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**USE OF INFORMATION TECHNOLOGY IN POPULATION AND HOUSING  
CENSUSES IN THE ESCAP REGION:  
PAST PRACTICES AND PLANS FOR THE 2010 ROUND\***

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# **Population Census Technologies**

## **Planned Practices of UNESCAP Countries for the 2010 Round of Censuses**

### **Final Report**

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Not for General Distribution

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## Introduction

The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) initiated a survey of its member countries to determine 1) technologies that will be used in the next round of population censuses; 2) how well selected recommended topics will be covered in the next census; 3) assistance that member countries need in the next census; and 4) assistance that member countries can provide to others. The survey was conducted during the summer of 2007 with results presented at the Expert Group Meeting held December 10 – 12, 2007, in Bangkok.

This document reviews the responses of the ESCAP countries that chose to participate. There are 53 member countries plus nine associate members in ESCAP.

Members and associate members asked that ESCAP make supporting the 2010 round of population and housing censuses in the region a priority. The formal mandate was given at the global level through ECOSOC resolution 2005/13 on the 2010 World Population and Housing Census Programme. ESCAP resolution 62/10 of May 2006 on strengthening statistical capacity in Asia and the Pacific explicitly recalls that mandate.

This survey builds on surveys done by ESCAP in 2005 and the Economic Commission for Europe (ECE) in 2004. To reduce the response burden any information available from these previous surveys was already completed in each country questionnaire and countries were asked to correct or update the information.

The results of the survey will be reviewed by an Expert Group Meeting (EGM) on effective use of IT in population and housing censuses. It is scheduled from 10 -12 December 2007, back-to-back with the fourth session of the Committee on Poverty Reduction (12-14 December 2007). The EGM will recommend, among other things, how to effectively exchange expertise among countries in the region in support of their census operations during the 2010 census round.

There were 40 responses from member countries to this survey. **Table A – Census Reference Year** identifies each country and the years that their census was held and when it is expected to be done in the future. Census data are more valuable the closer they are to the census reference date. It is interesting to note that 29 countries conduct their population census approximately every 10 years and 10 countries do theirs approximately every five years. Singapore, however, uses registers for their population census. This gives them the ability to tabulate total population counts at any time, just as we see today in several European countries. The timeliness of data will be further explored in this paper under Publication and Dissemination.

**Table A – Census Reference Year**

	Country	Census Year	
		Prior Census	Next Census
1	Afghanistan	1997	2008
2	American Samoa	2000	2010
3	Armenia	2001	2011
4	Australia	2006	2011
5	Azerbaijan Republic	1999	2009
6	Bangladesh	2001	2011
7	Bhutan	2005	2015
8	Brunei Darussalam	2001	2010/2011
9	Cambodia	1998	2008
10	China	2000	2010
11	Cook Islands	2001	2006
12	Georgia	2002	2010
13	Hong Kong, China	2006	2011
14	India	2001	2011
15	Indonesia	2000	2010
16	Iran (Islamic Republic)	1996	2006
17	Japan	2005	2010
18	Kazakhstan	1999	2009
19	Republic of Korea	2005	2010
20	Kyrgyzstan	1999	2009
21	Lao PDR	2005	2015
22	Macao, China	2001	2011
23	Malaysia	2000	2010
24	Maldives	2006	2011
25	Marshall Islands	1999	2009
26	Mongolia	2000	2010
27	Nepal	2001	2011
28	New Zealand	2006	2011
29	Niue	2006	2011
30	Pakistan	1998	2008
31	Philippines	2007	2010
32	Russian Federation	2002	2010
33	Samoa	2006	2011
34	Singapore (1)	2000	N/A
35	Sri Lanka	2001	2011
36	Tajikistan	2000	2010
37	Thailand	2000	2010
38	Turkey	2000	2010
39	Turkmenistan	1995	2009
40	Viet Nam	1999	2009

(1) 2000 Census used registers for basic data. 20% of households were contacted for remaining information.

In many countries a Pilot Census is conducted prior to the census. The Pilot Census is important as it is an opportunity to test everything that will happen during the census. Enumerator and supervisor procedures, maps, logistics, the questionnaire, data capture, data coding, editing, and tabulation programs are all tested. Results of this test provide senior managers with information on processes that need to be improved, changed or left alone before the census is conducted. If new technologies are being incorporated into census processes they can only be truly tested prior to the census in a Pilot Census. It is one thing to test technology with made up test data, but very different to use actual raw data from real households. There are often times surprises with real data that one may not have expected.

**Table B – Pilot Census Information** identifies countries that conducted a Pilot Census. The table below shows 27 countries that will perform a Pilot Census in the next census. This is the same as the 27 countries that conducted a Pilot Census in their last census.

**Table B – Pilot Census Information**

	Country	Pilot Census	
		Prior Census	Next Census
1	Afghanistan	No	Yes
2	Armenia	Yes	Yes
3	Australia	Yes	Yes
4	Azerbaijan Republic	Yes	Yes
5	Bangladesh	No	Yes
6	Bhutan	Yes	Yes
7	Brunei Darussalam	Yes	
8	Cambodia	Yes	Yes
9	China	Yes	Yes
10	Cook Islands	Yes	Yes
11	Hong Kong, China	Yes	N/A
12	India	N/A	N/A
13	Indonesia	Yes	Yes
14	Iran (Islamic Republic)		Yes
15	Japan	Yes	Yes
16	Kazakhstan	Yes	Yes
17	Republic of Korea	Yes	Yes
18	Kyrgyzstan	Yes	
19	Lao PDR	Yes	
20	Macao, China	Yes	N/A
21	Malaysia		Yes
22	Maldives	Yes	Yes
23	Mongolia	Yes	N/A
24	Nepal	Yes	Yes
25	New Zealand	Yes	Yes
26	Niue	No	N/A
27	Pakistan	Yes	Yes
28	Philippines	Yes	Yes
29	Russian Federation	Yes	Yes
30	Singapore	Yes	N/A
31	Sri Lanka	Yes	Yes
32	Tajikistan	Yes	Yes
33	Thailand		Yes
34	Turkey		Yes
35	Turkmenistan		Yes
36	Viet Nam	Yes	Yes

After the census many countries conduct a Post Enumeration Survey. The Post Enumeration Survey is important to determine how well the census was conducted. This survey is meant to be independent of the census so that households can be matched from the survey to the census to determine how well households and persons were counted. It is important to do this as close to the census as possible as the reference date should be the same for both. The farther away from the census reference date the more difficult it is for respondents to remember exactly who was in the household at the time of the census. In some countries a Post Enumeration Survey has been replaced by a survey that is conducted at the same time as the population census. This survey uses a staff not involved in the census. Results identifying under count or over counts are available at the same time as the results from the census.

A Post Enumeration Survey will be conducted by 31 countries in the next census compared to 27 in the last census. **Table C – Post Enumeration Survey Information** identifies countries that will do a Post Enumeration Survey.

**Table C – Post Enumeration Survey Information**

	Country	Post Enumeration Survey	
		Prior Census	Next Census
1	Afghanistan	Yes	Yes
2	Armenia	No	Yes
3	Australia	Yes	Yes
4	Bangladesh	Yes	Yes
5	Bhutan	No	Yes
6	Brunei Darussalam	No	Yes
7	Cambodia	Yes	Yes
8	China	Yes	Yes
9	Cook Islands	Yes	Yes
10	Hong Kong, China	Yes	N/A
11	India	Yes	Yes
12	Indonesia	Yes	Yes
13	Iran (Islamic Republic)	Yes	Yes
14	Japan	Yes	Yes
15	Republic of Korea	Yes	Yes
16	Kyrgyzstan	Yes	Yes
17	Macao, China	Yes	N/A
18	Malaysia	Yes	Yes
19	Maldives	Yes	Yes
20	Marshall Islands	Yes	Yes
21	Mongolia	Yes	Yes
22	Nepal	Yes	Yes
23	New Zealand	Yes	Yes
24	Niue	Yes	Yes
25	Pakistan	No	Yes
26	Philippines	No	Yes
27	Russian Federation	Yes	Yes
28	Samoa	No	Yes
29	Singapore	No	N/A
30	Sri Lanka	Yes	Yes
31	Tajikistan	Yes	Yes
32	Thailand	Yes	Yes
33	Turkmenistan	Yes	Yes
34	Viet Nam	Yes	Yes

These trends for Pilot Censuses and Post Enumeration Surveys in the ESCAP region are significant and positive. They indicate a dedication to improving quality in the population census.

Eleven countries used a sample or “long form” in their last census compared with ten that definitely will in the next census. Of these ten, five did not use a “long form” in the last census. The sample form is used to collect very detail household and person data. In ESCAP member countries the sample size used was from a little over 2% to 25% of households. This sample form reduces reporting burden and the time needed by enumerators to conduct interviews as most households do not need to answer all census questions. But, this is not a majority approach in the ESCAP region as most countries are not using a “long form.” In the USA the sample form has been replaced by an ongoing monthly survey “The American

Community Survey.’’ This survey is designed to reduce respondent burden during the census and provide significant household and person data on a more current basis than the 10 year cycle that had been used in the past. **Table D – Questionnaires and “Long Form” Use** shows the number of different forms each country used and if they used a “long form” what percentage of the households received that form.

**Table D – Questionnaires and “Long Form” Use**

	Country	Number of Questionnaires		% of Long Forms	
		Prior Census	Next Census	Prior Census	Next Census
1	Afghanistan	1	1		
2	American Samoa	1	1		
3	Armenia	1	2	0	25
4	Australia	6	6		
5	Azerbaijan Republic	1	1		
6	Bangladesh	2	2	2.29	2.29
7	Bhutan	3	3		
8	Cambodia	4	6		
9	China	2	N/A	10	N/A
10	Cook Islands	2	2		
11	Georgia	5	6		
12	Hong Kong, China	2	N/A	10	N/A
13	India	23	23		
14	Indonesia	2	3		10
15	Iran (Islamic Republic)	4	5		11
16	Japan	1	1		
17	Kazakhstan	30	32		
18	Republic of Korea	7	7	10	10
19	Macao, China	2	2	20	N/A
20	Malaysia				20
21	Maldives	3	3	N/A	N/A
22	Nepal			12.5	N/A
23	New Zealand	1	1		
24	Pakistan	4	3	8	8
25	Philippines	5	6	0	10
26	Russian Federation	5	6	25	undecided
27	Singapore	2	N/A	20	N/A
28	Sri Lanka	2	2		
29	Tajikistan	2	2		
30	Thailand			20	20
31	Turkey	1	N/A		
32	Viet Nam	2	2	3	10 - 15

## PART 1

### Population Census Technologies

Although population censuses have been conducted throughout the world for a very long time it is only in the last 120 years or so that modern technology has been applied to many census processes. The laborious task of adding together the information from numerous census registers could take considerable time and was prone to error. Punch cards may have been the first census application to make use of computers. Compare those ways with technologies used today in many countries where raw data are automatically captured by machines either in the field or in an office, questionable data imputed, industry or occupation codes automatically created, and tabulations produced with very little human intervention. Of course, there has been significant human development and testing of these systems prior to the census to ensure they work correctly. But in the end there can be significant savings in manpower, other resources, and time when technology is applied in an appropriate manner.

#### 1. Project Management Software

This paper begins its review of technologies being used in the ESCAP region by identifying how many countries are making use of project management software. In **Table 1.1 – Use of Technologies in Census Management** countries identify how many are using software and computers to ensure all census processes are being developed on schedule. This software requires that tasks are assigned to individuals with responsibility for specific parts of the census process and with a specified time frame in which to complete the work. These individuals update their progress on a regular basis so that senior managers can easily tell if all work is on schedule or if there are areas that need additional assistance. The software can warn managers if a process is not being completed on time and how that will affect other processes.

