countries with a traditional census, the average percentage of inclusion of all 12 core topics in the census was slightly higher (90 per cent), with the topics of 'housing arrangements' and 'number of rooms' included in the census by all such countries. Countries with register-based approach have the highest average percentage of inclusion of the housing topics of all the methodologies (94 per cent). Seven of the topics were included in the census in all nine register-based censuses countries, and four topics were included in eight of the nine. 'Number of rooms' was, however, included in only six countries with register based censuses (not in Denmark, the Netherlands nor Sweden). The Netherlands and Sweden reported that in order to meet EU regulation requirements, they imputed four variables: Type of heating, Bathing facilities, Toilet facilities, and Water supply system.

Table 19.1
Inclusion of housing core topics (number of countries and percentage)

Non-core topics	Total (out of 50 replies)	%	Type of census						Region			
			Traditional (31)	%	Register-based (9)	%	Combined (10)	%	EEA (30)	%	Non-EEA (20)	%
Housing arrangements	46	92	31	100	8	89	7	70	28	93	18	90
Type of living quarters	46	92	30	97	8	89	8	80	27	90	19	95
Occupancy status	43	86	26	84	9	100	8	80	30	100	13	65
Type of ownership	48	96	29	94	9	100	10	100	29	97	19	95
Useful floor space	42	84	25	81	9	100	8	80	27	90	15	75
Number of rooms	46	92	31	100	6	67	9	90	26	87	20	100
Toilet facilities	41	82	26	84	8	89	7	70	26	87	15	75
Bathing facilities	43	86	27	87	9	100	7	70	27	90	16	80
Type of heating	46	92	28	90	9	100	9	90	30	100	16	80
Type of building	43	86	27	87	9	100	7	70	29	97	14	70
Period of construction	47	94	28	90	9	100	10	100	29	97	18	90
Water supply system	39	78	25	81	8	89	6	60	24	80	15	75

There was overall less compliance with the CESR in the inclusion of core housing topics among countries with a combined census approach (80 per cent on average) and more variability across topics.

As a consequence of the mandatory requirements under EU legislation for EU Member States to provide outputs on the core housing topics it is not surprising that, generally, higher levels of compliance were reported for countries in the EEA (where the proportions of reported inclusion of core topics range from 80 per cent for 'water supply system' to 100 per cent for 'occupancy status' and 'type of heating') than elsewhere in the UNECE region.

Classifications used

The survey also enquired if the classifications used for each of the 12 core topics were those recommended by the CES Recommendations (and at which digit-level of compliance) or if, for EU member states in particular, the classifications were those prescribed by the EU Census Regulation.

But before looking at the results, it may be helpful first to define the 12 core topics and the recommended classification in the order as set out in the 2010 CESR.

Housing arrangements: This variable refers to people or households living in different type of accommodation defined (at paragraph 617) as: "… *the type of housing where a person is a usual resident at the time of the census*".

This covers all persons who are usual residents in households in different types of living quarters, or who do not have a usual residence and stay temporarily in living quarters, or are roofless persons sleeping rough or in emergency shelters when the census was taken. The concept of 'housing arrangement' was introduced as a core topic in the 2010 round to ensure that the whole population is classified according to all the units counted in the housing censuses including the consideration of those who are roofless.

The recommended classification was:

(1.0) Occupants (that is persons with a usual residence) living in a conventional dwelling

(2.0) Occupants (that is persons with a usual residence) living in another housing unit – hut, cabin, shack, caravan, houseboat, or a barn, mill, cave or other shelter used for human habitation at the time of the census

(3.0) Occupants (that is persons with a usual residence) living in a collective living quarter – a hotel, institution, camp, etc.

(4.0) Persons who are not usual residents in any living quarter category, such as homeless or other people moving between temporary accommodation.

Type of living quarters: Using the concept and definition described above, the CESR recommended (at paragraph 623) the following classification:

(1.0) Occupied conventional dwellings

(2.0) Other housing units

- (2.1) Mobile units
- (2.2) Semi-permanent units
- (2.3) Other units designed for habitation
- (2.4) Other units not designed for habitation

(3.0) Collective living quarters

- (3.1) Hotels, rooming houses and other lodging houses
- (3.2) Institutions
- (3.3) Camps

being optional at the two-digit level, and with the qualification that all conventional dwellings and other housing units must be in use by at least one person as their usual residence at the time of the census in order to be counted as part of living quarters.

Occupancy status (of convention dwellings): This refers to "… *whether or not a conventional dwelling is occupied by a usual resident at the time of the census*."

For those dwellings not occupied (that is, vacant or in secondary use), the CESR recommended that the reason for not being occupied should also be classified. The classification (recommended at paragraph 628) was:

(1.0) Occupied conventional dwellings with one or more usual residents

(2.0) Conventional dwelling with no usual residents at time of census

- (2.1) Dwellings reserved for seasonal or secondary use
- (2.2) Vacant dwellings
  - (2.2.1) Vacant for sale
  - (2.2.2) Vacant for rent
  - (2.2.3) Vacant for demolition
  - (2.2.4) Other vacant or not known

(3.0) Conventional dwellings with residents not included in census (foreign nationals, etc.)

being optional at the three-digit level and with the additional suggestion that categories (2.2.1) and (2.2.2) might be subdivided to show the length of time the dwelling has remained unoccupied - as an indication of the situation in the housing market in the area concerned. The CESR went on to recommend that dwellings that are used during the working week only by persons who are resident in another dwelling at their family place should be considered as part of (2.0) "Conventional dwellings with no usual residents at time of census" since the persons using the dwelling are not usual residents of the dwelling.

Type of ownership: This topic refers to: "…*the type of ownership of dwellings and not that of the land on which the dwelling stands*".

This is not necessarily the same as the topic 'tenure status of the household' described in Chapter 18, except in the case of an owner-occupied dwelling where the type of ownership and the tenure status will be the same. The classification (recommended at paragraph 639), optional at the two-digit level, was:

(1.0) Owner-occupied dwellings

(2.0) In co-operative ownership

(3.0) Rented dwellings

- (3.1) In private ownership
- (3.2) Owned by the local or central government and/or by non-profit organisations
- (3.3) Mixed ownership

(4.0) Other types of ownership

Number of occupants: The number of occupants of a living quarter was defined (at paragraph 644) as being: "…*the number of people for whom the living quarter is the usual residence*".

No specific classification was recommended, but the CESR noted that a classification of the total number of living quarters according to the type (occupied conventional dwellings, other housing units and collective living quarters) and the number of occupants should be included (that is, dwellings with one person, two persons, etc.) in order that the average number of occupants for each type of living quarter be derived.

Useful floor space: The CESR definition is set out above. The topic is recommended for inclusion in the census so that a measure of density standard in conventional dwellings can be derived. The classification (recommended at paragraph 647) was:

(1.0) Under 30 square metres

(2.0) 30 and less than 40 square metres

(3.0) 40 and less than 50 square metres

(4.0) 50 and less than 60 square metres

(5.0) 60 and less than 80 square metres

(6.0) 80 and less than 100 square metres

(7.0) 100 and less than 120 square metres

(8.0) 120 and less than 150 square metres

(9.0) 150 square metres and over

Number of rooms: This topic was recommended as being an alternative (or additional) means of measuring size of the living accommodation. The definition of what constitutes a 'room' for this purpose is given above, but no specific classification was recommended in the CESR.

Water supply system: The CESR recommended that countries should collect information on the water supply system used by occupied conventional dwellings and other housing units. The classification (recommended at paragraph 659) was:

(1.0) Piped water in the housing unit
- (1.1) From a community scheme
- (1.2) From a private source

(2.0) No piped water in the housing unit
- (2.1) Piped water available within the building but outside the housing unit
  - (2.1.1) From a community scheme
  - (2.1.2) From a private source
- (2.2) Piped water available outside the building
  - (2.2.1) From a community scheme
  - (2.2.2) From a private source
- (2.3) No piped water available

The recommended classifications of other core housing amenities were:

Availability of toilet facilities:

(1.0) Flush toilet in the housing unit

(2.0) No Flush toilet in the housing unit
- (2.1) Toilet of other type in the housing unit
- (2.2) Flush toilet available within the building but outside the housing unit
  - (2.2.1) Private (i.e. for the exclusive use of the occupants of the housing unit)
  - (2.2.2) Shared (i.e. shared with occupants of another housing unit)
- (2.3) Flush toilet available outside the building
  - (2.3.1) Private
  - (2.3.2) Shared
- (2.4) Toilet of other type within the building but outside the housing unit
  - (2.4.1) Private
  - (2.4.2) Shared
- (2.5) Toilet of other type outside the building
  - (2.5.1) Private
  - (2.5.2) Shared

***Availability of bathing facilities*:**

(1.0) Fixed bath or shower in the housing unit

(2.0) No fixed bath or shower in the housing unit

(2.1) Fixed bath or shower available within the building but outside the housing unit

(2.1.1) Private

(2.1.2) Shared

(2.2) Fixed bath or shower available outside the building

(2.2.1) Private

(2.2.2) Shared

(2.3) No fixed bath or shower available

Type of heating:

(1.0) Central heating

(1.1) Central heating from an installation in the building or in the housing unit

(1.2) Central heating from a community heating centre

(2.0) No central heating

(2.1) Heating facilities or equipment available in the occupied conventional dwelling/other housing unit

(2.1.1) Stove

(2.1.2) Fireplace

(2.1.3) Portable electric heater

(2.1.4) Other

(2.2) No heating at all

each being optional at the two and three-digit levels.

