Population and Housing Census 2000 Mongolia ADMINISTRATIVE REPORT

Volume I

NSO
National Statistical Office Of Mongolia

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UNSD
United Nations Statistics Division

Australia - Mongolia Development Cooperation Program
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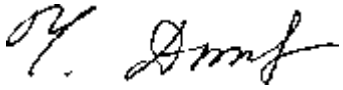
I wish to thank all staff of central and local statistical divisions, census staff of all levels of the census commissions and temporary bureaus, census enumerators, supervisors and operators who made a tremendous effort towards the successful completion of the census, and to the many citizens who participated in the conduct of a successful census.



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PREFACE

This Report contains information on the planning and conduct of the 2000 Population and Housing Census of Mongolia. The key feature of the 2000 census was the attempt to adopt and adapt the international principles and recommendations prepared under the guidance of the United Nations Statistical Commission[1]. This attempt necessitated many changes to the approach to census-taking compared with the way in which censuses had traditionally been conducted in Mongolia. Some of these changes were small but many, both conceptual and practical, were profound and required much discussion and testing prior to their adoption, and sometimes adaptation.

The main purpose if this Report is to gather together a record of the experiences accumulated during the 2000 census. The ease of access to these records will ensure that they will be utilized during the next and subsequent censuses as part of what is sometimes referred to as institutional memory. The Report will be far more than a depository of the 2000 census documentation. The Report will serve as a useful reference for statisticians engaged in population census work and for teachers and researchers in the social sciences wishing to draw on real experiences in confronting and resolving issues in conducting censuses and, indeed, in undertaking a range of data collection activities.

In preparing the Report, the NSO has benefited from the generous financial support and technical assistance provided by the United Nations Population Fund (UNFPA) and the Australian Government. Indeed, throughout the 2000 census, the NSO has valued the advice and technical support it has received from advisers from the UN Statistical Division, UNFPA, the Australian Bureau of Statistics (ABS) and other organizations, all of which have assisted in incorporating international recommendations into the 2000 census framework.

This Report is Volume 1 of a series of two volumes. The first volume contains the background and descriptive chapters on the 2000 census experiences as well as the more analytic sections on problems and lessons learned together with key annexes. It is expected that this first volume will prove useful not only for professional statisticians within the NSO but also for a wider audience outside with an interest in the problems associated with the taking of a national census. The second volume will contain the various forms, manuals and other documentation used in the census and will thus provide a useful single reference for source materials in future years. It is expected that the main beneficiaries of this second volume will be the future census-takers within the NSO. Limited number of copies of the second volume are available only in Mongolian for consultation within NSO.

The various chapters in this Report were prepared by the staff of the Population Census and Survey Bureau (PCSB) and the Data Processing and Software Department (DPSD) in the NSO together with the census adviser to the NSO. Original drafts were in Mongolian and these were translated into English, edited, and translated back into Mongolian. Thanks are due to Mr. B. Batmunkh, Head

[1] *Principles and Recommendations for Population and Housing Censuses*, United Nations Department of Economic and Social Affairs, New York, 1998

of the PCSB, and to the staff of the PCSB and Data Processing Departments of the NSO who worked so diligently to prepare draft chapters. These include Mr. A. Amarbal, Ms. D. Ariunaa, Ch. Baatarchuluun, Mr. Ts. Badrakh, Ms. B. Baigalmaa, Mr. A. Gerel, Ms. A. Gereltuya, Ms. P. Munkhtsetseg, Ms. L. Munkhtuya, Sh. Narantsetseg, Ms. Ts. Tseveennya, Ms. Zultsetseg, Mr. B. Batjargal, Mr. Erdembayar, Ms. E. Erdenesan, Mr. Oyunbayar, Mr. E. Sundui and Ms. B. Tserenkhand.

Chapter 1: BRIEF HISTORY OF POPULATION CENSUSES IN MONGOLIA

While population censuses as we know them have a relatively short history, the interest in population size has been present as long as socially organized human communities. Indeed, there are scattered references to population censuses and population counts throughout history, usually associated with the demand for taxes or the need to estimate potential military strength.

However, it is only in the past 200 years or so that periodic censuses were taken and the results factually recorded. But it was not until the 20th century that censuses in Mongolia were conducted in a regular and systematic way. The first census in the 20th century was conducted in 1918. Further censuses being conducted in 1935, 1944, 1956, 1963, 1969, 1979,1989 and 2000.

In 1918, the population of the Empire of Bogd was estimated at 647.5 thousand persons.

In its day the 1956 census was considered as technically advanced conducted by an established and dedicated census organization. New advances were introduced for the census of 1963, particularly the first use of a computer, which was expected to speed processing and generally improve census methodology. The basic design of the census was developed by the Commission for Mutual Economic Assistance to assure conformity with other censuses in the region. 1017.1 thousand persons were enumerated in the 1963 census.

The censuses of 1969, 1979 and 1989 also followed the methodological guidelines developed by the Commission. Moreover, in accordance with UN recommendations these three censuses were conducted once in 10 years and included questions on housing. From 1979 the population and housing censuses were conducted jointly with population surveys using broad-based questionnaires. For instance, the survey of industrial and agricultural workers, "Workers" and "Herdsmen", were conducted together with the 1979 census. The survey of unemployed population, and the survey among women on reproductive issues were conducted in 1989

The 2000 census differed from earlier censuses in many ways. As the first to be conducted during the transitional period to a market economy, it was expected to reflect a changing emphasis in the demand for economic and social data. The 2000 census was based largely on United Nations principles and recommendations for conducting censuses and thus, in meeting global standards, could be thought of as the first truly modern census to be conducted in the country.

Chapter 2: PLANNING, ADMINISTRATION AND ORGANISATION OF THE 2000 CENSUS

A national population and housing census is by far the largest statistical operation carried out by the National Statistical Office. According to the "Law on statistics" of Mongolia the census should be conducted once in every ten years. However, for various reasons there was an interval of eleven years before the 2000 census of Mongolia. In view of both the scale of the operation and the lack of sufficient numbers of skilled staff, radical approaches were needed in meeting the challenges in preparing an appropriate and realizable census plan, in creating a sound management team, and in building an appropriate census organization.

Census planning

As in any major enterprise, the proper planning for a population census is an essential prerequisite for success. The planning stage thus played a crucial part in the overall census operation. The planning process involved the development of a carefully crafted and integrated schedule of activities, providing realistic estimates of timing, costs and outputs, census preparatory work, organization, training, enumeration activity, data processing, analysis, evaluation and dissemination of results to users. As part of the planning approach, the entire census operation was sub-divided into three key stages, pre-census, census enumeration and post-enumeration activities.

The pre-census stage focused on census preparation that included the following activities:

- Creation of a legal basis for census-taking
- Estimation of costs and preparation of budget
- Fund raising and advocacy
- Development of a census workplan and timetable
- Establishment of a dedicated census organization
- Preparation of census maps
- Preliminary listing of households and houses
- Design of questionnaire
- Conduct of census pretests
- Planning for enumeration
- Design of output tables
- Design and testing of processing system
- Recruitment and training of staff
- Design of census communications and publicity strategies

The census enumeration stage covered the actual process of collecting census information from the entire population through interviews and the completion of census questionnaires.

Finally, planning for the post-enumeration stage included design of census evaluation, data processing, analysis, dissemination, publication of results and support to users of census data.

An initial plan for the 2000 census was developed in 1997 and approved by the Chairman of the National Statistical Office (NSO) at the beginning of 1998. Based on this plan a detailed work plan was developed at the end of 1998 (Annex 1) and disseminated among key census staff to enable preliminary work to proceed.