The number of countries using this software is increasing from 17 in the last census to 20 in the next census. Perhaps a better indication of the change going on is to look at the number of countries not using this software. There were 22 countries that did not use this software in the last census but only 11 are definitely not using it in the next census. This may indicate a movement to better organize and manage the many processes that need to be included in conducting a population census. MS Project and “self developed” are the most popular choices for this software for the upcoming censuses in these 40 countries, as they were in the last round of censuses.

**Table 1.1 - Use of Technologies in Census Management**

	Country	Project Management & Tracking Software			
		Prior Census		Next Census	
1	Afghanistan	No		Yes	MS Office
2	American Samoa	Yes		Yes	MS Office
3	Armenia	No		No	
4	Australia	Yes	MS Project and self developed	Yes	MS Project and self developed
5	Azerbaijan Republic	No		No	
6	Bangladesh	No		No	
7	Bhutan	No		Maybe	
8	Brunei Darussalam	No		Yes	
9	Cambodia	Yes	self developed	Yes	self developed
10	China	No		N/A	
11	Cook Islands	Yes	MS Excel & Access	Yes	MS Excel, Access & Project
12	Georgia	Yes	MS Project	Yes	MS Project
13	Hong Kong, China	Yes	MS Project		
14	India	Yes	Statistical Management	Yes	
15	Indonesia	Yes	self developed	Yes	self developed maybe MS Project
16	Iran (Islamic Republic)	No		Yes	MS Project
17	Japan	No		No	No
18	Kazakhstan	No			
19	Republic of Korea	Yes	MS Project	Yes	MS Project
20	Kyrgyzstan	Yes	Delphi	Yes	Visual Studio
21	Lao PDR	No		No	
22	Macao, China	Yes	MS Project	Yes	MS Project
23	Malaysia	No		Yes	Gantt Chart
24	Maldives	No		No	
25	Marshall Islands	No		No	
26	Mongolia	Yes	self developed	Yes	
27	Nepal	No		N/A	
28	New Zealand	Yes	Statistics Project Management	Yes	MS Project
29	Niue	No		Maybe	
30	Pakistan	No		No	
31	Philippines	Yes	Visual Basic 6	Yes	Visual Basic 6
32	Russian Federation	Yes	self developed	Yes	self developed
33	Samoa	No			
34	Singapore	No			
35	Sri Lanka	No		Yes	
36	Tajikistan	Yes	Visual FoxPro	Yes	
37	Thailand			No	
38	Turkey	Yes	self developed		
39	Turkmenistan			Yes	self developed
40	Viet Nam	No		No	

## 2. Coding Technologies

Coding is another laborious job in a population census. Industry and occupation coding, as well as geography coding, require a well trained staff and a significant number of them to get the work completed in a timely fashion. The fewer staff available the longer the work will take. After manual coding the codes need to be keyed to get them into a digital form so computers can further process the data. In many countries today coding work has become automated with only residual work needing to be done by a human. Machines are able to translate the word descriptions from census forms into numeric codes for further processing. This saves considerable time in census processing. These automated coding processes are still not used in most countries but that is changing. In the 39 countries that responded to this question in this survey 14 countries expect to use manual coding in the next population census compared to 25 that used manual coding in the last census. Computer assisted software is becoming more and more popular. This software can eliminate the need for coding manuals as all information is available online for the coder. It can also speed up the coding process as a coder needs to type a word or words and the computer can present possible codes for that situation from which the coder selects the correct one. **Table 2.1 – Use of Coding Technologies** summarizes the responses from the ESCAP countries.

**Table 2.1 - Use of Coding Technologies**

	Country	Data Coding	
		Prior Census	Next Census
1	Afghanistan	Manual	Manual
2	Armenia	Manual	Manual
3	Australia	Computer assisted and automatic self developed IBM	Computer assisted and automatic self developed or other software
4	Azerbaijan Republic	Manual	Manual
5	Bangladesh	Manual	Manual
6	Bhutan	Computer assisted CSPRO and SPSS	Computer assisted CSPRO and SPSS
7	Brunei Darussalam	Manual computer assisted Oracle	
8	Cambodia	Manual computer assisted	Manual computer assisted
9	China	Manual	N/A
10	Cook Islands	Manual	Manual
11	Georgia	Manual	Manual computer assisted
12	Hong Kong, China	Computer assisted self developed	
13	India	Automated and computer assisted	Automated and computer assisted
14	Indonesia	Manual	Computer assisted, FoxPro Visual basic
15	Iran (Islamic Republic)	Manual	Computer assisted CAC
16	Japan	Manual	Maybe automatic
17	Kazakhstan	Manual	Manual
18	Republic of Korea	Manual automatic self developed	Manual automatic self developed
19	Kyrgyzstan	Manual	Manual
20	Lao PDR	Computer assisted self developed	
21	Macao, China	Manual	Manual
22	Malaysia	Manual	Manual computer assisted self developed
23	Maldives	Manual computer assisted MS Access	Manual computer assisted MS Access
24	Marshall Islands	Manual	Manual
25	Mongolia	Manual computer assisted self developed	Manual computer assisted self developed
26	Nepal	Manual	Manual
27	New Zealand	Manual automatic C+ Visual Basic	Manual automatic C+ Visual Basic
28	Niue	Manual	Maybe
29	Pakistan	Manual	Manual
30	Philippines	Manual computer assisted Visual Basic 6	Manual computer assisted Visual Basic 6
31	Russian Federation	Manual	Manual computer assisted self developed
32	Samoa	Manual	
33	Singapore	Computer assisted automatic self developed	
34	Sri Lanka	Manual	Manual, maybe computer assisted
35	Tajikistan	Manual	Manual
36	Thailand	Manual	Manual
37	Turkey	Manual computer assisted automatic Visual Basic, Fox Pro, Oracle Forms	
38	Turkmenistan	Manual	Manual
39	Viet Nam	Manual	Manual

### 3. Data Capture Technologies

Data entry has long been an area that demanded significant resources in any statistical organization. This meant a large staff with equipment and space and infrastructure to support a large data entry job. The staff required significant training and in many countries after the population census is completed there is no longer a need for so much equipment, space and staff. Some countries use outsourcing to take care of the large census work load. Others have moved to automated data capture technologies that they can then use for their other ongoing and current surveys.

Optical Mark Reader (OMR) capture was the first automated data capture from census forms where machines were able to capture data from answer spaces (often penciled in circles or rectangles). A drawback to the technology was that all answer spaces on the form had to be in the circle or rectangle format. This made forms design a little cumbersome. It also meant that if there were answer spaces that could not use the “circle” answer format then the forms had to go through two data capture processes, one OMR and one manual. In some cases this problem is reduced by presenting the image of the form to a data entry operator that only needs to key the non-OMR answers.

The technology has improved today to the point that machines can scan the paper census form and interpret alphabetic characters or numbers hand written on those census forms and change that information into digital characters that computers can process. This Optical Character Recognition (OCR) or Intelligent Character Recognition (ICR) process eliminates the need for much of the staff, space and equipment that was used in a manual data capture operation.

In **Table 3.1 – Manual Data Capture** there are 11 countries that intend to use manual data entry in the next census as compared to 18 that used only manual data entry in the last census.

**Table 3.1 – Manual Data Capture**

	Country	Manual Data Capture			
		Prior Census		Next Census	
1	Afghanistan	Key		Key	CSPro
2	Armenia	Key	CSPro	Key	CSPro
3	Azerbaijan Republic	Key	Visual FoxPro	Key	Visual FoxPro
4	Bhutan	Key	CSPro	Key	CSPro
5	Brunei Darussalam	Key		Key	
6	Cambodia	Key	IMPS	Key	CSPro
7	Cook Islands	Key	CSPro and MS Access	Key	CSPro and MS Access
8	Marshall Islands	Key		Key	
9	Nepal	Key	IMPS	Key	CSPro
10	Niue	Key	CSPro	Key	CSPro/MS Access maybe automatic
11	Tajikistan	Key		Key	

There are 19 countries that will be using OMR/OCR/ICR or a combination of manual with these automated technologies. Three countries in this group, Kyrgyzstan, Malaysia and Viet Nam, used manual data entry in their last census. Sri Lanka and Turkmenistan used manual data entry last census and may use OMR/OCR/ICR in the next census. **Table 3.2 - Data Capture Automated Technologies** shows these results.

**Table 3.2 - Data Capture Automated Technologies**

	Country	Data Entry			
		Prior Census		Next Census	
1	Australia	OCR/ICR	IBM	OCR/ICR	IBM
2	Bangladesh	OCR	Cobol, FoxPro, Excel	OCR	
3	China	OCR		N/A	
4	Georgia	OCR/ICR	Readsoft and self developed	OCR/ICR and Key	self developed
5	Hong Kong, China	OMR/ICR	self developed	N/A	
6	India	OCR/ICR		OCR/ICR	
7	Indonesia	Key OMR OCR/ICR	Nestor Reader and self developed	Key OMR ICR	Not yet determined
8	Iran (Islamic Republic)	Key and OMR		ICR	
9	Japan	OCR and Key	self developed VB Net	OCR and Key	
10	Kazakhstan	OMR	Recostar	OMR	
11	Republic of Korea	Internet ICR	self developed	Internet ICR	self developed
12	Kyrgyzstan	Key	self developed Delphi	OCR/ICR	
13	Lao PDR	OMR	Eyes and Hand		
14	Macao, China	Key OMR OCR/ICR	MS SQL self developed Delphi 6.0	Key Internet OMR OCR/ICR	MS SQL self developed Delphi/MS Visual Studio
15	Malaysia	Key	IMPS	ICR	
16	Maldives	ICR	Smart Form	ICR	Smart Form
17	Mongolia	Key	IMPS	Key internet computer assisted	CSPPro
18	New Zealand	IBM smart key system	microsoft.net	IBM smart key system	microsoft.net
19	Pakistan	OMR	OPSCANS by NCS	OMR/ICR	
20	Philippines	OCR/ICR OMR Key Mobile Phone Internet	Eys and Hands for Forms Visual Basic 6	OCR/ICR OMR Key Mobile Phone Internet	Eys and Hands for Forms Visual Basic 6 CSPPro
21	Russian Federation	OMR OCR/ICR	C,C++, Visual Basic	OMR OCR/ICR	
22	Singapore	Key OMR Internet	SQL Oracle Java		
23	Sri Lanka	Key	IMPS	OCR/ICR	
24	Thailand	ICR	TELEform	ICR	TELEform ABBYY
25	Turkey	OMR OCR/ICR	AFPSPPro		
26	Turkmenistan	Key		Key maybe OCR/ICR	
27	Viet Nam	Key	ISSA	ICR	Eyes and Hands

In **Table 3.3 – All Data Capture Methodologies** the responses for all countries are shown. It is interesting to note that 4 countries plan to collect data via the internet versus three that did this in the last census.