Type of building: The CESR recommended that dwellings should be classified by the type of building in which they are located, with the classification (recommended at paragraph 701) being:

(1.0) Residential buildings

(1.1) Detached house (houses not attached to any other buildings)

(1.1.1) Detached houses with one dwelling

(1.1.2) Detached houses with two dwellings (with one above the other)

(1.2) Semi-detached house (two attached dwellings)

(1.3) Row (or terraced) house (at least three attached or connected dwellings each with separate access to the outside)

(1.4) Apartment buildings

(1.4.1) Apartment buildings with three to nine dwellings

(1.4.2) Apartment buildings with 10 or more dwellings

(1.5) Other residential buildings

(2.0) Non-residential buildings

The CESR noted that for some purposes, it might be useful, conversely, to classify the buildings by the number of dwellings a building contains. The relationship between the classification of dwellings above and the suggested classification of buildings was:

(1.0) Dwellings in one-dwelling buildings (1.1.1)

(2.0) Dwellings in two-dwelling buildings (1.1.2 + 1.2)

(3.0) Dwellings in three or more dwelling buildings (1.3 + 1.4)

Period of construction: This topic refers to the date when the building was completed, again relating to dwellings. The CESR recommended that information should be collected on all dwellings but that the census should report separately on occupied conventional dwellings. The classification (recommended at paragraph 705), optional at the two-digit level, was:

(1.0) Before 1919
(2.0) 1919–1945
(3.0) 1946–1960
(4.0) 1961–1970
(5.0) 1971–1980
(6.0) 1981 –1990
(7.0) 1991–2000
(8.0) 2001–2005
(9.0) 2006 or later
  (9.1) 2006
  (9.2) 2007
  (9.3) 2008
  (9.4) 2009
  (9.5) 2010
  (9.6) 2011

The survey collected information on the relevant classification used for each of the housing core topics, distinguishing the cases where countries used a classification that was fully compliant with the CES Recommendations, or the classification required by the EU or another classification. The results are presented in Table 19.2.

Overall, the large majority of countries (between 68 per cent and 83 per cent of the countries) used a classification that was fully compliant with the CES Recommendations, and a relatively small proportion of countries (between 16 per cent and 26 per cent) used the EU classification which was sometimes different from the classification given by the CES Recommendations. The results show clearly that the majority of countries have adopted the classifications only at the recommended levels (generally one digit), and only a small number of countries adopted the more detailed (two or three digits) optional levels.

The percentage of countries using a classification which was different from either of those recommended by the CES or the EU was in general lower than 10 per cent, with the exception of the topic ‘type of ownership’, for which six countries (four of them EEA members) used their own classification.

Table 19.2
Classification used for housing core topics (number of countries using the classifications)

Topic	One-digit	Two-digit	Three-digit	EU classification	Other
Housing arrangements	R (28)			D (10)	(2)
Type of living quarters	R (28)	O (6)		CES 1-digit (7)	(3)
Occupancy status	R (10)	R (15)	O (4)	D (11)	(2)
Type of ownership	R (23)	O (10)		CES 1-digit (8)	(6)
Useful floor space	R (27)			CES 1-digit (10)	(1)
Number of rooms	R (15)			D (10)	(2)
Water supply system	R (21)	O (6)	O (3)	CES 1-digit (6)	(-)
Toilet facilities	R (25)	O (3)	O (2)	CES 1-digit (7)	(1)
Bathing facilities	R (27)	O (3)	O (1)	CES 1 digit (8)	(1)
Type of heating	R (22)	O (10)		CES 1-digit (7)	(3)
Dwellings by type of buildings	R (11)	R (10)	R (6)	D (10)	(3)
Dwellings by period of construction	R (19)	O (11)		CES 1-digit (9)	(4)

R = Recommended classification
O= Optional
D =Different from CES Recommendations

Density standard

By using the information on either 'useful floor space' or 'number of rooms' as defined above, a derived measure of 'density standard' was recommended as further core variable in the 2010 round. Consequently, two possible classifications were recommended (at paragraphs 653 and 654 of the CESR):

Using useful floor space:

(1.0) Under 10 square metres per occupant

(2.0) 10 and less than 15 square metres per occupant

(3.0) 15 and less than 20 square metres per occupant

(4.0) 20 and less than 30 square metres per occupant

(5.0) 30 and less than 40 square metres per occupant

(6.0) 40 and less than 60 square metres per occupant

(7.0) 60 and less than 80 square metres per occupant

(8.0) 80 square metres and over per occupant

Using number of rooms:

(1.0) Less than 0.5 room per occupant

(2.0) 0.5 and less than 1.0 room per occupant

(3.0) 1.0 and less than 1.25 rooms per occupant

(4.0) 1.25 and less than 1.5 rooms per occupant

(5.0) 1.5 and less than 2 rooms per occupant

(6.0) 2 and less than 2.5 rooms per occupant

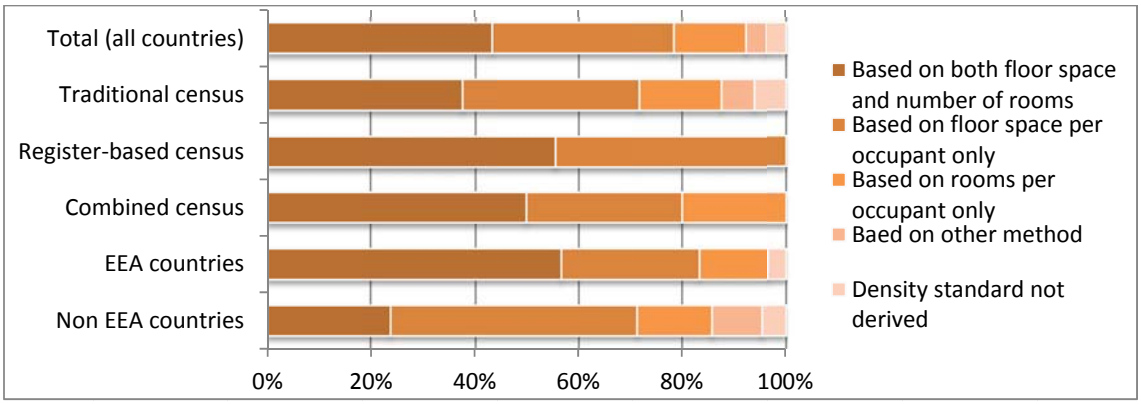
(7.0) 2.5 and less than 3 rooms per occupant

(8.0) 3 or more rooms per occupant.

The responses to the survey show that it was more common to derive a density standard by using information on useful floor space (see Figure 19.2). This is surprising considering that the number of countries collecting information on number of rooms was slightly higher (46) than the number of countries collecting useful floor space (42). Both topics were included by 38 countries but only 22 of them also derived both density standard measures.

Of the responding countries (51) all reported on the question if and how density standard was derived. Some 41 countries (80 per cent) used information on useful floor space to derive the variable, and of these 25 were EEA countries (83 per cent of EEA members). (Note that of the 42 countries reported above as having collected data on floor space, neither Cyprus not France derived a density standard based on this topic). Twenty-nine countries or 57 per cent responded that they derived density standard based on number of rooms per occupant. Of these 21 are members of the EEA region (70 per cent of the EEA countries). Twenty-two countries (43 per cent) produced both types of density standard, seven only derived the topic by using number of rooms and 18 only derived the topic by using useful floor space.

Figure 19.2
Type of density standard derived, by type of census and region (proportion of countries)



Type of ownership and tenure status of household

It has already been noted above that there is some overlap in terminology between the housing-related topic of 'type of ownership' and the household-related topic of 'tenure status' (covered in Chapter 18). The UNECE survey thus specifically enquired into whether or not countries attempted to distinguish between the two concepts by collecting information on both separately.

Some 20 of the responding 51 countries (39 per cent) reported that they included separate questions or collected separate information on type of ownership and tenure status of household. Of these 13 were EEA countries (43 per cent of all EEA member states).

Except for Iceland, all countries which collected information on type of ownership and tenure status of household are countries with a census with traditional or combined methodology. Half of the countries with a traditional census (14 out of 28) and half of those with a combined census (5 out of 10) included separate questions on type of ownership and tenure status of household, while the other half of the countries in the two groups (respectively 14 and 5 countries) used the same information for the two topics.

Inclusion of non-core housing topics in the census

The CES Recommendations also refers to 16 other housing characteristics that are identified as non-core. In the survey the respondents were asked to report on any such topics which they included in their census, and, for each included, to report also which data source (full enumeration, sample, registers, other source) was used in the main for deriving the topic, and if they used the classifications recommended by the CES.

The analysis of the survey results showed that the non-core topics can be grouped by the extent of their inclusion in the 2010 round. At one end of the scale there are only two non-core topics which have been included in the census by more than half of the responding countries ('main type of heating energy' and 'availability of kitchen') whereas four of the non-core topics ('accessibility to the dwelling', 'cooking facilities', 'type of rooms', and 'state of repair of building') were included in less than one fifth of the censuses (see Table 19.3).