A more detailed annual action programme was drawn up for the Population Census and Survey Bureau (PCSB) of the NSO. This action plan was incorporated into the quarterly and annual plans of the PCSB staff. By 1999 the personal action plans were developed to provide detailed activity targets on a monthly basis. To ensure that progress was adequately monitored these plans were to be evaluated three times per month.

Creation of the legal basis for the census

The previous Mongolian population census was carried out in 1989. Given the advantages in maintaining a ten-year interval between censuses, the next census was due in 1999. Accordingly, a draft order to proclaim a date in 1999 for the census was presented to the Cabinet in November 1996. However, it was decided to delay the census because time would be very short to carry out the necessary preparation and difficulties would be experienced in finding sufficient financial resources.

Creation of a legal basis for census-taking is a basic requirement for carrying out a population census. Without appropriate legal provision it is impossible to provide proper authority to conduct the census. In many countries, specific census laws are passed to enable the census to be taken. Such laws specify the authorities of organizations and their responsibilities for conducting the census; define the scope and coverage of the census; set penalties for refusal to respond to the census; and protect the confidentiality of information provided by individuals to the census authorities.

In 1998 a separate Law on "Population and Housing Census-taking" was drafted. But it was not presented to the Parliament of Mongolia due to a belief that the existing legal provisions were sufficient to enable a census to be carried out. In the event, the 2000 census went smoothly without challenge to the legal provisions. But this situation cannot be assumed for future censuses. Success in 2000 was due in part to the wide participation and enthusiasm of many people, often with little or no financial gain. The willingness of the various participating agencies and ministries at all geographic and political levels to assume responsibilities defined in the various orders and regulations played an important part in ensuring the success of the census. In the future, this cooperation may not be so easily secured and, in line with other countries' experience, it would be desirable to pass a separate law on census-taking.

Although no special law was enacted in Mongolia, the existing Law on Statistics, enacted in 1994 and revised in 1997, was in the event felt to be adequate to provide legal support to the 2000 census (Annex 2). This Law

stipulates that: "The National Statistical Office organizes the population and housing census at the national level every 10 years". In accordance with the provisions of the Law, the Government will declare the date of the census. Whenever there is a need to carry out a census, the date should be set up by the Government upon the agreement of the Parliament. The following laws, Government orders and decisions were passed to create a legal basis for the 2000 census:

- The Mongolian "Law on Statistics": 1994, revised in 1997 article N.7, provision N.1,3 and article 23, provision N. 1,2;
- The Mongolian "Law on Administrative Responsibilities": dated November 27, 1992 article N. 43, part N.1;
- The Parliament Resolution N. 06 dated January 8, 1998 concerning "Approval of date to conduct the Population and Housing Census-2000";
- The Government Order N. 28 dated February 25, 1998 concerning "Conducting the Population and Housing Census-2000";
- The Parliament Resolution N. 39 dated June 3, 1999 concerning "Establishing the Committee";
- The NSO Chairman's Order N. 125 dated July 21, 1999 concerning "Approval of the Population and Housing Census-2000 Questionnaire";
- The NSO Chairman's Order N. 171 dated October 28, 1999 concerning "Approval of regulation to carry out the Population and Housing Census-2000 and instructions for filling up the questionnaire ".

These legal documents and decisions together were considered to provide a sufficient legal framework to conduct the 2000 census. On this basis it was possible to commence census operations and assign responsibilities to the participating agencies and staff. Of prime importance was the Government Order N.28 of 1998 that stipulated the census-taking date, defined responsibilities for the NSO, the city and aimag governors, and other ministries in Mongolia.

Organization and administration of the 2000 census

In accordance with the Law on Statistics the NSO is the main body responsible for conducting a census. Including the 2000 census, the statistical organization of Mongolia has now conducted eight censuses. Following the 1989 census a number of reforms and departmental restructuring were carried out that were to influence the organization of the 2000 census. In 1989 overall planning and supervision of the census was carried out by the Population Census Unit (PCU) within the NSO, which was itself an organ under the State Planning and Economic Committee. In March 1990 the PCU was restructured and renamed the Population and Labor Department (PLD). In March 1992 the PLD was absorbed into a separate unit, the Population Laboratory, established under the

NSO structure. In 1997 this Laboratory was amalgamated with the Social Statistics Division of the NSO.

To create a more dedicated unit, following the issuance of Government Order N.28 in March 1998, the NSO management passed an order to split the Population and Social Statistics Department into the Population and Research Department and Social Statistics Division. The total number of staff assigned to the newly-formed unit was eight persons. This unit was directly in-charge of population and housing census preparatory work. In February 1999 the Department was re-organized into the Population Census and Survey Bureau (PCSB). The staff ceiling was raised to 15 persons. Mr. B. Batmunkh, Vice-Chairman of the NSO, and Ms. A. Gereltuya were nominated as director and deputy director of PCSB respectively. Within the Bureau, four of the staff members were financed by the United Nations Population Fund (UNFPA) under various projects. The Bureau was charged with overseeing all stages of the population census, including design, preparatory work, development of forms and instructions, enumeration, data processing, and technical control over of all census activities carried out at the aimag and lower geographic levels.

In actual fact, preparatory work for the 2000 census had started at the NSO as early as 1996. At that time NSO initiated negotiations with a number of international organizations to seek financial and technical assistance. As a result a project document was developed for review by international donor agencies. At the same time, Parliamentary approval was sought to proceed with a census as provided by the Law on Statistics.

The MON/97/P10 project, "Strengthening the Capacity of the National Statistical Office in Data Processing, Analysis and Dissemination", was approved in September 1997. It is executed by UNFPA, and implemented by the NSO. This project aims at strengthening the NSO technical capacity to collect, process and analyze demographic and related social and economic data, and to improve dissemination and utilization of such data for national policy and planning and for operational programmes and activities. The MON/97/P10 project has provided a lot of financial assistance in census preparation, including training of the NSO officials and census staff, purchase of census data processing equipment, software and other supplies, recruitment of the international experts and consultants, conduct of the pilot censuses, and census advocacy and publicity. The MON/97/P10 project's consultants who visited the NSO provided active assistance and support in conducting the census in line with international standards. The MON/97/P04 project, "Strengthening the Population and Reproductive Health Database for Mongolia", has been also implemented by the NSO since 1997. The technical equipment, purchased under this project, has strengthened the technical capacity of the census data processing.

An important consideration for the successful conduct of the census was that it should have the very highest level of political and administrative support. Following recommendations from the various United Nations advisers who visited Mongolia, NSO presented a proposal to Parliament to establish a high level National Census Committee. This proposal was approved by Parliament Resolution N. 39 dated June 3, 1999. Under this resolution the Committee was set up under the Chairmanship of Mr. R. Amarjargal, the Prime-Minister of

Mongolia. Ms. Ch. Davaasuren, Chairman of the NSO, and Mr. B. Batmunkh, Vice-Chairman of the NSO, were appointed as Vice-Chairman and Secretary to the Committee respectively. Other Committee members included the Foreign Affairs Minister, the Defence Minister, the Infrastructure Development Minister, the Finance Minister, the Justice Minister, and the Health and Social Welfare Minister. Responsibilities for special enumeration groups such as the military, diplomatic missions abroad and their families, and prisoners would be assigned to the relevant Ministers, namely Defence, Foreign Affairs, and Justice Ministers; the Finance Minister would be in a position to authorize the allocation and timely release of funds for census-taking; the Infrastructure Development Minister would assume responsibility for the provision of transportation and communications; and the Health and Social Welfare Minister, as a main user of a census results, could advocate the need to utilize census results fully in policy making.

The National Census Committee had several meetings in which the NSO management reported on progress and sought guidance on problems that had arisen. On 3rd January 2000, the Mongolian Prime Minister held a national radio talk where he discussed preparatory work with aimag governors and directed various bodies to address specific issues to resolve outstanding problems.