**Table 3.3 – All Data Capture Methodologies**

	Country	Data Capture Methodologies			
		Prior Census		Next Census	
1	Afghanistan	Key		Key	CSPro
2	American Samoa				
3	Armenia	Key	CSPro	Key	CSPro
4	Australia	OCR/ICR	IBM	OCR/ICR	IBM
5	Azerbaijan Republic	Key	Visual FoxPro	Key	Visual FoxPro
6	Bangladesh	OCR	Cobol, FoxPro, Excel	OCR	
7	Bhutan	Key	CSPro	Key	CSPro
8	Brunei Darussalam	Key		Key	
9	Cambodia	Key	IMPS	Key	CSPro
10	China	OCR		N/A	
11	Cook Islands	Key	CSPro and MS Access	Key	CSPro and MS Access
12	Georgia	OCR/ICR	Readsoft and self developed	OCR/ICR and Key	self developed
13	Hong Kong, China	OMR/ICR	self developed	N/A	
14	India	OCR/ICR	Eflow	OCR/ICR	
15	Indonesia	Key OMR OCR/ICR	Nestor Reader and self developed	Key OMR ICR	Not yet determined
16	Iran (Islamic Republic)	Key and OMR		ICR	
17	Japan	OCR and Key	self developed VB Net	OCR and Key	
18	Kazakhstan	OMR	Recostar	OMR	
19	Republic of Korea	Internet ICR	self developed	Internet ICR	self developed
20	Kyrgyzstan	Key	self developed Delphi	OCR/ICR	
21	Lao PDR	OMR	Eyes and Hand		
22	Macao, China	Key OMR OCR/ICR	MS SQL self developed Delphi 6.0	Key Internet OMR OCR/ICR	MS SQL self developed Delphi/MS Visual Studio
23	Malaysia	Key	IMPS	ICR	
24	Maldives	ICR	Smart Form	ICR	Smart Form
25	Marshall Islands	Key		Key	
26	Mongolia	Key	IMPS	Key internet computer assisted	CSPro
27	Nepal	Key	IMPS	Key	CSPro
28	New Zealand	IBM smart key system	microsoft.net	IBM smart key system	microsoft.net
29	Niue	Key	CSPro	Key	CSPro/MS Access maybe automatic
30	Pakistan	OMR	OPSCANS by NCS	OMR/ICR	
31	Philippines	OCR/ICR OMR Key Mobile Phone Internet	Eys and Hands for Forms Visual Basic 6	OCR/ICR OMR Key Mobile Phone Internet	Eys and Hands for Forms Visual Basic 6 CSPro
32	Russian Federation	OMR OCR/ICR	C,C++, Visual Basic	OMR OCR/ICR	
33	Samoa	Key	CSPro		
34	Singapore	Key OMR Internet	SQL Oracle Java		
35	Sri Lanka	Key	IMPS	Maybe OMR/ICR	
36	Tajikistan	Key		Key	
37	Thailand	ICR	TELEform	ICR	TELEform ABBYY
38	Turkey	OMR OCR/ICR	AFPSPro		
39	Turkmenistan	Key		Key maybe OCR/ICR	
40	Viet Nam	Key	ISSA	ICR	Eyes and Hands
		Key only-18 OMR/OCR/ICR-21 Internet-3		Key only-11 OMR/OCR/ICR-19 Internet-4	

#### 4. Data Entry Verification

Data entry verification is an operation to provide measures of how well data capture systems are working. This can be used in either manual data capture or automated data capture systems.

In the case of manual data entry the second keying of a set of forms, or data entry verification, helps identify data transcribers that are not keying data within the quality level set. Sometimes data transcribers need to be retrained and sometimes they need to be replaced. Verification is done in either an independent or dependent mode. With independent verification the verifier keys the workload as if it was the first time being keyed. The two data sets are then compared by an automated system and disagreements keyed by a third person. An error rate for each data transcriber is then determined. In dependent verification the verifier data transcriber sees what was originally keyed and either corrects or accepts the individual fields.

An automated data capture system such as OMR, OCR/ICR might require a similar approach to ensure systems are working correctly. Often with these systems a test batch of work is captured on each scanner at the beginning of each work day and the data compared with what was expected to be captured. Assuming the test batch is properly designed this approach ensures the automated systems are doing as expected. In countries that use a combination of manual and automated data capture not only will work that was done manually be sent to a second data transcriber but also some work that has been automatically captured will also be sent to a data transcriber to rekey the work and ensure the system is working correctly.

In either a manual data entry operation or an automated capture system it is important to ensure that data capture is working correctly. In some countries it has happened that managers discovered weeks or months into a data capture operation that something was not working correctly and work has to be redone.

In **Table 4.1 – Data Capture Verification** there were 20 countries that used data entry verification in the last census and 19 are planning to use it in the next census.

**Table 4.1 - Data Capture Verification**

	Country	Prior Census		Next Census	
		Y/N	%	Y/N	%
1	Afghanistan			Yes	
2	Armenia	Yes	35	Yes	50
3	Azerbaijan Republic	Yes	10	Yes	10
4	Bangladesh	Yes	(small)	Yes	(small)
5	Bhutan	Yes	100	Yes	100
6	Cambodia	Yes	10	Yes	10
7	China	Yes	5	N/A	
8	Georgia	No		Yes	
9	Hong Kong, China	Yes	2	N/A	
10	India	Yes	10	N/A	
11	Malaysia	Yes	100	Yes	50
12	Maldives	Yes	20	Yes	20
13	Marshall Islands	Yes		Yes	
14	Mongolia	Yes	40	Yes	

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15	Nepal	Yes	5	Yes	5
16	Niue	Yes		Yes	
17	Philippines	Yes	20	Yes	20
18	Sri Lanka	Yes	25	Yes	
19	Tajikistan	Yes	10	Yes	10
20	Thailand	Yes	18	Yes	<=5
21	Turkmenistan	Yes		Yes	1
22	Viet Nam	Yes	3	Yes	3

There were 17 that did not use verification in the last census but only 14 that do not plan to use verification in the next census. In **Table 4.2 – Manual Data Capture and Verification** there are 12 countries that intend to use manual data entry in the next census and there are two of these countries that will not use verification.

**Table 4.2 – Manual Data Capture and Verification**

	Country	Data Entry	Verification
		Next Census	Next Census Y/N
1	Afghanistan	Key	Yes
2	Armenia	Key	Yes
3	Azerbaijan Republic	Key	Yes
4	Bhutan	Key	Yes
5	Brunei Darussalam	Key	No
6	Cambodia	Key	Yes
7	Cook Islands	Key	No
8	Marshall Islands	Key	Yes
9	Mongolia	Key internet computer assisted	Yes
10	Nepal	Key	Yes
11	Niue	Key	Yes
12	Tajikistan	Key	Yes

Of the six countries planning to use a combination of manual and automated data capture in the next census two of those countries plan to use verification. There are 14 countries that plan to use only automated data capture in the next census. Six of those countries plan to use verification. It must also be stated that some automated capture systems have built-in software to ensure data capture quality. Although this is not called verification it serves the same purpose of ensuring quality data during data capture operations.

**Table 4.3 – Automated Data Capture and Verification**

	Country	Data Entry	Verification
		Next Census	Next Census Y/N
1	Australia	OCR/ICR	No
2	Bangladesh	OCR	Yes
3	Georgia	OCR/ICR and Key	Yes
4	India	OCR/ICR	
5	Indonesia	Key OMR ICR	No
6	Iran (Islamic Republic)	ICR	No
7	Japan	OCR and Key	No
8	Kazakhstan	OMR	No
9	Republic of Korea	Internet ICR	No
10	Kyrgyzstan	OCR/ICR	No
11	Macao, China	Key Internet OMR OCR/ICR	No
12	Malaysia	ICR	Yes
13	Maldives	ICR	Yes
14	New Zealand	IBM smart key system	No
15	Pakistan	OMR/ICR	No
16	Philippines	OCR/ICR OMR Key Mobile Phone Internet	Yes
17	Russian Federation	OMR OCR/ICR	No
18	Sri Lanka	OCR/ICR	Yes
19	Thailand	ICR	Yes
20	Viet Nam	ICR	Yes

**Table 4.4 – Real Time Error Control** shows countries planning to use real time error control during data capture. Real time error control identifies data fields that are unreasonable or otherwise fail an edit that has been run to ensure data quality. In manual data entry the software may stop the data transcriber and make he/she review the field to ensure that the data were keyed as reported.

**Table 4.4 - Real Time Error Control**

	Country	Prior Census	Next Census
1	Afghanistan	Yes	Yes
2	Australia	Yes	Yes
3	Azerbaijan Republic	Yes	Yes
4	Bangladesh	Yes	Yes
5	Bhutan	Yes	Yes
6	Brunei Darussalam	Yes	Yes
7	Cambodia	Yes	Yes
8	China	Yes	Yes
9	Cook Islands	Yes	Yes
10	Georgia	Yes	Yes
11	Hong Kong, China	Yes	
12	India	Yes	Yes
13	Indonesia	Yes	Yes
14	Iran (Islamic Republic)		Yes
15	Japan	Yes	Yes
16	Republic of Korea	Yes	Yes
17	Kyrgyzstan	Yes	Yes
18	Lao PDR	Yes	No
19	Macao, China	Yes	Yes
20	Malaysia	Yes	Yes
21	Maldives	Yes	Yes
22	Marshall Islands	Yes	
23	Mongolia	Yes	Yes
24	Nepal	Yes	Yes
25	New Zealand	Yes	Yes
26	Niue	Yes	Yes
27	Pakistan	Yes	Yes
28	Philippines	Yes	Yes
29	Russian Federation	Yes	Yes
30	Samoa	Yes	
31	Singapore	Yes	
32	Sri Lanka	Yes	Yes
33	Tajikistan	Yes	Yes
34	Thailand	Yes	Yes
35	Turkey	Yes	
36	Turkmenistan	Yes	Yes
36	Viet Nam	Yes	Yes

In the last census 18 countries used manual data entry only. Of these, 18 made use of real time error control during data entry. In the next census of the 11 countries intending to use manual data entry nine intend to use real time error control during data entry. One of the other two has not decided, but did use real time error control during the last census

**Table 4.5 – Manual Data Capture and Real time Error Control**

	Country	Data Entry		Real time error control during data capture	
		Prior Census	Next Census	Prior Census	Next Census
1	Afghanistan	Key	Key	Yes	Yes
2	Armenia	Key	Key	No	No
3	Azerbaijan Republic	Key	Key	Yes	Yes
4	Bhutan	Key	Key	Yes	Yes
5	Brunei Darussalam	Key	Key	Yes	Yes
6	Cambodia	Key	Key	Yes	Yes
7	Cook Islands	Key	Key	Yes	Yes
8	Kyrgyzstan	Key	OCR/ICR	Yes	Yes
9	Malaysia	Key	ICR	Yes	Yes
10	Marshall Islands	Key	Key	Yes	
11	Mongolia	Key	Key internet computer assisted	Yes	Yes
12	Nepal	Key	Key	Yes	Yes
13	Niue	Key	Key	Yes	Yes
14	Samoa	Key		Yes	
15	Sri Lanka	Key	OCR/ICR	Yes	Yes
16	Tajikistan	Key	Key	Yes	Yes
17	Turkmenistan	Key	Key maybe OCR/ICR	Yes	Yes
18	Viet Nam	Key	ICR	Yes	Yes

There are five countries planning to use a combination of manual and automated data entry in the next census and all five of these will make use of real time error control during data capture. Of the 14 countries intending to use only automated capture in the next census 13 will make use of real time error control during data capture. During the last round of censuses only one of the 15 countries that used automated data capture did not use real time error control during data capture.

**Table 4.6 – Automated Data Capture and Real Time Error Control**

	Country	Data Entry		Real time error control during data capture	
		Prior Census	Next Census	Prior Census	Next Census
1	Australia	OCR/ICR	OCR/ICR	Yes	Yes
2	Bangladesh	OCR	OCR	Yes	Yes
3	China	OCR	N/A	Yes	Yes
4	Georgia	OCR/ICR	OCR/ICR and Key	Yes	Yes
5	Hong Kong, China	OMR/ICR	N/A	Yes	
6	India	OCR/ICR	OCR/ICR	Yes	Yes
7	Indonesia	Key OMR OCR/ICR	Key OMR ICR	Yes	Yes
8	Iran (Islamic Republic)	Key and OMR	ICR		Yes
9	Japan	OCR and Key	OCR and Key	Yes	Yes
10	Kazakhstan	OMR	OMR	No	No
11	Republic of Korea	Internet ICR	Internet ICR	Yes	Yes
12	Kyrgyzstan	Key	OCR/ICR	Yes	Yes
13	Lao PDR	OMR		Yes	No
14	Macao, China	Key OMR OCR/ICR	Key Internet OMR OCR/ICR	Yes	Yes
15	Malaysia	Key	ICR	Yes	Yes
16	Maldives	ICR	ICR	Yes	Yes
17	New Zealand	IBM smart key system	IBM smart key system	Yes	Yes
18	Pakistan	OMR	OMR/ICR	Yes	Yes
19	Philippines	OCR/ICR OMR Key Mobile Phone Internet	OCR/ICR OMR Key Mobile Phone Internet	Yes	Yes
20	Russian Federation	OMR OCR/ICR	OMR OCR/ICR	Yes	Yes
21	Singapore	Key OMR Internet		Yes	
22	Sri Lanka	Key	OCR/ICR	Yes	Yes
23	Thailand	ICR	ICR	Yes	Yes
24	Turkey	OMR OCR/ICR		Yes	
25	Viet Nam	Key	ICR	Yes	Yes

## 5. Data Editing and Imputation

After data are captured there is normally editing of that data to identify potential problems. For example, a son will not normally be older than his father. A mother is probably not five years old. A neighborhood with relatively low household income might not have a household with a very large household income. In some cases these may have been data capture errors that need to be fixed. In the 38 countries in **Table 5.1 – Data Editing and Imputation Technologies** 33 reported computer supported data editing in the last census and 29 expect to do so in the next census. Four countries reported not using computer supported data editing in the last census and only three say they will not use it in the next census.