Table 19.3
Housing non-core topics, by proportion of inclusion in the census by countries

Proportion of countries including the topic	Topics
> 50%	Main type of heating energy Kitchen
> 33 and < 50%	Electricity Piped gas Type of sewage disposal system, Hot water Occupancy by number of private households, Number of floors in the building Materials of which specific parts of the building are constructed
> 20 and < 33%	Air-conditioning Lift Position of dwelling in the building
< 20%	Accessibility to dwelling Cooking facilities Type of rooms State of repair of the building

In looking at the results of the survey it will be helpful to see how the CES Recommendations defined and classified these non-core topics. This information is presented below, following the order of presentation of the topics in the CES Recommendations.

Occupancy by number of private households: More commonly referred to as 'multi-occupancy', this topic relates to the occupancy of a housing unit by more than one household as defined by the 'housekeeping concept' described in Chapter 18. The classification of housing units by single or shared occupancy (as recommended at paragraph 643 of the CESR) was simply:

(1.0) Housing units occupied by a single household

(2.0) Housing units occupied by two households

(3.0) Housing units occupied by three or more households

From Table 19.4 it can be noted that overall 48 per cent of responding countries collected information on the topic, including 61 per cent of traditional censuses countries, 40 per cent of countries with a combined census, but only one of the nine countries with register-based census (Slovenia). All but one of these countries reported that they adopted a classification that was compliant with the CESR recommendations.

Table 19.4
Inclusion of housing non-core topics (number of countries and percentage)

Non-core topics	Total (out of 50 replies)	%	Type of census						Region			
			Traditional (31)	%	Register-based (9)	%	Combined (10)	%	EEA (30)	%	Non-EEA (20)	%
Main type of energy used for heating	29	58	21	68	3	33	5	50	18	60	11	55
Kitchen	26	52	16	52	5	56	5	50	18	60	8	40
Hot water	24	48	17	55	2	22	5	50	15	50	9	45
Occupancy by number of private households	24	48	19	61	1	11	4	40	13	43	11	55
Type of sewage disposal system	22	44	17	55	2	22	3	30	12	40	10	50
Dwellings by numbe of floors in the building	22	44	15	48	4	44	3	30	14	47	8	40
Electricity	19	38	16	52	2	22	1	10	7	23	12	60
Piped gas	19	38	17	55	-	0	2	20	7	23	12	60
Dwellings by materials	18	36	15	48	3	33	-	0	10	33	8	40
Position of dwelling in the building	15	30	11	35	2	22	2	20	9	30	6	30
Lift	12	24	8	26	3	33	1	10	8	27	4	20
Air-conditioning	11	22	10	32	-	0	1	10	6	20	5	25
Type of rooms	8	16	7	23	-	0	1	10	5	17	3	15
Dwellings by state of repair of the building	7	14	6	19	-	0	1	10	4	13	3	15
Cooking facilities	6	12	6	19	-	0	-	0	3	10	3	15
Accessibility to dwelling	4	8	3	10	-	0	1	10	2	7	2	10

Type of rooms: The CESR recognised (at paragraph 656) that: "…*some countries might wish to provide more specific information on overcrowding within housing units than is measured by density standard by providing information on the number of certain types of rooms within housing units*".

In particular it was noted that some countries consider that the number of bedrooms provides a more accurate indicator of overcrowding, especially where overcrowding is defined nationally by number of bedrooms and age, sex and relationships of members within the household. However, the CESR recommended that a room that is used as a household living space should not be counted as a bedroom. A count of the following categories of rooms for housing units was recommended:

(1.0) Reception and living rooms

(2.0) Bedrooms

Surprisingly, perhaps, only eight countries attempted to categorise rooms in any way (Canada, Estonia, Hungary, Italy, Kazakhstan, Romania, the Former Yugoslav Republic of Macedonia, and the UK) - no register-based census did so - and only five of these adopted the recommended classification. While Canada and the UK, for example, separately counted the number of bedrooms, neither attempted to identify specifically other types of room.

Availability of hot water: This topic is much aligned with the core topic on the availability of bathing facilities, and the CESR recommended (at paragraph 670) a similar classification:

(1.0) Hot water tap in the housing unit

(2.0) No hot water tap in the housing unit

(2.1) Hot water tap available within the building but outside the housing unit

(2.2) Hot water tap available outside the building.

(2.3) No hot water tap available

As with multi-occupancy above, some 48 per cent of responding countries (but not the same countries) collected this information, but of these less than two thirds adopted the recommended classification (the lowest proportion of compliant countries for any of the non-core topic classifications). Only Finland and Iceland among the countries with register-based census collected this information.

Type of sewage disposal system: With reference to this topic the CESR suggested (at paragraph 671) that: "*It is preferable that all countries collect information on the type of sewage disposal system in occupied conventional dwellings and report it separately*."

and went on to recommend that: *"…countries which use the building as a unit of enumeration or of data collection collect information on the type of sewage disposal system to which the building containing the housing unit is connected, and to cross-classify housing units by type of toilet facilities at the one-digit level and type of sewage disposal system",*

referring to the following recommended classification:

(1.0) Wastewater empties into a piped system connected to a public sewage disposal plant

(2.0) Wastewater empties into a piped system connected to a private sewage disposal plant (for example a septic tank built for a single housing unit or a small group of dwellings)

(3.0) All other arrangements (for example waste water empties into an open ditch, a pit, a cesspool, a river, the sea, etc.)

(4.0) No sewage disposal system

Information was collected in 22 countries: more than half the countries with traditional census, but only two of the countries with register-based census (Finland and Slovenia) did so. Of these 22 countries, only two thirds adopted the recommended classification.

Availability of a kitchen: The CESR suggested (at paragraph 673) that "…*where occupied conventional dwellings are classified by number of rooms they should also be classified by availability of a kitchen*",

where a 'kitchen' or 'kitchenette' was defined as "… *a room (or part of a room) of at least 4 square metres or two metres wide that has been designed and equipped for the preparation of the principal meals and is used for that purpose, irrespective of whether it is also used for eating, sleeping or living*",

and recommended the classification of dwellings as:

(1.0) With a kitchen

(2.0) With a kitchenette (that is a separate space with less than 4 square metres or two metres width of floor space)

(3.0) Without a kitchen or kitchenette

(4.0) Cooking facilities are provided in another type of room

Twenty-six countries (more than half overall) collected such information in the 2010 census round, 20 of whom adopted the recommended classification. This was the only non-core topic included in the census by more than half the countries with register-based census (five out of nine).

Cooking facilities: The CESR noted (at paragraph 677) that the reference to a 'kitchen' or 'kitchenette' above referred only to its *availability* in the dwelling. The Recommendations went to suggest, however, that in addition: "…*some countries may wish to know what kind of equipment is used for cooking (for example: stove, hot plate, fireplace, etc.), what other kinds of equipment are available (such as a sink), and whether electricity, gas, oil, coal, wood or some other fuel is used for cooking. Some of these items would relate to the dwelling and others to the household*".

Some six countries (all with traditional census) did want to know this information and collected relevant data. There was no classification recommended that related to the type of information that should be collected.

Main type of energy used for heating: In addition to the core topic 'type of heating' described above, the CESR suggested that some countries might also wish to collect information on the main type of energy used specifically for heating purposes. The following classification (recommended at paragraph 682), referred to occupied conventional dwellings:

(1.0) Solid fuels

- (1.1) Coal, lignite and products of coal and lignite
- (1.2) Wood and other renewable wood-based products
- (1.3) Other

(2.0) Oil

(3.0) Gaseous fuels

- (3.1) Natural gas
- (3.2) Other (including liquefied gases)

(4.0) Electricity

(5.0) Other types of energy used

- (5.1) Solar energy
- (5.2) Wind energy
- (5.3) Geothermal energy
- (5.4) Other

As noted above, this was the non-core topic most commonly included in the 2010 round of census; some 29 countries overall (58 per cent) did so, but only in a third of countries with register-based census (Denmark, Finland and Iceland). A good majority of these countries (23) used the recommended classification.

The inclusion of topics relating to the general availability in the housing unit of particular energy sources was also recommended. These covered:

Electricity for which the recommended classification was simply:

(1.0) Electricity available in the housing unit

(2.0) No electricity available in the housing unit

and ***Piped gas*** for which the recommended classification was:

(1.0) Piped gas available in the housing unit

(1.1) For heating purposes

(1.2) For cooking purposes

(2.0) No piped gas available in the housing unit

where 'piped gas' was defined (at paragraph 686 of the CESR) as: *"…natural or manufactured gas which is distributed by pipeline and the consumption of which is recorded by gas meters"*.

The extent of inclusion of each of these topics was very much the same across all countries overall. Some 19 countries in all collected information on each topic – though they were not the same countries in each case; indeed only 12 countries collected information on both – all of these being traditional census-taking countries in Eastern and South-Eastern Europe, and the Caucasus.

Availability of air conditioning: The CESR suggested (at paragraph 688) that some countries might wish to record the availability of air-conditioning as a housing quality measure, but noted that the use and importance of this topic as a housing measure was likely to vary across countries. Some 11 countries collected this information (no register-based census did), and all but one of these adopted the basic recommended classification:

(1.0) Air-conditioning available in the housing unit

(1.1) Central air-conditioning from an installation in the building or in the housing unit

(1.2) Independent air-conditioning unit(s) available in the housing unit

(2.0) No air-conditioning available in the housing unit

The CESR also suggested that some countries might wish to collect the sort of information that could be used as an indicator of *accessibility* to the dwelling, with respect, in particular, to people with disabilities. Three topics were recommended:

Position of the dwelling within the building, for which the recommended classification was:

(1.0) Dwellings on one floor only

(1.1) Dwelling on the ground floor of the building or lower (below ground level)

(1.2) Dwelling on the 1st or 2nd floor of the building

(1.3) Dwelling on the 3rd or 4th floor of the building

(1.4) Dwelling on the 5th floor of the building or higher

(2.0) Dwellings on two or more floors

(2.1) Dwelling on the ground floor of the building or lower (below ground level)

(2.2) Dwelling on the 1st or 2nd floor of the building

(2.3) Dwelling on the 3rd or 4th floor of the building

(2.4) Dwelling on the 5th floor of the building or higher

with the additional proviso that for dwellings extending over two or more floors, information should be provided with reference to the lowest floor level of the dwelling.