In the radio talk referred to above, in addition to the governors and ministers, the city governor, the central bank deputy governor, and other important organizations and individuals participated actively. During the evening the radio talk was also given time on national television, providing very effective census publicity.

Parallel to the establishment of the National Census Committee, was the need to create a national census structure throughout the entire country.

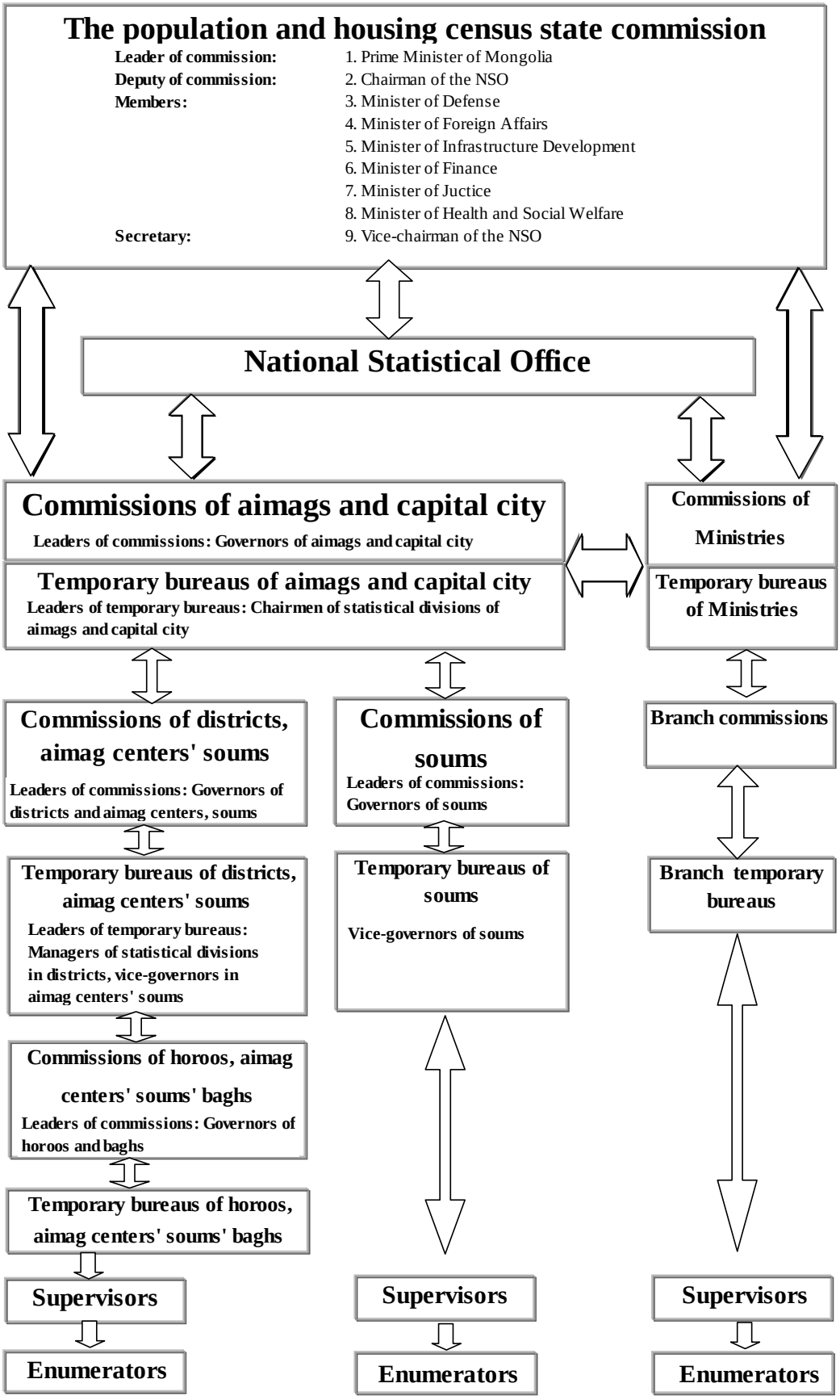
In essence it was necessary to create two parallel structures: the Census Commissions representing the political/administrative hierarchy with responsibility to the National Census Committee, and the temporary bureaus representing the operational hierarchy with responsibility to the NSO (Chart 1).

All the levels of the census commissions were responsible for overall monitoring of the quality of all census operations, and for ensuring adequate human and financial resources, including the provision of transportation, were allocated to the census.

For rural areas, in accordance with the guidelines developed by the National Census Committee and the NSO, each aimag established a Census Commission and a dedicated temporary census bureau. In collaboration with the NSO, work plans within a strict timeframe were agreed upon. In each aimag, the Governor was appointed as head of the Census Commission and the chief of the statistical division appointed as deputy.

At the operational level dedicated temporary bureaus were established for the duration of the census, headed by the statistical division chiefs. The aimag temporary bureaus were staffed with government officials, most with statistical training or experience.

Chart 1. Census organizational structure



Under the direct supervision of the census commissions and within their respective geographical locations the census temporary bureaus were responsible for census preparations, training, conduction of the pilot censuses, reporting progress, receiving and submitting the census materials and preliminary result to the NSO.

Similar structures were established in the rural soums. The soum Governors served as chairmen of the Census Commissions. As at the higher levels, the Census Commissions provided authority to the census and assured it had wide support. Temporary census bureaus were also established headed by the soum Vice-Governors. Selected soum center officers with experience in census or survey fieldwork served as bureau members. The main responsibilities of the bureaus reflected the tasks of the higher aimag level bureaus. They were assigned to carry out field duties for the census in their respective geographical locations.

A Census Commission was also established in the Capital City headed, as in the aimags, by the Governor. A Capital City temporary bureau was similarly established, headed by the chairman of the statistical division, who was also a member of the Commission. However, in contrast to the rural areas, census organizations were created at two lower administrative levels. Census Commissions and temporary bureaus were established both at the district and the lower khoroo levels.

The aimag centers, characterized as largely urban, were treated in a similar fashion to the Capital City. In addition to the soum-level organizations established for rural aimags, additional Commissions and temporary bureaus were established at the lower bagh level. The bagh Commissions were headed by the bagh Governors, while the temporary bureaus were headed by the bagh Vice-Governors. Officers with statistical field experience were recruited to the Commissions.

At the lower levels of the census hierarchy, the temporary bureaus were charged with the most crucial task of assisting in the selection and training of enumerators and supervisors and monitoring their performance. They also played a central role in census preparation, particularly through the mapping of enumeration areas and preparation of household lists.

Issues raised and lessons learned

As it stands, Government Order N.28 has some limitations which should be addressed in the next census. For example: it provides insufficient guidance relating to sources of funding for the NSO from local and centralized budgets; it fails to allocate clear responsibilities among participating agencies, for example, in spelling out the responsibilities of the Rail and Air transport service agencies in supporting census logistics.

While the Law on Statistics proved adequate for the 2000 census, it will be necessary to enact a specific population and housing census law for the next census. Such an act would clearly spell out the responsibilities of all census bodies and participating agencies. Specifically it would address some of the census issues raised in the 2000 census including:

- establishing the census as a national level activity;
- defining clear responsibilities for providing financial and human resources and setting out clear responsibilities among all participating bodies (ministries, agencies, departments and individuals);
- providing for compulsory participation of all citizens and the need to give accurate answers to all questions in the census form;
- permitting census officers to enter private premises for the purposes of carrying out responsibilities under the law;
- setting out the legal requirement for all persons involved in data collection and processing to ensure that the responses to the census provided by any individual remained confidential;
- defining the responsibilities of the NSO in areas such as access to computer records and files, storage of census records and archiving.