During the last round of censuses 24 of the 33 countries that used computer supported data editing also used automated imputation. Automated imputation can be used to fill in for missing data and it can also be used to correct erroneous data. In the next round of censuses 29 countries intend to use computer supported data editing and 23 of these will use automated imputation. Whatever rules a country might use for manual editing of data can normally be incorporated into a computer program to have the same work done automatically.

**Table 5.1 - Data Editing and Imputation Technologies**

	Country	Computer Supported Data Editing		If Yes, then automated imputation			
		Prior Census	Next Census	Prior Census		Next Census	
1	Afghanistan	No	Yes			Yes	CSPro
2	Armenia	Yes	Yes	Yes	CSPro	Yes	CSPro
3	Australia	Yes	Yes	Yes	self developed	Yes	self developed or other vendor
4	Azerbaijan Republic	Yes	Yes	Yes	Visual FoxPro	Yes	Visual FoxPro
5	Bangladesh	Yes	Yes	Yes	FoxPro, Excel	Yes	FoxPro, Excel
6	Bhutan	Yes	Yes	No		No	
7	Brunei Darussalam	Yes	Yes	Yes	self developed SPSS	Yes	
8	Cambodia	Yes	Yes	Yes	CSPro	Yes	CSPro
9	China	Yes	Yes	No		Maybe	
10	Cook Islands	Yes	Yes	Yes	CSPro & MS Access	Yes	CSPro & MS Access
11	Georgia	No	No				
12	Hong Kong, China	Yes		Yes	Visual Basic		
13	India	Yes	Yes	Yes	IMPS	N/A	
14	Indonesia	Yes	Yes	No		No	
15	Iran (Islamic Republic)		Yes			Yes	S.C.I.
16	Japan	Yes	Yes	Yes	VB.net	Yes	unknown
17	Kazakhstan	Yes	Yes				
18	Republic of Korea	Yes	Yes	Yes	SAS	Yes	SAS
19	Kyrgyzstan	No	No				
20	Lao PDR	Yes		Yes			
21	Macao, China	No	No				
22	Malaysia	Yes	Yes	Yes	IMPS CONCOR	Yes	
23	Maldives	Yes	Yes	Yes	IMPS, CSPro, STATA	Yes	IMPS, CSPro, STATA
24	Mongolia	Yes	Yes	Yes	IMPS	Yes	CSPro
25	Nepal	Yes	Yes	Yes	IMPS	Yes	CSPro
26	New Zealand	Yes	Yes	Yes	SQL server - tsq	Yes	SQL server - tsq
27	Niue	Yes	Yes	No		Maybe	
28	Pakistan	Yes	Yes	Yes	CONCOR	Yes	CONCOR
29	Philippines	Yes	Yes	Yes	CSPro	Yes	CSPro
30	Russian Federation	Yes	Yes			Yes	Specially developed
31	Samoa	Yes		No			
32	Singapore	Yes		No			
33	Sri Lanka	Yes	Yes	Yes	IMPS CONCOR	Yes	
34	Tajikistan	Yes	Yes	Yes	Census - 2000	Yes	Under discussion
35	Thailand	Yes	Yes	Yes	COBAL	Yes	PL/1
36	Turkey	Yes		No			
37	Turkmenistan	Yes	Yes	Yes		Yes	will develop
38	Viet Nam	Yes	Yes	Yes	ISSA	Yes	Visual Basic
		Yes-33 No-4	Yes-30 No-3	Yes-23 No-8		Yes-24 No-3	

CSPro - 5

Visual Basic - 2

IMPS - 6

FoxPro - 2

Other - 10

CSPro - 8

Visual Basic - 1

IMPS - 1

FoxPro - 2

Other - 10

## **6. Forms Control Technologies**

Forms control is so very important in census processing. Adequate controls allow managers to always know once a form has been “checked-in” to the processing center where to find that form. A manager needs to know which forms have been through data capture, coding, editing or whatever operations are to be performed. Forms control is often done through batches with a batch number assigned to a group of forms. These forms stay in that batch through all census processes, although some systems allow for the batch number to change if the form is put into a new batch. Once processing of the batch is finished the batch is stored, often in something called a census library. If the library is set up correctly the batch can easily be retrieved and therefore any form in that batch can easily be retrieved.

Computer based forms control keeps track of forms (and batches) and identifies workloads and backlogs in census data capture, coding, editing, etc. Managers use this information to gauge how long an operation might take to complete or to apply staff to areas in need of assistance so that work flows as smoothly as possible.

Today in many countries computer based forms control eliminates the need for paper reports and the time involved in preparing and distributing those reports. Some systems use an overnight updating routine while the more advanced technologies can provide real time information on census data capture and processing activities. In some countries bar codes are used on batch cover sheets (and individual forms) so that batch numbers can be captured automatically as batches move from one operation to another.

An automated data capture system that captures the image of the form allows the image to be used in later processing and eliminates the need to move paper through so many processes. This type of system also needs to have forms control so that managers are aware of workloads, backlogs, and that all forms that have been processed.

In **Table 6.1 – Forms Control Technology** there are five countries that did not make use of this technology last census and three that do not expect to use it in the next census.

**Table 6.1 - Forms Control Technology**

	Country	Computer based forms control	
		Prior Census	Next Census
1	Afghanistan		Maybe
2	Armenia	Yes	Yes
3	Australia	Yes	Yes
4	Azerbaijan Republic	No	No
5	Bangladesh	Yes	Yes
6	Bhutan	Yes	Yes
7	Brunei Darussalam	Yes	Yes
8	Cambodia	Yes	Yes
9	China	Yes	Yes
10	Cook Islands	Yes	Yes
11	Georgia	Yes	Yes
12	Hong Kong, China	Yes	
13	India	Yes	
14	Indonesia	Yes	Yes
15	Iran (Islamic Republic)		Yes
16	Japan	Yes	Yes
17	Kazakhstan	Yes	
18	Republic of Korea	Yes	Yes
19	Kyrgyzstan	Yes	Yes
20	Lao PDR	Yes	Yes
21	Malaysia		Yes
22	Maldives	Yes	Yes
23	Mongolia		Yes
24	Nepal	No	No
25	New Zealand	Yes	Yes
26	Niue	No	No
27	Pakistan	Yes	Yes
28	Philippines	Yes	Yes
29	Russian Federation	No	Yes
30	Samoa	No	
31	Singapore	Yes	
32	Sri Lanka	No	Yes
33	Turkey	Yes	
34	Turkmenistan	Yes	Yes
35	Viet Nam	Yes	Yes

## 7. Micro Data Technologies

Micro data management is a critical topic for national statistical offices as it not only directly impacts the value of outputs from censuses and surveys, but can also contribute to better planning for future collections and dissemination. ESCAP is implementing a project, in cooperation with the Accelerated Data Programme (ADP), on micro data management for national statistical agencies in the region. ADP was a result of the Marrakech Action Plan for Statistics (MAPS), and is funded by the World Bank and managed globally by Paris21 (OECD). The project will take advantage of experiences acquired by ADP and the International Household Survey Network (IHSN), also established under MAPS.

Many countries are making use of micro data software to easily extract census data for small areas. In **Table 7.1 – Micro Data Technologies** there are 29 countries that made use of this technology in the last census and 28 that expect to use it in the next census. It is hopefully safe to assume that some of the countries that did use this technology in the last census will use it again even though they did not respond to the question.

**Table 7.1 - Micro Data Technologies**

	Country	Software used for database for micro data	
		Prior Census	Next Census
1	Afghanistan		Not decided
2	Armenia	CSPPro	CSPPro
3	Australia	SAS, Supercross	SAS, Supercross
4	Bangladesh	Cobol, FoxPro, Excel	Cobol, FoxPro, Excel
5	Brunei Darussalam		SPSS
6	Cambodia	IMPS, Wink+	CSPPro, SQL Server, Wink+
7	China	Oracle	Undecided
8	Cook Islands	CSPPro, MSAccess	CSPPro, MSAccess
9	Georgia	SQL Server, MS Access, SPSS	SQL Server
10	Hong Kong, China	MS SQL Server SAS	
11	India	ASCII Flat file	SQL Server, Oracle
12	Indonesia	Sybase, MS Access, VB, self developed	Sybase, MS Access, VB, SQL, self developed
13	Iran (Islamic Republic)		SQL Server Oracle
14	Japan		Under consideration
15	Kazakhstan	MS SQL	
16	Republic of Korea	Oracle	Oracle
17	Kyrgyzstan	Delphi	Visual Studio
18	Lao PDR	SQL Server	SQL Server
19	Macao, China	MS SQL 6.5 +2000	MS SQL Server 2005
20	Maldives	IMPS, CSPPro	CSPPro
21	Mongolia	SQL server, MS Access, Redatam	SQL server, MS Access
22	Nepal	Oracle, SPSS	Oracle, SPSS
23	New Zealand	Microsoft.net sql	Microsoft.net sql
24	Niue	PC based	PC based
25	Pakistan	Cobol	Cobol, Oracle, SQL
26	Philippines	CSPPro	CSPPro
27	Russian Federation	Oracle	
28	Singapore	N/A	
29	Sri Lanka	MS Access, Excel, Visual Basic	Under consideration
30	Tajikistan	FoxPro	Under discussion
31	Thailand	DB2	DB2
32	Turkey	Oracle, MSAccess, FoxPro	
33	Turkmenistan		Will develop
34	Viet Nam	FoxPro	FoxPro

CSPPro - 4	CSPPro - 5
SAS - 2	SAS - 1
MSAccess - 6	MSAccess - 2
SQL - 6	SQL Server - 8
Oracle - 5	Oracle - 5
FoxPro - 4	FoxPro - 2
SPSS - 2	SPSS - 2
Other - 12	Other - 10

## 8. Cartography/Mapping Technologies

In the last 30 years there has been great progress made in using cartography/mapping technologies. No longer are paper maps with hand drawn census markings the only way to identify for enumerators where they are to collect census data. This very laborious and time consuming effort has been replaced in many statistical offices with digital maps that can be created quickly and easily, and even produced in local field offices. Geographical Information Systems (GIS) offer even more tools than just providing digital maps. These systems can tie together households, addresses, blocks, villages, cities and whatever other information the system has been provided. In **Table 8.1 – GIS and Digital Maps** the countries using this technology and creating digital maps are shown. There were 21 countries that used GIS technology in the last census and 28 that intend to use it in the next census. Digital maps were used by 14 countries in the last census but 28 have definite plans to use them in the next census.