Accessibility to the dwelling, for which the recommended classification was:

(1.0) Access with no steps or ramp

(2.0) Access by ramp

(3.0) Access by disabled stair lift

(4.0) Access using lift only (though the building may have staircases as well)

(5.0) Access by using only steps

(6.0) Access only by using both lift and steps

with the note that information on more than one means of access should be recorded.

Presence of a working lift, the concept of which was clarified at paragraph 695 of the CESR, which noted: "*It is suggested that information on the presence of a working lift in multi-storey buildings be collected. Countries collecting this information should report it separately for occupied conventional dwellings. The information should not be limited to the presence of a lift, but it should be indicated if the lift is operational for most of the time and is subject to regular maintenance. It could also be useful to collect information on the size of the lift (for the handicapped persons and ambulance transport), and if the lift goes to the ground floor.*"

The extent of take-up of these three related topics varied across the UNECE Region. Information on the 'position of the dwelling' was collected by 15 countries, 12 of which adopted the recommended classification, whereas only 4 countries (Bosnia and Herzegovina, Republic of Moldova, the Former Yugoslav Republic of Macedonia, and Spain) attempted to collect information on 'accessibility to the dwelling', and only 2 of these (Bosnia and Herzegovina, and the Former Yugoslav Republic of Macedonia) used the recommended classification.

Information on 'presence of a working lift' was collected in 12 censuses, including those based on registers in Finland, Norway and Slovenia. Though no specific classification for the 'lift' topic was set out in the CESR, 10 of these 12 countries reported in the survey that they had complied with the Recommendations. This might, instead, have meant that the criteria set out at paragraph 695 had been taken into consideration.

A number of non-core topics related to the characteristics of the buildings containing the dwellings rather than of the dwellings themselves were recommended. These covered:

Number of floors in the building: For this topic the following classification was recommended:

(1.0) 1 floor

(2.0) 2 floors

(3.0) 3 floors

(4.0) 4 floors

(5.0) 5 - 9 floors

(6.0) 10 -19 floors

(7.0) 20 floors or more

Some 22 countries, including 4 of the 9 with register-based census, collected this information, and most of these (17) used a classification that was compliant with the CESR.

Building construction materials: The CESR suggested (at paragraph 712) that "…*information on the materials of which specific parts of buildings containing dwellings are constructed may be used, in conjunction with data on other topics, for assessing the quality of dwellings*".

The CES Recommendations went on to suggest that some countries might wish to collect data on the materials of which the outer walls, the roof, the floors, etc. are constructed for this and other purposes, and recommended the following classification referring specifically to the material of which the outer wall is constructed:

(1.0) Wood

(2.0) Unburnt clay (may be omitted by countries where this is not important)

(3.0) Burnt clay (bricks, blocks, panels, etc.), stone, concrete (in situ cast concrete, blocks, panels, etc.), or steel frame

(4.0) Prefabricated units – generally factory constructed and brought to the site and erected

(5.0) Other material (to be specified)

(6.0) Mixed materials (that is a combination of building materials)

Information on this topic was collected by 18 countries across the UNECE region (including 3 with register-based census) of whom 15 adopted the recommended classification.

State of repair of the building: This refers to whether or not the building (rather than the dwelling itself) is in need of repair and the extent of repair needed. The recommended classification was:

(1.0) Repair not needed

(2.0) In need of repair

- (2.1) Minor repair
- (2.2) Moderate repair
- (2.3) Serious repair

(3.0) Irreparable

In acknowledgement of the rather subjective nature of the topic the CESR went on to define (at paragraph 716-719) what constituted the different level of repair and irreparability to which the classification referred.

Only seven countries collected this information; all but one carried out a traditional census, and all but two adopted the recommended classification.

Housing characteristics of unoccupied dwellings

The majority of topics in this chapter relate to 'occupied conventional dwellings'. However, the CESR suggested that countries might have some interest in collecting information on at least some of the main characteristics of all conventional dwellings, regardless of their occupancy status. In the core topic 'Occupancy status of conventional dwellings' reported above, the number of all conventional dwellings includes seasonal, secondary and vacant dwellings. In addition to knowing this number the CESR suggested that some countries might also wish to collect more information on unoccupied dwellings in order to be able to obtain a more complete picture of the entire national dwelling stock. Accordingly this non-core topic allows for the description of some of the features of unoccupied conventional dwellings.

The range of such features to be measured is, of course dependent on the individual requirements of countries, but the UNECE survey enquired about the inclusion of a number of particular core characteristics. These are shown in Table 19.5.

Table 19.5
Availability of selected topics for unoccupied dwellings (number of countries and percentage)

Topics	Total (out of 44 replies)	%	Type of census						Region			
			Traditional (27)	%	Register-based (8)	%	Combined (9)	%	EEA (29)	%	Non-EEA (15)	%
Location of living quarters	38	86	24	89	6	75	8	89	25	86	13	87
Period of construction of building	37	84	21	78	8	100	8	89	25	86	12	80
Type of building	37	84	22	81	8	100	7	78	25	86	12	80
Useful floor space	28	64	13	48	8	100	7	78	19	66	9	60
Number of rooms	25	57	13	48	6	75	6	67	16	55	9	60
Type of ownership	18	41	10	37	4	50	4	44	12	41	6	40
Other characteristics	10	23	5	19	4	50	1	11	8	28	2	13

Of the total number of countries responding to the survey, 44 (86 per cent) reported having collected some information relating to the housing characteristics for unoccupied dwellings. Six countries (Armenia, Azerbaijan, Belarus, Denmark, Russian Federation, Turkey) did not respond, either because unoccupied dwellings are not covered in their census or information on characteristics of unoccupied dwellings are not collected.

Information on 'location' of such dwellings was collected by 38 countries across the UNECE region followed in ranked order by 'type of building' and 'period of construction' (37), 'useful floor space' (28), 'number of rooms' (25) and 'type of ownership' (18).

There is little significant difference in distribution among EEA and non-EEA countries, but it is noticeable from the figures in Table 19.5 that because dwelling registers generally contain information for unoccupied dwellings more countries with a register-based census are able to provide information on the characteristics for dwellings without usual resident population than are traditional censuses. In a field enumeration it is notoriously difficult to collect accurate information for vacant dwellings or dwellings reserved for seasonal use. As a result it is more often the case that only information on the address and characteristics of the building is available.

Results from the survey showed that 14 countries were able to assign other characteristics to unoccupied dwellings. These included Austria, Belgium, Iceland and Montenegro who each reported having collected all the same information for unoccupied dwellings as for occupied dwellings, and a number of other countries that collected information on at least one 'other' topic, including for example:

Bulgaria: Kitchen, electricity, source of water, sewage, outside thermal insulation, heating system, energy saving woodwork

Ireland: Reason for vacancy

Lithuania: Water supply system, toilet facilities, bathing facilities, type of heating, kitchen

Malta: State of repair of dwelling

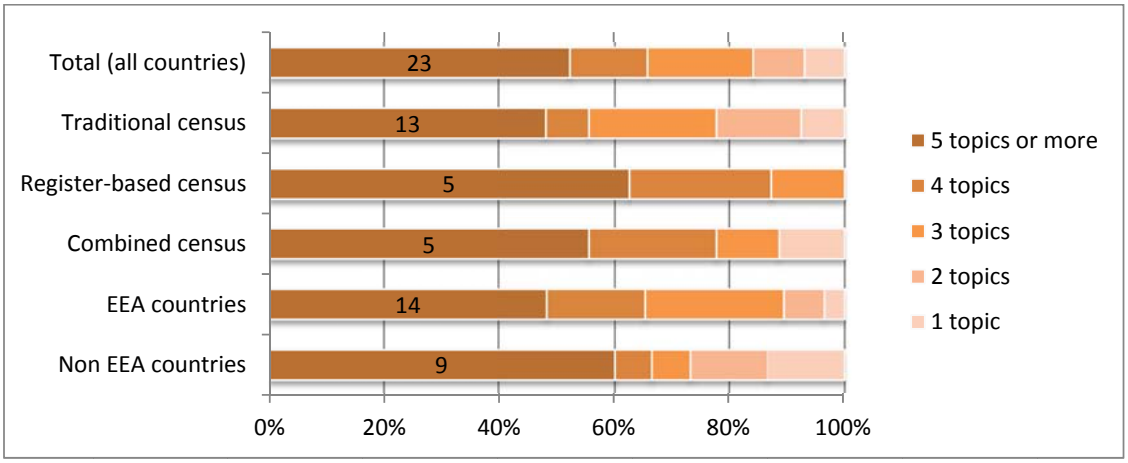
Poland: Water supply system; toilet facilities; piped gas; type of heating; reason for not being occupied; occupancy status of the building in which the unoccupied dwelling is located; type of ownership

Slovenia: Water supply system, electricity, toilet facilities, bathing facilities, kitchen

United States: Complete kitchen facilities, complete plumbing facilities, rent asked (if vacant for rent), and price asked (if vacant for sale).