The issue of timing of the census will also need to be reviewed. For the 2000 census the night of 4 January 2000 was fixed as the census night (midnight being the census "moment"). While there was no difficulty applying this concept during the first few days of enumeration, towards the end of the enumeration period some enumerators had problems identifying the *de facto* residence of persons who had moved recently. For the next census it might be worth considering adopting a shifting census night concept where the enumerator always collects information relating to "last night", particularly if the enumeration period is long. Note that this change would involve selecting a night midway through the enumeration period as the notional census date.

A related issue was the timing of enumeration. Traditionally, early January is selected in Mongolia as a period of minimum population mobility particularly for herdsmen, and was thus again selected in 2000. But the period brings with it some problems. The weather in January is harsh with temperatures reaching -40 to –50°C. Cold and snow can be hazardous and increase transportation costs. During the 2000 census fieldwork, "dzud" occurred in a number of areas. In some aimags, Bayankhongor and Dundgovi for example, roads were destroyed by heavy snow and as a result some households were unreachable. In addition, many herdsmen moved to other aimags not affected by the "dzud", further complicating the census.

January enumeration also requires special care in budgeting, as coming so early in the year the full census field budget may not be approved on time by the Ministry of Finance or by local authorities.

Based on the above experiences and problems, a change in timing is worth consideration. If there is to be change the strongest arguments are for a November census, although other periods are possible. The weather is less cold than January but already most nomadic herdsmen have arrived and settled in their winter places of residence. Another important factor in favour of early November is that, in contrast to certain other periods, this period is suitable for the the full census budgeting, and there is little student movement to compound questions on usual residence.

Chapter 3: CENSUS CONCEPTS, DEFINITIONS, AND DESIGN OF THE POPULATION QUESTIONNAIRE

The design of the population and housing questionnaire is fundamental to the census. Together with the concepts and definitions employed it determines both census coverage, who will be included in the census, and census scope, what users will get from the census. Thus it is not surprising that the development of the census concepts, definitions and topics, issues that underlie the questionnaire, demanded a great deal of attention. This is true of all censuses but was particularly true for the 2000 census, in which many new approaches to the collection of data were introduced.

The task confronting the NSO was to balance the wide-ranging needs of users against technical and financial constraints that limited what was feasible. It may seem easy enough to add additional questions to the census. But the cost of producing additional census forms, the requirement to test the efficacy of the questions to ensure they provided useful results, the need to give additional training to enumerators, the concern about the attitudes of respondents to overly-lengthy interviews, and the cost of the additional data processing, are just some of the considerations that must be taken into account.

This chapter is concerned largely with the development of the concepts, topics and questions asked in the population census. A housing census was also conducted in which questions were posed that covered conventional and traditional housing (gers) and household characteristics. While most of the questions asked about conventional housing followed international recommendations, the questions about gers clearly reflected the uniqueness of the Mongolian culture.

Coverage and usual residence

A population census is usually designed to measure the population, adopting one of two approaches. The first attempts to measure all persons usually resident in the country, often referred to as the *de jure* approach. The second attempts to measure the population in the country at the time of the census, regardless of usual residence, often referred to as the *de facto* approach. A few countries, including Mongolia, attempted to measure both the *de jure* and *de facto* populations in a single census. To do this properly it was, in theory, necessary to identify in each household, persons usually resident present at the time of the census, persons usually resident away at the time of the census and persons visiting at the time of the census. The first two of these categories would combine to give the *de jure* population. The first and third categories would combine to give the *de facto* population. In practice a number of problems were experienced, resulting in modifications to coverage.

No doubt, the use of both concepts have advantages in the choices they offer in the way results can be presented. But whatever approach is used care is required in estimating the population. Note, for example, that if all three

categories were combined to provide a population estimate there would be double-counting for persons normally resident in the country who, while still in Mongolia, were not staying in their usual residence at the time of the census. It would also include in the census, both persons temporary absent overseas and temporary visitors to Mongolia, extending the coverage beyond that recommended by the United Nations.

Related to these broad concepts is the definition of a usual resident, which determined exactly who was included in the census and which of the residential status categories referred to above each individual was classified to. The definition of usual residence also had some bearing on the way in which migration was measured from the census, and the associated concept of urbanization. The basic definition of a usual resident adopted for the 2000 census was that a person had spent six months or more in the census household. But a person who moved into the household of current residence during the past six months and intended to remain there for six months or more was also considered a usual resident. Conversely, a person who had been away from a household for less than six months but intended to be away for at least six months was not considered to be a usual resident and thus should not have been included in that household for the census. Had these concepts been properly applied, the rules of coverage should have been clear and sound estimates for both *de facto* and *de jure* populations could have been obtained.

In practice a number of problems were experienced in following these broad concepts resulting in the need for modifications to the definitions of *de facto* and *de jure* populations. Essentially these modifications involved the exclusion of short-term visitors from the census, the inclusion of some Mongolians who were resident overseas and the reclassification of some visitors as usual residents that were considered as mis-classified. These and other issues are discussed in more detail in the chapter on census evaluation.

Another important concept for the measurement of coverage related to the timing of the census. While the enumeration covered the seven-day period from 5-11 January 2000, it is important for the interpretation of the data that the census results relate to a more precise point in time. Thus all enumerators were instructed to ask about persons usually resident or visiting the household on the night of 4th January regardless of the actual day or time of interview. The night of 4th January was thus designated as census night. Generally, this concept of a fixed census night did not cause problems for respondents or enumerators. However, in the few cases where location on census night did introduce difficulty, where, for example, the respondent traveled during census night, the more precise time reference of midnight on census night was introduced. This was designated as the census moment. In interpreting the census, the results relate conceptually to the population at the census moment.

Scope of the census

As already discussed, the 2000 census differed from the 1989 in some very fundamental ways. This was the first census during the transition to a market economy and new types of economic and social data were required by users. The changes required were consistent with the principles and recommendations for a population and housing census approved by the UN Statistical Commission and as a result they served as useful guidelines in the development of the Mongolian questionnaire.

An elaborate process of discussions and field testing was essential before it was possible to adopt a questionnaire. The sometimes conflicting needs to retain comparability with the past and to introduce improved questions and design compounded this process. In the early discussions on the scope of the population census it was agreed that in keeping with the international principles and the recommendations of UN advisers, the following topics would be included:

1 Social and demographic characteristics
- Name
- Relation to household head
- Date of birth
- Age
- Sex
- Marital status
- Citizenship
- Ethnicity

2 Geographical and migration characteristics
- Residential status
- Duration of residence
- Place of birth
- Place of residence five years ago

3 Educational characteristics
- Educational level
- Literacy
- School attendance

4 Economic characteristics
- Activity status
- Occupation
- Industry
- Employment status
- Unemployment

Even after reaching agreement on the topics, however, much needed to be done to frame the questions and design a questionnaire. In fact, the format of the questionnaire was uppermost in the mind of census planners, since it was agreed that if the population questions could be confined to a single A3 page, considerable savings in cost would be achieved. The first drafts of the housing and population questions were informally tested in October-December 1998

during the Reproductive Health Survey (RHS) among 1500 households. This test demonstrated that the questions were essentially sound but also pointed to a number of problems that would need to be investigated. It was also felt that some of the questions, especially relating to economic activity would need revision to meet the needs of users in a more market-oriented economy.

The first formal census pretest was conducted in January 1999 in 2nd and 9th baghs, of Kherlen soum (aimag center soum), and in Sergelen soum, both in Dornod aimag.

A number of questions were tested during the Dornod pretest, although not all were retained for the census. Questions on religion, age at first marriage, deaths in the previous year and several questions on fertility were included in the pretest draft but were not retained. The prime consideration was the limits set by the format and practical scope of the census, but the fact that some of the possible questions had been covered in more detail, and probably more accurately, in the 1998 RHS (though without the geographical coverage of the census) provided a good argument for not including them in the census.