**Table 8.1 – GIS and Digital Maps**

	Country	GIS Technology		Digital Maps			
		Prior Census	Next Census	Prior Census	Next Census	Census	
1	Afghanistan		Yes			Yes	1
2	American Samoa	Yes		No			
3	Armenia	No	Yes	No		Yes	1
4	Australia	Yes	Yes	Yes	1	Yes	1
5	Azerbaijan Republic	No	No	No		No	
6	Bangladesh	Yes	Yes	Yes	3	Yes	1
7	Bhutan	Yes	Yes	Yes	1	Yes	1
8	Brunei Darussalam	No	Yes	No		Yes	1
9	Cambodia	Yes	Yes	Yes	6	Yes	4
10	China	Yes	Undecided	No		Undecided	
11	Cook Islands	No	Yes	No		Yes	1
12	Georgia	No	Yes	No		Yes	1
13	Hong Kong, China	Yes		Yes	1		
14	India	Yes	Yes	Yes	3	Yes	1
15	Indonesia	Yes	Yes	Yes		Yes	4
16	Iran (Islamic Republic)	No	Yes	No		Yes	
17	Japan	Yes	Yes	Yes	1	Yes	1
18	Kazakhstan	No		No			
19	Republic of Korea	Yes	Yes	Yes	1	Yes	1
20	Lao PDR	Yes	Yes	No		No	
21	Macao, China	Yes	Yes	Yes		Yes	
22	Malaysia	Yes	Yes	No		Yes	1
23	Maldives	No	Yes	No		Yes	2
24	Marshall Islands	No	Yes			Yes	1
25	Mongolia	No	Yes	No		Yes	1
26	Nepal	Yes	Yes	Yes		Yes	1
27	New Zealand	Yes	Yes	Yes		Yes	
28	Niue	No	No	No		No	
29	Pakistan	No	Yes	No		Yes	3
30	Philippines	No	Yes	No		Yes	1
31	Russian Federation	Yes	Yes	Yes	1	Yes	1
32	Samoa	Yes		Yes	1		
33	Singapore	No		No			
34	Sri Lanka	Yes	Yes	No		Yes	
35	Tajikistan	No	No	No		No	
36	Thailand	Yes	Yes	No		Yes	4
37	Turkey	No		No			
38	Turkmenistan	Yes	Yes			Yes	5
39	Viet Nam	No	No	No		Yes	6
		Yes-21	Yes-28	Yes-14		Yes-28	

(1) Enumeration level	7	17
(2) Block level	0	1
(3) Administrative District	2	1
(4) Point of Village	0	3
(5) All Urban Area	0	1
(6) Commune possibly	1	1

Global Positioning Systems (GPS) are being used in several countries to create even more accurate maps. The Satellites used to provide GPS coordinates allow digital maps to have easily recognized and very correct placement of landmarks. This can be a significant improvement for map readers trying to find their way. Some countries have also decided to use GPS technology to identify households. This can be especially valuable in remote areas where homes may not be on main roads. After the census it can be very difficult in statistical surveys based on the population census to find the correct household, especially in remote areas and GPS can make this much easier. Only two countries used GPS technology in the last census, but 16 are either planning to or are still deciding for the next census. The number of countries making use of GPS coordinates for households increased from two in the last census to nine, plus two “maybe” for the next census. **Table 8.2 – GPS Technologies** shows those countries using these technologies.

**Table 8 – GPS Technologies**

	Country	GPS Technology		GPS Coordinates for each household	
		Prior Census	Next Census	Prior Census	Next Census
1	Bhutan	Yes	Yes	Yes	Yes
2	Brunei Darussalam	No	Yes	No	Yes
3	Cambodia	No	Yes	No	No
4	Cook Islands	No	Yes	No	Yes
5	Georgia	No			Yes
6	India	No	Yes	No	Yes
7	Indonesia	No	Yes		No
8	Iran (Islamic Republic)	No	Yes		No
9	Republic of Korea	No	No	Yes	Yes
10	Lao PDR	Yes	Yes	No	No
11	Malaysia	No	No		Yes
12	Marshall Islands	No	Yes		Yes
13	Mongolia	No	Yes	No	Yes
14	Nepal	No	Maybe	No	Maybe
15	New Zealand	No	Maybe	No	Maybe
16	Pakistan	No	Yes	No	No
17	Philippines	No	Yes	No	No
18	Sri Lanka	No	Yes	No	No
19	Turkmenistan	No	Yes	No	No

## 9. Publication and Dissemination

As important as it is to conduct population censuses the value of the data becomes less so the longer it is before release of the data. In many countries a release of preliminary data attempts to bridge this gap. But in other countries preliminary data is not released and every attempt is made to get final results tabulated and released as quickly as possible. The proper use of technology can help in this endeavor.

In **Table 9.1 – Census Data Release Timing** it is clear that the trend in ESCAP countries from the last census to the next census is away from a preliminary data release and towards an earlier release of final results. There are 33 countries that released preliminary data last census, but only 27 that expect to during the next census. The number of countries beginning to release final data more than 18 months after the census drops from 12 to 5.

**Table 9.1 - Census Data Release Timing**

	Country	Preliminary Data Release		Final Results Months After Census	
		Prior Census	Next Census	Prior Census	Next Census
1	Afghanistan	No	Yes		18 - 24
2	American Samoa			24	
3	Armenia	Yes	Yes	12	11
4	Australia	No	No	10	10
5	Azerbaijan Republic	Yes	Yes	12 - 24	12 - 24
6	Bangladesh	Yes	Yes	72	38
7	Bhutan	Yes		11	
8	Brunei Darussalam	Yes	Yes		
9	Cambodia	Yes	Yes	16	16
10	China	Yes	Yes	20	20
11	Cook Islands	Yes	Yes	12	12
12	Georgia	Yes	Yes	26	18
13	Hong Kong, China			8+	
14	India	Yes	Yes		
15	Indonesia	Yes	Yes	18	8
16	Iran (Islamic Republic)	Yes	Yes	8	9
17	Japan	Yes		38	
18	Kazakhstan	Yes	Yes	34	34
19	Republic of Korea	Yes	Yes	13	13
20	Kyrgyzstan	Yes	Yes	20	20
21	Lao PDR	Yes	Yes	9	9
22	Macao, China	Yes		11	
23	Malaysia	Yes	Yes	12	12
24	Maldives	Yes	Yes	9	6
25	Marshall Islands	Yes		3	
26	Mongolia	Yes		19	
27	Nepal	Yes	Yes	12	7
28	New Zealand	Yes		9+	
29	Niue	Yes	Yes	14	10 - 11
30	Pakistan	Yes	Yes	24	18 - 20
31	Philippines	No	No	7	7
32	Russian Federation	Yes	Yes	12	12
33	Samoa	Yes		18	
34	Singapore	Yes		18	
35	Sri Lanka	Yes	Yes		
36	Tajikistan	Yes	Yes	24	24
37	Thailand	Yes	Yes	14	12
38	Turkey			22	
39	Turkmenistan		Yes		16 - 24
40	Viet Nam	Yes	Yes	28	18
		Yes-33 No-3	Yes-27 No-2	<12=10 12-18=13 19-24=7 24+=5	<12=8 12-18=13 19-24=3 24+=2

Traditionally final results have been available in a paper form in most countries. However, technology changes in the last 10 – 20 years now allow for CD-ROM releases, on-line data bases that can be mined by data users, GIS information with census information, etc.

We are beginning to see countries (Australia in the ESCAP region) in the world that no longer provide any paper products. **Table 9.2 – Publication and Dissemination Mediums** shows the dissemination medium used by ESCAP respondents.

**Table 9.2 - Publication and Dissemination Mediums**

	Country	Dissemination Medium	
		Prior Census	Next Census
1	Afghanistan	1	1,2,3
2	American Samoa	1,2,3	
3	Armenia	1,2,3	1,2,3
4	Australia	1,2,3	1,2,3
5	Azerbaijan Republic	1,2	1,2
6	Bangladesh	1	1,2,3
7	Bhutan	1,2,3	1,2,3
8	Brunei Darussalam	1,2	1,2,3
9	Cambodia	1,2,3	1,2,3
10	China	1,2,3	1,2,3
11	Cook Islands	1,3	1,3
12	Georgia	1,2,3	1,2,3
13	Hong Kong, China	1,3	
14	India	1,2,3	1,2,3
15	Indonesia	1	1,2,3
16	Iran (Islamic Republic)	1,2,3	1,2,3
17	Japan	1,2,3	
18	Kazakhstan	1,2	1,2
19	Republic of Korea	1,2,3	1,2,3
20	Kyrgyzstan	1,2	1,2,3
21	Lao PDR	1	1,3
22	Macao, China	1,2,3	1,2,3
23	Malaysia	1,2,3	1,2,3
24	Maldives	1,2,3	1,2,3
25	Marshall Islands	1	
26	Mongolia	1,2,3	1,2,3
27	Nepal	1,2,3	1,2,3
28	New Zealand	1,2,3	1,2,3
29	Niue	1,2,3	1,2,3
30	Pakistan	1,2	1,2,3
31	Philippines	1,2,3	1,2,3
32	Russian Federation	1,2,3	1,2,3
33	Samoa	1,2,3	
34	Singapore	1,3	
35	Sri Lanka	1,2,3	1,2,3
36	Thailand	1,2,3	1,2,3
37	Turkey	1,2,3	
38	Turkmenistan		1,2
39	Viet Nam	1,2,3	1,2,3
		1,2,3 =25 1,2 (only)=5 1,3 (only)=3 1 (only)=5	1,2,3 =27 1,2 (only)=3 1,3 (only)=2 1(only)=0

key

(1) Tables or reports in printed form

(2) Tables or reports on CD-ROMs

(3) On-line dissemination of tables and reports

Statistical products from census data have increased significantly over the last 20 years. Statistical agencies have listened to data users and responded with products that better serve data users needs while maintaining the confidentiality that a census requires. **Table 9.3 – Planned Statistical Products** lists the products available during the last census and the planned products for the next census in each responding country.

**Table 9.3 – Planned Statistical Products**

	Country	Planned Statistical Products	
		Prior Census	Next Census
1	Afghanistan	1	1,2,3,4,5,7,8,9
2	American Samoa	1,2,3,4,5,6	
3	Armenia	1,2,4,7	1,2,4,7,8
4	Australia	1,2,4,5,6,7,8,9,10	2,4,5,8,10
5	Azerbaijan Republic	1,5,7	1,5,7
6	Bangladesh	1,3,6,7,10	1,2,3,4,6,7,8,9,10
7	Bhutan	1,2,5,7,8,9,10	1,2,5,7,8,9,10
8	Brunei Darussalam	1,2	1,2,4,5,6,7,8,9
9	Cambodia	1,2,3,4,5,7,8,9,10	1,2,3,4,5,6,7,8,9,10
10	China	1,2,3,4,5,7,8,9,10	1,2,3,4,5
11	Cook Islands	1,3,5,7,8	1,3,5,7,8
12	Georgia	1,2,3,4	1,2,3,4,5,7,8,9
13	Hong Kong, China	1,3,4,5,6,7,10	
14	India	1,2,3,4,5,6,7,8,9	1,2,3,4,5,6,7,8,9
15	Indonesia	1,2,3,4,5,9	1,2,3,4,5,7,9
16	Iran (Islamic Republic)	1,2,3,4,10	1,2,3,4,5,6,7,8,9,10
17	Japan	1,2,5,7,8,9	
18	Kazakhstan	1,2,4	1,2,4,5,6
19	Republic of Korea	1,2,3,4,5,6,7,8,10	1,2,3,4,5,6,7,8,9,10
20	Kyrgyzstan	1,2,3,4,5,7	1,2,3,4,5,7
21	Lao PDR	1,2,3,4	1,2,3,4,5,7,8
22	Macao, China	1,2,3,4,5,10	1,2,3,4,5,10
23	Malaysia	1,2,3,4,5,7,8,9,10	1,2,3,4,5,7,8,9,10
24	Maldives	1,2,3,4,5,6,7,9	1,2,3,4,5,6,7, 9
25	Marshall Islands		1,2,3,4,5,6,7,8,9
26	Mongolia	1,2,3,4	1,2,3,4,5,6,7, 8,9,10
27	Nepal	1,2,3,4,5,8	1,2,3,4,5,8,9
28	New Zealand	1,2,4,5,9,10	1,2,3,4,5,9,10
29	Niue	1,2,3,5	1,2,3,5,7,8,9
30	Pakistan	1,2,7,8,10	1,2,5,7,8,9,10
31	Philippines	1,2,3,4,5,6,7,10	1,2,3,4,5,6,7, 8, 9,10
32	Russian Federation	1,2,3,4,5,7	1,2,3,4,5,6,7,8,9
33	Samoa	1,2,3,4,5	
34	Singapore	1,3,5	
35	Sri Lanka	1,2,3,4,5,7,8	
36	Tajikistan	1,3,4,5,8	1,3,4,5,8
37	Thailand	1,2,5	1,2,5
38	Turkey	1,2,3,4,7,10	
39	Turkmenistan	1,2,3,6	1,2,3,4,5,6,8
40	Viet Nam	1,2,3,4,5,6,7,8,9,10	1,2,3,4,5,6,7, 8,9,10