There were three countries which only were able to assign just one characteristic to unoccupied dwellings (location of living quarters): Israel, Tajikistan and the United Kingdom. On the other hand more than half of the countries which were able to assign at least one characteristic to unoccupied dwellings (23) reported doing so for five or more topics (Figure 19.3). Of these, five were countries with a register-based census (representing 63 per cent of countries of this group), five countries with a combined census (56 per cent of countries with the combined approach) and 13 with a traditional enumeration (including France) representing 48 per cent of this group.

Figure 19.3
Countries by number of topics for unoccupied dwellings, type of census and region



Other housing characteristics not covered in the CES Recommendations

Some 15 of the responding 51 countries (29 per cent) reported that information was collected in their census on housing characteristics other than those specifically referred to in the CES Recommendations. All countries but one that did so had adopted a traditional or combined methodology in carrying out their censuses. Such censuses generally provide more flexibility in collecting other 'non standard' information. Of the register-based countries only Austria reported collecting information on additional housing characteristics.

In responding so however, some countries specified topics such as internet access (Montenegro and Spain), source of income (Albania), and place of second residence (Estonia), which are characteristics more associated with the household rather than the housing in which the household lives (see Chapter 18)

Several countries included questions related to energy saving and thermal insulation (Bulgaria, Italy and Romania) suggesting that these are, perhaps, the sort of topics on which census information may become increasingly valuable in a more environmentally conscious future.

A range of information on the costs of maintaining the household's accommodation, whether rented or owner-occupied, was collected in Portugal, Canada and the United States. Such information

covered different items in the various countries including, for example, type and date of contract, detail of mortgages, rents, utility costs, condominium fees, financial charges, and the current market value of the property.

The United Kingdom (Northern Ireland) reported on whether or not the household's accommodation had been designed or adapted to suit the needs of people with a disability.

More general information on the characteristics of the building in which the household's dwelling is located (as opposed to the dwelling itself), such as access and ownership, was collected by Austria, the former Yugoslav Republic of Macedonia, and Poland.

Some very specific information on buildings was collected by Portugal, such as type of roof, solid waste disposal, ground floor configuration, position of the building compared to neighbouring buildings.

Plans for the 2020 housing census

Countries were asked if they intend to include more energy-related questions in the next census. The objective was to evaluate if there was likely to be a need to cover such 'new' housing topics (such as 'type of energy used for heating water', 'type of energy used for air-conditioning' and questions on the thermal insulation) in the revised CES Recommendations. The survey also provided the opportunity for countries to identify other topics on which they plan to collect (or are thinking about collecting) information in their next census.

Four fifths of the respondents address the issues of the three specifically identified topics. About half of them stated that they have not yet decided if they would collect such information on these topics. But most of the other countries indicated that they did not plan to include any of them in the next census. And very few respondents reported that they might collect other 'energy related' information. Only one country (Switzerland) reported definite plans to collect one of the topics in question (type of energy used for heating water), but there the topic has been part of their housing census programme since 1980 (more details on plans for new hosing topics in the 2020 census round are presented in Chapter 23).

20. AGRICULTURE

Introduction

It may seem, at a first glance, to be somewhat strange to include the subject of 'agriculture' in a review of practices of population and housing in censuses, since this is clearly a subject that is normally covered extensively in agricultural censuses. However the CESR for the 2010 round of censuses gave particular attention to two non-core topics that countries could consider for inclusion in their population census, in order to facilitate the preparation of a frame of agricultural holdings by the household for use in a subsequent agricultural census.

With the first topic, relevant at the household level, the information to be collected relates to whether or not any member of the household is 'engaged in own-account agricultural production activities' at their usual place of residence or elsewhere. With the second topic, at the individual person level, the information is intended to identify those 'persons involved in agricultural activities' during a longer period, such as a year. These topics may, therefore, be considered as a particular extension of the enquiry into the economic characteristics of the population.

This chapter presents a review of how many countries in the UNECE region collected information an agriculture in their population census of the 2010 round, and provides some information on national practices in this area[35].

Results from the UNECE survey

Information on agriculture was collected in the census by over one quarter of the UNECE countries (14 out of 51 responding countries). Ten countries collected information at household level (relating, that is, to whether or not any members were involved in own-account agricultural production): Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Canada, Croatia, Estonia, Georgia, Serbia, and the Former Yugoslav Republic of Macedonia.

All (except for Estonia) are countries with a traditional census, and all (with the exception of Canada) are geographically situated in South-East Europe or the Caucasus. The range of information collected included:

- size or tenure (owned or rented) of agriculture land managed (4 countries);
- type and number of livestock held (4 countries)
- whether or not household produces any crops on its land or is involved in the farming of animals for own consumption, sale etc. (2 countries)
- agricultural equipment used by the household managing a holding (one country)
- household involvement in fishing/aquaculture (one country).

Four countries collected information at individual level (relating specifically to information on all agricultural jobs carried out during the year preceding the census); these were Ireland (traditional census), Austria (register-based), and Poland and Switzerland (combined approach). The range of information collected included:

- type of agricultural activity carried out (2 countries)
- size of agriculture land managed (one country)

[35] The material in this chapter has been taken largely from the a paper prepared by Paolo Valence (UNECE) and submitted to the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

- whether or not the person worked on an agricultural holding and how many months in a year (one country)
- whether or not the person is an agricultural holding holder or a family member in the holder's household (one country).

More details on the information on agriculture collected by selected UNECE countries are shown in Table 20.1.

Table 20.1
Information on agriculture collected by selected UNECE countries

Country	Level	Type of information on agriculture collected
Albania	Household	• Whether or not household as a "kitchen garden" larger than 200 m2 • Use of any other agricultural land • Whether or not household has livestock or bees
Armenia	Household	• Whether or not household produces any crops on its land (own, including garden, rented, paid or free) or is involved in the farming of animals for own consumption, sale etc. • Size of agricultural land owned by the household (regardless of whether it is utilized or not) including the part of rented out • Number of livestock owned by the household • Household involvement in fishing, aquaculture
Georgia	Household	• Structure of land • Livestock and poultry • Agricultural equipment used by the household.
Ireland	Individual	• Agricultural occupations based on data on occupation of all persons at work, unemployed or retired • Size of area farmed (collected for those who indicated they were a "farmer") but no information on type of farming
Poland	Individual	• Type of activity conducted on main or additional job (based on Statistical classification of economic activities in the European Community (NACE) classification) • Whether or not the person is an agricultural holding holder or a family member in the holder's household • Whether or not the person worked on an agricultural holding
Serbia	Household	• Owned, rented and utilized agricultural land • Possession of stock • Agricultural production
The former Yugoslav Republic of Macedonia	Household	• Agricultural land used • Type and number of livestock

PART 3 LESSONS LEARNED AND PLANS FOR THE 2020 ROUND

21. INTRODUCTION

It is generally recognised that censuses of population and housing are never perfect, and that mistakes are made and/or poor practices followed. The value of making critical evaluations of the entire census process is that they not only help to assess the quality of the data but also enable the valuable lessons learned to be recorded in order to benefit the design and planning of subsequent census operations.

In order to inform the content of the Conference of European Statisticians' recommendations for the 2020 round of census, the UNECE survey asked countries to report on any key lessons learned that might benefit the wider international census community. This part of the publication highlights the key messages that came out of a number of countries' responses, and goes on to report on how these lessons learned are helping to shape the plans for the next round censuses in those cases where countries are already advanced in making such plans.[36]

22. KEY LESSONS LEARNED

While there may be a great number of circumstances and situations experienced during the course of taking a census that are unique to each country, there are also many common experiences and hence similarities in the lessons learned across the UNECE region. In reviewing the responses to the survey a number of common themes emerged. However, it should be noted here that the survey itself was quite challenging, in that it required countries to critically review their last census and succinctly describe those elements that went well and those that did not. For some countries, the results provided an early insight into how their next census might develop in the light of the lessons learned.

A major theme to emerge is the need to review census methodologies, and it is clear that a number of countries plan to move from a traditional census (however that might be defined) to an operation that involves an increased use of pre-existing administrative data held on registers in order to achieve cost and time efficiencies. Moreover, the increased use of technology has in most cases benefitted the census, and there is likely to be more dependence on new and developing technological solutions in the future, particularly in field operations. In particular the use of the internet for both data collection and dissemination is replacing, or reducing, the need for paper in a traditional census.

But there are challenges as well as opportunities in adopting new methodologies and/or technologies for the first time. Both require time, testing, and trained staff to implement successfully. With each of the methodologies, there are trade-offs.

Keeping within budget, achieving better timeliness, improving data quality, and meeting an increasing demand for data, continue to be important considerations for census planning and implementation. These are all key factors in determining which census methodology and/or technologies countries will utilize in their next census.

This all must be balanced with the role of stakeholders, government, and the public. At a time of increasing public resistance, countries carrying out field enumerations must find ways to maintain

[36] The material in this chapter has been taken largely from a paper on field operations, legislation and lessons learned from the 2010 census round prepared by the UNECE Steering Group on Censuses, and partly from responses to the survey in respect of number of other specific topics reported by the Task Forces at the Joint UNECE-Eurostat Work Session on Population and Housing Censuses, held in Geneva from 30 September to 3 October 2013 (http://www.unece.org/stats/documents/2013.10.census1.html)

response rates and continued support for census taking. Key to this is communications with stakeholder groups to ensure that the messages to the public about privacy, data confidentiality, and data protection are clear and accepted.