Based on this pretest, the general format for the census began to take shape. The content of the population questionnaire was reduced to the 19 questions listed above, thus making it possible to combine the population and housing questions onto a single form. Adding the household and cover page details and provision for up to six respondents meant that the standard household census forms could be printed on a single A3 page.

The second pretest, sometimes referred to by the NSO as the pilot census, conducted in May 1999 in the Chingeltei district of Ulaanbaatar, provided an opportunity to refine the 19 questions selected for inclusion in the census. A number of changes were made as a result of the problems identified and the subsequent pretest review. Some of the changes were minor, intended only to facilitate the correct recording of responses. For example, date and place of birth were asked in a single question in the draft form but were separated following the pretest when it was found that in a number of cases birthplace details were not recorded. The minimum age at marriage was reduced from 18 years to 15 years to conform to standard international practice, recognizing that care would be needed in asking the marital status question to young persons. Questions on education and literacy were separated to ensure all persons aged seven and above who were below primary school education level were asked both questions.

Questions on migration were also modified. In keeping with the revised concepts on coverage, the instructions for classifying persons as resident, temporarily absent or visitor were clarified and revised. The order of questions on current residence, duration of residence and place of previous residence were streamlined to assist in asking the questions and recording responses in a more rational way. Finally the question seeking residence at a fixed date in the past was changed from one to five years ago. One result of the longer period would be to increase the number of identified migrants for analysis.

Most important of all were the changes made to the questions on economic activity. A large and crucial debate took place within the NSO on the measures

required from the census. While some persons wished to measure the concept of usual activity, based on employment history during the past year, the majority felt that current activity, although it introduced some problems with seasonal work, was more appropriate for a census. Indeed, the first revision following the pretest included questions that attempted to use both approaches in the measurement of employment but this was later abandoned.

Clearly the pretest itself showed up a number of problem areas. The maximum ages set for economic activity at 59 for males and 54 for females, though based on the ages at retirement at that time, were inappropriate, not least since they excluded the possibility of analysis of the aged, and were thus revised to cater to all persons aged 15 and above. The reference period for activity status was unclear. The question asking whether a person had worked at least a week in the past 12 months seemed to mix the concepts of current and usual activity. In the pilot census this question clearly resulted in an over-estimation of employment and a corresponding under-estimation of unemployment. This could be shown from the large number of computer edits that found respondents who answered *yes* to this question but also gave a reason for not working. Presumably many of these were not working at the time of the census or in the recent past. Accordingly, the reference period was changed to *last week*.

Special concern was given to the treatment of workers of gold mining, since a mid-winter enumeration would mean that in many cases they were not actively working at their jobs. The UN Principles and Recommendations provided a useful guide on their treatment. Among other groups, the definition of employment included all persons:

> *"with a job but not at work: persons who, having already worked in their present job, were temporarily not at work during the reference period and had a formal attachment to their job, as evidenced by, for example, … an assurance of return to work".*

Another important topic was unemployment and its treatment in the census was the subject of intensive discussion and argument. While some felt that the number of persons who were registered as unemployed would suffice to measure the unemployment rate others felt that the census definition should be more precise. This argument was strengthened by evidence from the pilot census that found persons without work and looking for a job and yet, for a number of reasons, not on the register. In the event, for a person to be unemployed in the census, three conditions had to be met: the person did not work in the past week, was not temporarily absent from a job, and was currently looking for a job. In addition a response category *no work available* was added to the question on reason for not working to cater for persons who were, for various reasons, not actively seeking work but presumably would be prepared to work if they felt a job was available. These are often described as discouraged workers and will be included in an extended definition of the unemployed. A summary of these definitions is provided in Table 2 above.

Table 2. Concepts and definitions used for the census

Concept	Definition	Age range
Census of usual residents of Mongolia	Population usually resident in Mongolia at the time of the census (including some persons remaining overseas for more than six months)	All ages
Census night	The night selected as the reference for the census, the night of 4th January 2000	-
Census moment	The point in time selected as the reference for the census, 12 o'clock midnight on the night of 4th January 2000	-
Usual resident	A person who has spent six months or more at the current place of residence or intends to reside there for a period of six months or more	All ages
Temporary absent person	A usual resident who is currently away from place of usual residence and has been away and intends to be away for a period of less than six months	All ages
Visitor	Person who is visiting a household for a period of less than six months	All ages
Household	A single person or two or more persons who make common provision for food and other essentials, such as pooling of income. Household members may be related or unrelated.	All ages
Institutional population	Persons included in the census who are not members of a household in Mongolia, including members of the police and armed forces not living at home, persons living in prisons, hospitals, educational institutions and so on.	All ages
Head of household	A person who is acknowledged as head by the other members	16 years and above
Age	Interval of time between date of birth and the date of the census expressed in completed years	All ages
Citizenship	Legal nationality of each person at the time of the census	All ages
Ethnicity	Ethnic group to which person claims to belong	All ages
Place of birth	Country of birth if born overseas or aimag or Capital City if born in Mongolia	All ages
Duration of residence	Number of completed years person has lived continuously in the aimag or Capital City of usual residence	All ages
Place of previous residence	Country or, if within Mongolia, aimag or Capital City in which person usually resided immediately prior to migrating to present place of usual residence	All ages
Place of usual residence on 1st January 1995	Country or, if within Mongolia, aimag or Capital City in which person usually resided on 1st January 1995	5 years and above
Marital status	Personal status of all persons at the time of the census in relation to Mongolian marriage laws and culture	15 years and above
School attainment	Highest grade attained or equivalent within the Mongolian educational system	7 years and above
Currently studying	Studying towards certificate or academic qualification at recognized school or academic institution	7-29 years
Literacy	Ability to read and write a short simple statement in Mongolian or any other language with understanding	7 years and above
Employed population	Persons who worked at least one day during the past seven days	15 years and above

Concept	Definition	Age range
Unemployed population	Persons who did not work during the past seven days, were looking for work or no work was available at the time of the census	15 years and above
Discouraged workers	Persons who did not work during the past seven days, were not temporarily absent from a job, were not actively looking for work at the time of the census because they felt that no work was available	15 years and above
Economically active population	Persons who were either employed or unemployed at the time of the census	15 years and above
Persons not economically active	Persons other than those economically active	15 years and above

As a consequence of these developments and innovations, the 2000 census differed in many important respects from that of 1989 and earlier censuses. Table 3 highlights some of the more important differences.

Among the key changes was the addition of migration as an important topic for investigation. The revised approach towards the measurement of economic activity also means that considerable care will need to be exercised in interpreting the employment figures from the two censuses.

Table 3. Variations in topics and questions on individual form, 1989 and 2000

Topic	Questions	1989	2000	Comments
Migration	1. Birth place	Not asked	Asked	Measures lifetime migration
	2. Duration of residence, present and last place of residence	Not asked	Asked (How long have you been living at usual residence?) (year moved in)	Measures duration of residence for migrants and the direction of migrant flows.
	3. Place of usual residence five years ago	Not asked	Asked	Measures net migration during past 5 years and direction of migrant flows.
Literacy and education	1. Educational level and literacy	Education and literacy level were asked by one question	Education level and Literacy by separate questions	In 1989 education and literacy were linked; the response categories for below secondary education being primary, literate and not literate. In 2000 separate questions were asked for education and literacy, seeking from those who achieved less than primary education whether or not they were literate.
	2.Current school attendance	Asked	Asked	In 1989, did not ask direct question whether you attend school or not but question of work place and attended school was linked.
	3. Qualifications	Asked	Not asked	Needless