## key

- (1) Tables or reports in printed form
- (2) Tables or reports on CD-ROMs
- (3) Tables produced in unpublished form or supplied upon request
- (4) On-demand services to users for tables or other output not available through other means
- (5) On-line dissemination of tables and reports
- (6) On-line database for users to extract tables
- (7) Census maps for census tables and reports in printed or digital form
- (8) Population atlas
- (9) Data available in a GIS on a CD-ROM
- (10) Microdata dissemination

## Totals of Planned Statistical Products

Prior Census	Next Census
1=39	1=33
2=32	2=30
3=28	3=25
4=27	4=27
5=27	5=31
6=10	6=14
7=21	7=24
8=14	8=24
9=11	9=21
10=15	10=13

## 10. Outsourcing

Outsourcing is becoming more and more useful to statistical agencies as they try to make use of and manage the growth in technology. Technology changes so quickly today that it becomes almost impossible for statistical agencies to keep up with these changes using in-house staff. Many agencies have decided their work is to ensure quality and completeness in census operations and to find better ways to use technology through outsourcing. If a technology offers improvements to a census process the statistical agency can quickly make use of that technology through outsourcing.

**Table 10.1 – Outsourcing** identifies those ESCAP countries that used outsourcing in the last census or are planning to use it in the next census. The areas outsourced are also listed. Data capture and mapping are significant areas where outsourcing will be used in the next census in several countries.

Table 10.1 - Outsourcing

	Country	Outsourcing		If "yes" Which Tasks	
		Prior Census	Next Census	Prior Census	Next Census
1	Armenia	Yes	Yes	Mapping	Mapping
2	Australia	Yes	Yes	eCensus, census inquiry service, data capture, printing, delivery and collection of materials	eCensus, census inquiry service, data capture, printing, delivery and collection of materials
3	Bhutan	No	Yes		
4	Brunei Darussalam	Yes	Yes	Printing	
5	Cambodia	No	Yes		Mapping for village boundary
6	China	No	Maybe		
7	Georgia	Yes	Yes	Data processing	Mapping, development data capture and processing software, printing and distribution
8	Hong Kong, China	Yes		Data capture service, development and implementation of web applications for respondents and enumerators	
9	India	Yes	Yes	Data Capture	
10	Indonesia	Yes	Yes	Enumeration, maintenance hardware, printing	Enumeration, maintenance hardware, printing
11	Iran (Islamic Republic)		Yes		Software capture
12	Japan	Yes	Maybe	Data input	
13	Republic of Korea	Yes	Yes	eCensus system design, Public Relations	eCensus system design, Public Relations
14	Malaysia	Yes	Yes	Transportation and printing	Transportation and printing
15	Marshall Islands		Yes		surveyors, data entry, some analysis
16	Mongolia	No	Yes		data processing and data analyses
17	Nepal	Yes	No	Data keying	
18	New Zealand	Yes	Yes	Field mapping, processing recruitment, scanning and key entry software, public helpline, printing, distribution and retrieval of field material, field recruitment advertising, development and hosting of internet option, development of some field systems	Field mapping, processing recruitment, scanning and key entry software, public helpline, printing, distribution and retrieval of field material, field recruitment advertising, development and hosting of internet option, development of some field systems
19	Niue	Yes	Yes	"Buddy system" for most of the tasks	"Buddy system" for most of the tasks
20	Philippines	No	Yes		Cartography/mapping, small area identification
21	Russian Federation	Yes	Yes	Communications, space lease, transportation, development AC, cartography, information interpretation work, development of training on multimedia program	Communications, space lease, transportation, development AC, cartography, information interpretation work, development of training on multimedia program
22	Samoa	Yes		Enumeration outsourced to Ministry of Education to use teachers as enumerators	
23	Sri Lanka	Yes	Yes	Digitizing maps, printing	Printing and data capture
24	Thailand	Yes	Yes	PR campaign	PR campaign
25	Turkmenistan		Yes		Data entry by OCR/ICR, digital maps
26	Viet Nam	Yes	Yes	Writing analysis report	Writing analysis, ICR
				mapping=3 recruitment=4 web services=5 data capture=7 printing=6 PR=4 data analysis=1 enumeration =1 hardware maintenance=1	mapping=7 recruitment=2 web services=4 data capture=9 printing=7 PR=5 data analysis=3 enumeration=1 hardware maintenance=1

## 11. Data Collection Technologies

Throughout the history of census taking there has been an enumerator responsible for collecting information from all the people in a certain area. In the last few years, however, technology has changed the way data are collected in many countries. The postal system is used in some countries to collect data. The internet is beginning to be used to collect data. The telephone is also used to collect data. The use of administrative registers is also being used to the point that a traditional census is no longer conducted in some countries. It is also happening that enumerators in some countries are using small hand held computers to collect data rather than use the traditional paper form. The data are then transmitted to a processing center. The enumerators workload is downloaded onto the small hand held computer. Technology is changing even the most basic census operation for enumerators.

**Table 11.1 – Data Collection by Enumeration** identifies the countries using the more traditional approaches to collect data in the last census. In these four methods 1) the enumerator completes the questionnaire, 2) delivers the questionnaire to the household and either waits for the household to complete the questionnaire or the enumerator picks it up later, 3) the enumerator drops off the questionnaire at the household and the household completes the questionnaire and mails it back to the census office, or 4) the questionnaire is mailed to the household and the enumerator picks it up after the household has completed the questionnaire. In the last census 30 countries used these traditional approaches. Nine of these 30 will try some new ways in the next census.

**Table 11.1 - Data Collection by Enumeration**

	Country	Enumeration	
		Prior Census	Next Census
1	Afghanistan	1,2	1,2
2	American Samoa	1,2,4	1,2,4
3	Armenia	1	1
4	Azerbaijan Republic	1	1
5	Bangladesh	1	1
6	Bhutan	1	1
7	Brunei Darussalam	1,2,3	1,2,3,6
8	Cambodia	1,2	1,2
9	China	1	1, (Maybe for others)
10	Cook Islands	1	1
11	Georgia	1	1,7
12	India	1,2,3,4	1,2,3,4,7
13	Indonesia	1	1,2,6
14	Iran (Islamic Republic)	1	1
15	Japan	2	2,3,6
16	Kazakhstan	1	1
17	Kyrgyzstan	1	1
18	Maldives	1	1
19	Marshall Islands	1,2,3	1,2,3
20	Nepal	1	1
21	Pakistan	1	1
22	Philippines	1,2,3	1,2,3,4,5,6,7
23	Russian Federation	1	1
24	Samoa	1,2	
25	Sri Lanka	1,2	1,2,6
26	Tajikistan	2	2
27	Thailand	1,2,3	1,2,3,4,5,6,7
28	Turkey	1	
29	Turkmenistan	1	1
30	Viet Nam	1	1

## key

- (1) Interviewer, paper questionnaire
- (2) Enumerator, self completed form, collected by enumerator
- (3) Enumerator, self completed form, mail-back
- (4) Mail-out, self completed form, collected by enumerator
- (5) Mail-out, self completed form, mail back
- (6) Questionnaire posted on internet
- (7) CAPI (Computer Assisted Personal Interviews)

In Table 11.2 – **Data Collection Using New Technologies** there are several ESCAP countries using other technologies to collect data. In the last census ten countries used newer technologies (key 5 – 9 in the list below). Many of these countries are moving to even more data collection options in the next census.

**Table 11.2 - Data Collection Using New Technologies**

	Country	Enumeration Methodology	
		Prior Census	Next Census
1	Australia	1,2,3,5,6	1,2,3,5,6
2	Hong Kong, China	1,3,6	
3	Republic of Korea	1,2,6	1,2,3,6,9
4	Lao PDR	1,2,3,7	
5	Macao, China	1,4,9	1,4,9 (Maybe others)
6	Malaysia	1,2,6	1,2,6
7	Mongolia	1,7	1,6,7,8
8	New Zealand	2,3,6	2,3,6
9	Niue	1,2,7	1,2,7
10	Singapore	1,6,7,9	

key
(1) Interviewer, paper questionnaire
(2) Enumerator, self completed form, collected by enumerator
(3) Enumerator, self completed form, mail-back
(4) Mail-out, self completed form, collected by enumerator
(5) Mail-out, self completed form, mail back
(6) Questionnaire posted on internet
(7) Enumeration based on administrative registers
(8) CAPI (Computer Assisted Personal Interviews)
(9) CATI (Computer Assisted Telephone Interviews)

Table 11.3 – **Data Collection Technologies** summarizes techniques used by ESCAP countries to collect census data in the last census and the next census. Although a large number of countries continue to use traditional approaches there are significant increases in the number of countries making use of newer technologies.

**Table 11.3 - Data Collection Technologies**

Number of Countries		Methods
Prior Census	Next Census	
37	32	(1) Interviewer, paper questionnaire
18	16	(2) Enumerator, self completed form, collected by enumerator
9	9	(3) Enumerator, self completed form, mail-back
3	5	(4) Mail-out, self completed form, collected by enumerator
1	3	(5) Mail-out, self completed form, mail back
6	11	(6) Questionnaire posted on internet
4	2	(7) Enumeration based on administrative registers
0	5	(8) CAPI (Computer Assisted Personal Interviews)
2	2	(9) CATI (Computer Assisted Telephone Interviews)

## PART 2

### Selected Recommended Topics

The UNESCAP suggested to its member countries that certain data items needed to be collected in the next round of censuses. Principles and Recommendations for censuses are available online at <http://unstats.un.org/unsd/demographic/sources/census/census3.htm>. The *Principles and Recommendations for Population and Housing Censuses, Revision 2* was adopted by the Statistical Commission at its 38th session in 2007. The main objective of the Principles and Recommendations is to provide international principles and recommendations for use by national statistical offices and census officials in countries throughout the world in planning and organizing their censuses. Information about internal migration, international migration and fertility and mortality can be found in the document. In **Tables 12.1 – 12.4** ESCAP countries that responded to this survey identify questions they will include on internal migration, international migration, and fertility and mortality.