To illustrate these points a selection of some of the countries' written responses to the survey are given below.

Comments on the key lessons learned from countries conducting a traditional census

Armenia reported the need for the use of innovative technologies in all stages of the census process, and more time to be allocated for preparatory work in the next census. In *Cyprus*, too, the use of technology had improved the quality, timeliness and dissemination of the Census data.

Azerbaijan felt the need to improve the training of the census field staff and to exert more control over their activities.

Belarus noted that a widespread information publicity campaign had provided a high level of participation. The centralized approach to data processing had helped ensure the confidentiality of data, and improved the quality of the information. It had established a system to access the census database that allowed better promotion of the census results.

Canada reported the need to build in sufficient flexibility within systems to cope with unexpected changes.

In *Croatia* there had been significantly more citizen interest in data protection compared with the previous census, and more reluctance to allow enumerators access to their houses. Media interest and the interest of national minorities and religious groups had significantly increased. Communication with public about data protection was also an issue in *Slovakia*, but here the other key lesson learned was the need to maximise the use of administrative data sources.

The *Czech Republic* also faced problems in overcoming public resistance, as well as with the use of internet for data collection, and, more generally, with the management of such a large project.

France had shown that its innovative rolling census was indeed possible and successful, but noted that it was important to retain a permanent central team for managing the organization and methodology.

Greece noted the benefit of recruiting enumerators with good communication skills. *Serbia* noted the need for even stricter criteria in selecting field staff. In particular it reported on the importance of recruiting a sufficient reserve of enumerators, improving the training of trainers, and that field training should last at least five days with necessary testing. Serbia also noted it would abandon the practice of pre-enumeration for certain categories of population (such persons doing military service, persons in correctional and detention institutions, etc.)

Hungary believes that it is necessary to increase the social dialogue; that the supply of outputs via multi channels is indispensable; and that it will want to continue the cooperation with scientific researchers and civil organizations.

Ireland reported that social media has now a much bigger role to play in all interactions with the public than ever before. The dissemination of the results in interesting and easy to use format created much interest and offered better value.

In a very full response *Italy* noted that the logistics of the census process proved to be very complex, with some potential points of failure. Close monitoring of census performance was a critical task for the coordinating organization. The online census management system met the defined requirements through the production of reports. These were designed to minimize any impact on the system's performance while offering census operators some information on how the census was progressing. Unfortunately, this proved insufficient, as proper monitoring of such a complex operation required a fully-fledged dashboard with online analytical processing functions. Future releases of the online census management system will have to cater for real time mirroring of the database, on top of

which a data warehouse should be produced and maintained to provide the needed dashboard and online analytical functions. Assisting citizens and municipalities was a fundamental aspect of the fieldwork. In dealing with such a large volume of work in future, a second-level help desk should be considered as one of the most important tasks of the census process and be implemented through dedicated, adequately trained staff. This would apply to all sectors and levels of the census process: from IT-specific issues of the online management system to logistics issues, from interpretation of the census process rules to legal questions about privacy and the rights of citizens.

Luxembourg's simple hope was that the 2011 Census would be their last traditional census and that the next one would be at least partially register-based.

In *Malta* it transpired that a considerable number of households were not included in its sampling frames, but that with the aid of the census, a track of these and similar households will be held in the future to overcome, or at least limit, the problem of under-coverage in surveys.

Portugal are planning to prepare for overwhelming response by internet in the next census, and, based on recent experiences, will not underestimate the value of an effective help line.

Romania believes it will benefit from a more aggressive publicity campaign and a better presence of the census's organizers in public meetings, in order to explain the goals and the scope of the census, the specific legislation, characteristics, information required, methods used and the need for comprehensive participation by everybody. *Tajikistan* also reported that a more active publicity campaign improved public awareness.

Tajikistan also reported that the scanning of census forms had improved data quality and recognised the need to use IT and GIS in both data collection and dissemination. As with some other countries better field staff recruitment and training, as well as allowing more time for the census operation, would be vital. A further comment was the need to select the optimal timing for the census taking account of the availability of skilled labour and weather conditions.

The key lesson learned by the *Russian Federation* was the need for compulsory participation in future censuses, together with the necessary introduction of new methods using IT for data collection.

In another full response, the *United Kingdom* reported that it had shown internet collection had not only been successful in the census but was viable for other data collection applications. It also noted the need to reinforce census messages with good publicity, as well as the need to manage outsourcing and monitor weekly expenditure. A key lesson was learned by working closely with local authorities and community groups in order to gain their support, to achieve a better understanding of local conditions, and to explain methodologies in order to gain acceptance of results. The importance of having a good address register and questionnaire tracking system was also seen as being vital to the success of the census.

The *United States* recognised the need to increase modes of data collection including, after years of contemplation, the use of internet. It was also vital to find ways to decrease per capita costs and to improve the management of large contracts.

Comments on the key lessons learned from countries conducting a register-based census

Few comments from countries with register-based census were reported. The *Netherlands* noted the need for preparations to start earlier including the need for earlier testing, while *Norway* warned that transforming administrative data into statistical data is challenging, especially when done for the first time. Obtaining consistency between data sources was also noted as being a key issue.

The aim of *Slovenia's* NSI is to use more of its own staff in future censuses and to utilise census methodology for other regular statistical demographic surveys. A decision has been made to carry out the census more frequently.

Comments on the key lessons learned from countries conducting a combined approach census

Estonia's key comment in an extensive response was that: *"It's all about testing. Test everything, processes, functionality, hardware, software, user friendliness, load tolerance, integration and so on. Enough time should be planned for load tolerance testing and optimization. In addition to testing it is very important to go into production with pilot. The larger and closer the pilot is to the real situation, the better. In 2009 we did the census pilot and 2010 the agricultural census. This experience was invaluable, but many problems didn't come out, because the sizes of the surveys were several times smaller than they were on census."*

In Estonia other key lessons learned were to: hire more people for a longer period; buy in experience, because there was no time to experiment and learn; and develop a clear management structure. In a clear message to other countries Estonia noted that it is not possible to create a fool-proof system, and that the rate of development of IT is unpredictable. The survey respondent added: "*Project organization and agreements with partners has to ensure a clear division of tasks and responsibilities. Partners must be as much as necessary and as little as possible. If something gets broken, usually there is no time to argue about whose fault or responsibility it is to fix it. In order to diagnose problems quickly and efficiently, the development and maintenance team has to work like boots and stockings. Users are very clever. I recall one situation, where four members family members started to fill questionnaire simultaneously in e-respondents environment and as the result there were a bunch of duplicate questionnaires. If we would have known in 2008 that the coverage of mobile internet in 2012 is almost 100 per cent in Estonia, we would have created probably a web application for enumerators*."

Israel was able to report a dissemination system that shortened the time for publishing the results and the successful implementation of new census methodologies (though these might be regarded more as successes - see Chapter 8 - than lessons learned).

The census in *Latvia* offered the possibility of introducing technological as well as organizational innovations into other statistical areas. For example, it reported that an Integrated Statistical Data Management System - Computer Assisted Survey Information System (ISDMS CASIS) will be used in data collection and processing for regular surveys of social statistics. Outsourcing of the census fieldwork provided to be a good practice, and in future, such co-operation with social research companies could be continued. Complete enumeration showed a noticeable difference from the Population Register, and that on the basis of the census data, recalculations would have to be done in other statistical areas including population, employment, income and living conditions. Methods for improving the population count are going to be developed. The criteria developed to determine the resident population in the census, using information from administrative registers, could be used in future for the improvement of migration statistics and for population statistics in general.

On the basis of its 2011 experience *Lithuania* has decided that future censuses will be carried out only with the use of administrative data sources. However, as they specified: "*The practice from 2011 census taught us, that it is important to dedicate enough time for the analysis of administrative data sources, close collaboration with the owners of the administrative data sources is necessary. We have to think about methods that could be applied for the identification of usual residents. Methods for estimation of variables which are not available from administrative data sources have to be developed.*"

Poland's key achievement was its paperless census. The use of modern technology and the use of data from administrative and non-administrative sources helped not only to abandon the need for paper at all, but also to reduce costs and respondent burden, meet deadlines, and improve data quality.

Spain had shown that although it was possible to obtain census data linking information from a big survey to its registers, it was also difficult to integrate and synchronize information between various channels, and that there were delivery timing problems with some outsourced suppliers. It

reported that there was need for better management of human resources, but that benefits had been gained by using electronic devices, cartography and GPS.

Turkey also recognised the benefits of GIS in data collection and the importance of administrative registers in order to check the quality of data. In common with several other countries there was a need to allocate more time for field staff training.