Topic	Questions	1989	2000	Comments
Economic activity	1. Work status in past week	Not asked	Did ask (Have you worked during the last week?)	In 2000 this question was asked to establish whether respondent was currently employed (additional probes were made to check on whether temporarily absent from a job). In 2000, economic activity questions were asked to all persons aged 15 and above; in 1989 these were restricted to 16-59 (males) and 16-54 (females).
	2. Occupation	Asked	Asked	Similar question asked but changes made in 2000 classification.
	3.Social origin/class	Asked	Not asked	This concept was outdated.
	4. Main source of income	Asked	Not asked	Needless
	5. Industry	Asked place of work	Asked sector of work	Different questions, in 1989 place of work and in 2000 sector of work, were asked. The changes were made in classification.
	6. Employment status	Not asked	Asked	
	7. Reason for not working	Asked (sample only)	Asked	Refinements made in response categories for 2000 to improve measure of unemployment
	8. Duration of unemployment	Asked (sample only)	Not asked	No survey conducted in 2000
	9. Have an interest to work	Asked (sample only)		No survey conducted in 2000
	10. According to you, what is the important condition to work?	Asked (sample only)		No survey conducted in 2000
	11. Whether you can work in different aimags and cities?	Asked (sample only)		No survey conducted in 2000
Fertility	Children ever born and still alive	Asked (sample only)	Not asked	2000 census did not attempt to measure fertility as NSO had conducted a Reproductive Health Survey in 1998.

Less severe are the changes in capturing education and marital status data; in these cases it should be possible to construct quite detailed comparable tables.

It is also worth noting the questions that were asked in 1989 but not in 2000. These include qualifications, sources of income and fertility. There were also a number of additional questions asked in the sample in 1989 on unemployment that were excluded from the 2000 census.

Printing of the questionnaire and census manual

Following the first census pretest and the modifications that resulted from the review, a revised draft questionnaire was produced. This draft was considered and approved by the Chairman's Council in July 1999.

To accompany the questionnaire the NSO produced a census manual setting out guidelines and instructions for completing the questionnaires. The aim of the manual was to provide added support to the temporary census bureaus as census managers and trainers. However, the final revision of the questionnaire was not approved until October 1999, following the conduct and review of the pilot census.

A decision to print the questionnaires utilizing in-house printing facilities contributed to large savings to the census budget. Entry of questions into PC was more suitable and easy. As well as in Mongolian, the questionnaires were prepared in English, Russian and Chinese, for completion by or on behalf of foreign nationals falling within the rules of coverage.

Issues raised and lessons learned

The design of the questionnaire is important and efforts should be made to see that a final version is ready early. Two important issues emerge that will need to be considered for the next census. The first relates to comparability between censuses. For 2000 the NSO felt it had a convincing argument for making the changes it did, but recognized in the process that this involved loss of comparability. It is hoped, therefore, that for the next census, it will be less necessary to change the concepts and definitions employed in 2000 and thus greater comparability will be maintained.

Second, the large number of changes made following the pilot census were considered necessary but created confusion and heated debate. All major changes should be made prior to the pilot census; indeed, the final version of the questionnaire should be available at least six months before enumeration. Thus the pilot census would be distinguishable from the routine pretests. As a true pilot census, it should be designed as a final integrated run of all census procedures and logistics after each operation has been separately designed, tested and approved. The pilot census provides the last opportunity to adjust or fine-tune any part of the census operational plan, but is not itself a pretest of any component activity.

The census dwelling, building, household and personal identification data on the front of the questionnaire needs further revision. As in 2000, the geographic code structure should be hierarchical (and consistent with census mapping) to identify the Capital City and each aimag, soum or district, village, bagh or khoroo, enumeration area (EA) and household. In addition to information on the household, consideration should also be given to recording the census dwelling or building number (regardless of whether it was occupied), possibly through use of the map reference number. This would have two benefits; it would improve the usefulness of the database for follow-up sample selection of households and it would provide estimates of unoccupied dwellings and

housing stock. Baghs and khoroos should also be coded to ensure that the complete census geography is captured.

Some improvement to the questionnaire will be required although many of the difficulties experienced in 2000 resulted from insufficient and short training. The question on education will need refinement to distinguish between persons attending school but attaining less than primary and persons who have never attended school. The assumption underlying the skip in asking the literacy question, that all persons with completed primary education are literate, will also need further evaluation. Industry and occupation were very difficult for many respondents to report accurately, but it is likely that much of the problem related to the short time allotted to the training of enumerators and supervisors and the first use of international standard classification in this census.

It will also be necessary to reconsider the conceptual basis for the census. In 1989 and 2000 both *de facto* and *de jure* concepts were used. A choice between these two approaches would simplify census coverage, reduce cost, collection and processing time, and reduce census errors. The choice may not be easy as some comparability with earlier censuses will be lost and, for some important uses at least, data would no longer be available. Nevertheless a single approach to enumeration is recommended.

While no doubt the census costs were significantly reduced using the single A3 page for population questions, there were some concerns expressed on the problems this caused for the layout. Ideally more space was needed for recording the geographic information on usual residence and migration and for the occupation and industry questions. The issues of scope and layout will again need wide discussion, sometimes involving users and it may be worthwhile considering to use, as in 1989, a more detailed sample form.

Chapter 4: TRAINING

The population census was a huge statistical operation involving many organizations and people from different backgrounds and with differing skills. The success of the census depended on each person involved performing assigned tasks to a high technical standard. But there were two major reasons why the skills and experience required for a census were not readily available and why therefore training played such a vital part in census preparations.

The first reason was that the NSO could not conduct a population census entirely from its own resources, human or financial. Bearing in mind the aim of the census was to interview every man, woman and child in the country within a few days the human capital required to perform that task was huge. The NSO could provide some of the special technical skills, but that would have been grossly inadequate to carry out the major logistical and management operations throughout the country. Thus the census required a large number of educated people from various walks in life to be trained to undertake specific census tasks in preparation for the census, in conducting census fieldwork and in processing census data.

The second reason concerned the NSO and the statistical field organization. The last census was conducted as far back as 1989 and thus few staff in the NSO, or in the Capital City or aimag statistical offices had any real population census experience. Add to this the need for radical change in the way the census was conducted and it was clear that even those who had had previous census experience needed to acquire new skills to equip themselves for a modern census.

Given the importance attached to the census training programme and the large number of people who would require training, it was desirable at the outset to develop a census training strategy. Unfortunately, the uncertainty of funding and the lateness in the promulgation of the census meant that development and implementation of the training programmes did not move as quickly as the NSO would have liked.

Training of NSO staff

The first task confronting the NSO was to develop a cadre of highly skilled statisticians able to design the census, prepare the census plan and commence preliminary census work. Of course there were skilled staff available for census work. Some of the senior staff had been involved in the 1989 and earlier censuses. Most of the core staff had worked on the 1998 RHS, during which they had gained a wealth of experience and enjoyed some training opportunities. But the need to train a largely new cadre of professionals in modern census-taking remained. It was important that this high-level training commenced early. In 1995, in readiness for the census, NSO staff participated in a seminar on census organization in Berlin, Germany. Mongolian staff continued to take advantage of international training opportunities in preparation for the forthcoming census. For example, NSO participated in

workshops in Bishkek, Kyrgyzistan, the first in 1997 on census project design and then in 1999 on census management. In addition a number of NSO staff attended international training sessions on data processing conducted in Almaty, Kazakhstan. In 1999, one staff member attended more intensive training on IMPS, the software selected for the census, with the Bureau of the Census in Washington. In July 2000, six members of the NSO staff visited the Australian Bureau of Statistics to observe and discuss issues relating to census evaluation and data dissemination. Most of these training opportunities were sponsored by UNFPA, UNSD and the Government of Australia.