**Table 12.1 – Internal Migration**

	Country	Internal Migration
		Next Census
1	Afghanistan	1,2,3,4,5,6
2	American Samoa	1,2,3,4,5,6
3	Armenia	1,2,3,4,5
4	Australia	1,2,3,6
5	Azerbaijan Republic	1,2,3,4,5
6	Bangladesh	1,2,3,4,5,6
7	Bhutan	2,3,4,5
8	Brunei Darussalam	1,2,3,4,5,6
9	Cambodia	1,2,3,4,5,6
10	China	1,2,3,4,5,6
11	Cook Islands	1,2,3,4,5,6
12	Georgia	1,2,3,4,5
13	Hong Kong, China	1,2,3,4,6
14	India	1,2,3,4,5,6
15	Indonesia	2,3,4,5,6
16	Iran (Islamic Republic)	1,2,3,4,5,6
17	Japan	4,6
18	Kazakhstan	1,2,4,5
19	Republic of Korea	1,4,6
20	Kyrgyzstan	1,2,3,4,5
21	Lao PDR	1,2,3,4,5
22	Macao, China	1,2,3,4,5,6
23	Malaysia	1,3,5
24	Maldives	1,2,3,4,5,6
25	Marshall Islands	1,2,3,4,5,6
26	Mongolia	1,2,3,4,5,6
27	Nepal	1,2,3,4,5,6
28	New Zealand	1,2,3,4,6
29	Niue	1,2,3,4,5,6
30	Pakistan	1,2,3,4,5

key	Totals
1) Place of usual residence	36
2) Place where present at time of census	32
3) Place of birth	34
4) Duration of residence	33
5) Place of previous residence	32
6) Place of residence at a specified date in the past	27

Part 2 - Selected Recommended Topics

31	Philippines	1,6
32	Russian Federation	1,2,3,4,5,6
33	Samoa	1,2,3,5,6
34	Singapore	1,3
35	Sri Lanka	1,2,3,4,5
36	Tajikistan	1,2,3,4,5,6
37	Thailand	1,3,4,5
38	Turkey	
39	Turkmenistan	1,2,3,4,5,6
40	Viet Nam	1,5,6

**Table 12.2 – International Migration**

	Country	International Migration
		Next Census
1	Afghanistan	1,2,3
2	American Samoa	1,2,3
3	Armenia	1,2,3
4	Australia	1,2,3
5	Azerbaijan Republic	1,2,3
6	Bangladesh	1,2,3
7	Bhutan	1
8	Brunei Darussalam	1,2,3
9	Cambodia	1,3
10	China	Not decided
11	Cook Islands	1,3
12	Georgia	1,2,3
13	Hong Kong, China	1
14	India	1,2,3
15	Indonesia	1,2
16	Iran (Islamic Republic)	1,2,3
17	Japan	
18	Kazakhstan	1,3
19	Republic of Korea	1,2
20	Kyrgyzstan	1,2,3
21	Lao PDR	1,2
22	Macao, China	1,3
23	Malaysia	1,2,3
24	Maldives	2
25	Marshall Islands	1,2,3
26	Mongolia	2
27	Nepal	1,2,3
28	New Zealand	1,3
29	Niue	1,2,3
30	Pakistan	1,3
31	Philippines	2
32	Russian Federation	1,2,3
33	Samoa	1,2

key	Totals
1) Country of birth	33
2) Citizenship	28
3) Year or period of arrival	25

Part 2 - Selected Recommended Topics

34	Singapore	1,2,3
35	Sri Lanka	1,2
36	Tajikistan	1,2,3
37	Thailand	1,2
38	Turkey	
39	Turkmenistan	1,2
40	Viet Nam	3

**Table 12.3 – Fertility and Mortality**

	Country	Fertility and Mortality
		Next Census
1	Afghanistan	1,2,3,4,5,6
2	American Samoa	1,2,3
3	Armenia	1,2,3,6
4	Australia	None
5	Azerbaijan Republic	1,2
6	Bangladesh	1,2,3,4,5,6
7	Bhutan	1,2,6
8	Brunei Darussalam	1,2,3,4,5,6
9	Cambodia	1,2,6,7
10	China	1,2,4,6
11	Cook Islands	1,2,3,5
12	Georgia	1,2,6,7
13	Hong Kong, China	None
14	India	1,2,3,4,5
15	Indonesia	1,2,3,4,5,6,7
16	Iran (Islamic Republic)	1,2
17	Japan	
18	Kazakhstan	1,2
19	Republic of Korea	1,2,4,7
20	Kyrgyzstan	1,2
21	Lao PDR	1,2,3,6
22	Macao, China	None
23	Malaysia	1,2
24	Maldives	1,2,3,4
25	Marshall Islands	1,2,3,4,5,6,7
26	Mongolia	1,2,3,4,5,6,7
27	Nepal	1,2,3,4,5,6
28	New Zealand	1,
29	Niue	1,2,3,4,5
30	Pakistan	1,2
31	Philippines	1,2,4
32	Russian Federation	1,2,4,5
33	Samoa	1,2,3,6,7
34	Singapore	1,4
35	Sri Lanka	1,2,3

key	Totals
1) Children ever born	35
2) Children living	33
3) Date of birth of last child born alive	17
4) Age, date or duration of first marriage	15
5) Age of mother at birth of first child born alive	11
6) Household deaths in the past 12 months	15
7) Child of lone mother or father	7

Part 2 - Selected Recommended Topics

36	Tajikistan	1,2
37	Thailand	1,2
38	Turkey	
39	Turkmenistan	1,2, maybe six
40	Viet Nam	1,2,3,6

In addition to disability topics being covered in the Principles and Recommendations referenced above ESCAP has prepared a “Disability Statistics Training Manual” that is available online at <http://www.unescap.org/stat/disability/index.asp>.

ESCAP has recently received funding from the United Nations Development Account in New York for implementing a project to improve disability measurement and statistics during the biennium 2008-2009. The project will facilitate the use of international statistical standards on disability measurement in census and surveys. It will take into account regional circumstances and promote political commitment and create technical capacity at national level. For further information: Contact: Ms Haishan Fu, Chief, Statistical Development Section, Statistics Division, ESCAP ([stat.unescap@un.org](mailto:stat.unescap@un.org)). The responses to the question in the survey about what disability questions would be asked in the next census are shown in table 12.4. 24 countries said they would be asking about disabilities.

**Table 12.4 – Disability Questions**

	Country	Disability Questions	
		Next Census	
1	Afghanistan	Yes	
2	American Samoa	Yes	1
3	Armenia	No	
4	Australia	Yes	2
5	Azerbaijan Republic	No	
6	Bangladesh	Yes	3
7	Bhutan	Yes	4
8	Brunei Darussalam	Yes	5
9	Cambodia	Yes	4
10	China	No	
11	Cook Islands	Yes	6
12	Georgia	No	
13	Hong Kong, China	Undecided	
14	India	Yes	7
15	Indonesia	Yes	Undecided
16	Iran (Islamic Republic)		
17	Japan	No	

key

(1) Limiting work or activities  
(2) Does the person ever need someone for self care activities  
Does the person ever need someone for body movement activities  
Does the person ever need someone for communication activities  
Reasons for need of assistance  
(3) As in 1991  
(4) Mobility, seeing, hearing, speech, mental  
(5) Follow UN recommendations as in 1991  
(6) Does this person have any disability/health problem lasting 6 months or more?  
If yes, describe the nature of disability.  
(7) Disability type, extent of disability  
(8) Mental or physical impairment  
(9) Type of disability and cause of disability  
(10) Even with the help of auxiliary equipment do you still require assistance from others in performing the following activities...  
Have the above mentioned difficulties been continuously occurring or will expect to continue for 6 months or more

Part 2 - Selected Recommended Topics

18	Kazakhstan	No	
19	Republic of Korea	Yes	8
20	Kyrgyzstan	No	
21	Lao PDR	Yes	9
22	Macao, China	Yes	10
23	Malaysia	Yes	11
24	Maldives	Undecided	
25	Marshall Islands	Yes	
26	Mongolia	Yes	12
27	Nepal	Yes	
28	New Zealand	Yes	Undecided
29	Niue	Hopefully	Undecided
30	Pakistan	Yes	13
31	Philippines	Yes	14
32	Russian Federation	Yes	15
33	Samoa	Yes	16
34	Singapore		
35	Sri Lanka	Yes	Undecided
36	Tajikistan	Undecided	
37	Thailand	Yes	17
38	Turkey		
39	Turkmenistan	No	
40	Viet Nam	Yes	18

What are the activities you need assistance from others?

In which year did you start to have difficulties?

What kind of physical, mental and emotional conditions that causes you to have difficulty in carrying out the above mentioned activities?

Did you use services provided by the government or other social organizations?

What kind of services used? Why not used?

(11) Still under study  
 (12) Do you have any difficulty in? (yes/no) 1) seeing, 2) hearing, 3) communication, 4) mental behaviour, 5) moving/self care  
 (13) Is there any disabled person in your family? Nature of disability i) seeing ii) hearing iii) talking iv) walking v) handling vi) mentally retarded vii) others viii) none  
 (14) Does \_\_\_\_ have any difficulty in a. seeing, even if wearing glasses b. hearing, even if using hearing aid? c. walking or climbing steps? d. bathing or dressing?

(15) Indicate all essential sources of means available to you.

(16) types of disability, self-care ability  
 (17) Has \_\_\_\_ had the following difficulties or health problem consecutively for 6 months or more? Seeing, hearing, walking, cognition. Impairment is divided into 31 categories such as blindness, low vision, deaf, paralysis, etc.  
 (18) Does the respondent have any physical or mental disability? If yes, what kind of disability?

## **PART 3**

### **Census Assistance Needed**

One of the reasons for doing this survey by ESCAP was for member countries to identify areas in which they felt they would need assistance in the next round of censuses. In Table 13.1 these areas are identified. The topics that are identified most often are Cartography/Mapping, Tabulation and Database Design, Post-Enumeration Survey, Data Quality Assurance, Evaluation, Census Output and Dissemination and Staff Recruitment and Training.

**Table 13.1** lists those countries that need assistance, the areas where they want assistance, and if they already expect to get assistance. Seventeen of the 32 countries requesting assistance expect to get some of that assistance.

Part 3 - Census Assistance Needed

	Country	Assistance Needed	Assistance Expected	Assistance Expected From Whom
1	Afghanistan	2,3,4,5,6,8,11,12,16,17,18	1,2,3,4,5,6,8,11,12,15,16,17,18	
2	Armenia	1,2,3,6,7,8,9,10,11,12,15,16,17,18		
3	Azerbaijan Republic	10,11,12,19 (i)	1,2,3,4,5,6,7,8,9,10,11,12,13	State Statistical Committee/Land and Cartography Committee
4	Bangladesh	4,11,16		
5	Bhutan	3,4,16,17	3,4	Donor agencies
6	Brunei Darussalam	1,2,3,8,9,10,11,12,16,17,18,19 (ii)	1,2,3,8,9,10,11,12,16,17,18,19	UN
7	Cambodia	1,2,3,4,5,10,11,12,16,17,18,19 (iii)	1,2,3,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	UNFPA/JICA/Germany
8	China	2,3,4,5,13,17		
9	Cook Islands	2,3,6,8,11,12,18	2,3,6,8,11,12,18	SPC/unknown
10	Georgia	1,2,13	3,8	UNFPA
11	Hong Kong, China	9,12,19 (iv)		
12	India	1,2,3,4,5,6,7,8,9,10,11,12,16,17		
13	Indonesia	1,2,3,5,8,18	1,2,3,8	Maybe UNFPA/WB
14	Iran (Islamic Republic)	2,5,13		
15	Kazakhstan	1,2,3,5,6,7,8,9,10,11,12,13,15,16,17,18	1,2,3,5,6,7,8,9,10,11,12,13,15,16,17,18	
16	Republic of Korea	9,16	9	Australia
17	Kyrgyzstan	3,9,10,11,12,13		
18	Lao PDR	1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18,19 (v)		
19	Malaysia	2,3,4,11	3,4,11	UNSD/ABS
20	Maldives	1,2,3,6,7,8,9,10,11,12,13,15,16,17,18		
21	Marshall Islands	1,2,6,9,11,12,13,15,16,17,18	1,2,4,6,11,15,16,17	
22	Mongolia	3,5,8,11,13,14,16,17	6,12,18	UNFPA
23	Nepal	2,3,4,5,11,16	4	Maybe UNFPA
24	Niue	3,6,11,12,14,16,17,18	2,11,12,14,16,17,18	SPC/NZS/UNDP/UNFPA
25	Pakistan	1,2,3,8,12,13,15,16,17	3,8,11,13,15,16,17	UNFPA
26	Philippines	3,4,5,14		
27	Samoa	3,16	8,9	SPC (Upon request)
28	Sri Lanka	1,2,3,8,10,11,12,16		
29	Tajikistan	3,4,6,11,16,17,18	3,4,6,16,17	
30	Thailand	2,3,4,5,9,10,11,12,13,16,17	1,7	UNFPA/WB
31	Turkmenistan	1,2,3,9,10,11,13,17	1,2,3,6,9,10,11,13,17 (Possibly)	UNDP/UNFPA/UNICEF
32	Viet Nam	19 (vi)	6,18/maybe 14	UNFPA/and other donors

key	Totals
1) Management	13
2) Data quality assurance and improvement	19
3) Cartography/Mapping	24
4) Sampling	11
5) Small-area identification	12
6) Questionnaire preparation and testing	9
7) Enumeration	4
8) Data Capture	12
9) Data editing	12
10) Data coding	12
11) Tabulation and database design	20
12) Census output and dissemination	16
13) Staff recruitment and training	13
14) Out-sourcing	4
15) Census tests	7
16) Post-enumeration	20
17) Evaluation	17
18) Census communication activities	12
19) Other, please specify	7