And finally, by way of summing up many of the key lessons to be faced by countries moving to a new census methodology, the following text is quoted directly from *Switzerland's* detailed response to the survey: *"It can be said that the changeover from the old system of a census every 10 years to a new, modern and sustainable system has been worthwhile for all involved. Although some information is no longer available at the finest level of regionalization, the benefits of a database available on an annual basis outweigh the disadvantages. The changeover process to a register-based census takes time. First of all, the legal bases have to be established and incentives have to be provided to the authorities maintaining the registers to obtain not only a statistical benefit but also a wide range of value-added benefits. The authorities maintaining the registers — in Switzerland, the cantons and communes — have to be persuaded of the advantages of such a system and supported in the operational implementation. This requires a high level of technical know-how, which must be developed before the project is implemented. In terms of deadlines, methodology and the technical aspects, the implementation was a major challenge for the Swiss Federal Statistical Office (FSO) and the participating authorities that maintain the registers. For the partners at all federal levels (communes, cantons and the Confederation), centralized project management and control, which took account of the different needs and implementation methods at the cantonal and communal level, was crucial to ensure the successful implementation of the project. New and current statistical results from the new census system have been continuously produced since April 2011. The possibility for the cantons to supplement the samples of all the surveys in the system in accordance with their own needs has proven to be correct and is being widely used. FSO is continuing to optimize how the results are disseminated. For example, on the FSO website the users of the statistics are increasingly able to evaluate the results themselves and obtain results on all topics of the census system. In order to measure the quality and comprehensiveness of the register survey, a census quality survey is also planned for 2013. There are many opportunities in integrated output systems to use the newly available databases in intelligent and multiple ways in various dissemination products."*

23. PLANS FOR 2020

At the time of the UNECE survey (early 2013), planning for the next round of censuses was either at a very early stage or, in the case of several countries, non-existent. Nevertheless, from the comments reported above it is clear that for some aspects of the census at least, some forward thinking has already been undertaken. This is particularly the case where the future use of technology and/or other innovations are concerned. Accordingly, the survey enquired about future plans with reference to a number of specific topic areas, technology and innovations being two.

Use of technology

Table 23.1 shows the range of technologies that countries plan to use in the 2020 round, compared with their overall usage in the 2010 round.

It is clear, even at this early stage of planning, that use of GIS and internet data collection will be adopted widely across the region in 2020, with 37 and 33 out of the 49 responding countries reporting these. This compares with just 19 and 18 countries respectively in the 2010 round. No other identified technology is expected to increase in usage to the same extent, although the planned use of tablet computers in the field by 20 countries (particularly in those outside the EEA), compared with just 3 countries in the 2010 round, represents a far greater increase proportionately. As an aid to field operations, GPS also seems to be a technology that is likely to be on the increase, with 16 countries reporting is possible use compared with the 7 in 2010. And proportionately, the use of SMS texting is also likely to increase to a similar extent.

Table 23.1
Use of technology in 2010 and planned for the 2020 census round (number of countries)

Kind of technology	*Used in 2010 round*	Planned use in 2020 round	Type of census			Region	
			Traditional	Register-based	Combined	EEA	Non-EEA
Geographical Information Systems (GIS)	*19*	**37**	25	5	7	23	14
Internet response option	*18*	**33**	23	1	9	19	14
Tablet Computers	*3*	**20**	18	0	2	9	11
Optical Character Reading/recognition (OCR)	*24*	**19**	17	0	2	9	10
Global Positioning System (GPS)	*7*	**16**	12	0	4	8	8
Optical Mark Reading/recognition (OMR)	*20*	**14**	13	0	1	7	7
Laptop Computers	*10*	**13**	10	0	3	9	4
Hand-held devices/Pocket Computers/Smart phones	*2*	**12**	9	0	3	9	3
SMS texting	*8*	**12**	9	0	3	8	4
Uploading data from field to data centre	*10*	**11**	8	0	3	5	6
Big data (information from credit card companies, cellular phone suppliers, Google, etc.)	*0*	**9**	4	3	2	8	1
Computer Assisted Telephone Interviewing	*7*	**7**	4	0	3	3	4
Internet exploration	*0*	**5**	4	0	1	3	2
Mobile or cellular phones (other than smart phones)	*9*	**4**	2	0	2	3	1
Automated Telephone Interviewing	*1*	**2**	1	0	1	1	1

But in thinking about the technology likely to be adopted in the 2020 round, only 19 countries reported that they plan to use OCR and even fewer, 14, plan to use OMR. If true this would represent a declining trend in the use of such technology compared with the 24 and 20 countries that reported such use, respectively, in the 2010 round and reflects a trend to move away from paper questionnaires.

Anticipating new and untried technologies is of course always going to be difficult, but it is noticeable that innovative technologies such as the use of Big Data (a technology that enables the potential access to vast volumes of data in real time) is on the horizon for a number of countries, though it is by no means clear in this case how such data will be utilized, nor how the quality of such data will be evaluated.

New technologies also bring with them, of course, new challenges, and therefore countries were asked what barriers might be encountered in the adoption of such technologies as those identified in Table 23.1

Lack of financial resources was reported by three quarters of all responding countries (37) as being a main barrier, followed by the related issue of lack of staff resources (31 countries) and lack of expertise (19) (see Table 23.2). Limited access to administrative registers is seen as a fundamental barrier to those countries still undertaking traditional censuses and one that will no doubt prevent some countries from looking to adopt a register-based approach in the 2020 round.

Table 23.2
Barriers to adoption of new technology (number of countries)

Kind of barrier	Total countries	Type of census			Region	
		Traditional	Register-based	Combined	EEA	Non-EEA
Financial Resources	37	27	3	7	23	14
Staff resources	31	22	2	7	19	12
Expertise	19	17	0	2	7	12
Infrastructure	17	12	1	4	9	8
Lack of administrative registers	17	15	0	2	9	8
Limited access to administrative registers	16	14	0	2	10	6
Public perception	15	14	0	1	9	6
Government support	10	8	0	2	5	5
Culture	5	5	0	0	3	2
Geographical conditions	2	2	0	0	1	1
Climate	2	2	0	0	0	2
None of the above	7	1	5	1	5	2

Other innovations

The possible introduction or development of other innovations was also reported in the UNECE survey, and the results from the 50 responding countries are shown in Table 23.3 (and illustrated in Figure 23.1).

It has already been noted above that geographical information systems and the internet (for data collection) are likely to be high on the list of technological innovations used in the round of 2010 censuses. But responses from the survey also indicated the use of such technologies for dissemination purposes also, as well as an increased use of registers and administrative data as reported by 23 and 20 countries respectively.

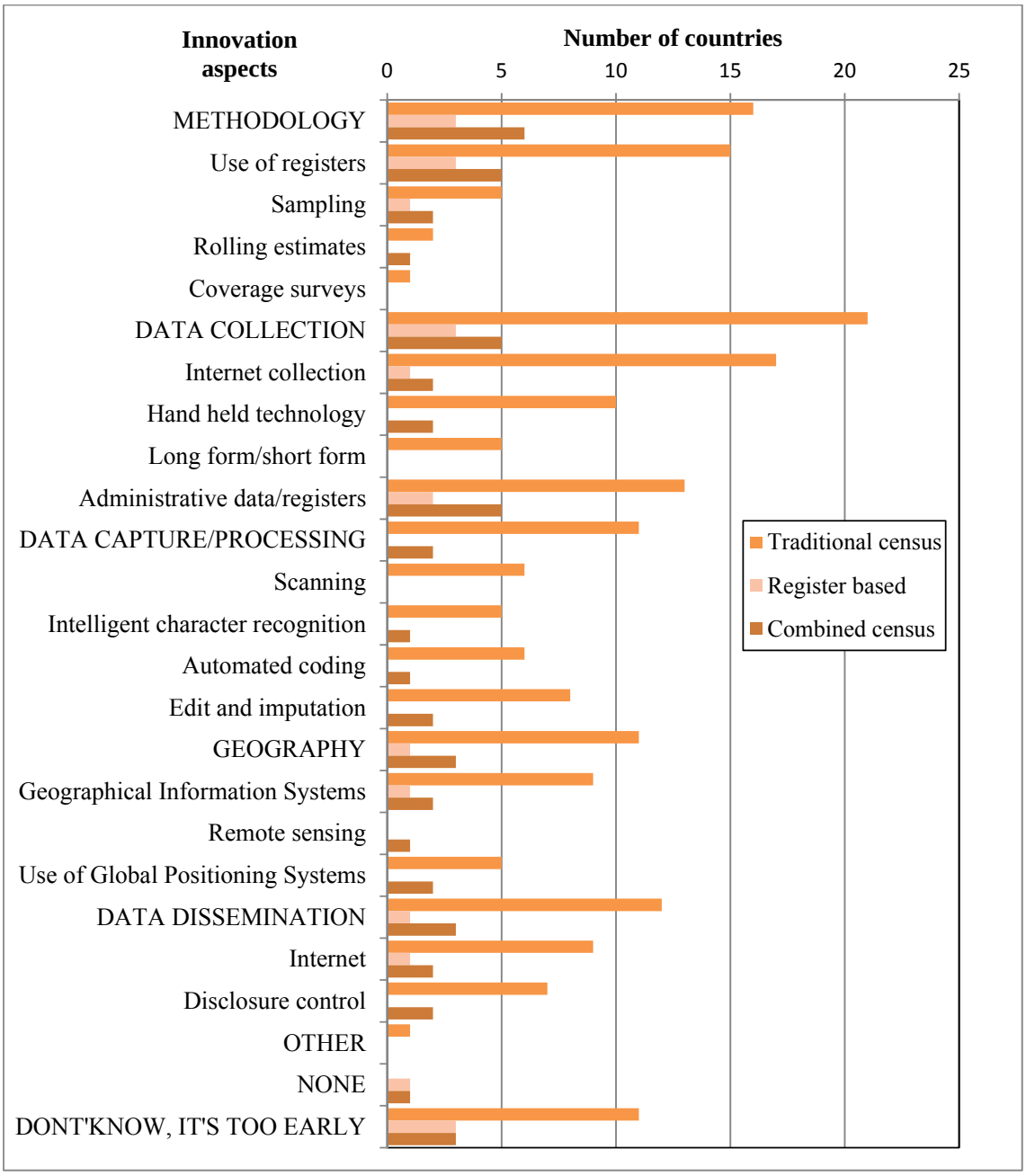
That fact that 15 countries with traditional census reported the likelihood of using registers as part of the methodological design of their 2020 census - of which 13 reported that they will collect census data from administrative sources - clearly suggests a continued move away from the long-standing approach, though it seems more than likely that a field enumeration will still form the basis of data collection for the majority of UNECE countries in the next round.