Yet by far the most important was the on-the-job training organized in Mongolia. During 1999, in particular, the NSO took full advantage of the visits of advisers largely from within the UN system to provide practical training to members of the newly formed PCSB. As examples, Mr. Carlo Ellis from UNSD and Mr. Nuri Ozsever from the UNFPA Country Support Team (CST) in Bangkok provided training in data processing during their visits. This training was consolidated through further assistance from Mr. Marian Zalcman, the UNFPA-funded UN Volunteer in data processing attached to the NSO. On the subject matter side, the NSO took advantage of missions from Mr. William Seltzer, Mr. Sam Suharto and Mr. Iqbal Alam from UNSD to ensure that the PCSB staff was fully involved in the development of the census. Many of these visits were funded by UNFPA. Mr. John Paice and Mr. Paul Williams from the Australian Bureau of Statistics visited Mongolia to assist the NSO and provided in-house training in census evaluation and data dissemination.

Additional and more intensive training was provided by longer-term advisers. Most important, a full-time UNFPA/UNSD Survey adviser, Mr. Albert Marckwardt, who had worked on the RHS, was available to provide assistance from time to time on the census. More formal in-house workshops and training sessions were held regularly to review progress, to introduce and discuss the more complex census concepts and to prepare PCSB staff as master trainers. In particular, a two-day training workshop was held late in September 1999 with Mr. Laurence Lewis, the UNFPA/UNSD adviser to the census, to discuss training methods and presentations and to simulate enumerator training. Following this workshop it was possible to produce an enumerators training manual containing easy-to-follow graphics and user-friendly language.

The various pretests provided an excellent opportunity to expose national staff to realistic census situations, quite apart from their value in maintaining census quality. Two major field tests were conducted, in Dornod and Ulaanbaatar. All PCSB staff members participated in these pretests and were involved in the review sessions leading to recommendations for improving the census.

Training of Aimag and Capital City Governors

The aimag Governors were appointed to chair the aimag Census Commissions and were to have a major responsibility in organizing and financing census activities in the aimags. To prepare them for these crucial roles, the NSO organized an intensive three-day working session in Ulaanbaatar during October 1999. While the focus was on their roles as chairpersons, managers and facilitators, the working sessions covered important background information

on the need for a census, uses of census results, preparatory activities, and organizational and financial issues.

Training of trainers

The major thrust of the training programme after October 1999 was to develop trainers and materials for the crucial phase of training fieldworkers, census mappers, listers, enumerators and supervisors. Already there was a core of PCSB staff, who had prepared the training materials, conducted the pretests and participated in mock enumerator training sessions in the NSO, and thus were well able to conduct training courses at all levels. But the number of core trainers was clearly insufficient to train a total of 24,000 people, including the 18,000 or so fieldworkers required for the census.

Table 4. Type of training and number of participants

Type of training	Participants		Date and Place	Days	Instructor(s)
	Type	No.			
1. Training of core trainers	Staff of PCSB of NSO	15	September, 1999, NSO	3 days	Census mission at NSO
2. Training of governors of aimags and Capital City	Governors of aimags and Capital City	23	October, 1999, Government house	4 day	Staff of PCSB, NSO
3. First stage training of trainers	Heads of statistical division of aimags, capital city and districts, and staff from other divisions of NSO	70	October, 1999, NSO	3 days	Core trainers, staff of PCSB, NSO
4. Training of staff of census commissions and temporary bureaus	Staff of census commissions and temporary bureaus of aimags and deputy governors of soums (head of temporary bureaus of soums)	615	October, 1999, In aimag centers	1 -2 days	Heads of statistical divisions
5. Second stage training of trainers	Heads of statistical divisions of aimags, Capital City and districts, and staff from other divisions of NSO	70	November, 1999, NSO	3 days	Core trainers,
6. Refresher training	Staff of census commissions and temporary bureaus of 22 aimags	315	November 1999 at aimag centers	1 day	Temporary bureau trainers
7.Mappers and listers training	Staff at the khoroos and soums	2,000	December 1999 Khoroo and soum centers	1 day	Temporary bureau trainers
8. First stage field training	Enumerators and supervisors	13,000	November, 1999	1-3 days	Core and bureau trainers
9. Second stage field training	Enumerators and supervisors	3,000	December, 1999	1-2 days	Core and bureau trainers

Before the training programme could be launched it was necessary to prepare the training materials and documentation. Among the important tasks during early October, 1999 were the completion of the census manual and the enumerators training manual. Once these documents were completed it became possible to extend the pool of trainers required for the main fieldworkers' training phase. Development of the manuals was also crucial in

bringing about final agreement within the NSO on the field strategies, the concepts and definitions to be employed, questions and probes to be asked and the duration and approach to training.

Using the training materials, the core PCSB trainers were able to start the next main training phase, training sufficient staff to conduct the fieldworker training. This so-called training of trainers was directed largely towards the heads of the statistical divisions of aimags and the Capital City and was conducted in two stages. The first stage training was held in at the NSO from 12-14 October 1999. It covered the broader aspects of census management, organization and census preparations although the opportunity was taken to introduce the more complex census concepts and definitions and discuss the structure of the questionnaires. On return to their aimags trainees provided training to members of the Census Commissions and temporary bureaus on relevant census management and organizational matters and brief staff of the temporary bureaus. In addition to the heads of statistical divisions of the aimags and Capital City selected staff from other divisions and departments of NSO, most with previous experience in conducting censuses and surveys, also attended.

A second training course was conducted for three days from 17-19 November 1999. Again, selected trainers from other divisions and departments of NSO attended together with the heads of aimag statistical divisions. The purpose of this course was to prepare the heads of statistical divisions to train their own temporary bureau staff as trainers to create a pool of fieldworker trainers throughout the country. Thus the training provided detailed instructions on census concepts and definitions, on techniques for asking census questions and completing the questionnaires. Other issues such as the organization of the census in the field and quality control were also discussed in detail. The course also provided a useful opportunity to review the overall census programme, the status of preparations in each aimag and the Capital City, and to provide suggestions and recommendations for overcoming difficulties.

Special arrangements were required for training of enumerators for embassies, for the armed forces and for prisoners. Training was provided for at the Ministry of Foreign Affairs in December 1999. These trainers in turn conducted training courses in Germany, France and England. Mongolian embassy staff stationed in other countries were also asked to attend one of these training courses. On his return from an overseas conference the vice-chairman of the NSO stopped in Moscow to conduct a two-day training course for participants from the Russian Federation and several East European countries. The Ministry of Defence was responsible for the enumeration of the armed forces. A one-day course was conducted by NSO in the second week of December 1999. Similarly, a special course was conducted by the NSO for officers of the Ministry of Justice for the enumeration of prisoners.

Training of fieldworkers

The quality of the entire census depended heavily on the success of the enumerators in achieving full coverage and in obtaining accurate interviews. One of the difficulties, however, was that even though the success of the census depended on their work, most enumerators did not have any previous

experience on census. The challenge to the census-takers was to provide the best training possible in circumstances where both time and finance were short.

The census strategy was to train other temporary staff to give support to the enumerators. Good coverage during the enumeration, for example, depended on prior knowledge of the population, so not everything was left to the discretion of enumerators. When an assignment, designated as an enumeration area (EA), was handed to an enumerator, some important details about the population to be covered was also provided. First, the number and location on each house was provided on a map. The enumeration maps also showed the boundaries of the EA and marked key geographic features required by the enumerator to locate each house or census dwelling. Second, for each dwelling in the EA, a list of households and names of all persons living in the household was provided. These maps and household lists were prepared by the mappers and listers.

Equally important in ensuring that the enumerators performed well was the appointment of supervisors. Each supervisor was expected on average to supervise 4-5 enumerators. This involved accompanying the enumerators during their work to ensure that all households and persons were covered, resolving difficult technical or practical problems confronting the enumerators, checking completed work and re-interviewing selected households as part of overall quality control.