(i) computers and technology

(ii) GIS, report writing and analysis

(iii) analysis

(iv) integration of administrative records, internet census form

(v) data analysis and report writing

(vi) writing analysis report/ICR

## Appendix



UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION FOR ASIA  
AND THE PACIFIC (ESCAP)

### Questionnaire on Population and Housing Censuses in Asia and the Pacific

UNESCAP is conducting this Survey on Population and Housing Censuses in Asia and the Pacific in order to assess the need for country-level and regional technical assistance during the 2010 round of censuses. The Survey will also assess the availability of census skills and expertise that could be shared among UNESCAP members and associate members. The results will be important for obtaining resources and adjusting the priorities of the Regional Census Programme that UNESCAP is planning together with its partners.

The information collected through the survey will be analysed, published and disseminated to various stakeholders at national, regional and international levels. An Expert Group Meeting will be held, tentatively 10-12 December 2007, to review the results and make detailed recommendations for regional activities.

In order to minimize the effort needed to complete the questionnaire, selected responses available to the secretariat from previously conducted similar surveys, the survey by UNESCAP in April 2005 and the survey by Eurostat/UNECE (in Central Asian countries) in 2004, have been pre-filled in the questionnaire. Space is provided to correct any pre-filled information that is not accurate. Throughout the electronic document, the answering space will stretch as you type detailed information.

You are kindly requested to send the completed questionnaire **by 31 August 2007**, either electronically or on a hard copy. Please send to e-mail address [stat.unescap@un.org](mailto:stat.unescap@un.org) or fax number +66 -22881082. The mailing address is Statistics Division, United Nations ESCAP, United Nations Building, Rajadamnern Nok Avenue, Bangkok 10200, Thailand.

Should you have any queries, please do not hesitate to e-mail to the above address, or call to Mr Joel Jere (+66-22881659) or Ms Haishan Fu, Officer-in-Charge, a.i. (+66-22881653), Statistics Division. Thank you!

Country/area	
Agency/office	
Date of completion	
Name of respondent	
E-mail	
Telephone	

Appendix

**B. General information about the population and housing census**

In the table below, please provide information about the timing and scope of your previous and next population and housing censuses.

	Previous census	Next census
1. Census date (or month)		
2. Enumeration period		
3. Number of unique questionnaires used/planned		
4. Sample ratio of 'long form', if used		
5. Scope of pilot census (sample size or area coverage)		
6. Was/will a post-enumeration survey be conducted (Y/N)		

**C. Use of technologies in census operations.**

In the table below, please identify the technologies that you were using in the previous census and are planning to use in the next census. Also, correct any erroneous or inaccurate pre-printed information.

	Previous census	Next census
7. Census management		
a) Did you use/will you be using any project management and tracking software? (Y/N)		
b) If yes, please indicate which software package		
8. Data Coding/Data capture		
a) What mode of data coding was/will be used? (manual, computer assisted, automatic, or other, please specify)		
b) If automatic or computer-assisted data coding was/will be applied, please indicate the software.		
c) What method of data entry/capture was/will be used?(keyboard, OMR, OCR/ICR, Internet, other please specify)		
d) What software was used/is planned for data entry/capture		
9. Data editing		
a) Was there/will there be any computer-supported editing of the raw data files? (Y/N)		

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	Previous census	Next census
b) If 'Yes' to question 9.a), did/will computer-supported editing include automatic imputation?		
c) If 'Yes' to question 9.b), please specify the software used.		
d) Was there/will there be any use of double entry verification? (Y/N)		
e) If 'Yes', what percentage of the data were/are expected to be captured twice?		
f) Did you use/are you planning to use real-time error control during the data capture (e.g., variable range checks, or check on the internal consistency of household composition)? (Y/N)		
<b>10. Data processing</b>		
a) Was/will a computer-based management and control system to check individual forms (or groups of forms) for each Enumeration Area (or for other processing units) established?		
b) What software was/will be used to set up a database for micro data?		
<b>11. Cartography/ Mapping – Did you use/are you planning to use any of the following tools?</b>		
a) GIS technology		
b) Digital maps		
c) GPS technology		
d) Other, please specify:		
e) Were/will digital maps be available down to the lowest level i.e. Enumeration Area (EA) level?		
f) If no, please specify down to which level of administrative area digital maps were/are expected to be available:		
g) Did you/are you planning to record the GPS coordinates of each household?		

### D. Publication and dissemination

In the table below please identify the goals of your agency for the release and publication of the data from the census. Previously reported data are pre-printed. Please enter information below for the last census if you did not report previously.

	Previous census	Next census
12. When did you/are you planning to release the preliminary data?		
13. When did you/are you planning to release the final results?		
14. What dissemination medium was/will be used to release the final results? (paper, CD-ROMS, Internet, other please specify)		
15. What were/are the planned statistical products to be made available to the public and other users? (Please indicate all that apply)		
a) Tables or reports in printed form for general distribution		
b) Tables or reports on CD-ROMs for general distribution		
c) Tables produced in unpublished form for limited distribution or supplied upon request		
d) On-demand services to users who require tables or other outputs not published or aggregates not available through other means		
e) On-line data dissemination of tables and reports		
f) On-line dissemination database designed for users to extract tables directly		
g) Census maps prepared for census tables and report in printed or digital format		
h) Population atlas		
i) Data made available in a geographic information system on a CD Rom		
j) Microdata dissemination		
k) Others, please specify		

### E. Outsourcing

External contractors are increasingly used to assist in specific stages of census operations. Please indicate below your experiences with and plans for outsourcing.

	Previous census	Next census
16. Outsourcing was used/is planned for any part of census operations (Y/N)?		
17. If yes for either, which tasks are planned to be out-sourced? The box will expand as needed.		

### F. Enumeration Methodology

The way census data are collected has changed in many countries. No longer is the use of an enumerator the only way, or even necessarily the best way, to collect data from all households. Many countries have moved to new ways for efficiency and quality reasons. ;

	Previous census	Next census
18. Enumeration methods: Please indicate the enumeration methods used in your previous and next censuses. Mark all applicable, and correct any previously reported information where needed.		
a) Interviewer, paper questionnaire		
b) Enumerator, self-completed form, collected by enumerator		
c) Enumerator, self-completed form, mail-back		
d) Mail-out, self-completed form, collected by enumerator		
e) Mail-out, self-completed form, mail-back		
f) Questionnaire posted on Internet		
g) Enumeration based on administrative registers		
h) CAPI (Computer Assisted Personal Interviews)		
i) CATI (Computer Assisted Telephone Interviews)		
j) Others, please specify:		

### G. Topics covered

Questions 19 through 0 cover selected recommended topics for the 2010 census round. UNESCAP plans to give special focus to these topics in a Regional Census Programme. Please indicate for each topic if there are plans to include them in your next census.

	Previously reported for the next census	Please make any needed corrections
19. Geographical and internal migration characteristics		
a) Place of usual residence		

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	Previously reported for the next census	Please make any needed corrections
b) Place where present at time of census		
c) Place of birth		
d) Duration of residence		
e) Place of previous residence		
f) Place of residence at a specified date in the past		
<b>20. International migration characteristics</b>		
a) Country of birth		
b) Citizenship		
c) Year or period of arrival		
<b>21. Fertility and mortality</b>		
a) Children ever born		
b) Children living		
c) Date of birth of last child born alive		
d) Age, date or duration of first marriage		
e) Age of mother at birth of first child born alive		
f) Household deaths in the past 12 months		
g) Child of lone mother or father		

**22. Disability**

- a) Will there be data collected on disabilities in the next census
- b) If yes, please specify the questions to be included under the disability topic in the next census

**H. Assistance needed**

UNESCAP is hoping to help countries get assistance for the next round of censuses through technical expertise exchange. Please identify below if you will need assistance and the areas where assistance is needed. It is also important that you identify any assistance, and from whom, that you already expect to get in the next census.

23. Is your office (or affiliated offices) in need of technical assistance for the next census?  
If no, please skip to H. Availability of Census Skills question 26.

24. Please specify the area of assistance needed using the following table (please rank in order of priority)	Mark all applicable
a) Census Management	
b) Census data quality assurance and improvement	
c) Cartography/Mapping	
d) Sampling	
e) Small-area identification	
f) Questionnaire Preparation & Testing	

24. Please specify the area of assistance needed using the following table (please rank in order of priority)	Mark all applicable
g) Enumeration	
h) Data capture	
i) Data editing	
j) Data coding	
k) Tabulation and database design	
l) Census output and dissemination	
m) Staff recruitment and training	
n) Out-sourcing	
o) Census tests	
p) Post-enumeration	
q) Evaluation	
r) Census communication activities	
s) Others, please specify	

25. Is there any planned assistance to be received from other sources (other than national sources)? (Mark all applicable)

	Y/N/Possibly	From whom?	Remarks
a) Census Management			
b) Census data quality assurance and improvement			
c) Cartography/Mapping			
d) Sampling			
e) Small-area identification			
f) Questionnaire preparation and testing			
g) Enumeration			
h) Data capture			
i) Data editing			
j) Data coding			
k) Tabulation and database design			
l) Census output and dissemination			
m) Staff recruitment and training			
n) Out-sourcing			
o) Census tests			
p) Post-enumeration			
q) Evaluation			
r) Census communication activities			
s) Others, please specify			

### I. Availability of census skills

In the table below, please indicate the areas where you know that your office (or affiliated offices) have special skills that other countries might benefit from during the 2010 round of censuses.

26. Our census office has advanced skills in...	Y/N	<u>Details (include any assistance already/being provided to others)</u>
a) Overall census management		
b) Census legislation drafting		
c) Census planning (including budgeting)		
d) Technology management		
e) Census advocacy/publicity/information		
f) Cartographic (mapping) work		
g) Use of GPS/GIS techniques		
h) Living quarters and household listing		
i) Questionnaire design		
j) Census tests		
k) Quality control		
l) Development of enumeration techniques		
m) Training of enumerators		
n) Supervision of enumeration		
o) Sampling in the enumeration		
p) Data capture		
q) Data editing		
r) Data coding		
s) Processing management and control system		
t) Tabulation plan		
u) Development of software applications and software tools		
v) Census database management		
w) Statistical analysis		
x) Post enumeration survey		
y) Dissemination strategies		
z) On-line dissemination		
aa) Comprehensive review of census for gender aspects ('engendering' census)		
bb) Census evaluation		
cc) Others, please specify		

27. Can your office (or affiliated offices) provide the technical expertise indicated above to other countries if travel costs are paid (Y/N/Remarks)?

Appendix

28. In order to discuss possible provision of technical assistance and short-term sharing of experts in those specified areas to other countries in the region, UNESCAP may contact a senior official in your organization with operative responsibility and authority on census operations at a later stage. Please provide contact details below:

Name:

Position:

E-mail:

Telephone:

Thank you very much for completing the questionnaire.