Table 23.3
Innovations being considered for the 2020 census round (number of countries)

Innovation aspect	Total countries	Type of census		
		Traditional	Register-based	Combined
Methodology	**26**	**16**	**3**	**6**
Use of registers	23	15	3	5
Sampling	8	5	1	2
Rolling estimates	3	2	0	1
Coverage surveys	1	1	0	0
Data collection	**29**	**21**	**3**	**5**
Internet collection	20	17	1	2
Administrative data/registers	20	13	2	5
Hand held devices	12	10	0	2
Long form/short form	5	5	0	0
Data capture/processing	**13**	**11**	**0**	**2**
Edit and imputation	10	8	0	2
Automated coding	7	6	0	1
Scanning	6	6	0	0
Intelligent character recognition	6	5	0	1
Geography	**15**	**11**	**1**	**3**
Geographical Information Systems	12	9	1	2
Use of Global Positioning Systems	7	5	0	2
Remote sensing	1	0	0	1
Data dissemination	**16**	**12**	**1**	**3**
Internet	12	9	1	2
Disclosure control	9	7	0	2
Don't know, too early for plans	***17***	***11***	***3***	***3***

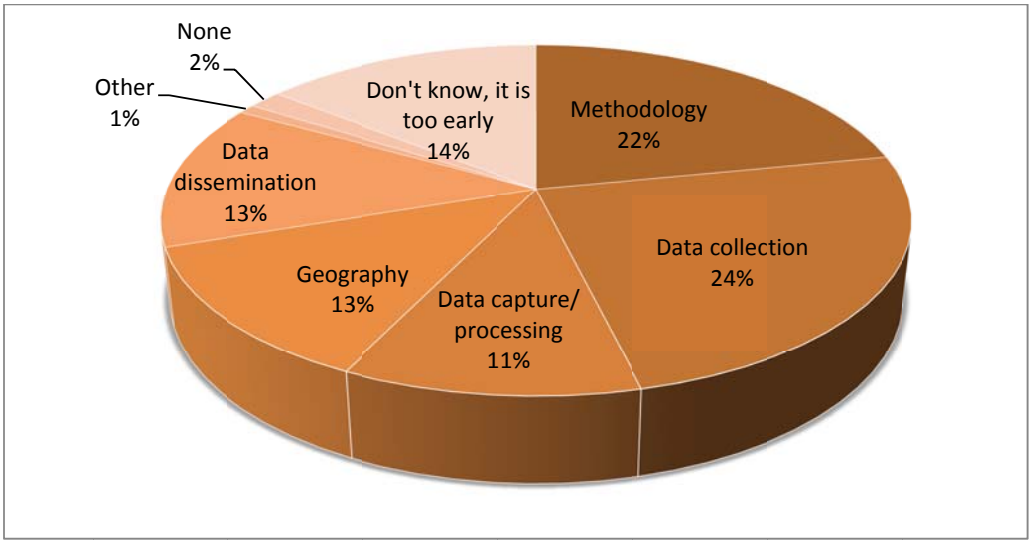
Other areas of innovation reported in response to the survey included the use of hand held devices (10 countries with traditional census and 2 with a combined census expect to use such technology in the field next time), edit and imputation routines as part of data processing (10 countries), disclosure control (9 countries), and sampling (8 countries). As it could be expected, proportionately fewer such innovations were reported among countries with register-based census, for whom the scope for significant methodological and/or operational development is less obvious.

Figure 23.1
Innovations considered for 2020 census round



The main census activities in which innovations may be expected in the 2020 round are illustrated in Figure 23.2. Reflecting the increase in the use of registers and internet, data collection and methodology are the two areas where more innovatory developments are likely to occur.

Figure 23.2
Main census activities in which innovations are expected for 2020 census round



The main factors driving such innovations were the need (a) to improve, or at least maintain, data quality - reported by 34 countries overall and the factor most frequently cited by countries with traditional and register-based census – and (b) to reduce costs (32 countries). But Table 23.4 shows that a number of other factors, such as the need to make results more timely and to reduce respondent burden, are almost equally relevant drivers.

Table 23.4
Factors driving innovation in the 2020 census round

Innovation factors	Total countries	Type of census		
		Traditional	Register-based	Combined
Maintain or improve data quality	34	22	5	7
Reduce costs	32	22	2	8
Make census result available sooner after the census	31	20	3	8
Reduce respondent burden	30	21	0	9
Follow international trends	21	17	2	2
Make census results more accessible to users	18	13	1	4
Replace obsolete systems/processes	12	9	0	3
Respondent privacy	11	9	0	2
Don't know, it is too early for plans to be made	8	3	4	1

Outsourcing

For most countries it is perhaps too soon to start planning what activities might be outsourced to external suppliers in the 2020 round, other than where previous outsourcing has proven to be a success and where no major methodological changes are anticipated. But at least eight countries reported that they intend to use external agencies for their publicity campaign. Four countries (France, Ireland, the Russian Federation and Switzerland) reported that data processing was likely to be an activity ripe for outsourcing. And four (Canada, Ireland, Kyrgyzstan and the Russian Federation) similarly reported using outside providers for field staff recruitment, training and/or pay. But most countries (30 out of 36 respondents), said that it was too soon to report on such plans.

Measuring quality

In order to assist UNECE in preparing universally acceptable recommendations on evaluating data quality for the 2020 round, countries were asked whether or not they would support an international recommendation that sets targets for the accuracy of statistics. All but four of countries that expressed a view responded positively. Three countries with register-based censuses, plus France had some concerns about seeing such targets. Norway, for one, commented that levels of quality depended too much on census methodology and national circumstances, while Finland similarly felt that this kind of approach was not suitable for the register-based census. France too, with its unique rolling census methodology also had reservations about its ability to measure quality quantitatively but did not enumerate these in its response.

Among the 'Don't knows', the Netherlands commented that benefit of any such recommendations would depend on the feasibility and relevance of the targets set and the amount of necessary work that would be required.

Support for such target setting is proportionately higher among non-EEA countries (85 per cent of whom were in favour) than countries within EEA (only 57 per cent), but this may just reflect the higher proportion of traditional censuses (85 per cent of whom overall supported the recommendation) carried out in non-EEA countries.

Somewhat fewer countries, however, positively supported the proposed recommendation, put forward by the Task Force on Quality and Coverage, that information about the accuracy of census statistics and the methods used to measure such accuracy should be published as part of the census metadata. This proposal was only supported by 26 countries overall (just over half) and by only 17 countries with a traditional census (55 per cent), although it should be noted that 5 more countries expressed some support for publishing only the information about accuracy but not the measurement methods themselves.

New housing topics

Because of the rather more disparate nature of the topics covered by countries in their housing censuses, and the potential for new housing-related topics to become more relevant in the future, the UNECE survey concluded by asking countries to report on any new topics not already covered by the CES Recommendations for which there are plans to collect data in the 2020 round. In particular, the survey asked countries to report on some specific energy-related topics.

As with other areas of future census design, many countries had not yet decided on the content of their next census so were unable to report definitely one way or the other on any such topics. But there were some positive responses (see Table 23.5).

Table 23.5
Support for new housing topics in the 2020 census round (number of countries)

Extent of support	Energy used for		Thermal insulation
	Heating water	Air conditioning	
Plan to collect data in 2020:			
Yes	1	0	0
Possibly	5	0	3
No	15	21	15
Not yet decided	20	19	22
Need for CES Recommendation:			
Yes	6	3	6
No	4	5	5
Don't know	7	5	11

Thus while only Switzerland reported that it would collect information on 'energy used for heating water' (indeed it had done so since its 1980 census), some five countries (Albania, Belgium, Finland, Israel and Turkey) thought that they might do so. Three countries that had made no decisions on this topic (Bulgaria, Germany and the United Kingdom) nevertheless thought that the 2020 CESR should make recommendations on this as a new non-core topic.

There was less enthusiasm, however, for including the topic of 'energy used for air-conditioning' – no countries were even contemplating collecting such information, but three countries (Albania, Bulgaria, and Germany) nevertheless thought that the 2020 CESR should make recommendations on this as a new non-core topic.

On the other hand the subject of 'thermal insulation' aroused more interest; six countries (Albania, Bulgaria, Germany, Hungary, Ireland, and Serbia) suggested that the CESR should make recommendations on this topic, though only two of them (Hungary and Serbia, plus Belgium) were thinking about collecting such data.

No other clear candidates for new housing topics emerged from the ad hoc comments made by responding countries. As the Netherlands succinctly noted: "*Only plans to collect housing data that we can derive from registers on housing will be welcomed for the 2020 census round*".