Thus the selection and training of all these categories of fieldworkers was crucial for the census. In all, about 13,000 enumerators (responsible for household listing and enumeration), 3,000 supervisors and about 2,000 mappers and listers were required. In addition, large numbers of checkers, coders and data entry operators were needed to process the census data.

Training of mappers and listers

The vast training programme commenced in December 1999. The most suitable staff from the khoroo and soum level temporary bureaus were selected as census mappers. The mappers as far as possible worked in their own areas ensuring they were available to assist the enumerators and supervisors in interpreting the maps during fieldwork. It became clear during the mappers training that not all staff were skilled at understanding mapping concepts or were able to draw clear maps. By implication similar differences would be found among the enumerators and there would be a need to provide some assistance during the enumeration period. As a rule, it was possible to employ local people on the household listing operation who thus had a close knowledge of the identity of all residents in the EA. In rural areas, to reduce costs, this listing was sometimes done at the same time as the livestock census.

Selection and training of enumerators and supervisors

The selection and training of enumerators and supervisors was far more structured. In keeping with their duties and based on detailed discussions of the pretest experiences, a number of selection criteria were established by the NSO. These included the requirement that trainees have good writing and communication skills, that they demonstrate a patience and sympathy required

in an interview situation and that they be diligent and prepared to work difficult and long hours. In the rural areas the Governors of baghs recommended the list of prospective trainees to the head of the soum temporary bureaus. In the urban areas the Governor of khoroos and the head of the temporary bureaus were able to make their own selections. Supervisors and enumerators were drawn from many walks of life. Many were schoolteachers, but others were professional women and pensioners.

The main training for enumerators and supervisors in rural areas was conducted in the soums. But the training programme began long before this. To produce the number and quality of trainers it was necessary to conduct training as a relay in a number of stages, only the last of which actually involved the enumerators and supervisors themselves. The first stage, as indicated in the earlier discussion, took place in Ulaanbaatar with the assistance of the UNFPA/UNSD adviser to the NSO in September 1999. This involved the first training of trainers for PCSB within the NSO and permitted the final touches to be put to the master training plan and strategies, training materials, progress and graduation tests and basic documentation.

The main reason, however, for the visit of the NSO staff to the aimags was to conduct the third and main level training, the training of the enumerators and supervisors. From 20 November 1999 this training began in earnest. To manage the scarce NSO resources, NSO staff were allocated to the aimags according to the perceived needs. For the highly populated and developed aimags, two officers from NSO were sent to assist with the training. But in the more sparsely populated aimags, such as in the Gobi, it was only possible for the NSO to send one person.

Of course, however desirable, it was not possible to use NSO trainers for all enumerator/supervisor training courses. To make the best possible use of their special skills in the rural areas (including the aimag centers), the soums that were for various reasons expected to be most difficult to enumerate were selected for training by the NSO staff. This concentration on difficult areas reduced the risk that enumeration would be badly affected as a result of poorly trained aimag-level trainers. For the remaining areas, members of aimags temporary bureaus and, where they were able, members of the Census Commissions, traveled to the soums to conduct the training. Not all soum-level training could be conducted simultaneously. Given the shortage of able trainers, each trainer was expected to cover 3-5 soums. During the harsh winters traveling long distances to cover this terrain was, in many cases, daunting.

Though in principle the same training strategy was followed in the Capital City, the proximity of the NSO to the urban khoroos meant that more use could be made of core staff. Urban training for enumerators and supervisors was conducted during the period commencing 20 December 1999. Most of the training in urban khoroos, and certainly in those believed to be specially difficult to enumerate, was conducted by NSO staff. The remainder of the urban training was conducted by staff of the district temporary bureaus, but even in these cases it was often possible to arrange a visit by an NSO officer.

Additionally, during the early days of enumeration, it was relatively easy to organize a visit by an NSO trainer to khoroos that were reported to be facing difficulties, usually resulting from short training. NSO officers were also able to make spot checks on khoroos to identify serious problems and more generally to give advice and discuss the more important issues that had arisen during the fieldwork.

The shortage of trainers was felt at all stages. One result was that the time allotted to training of enumerator/supervisors was a single day in some places, particularly in rural areas, clearly far too short a period. In some areas trained enumerators showed a great deal of initiative and followed up the training by conducting practice interviews.

Training of temporary data processing staff

Apart from fieldwork, a large number of temporary staff were recruited and trained to work on different aspects of data preparation and processing, including, receipt and recording of forms, coding and data entry. Training for these staff will be covered under the data processing section of this Report.

Issues raised and lessons learned

The main concern was that the working session for Governors who were already selected as chairman of Census Commissions was very late and depended on the goodwill of the Governors to organize funding and to start working in earnest towards the census. In the event, the working session was characterized by their enthusiasm and the willingness of participants to work long hours. They also utilized their time in Ulaanbaatar to consult the Ministry of Finance on financial support to the aimags for the census. But it is recommended that for the next census the appointment, briefing and working sessions for the aimag Census Commission chairmen are conducted much further in advance.

Trainers of trainers were not properly evaluated. Better evaluation would have assisted in identifying potentially weak aimags where more support from NSO could have been provided during the enumeration phase. For the next census, greater effort should be made to develop evaluation strategies for trainers, the training programme, the training materials and training methodologies. It is also important the participants themselves be given the opportunity to evaluate their training; to this end earlier preparation of the training programme and proper pretesting would have been useful.

The number of trainers was a critical factor in determining the duration and therefore the adequacy of fieldworker training. For the aimags and Capital City, largely due to the shortage of funds, there were far fewer trainers than needed. As a consequence, the training courses for fieldworkers were too short and the trainers that were available were over-extended to cover the entire country. The small numbers of trainers at the aimag level also meant that the NSO core staff were used almost exclusively as trainers and were unable to operate as more mobile support staff or give greater attention to quality control.

One solution that needs to be considered for the next census is to add one more level of training for trainers. For the 2000 census, trainers were selected at the

State and aimag levels, leaving untapped the potential pool of trainers at the khoroo and soum levels. Apart from the potential numbers of trainers from these sources, it can be argued that the khoroo and soum officers would be more in touch with the enumerators and supervisors and have more intimate knowledge of the enumeration areas.

The instruction for census mappers and listers in the training manual needs to be improved in the next census. Mapping in particular is a skilled task and requires persons with special aptitudes and training. The absence of a strong census structure at the rural bagh level also created problems in finding suitable mappers and listers. It is recommended for the next census that more detailed mapping and listing instructions be developed, that greater efforts be made in the recruitment of these important fieldworkers and that mapping and listing training be integrated more specifically into the master census training plan.

For the 2000 census, insufficient attention was given to training in mapping and listing. As a result, many dwellings were identified by enumerators that had not been included on the EA maps. Invariably the number of persons enumerated during the census exceeded the number included on the household lists.

The most marked problems confronting the training programme were the shortage of skilled trainers and the consequent effects on the duration and quality of field worker training. There were too few trainers in the aimag statistical divisions to cover all soums leading to the need for the few trainers to cover too many training courses and spending a great deal of time on travel. Fortunately for the 2000 census, it does appear that every effort was made to deal with these limitations and the post census evaluation suggests that the ill effects have been minimized. But the situation was still far from ideal and improvements will be essential for the next census.

Funding is clearly an important contributing factor and greater efforts will be required to stress the priority of the fieldwork and seek adequate funds. Other factors are also important, although these are to some extent linked to the problems of funding. But regardless of actual funding, the training master plan needs to be developed early and the testing and implementation of the higher level training should begin six months before enumeration. To provide the additional trainers required, an extra tier of training, at the rural bagh level, needs to be introduced. This also would help in the recruitment of trainers familiar with the rural EAs. In the urban areas and the aimag centers, it may be necessary to increase the size of the temporary bureaus to ensure that there are sufficient quality trainers. Ideally training courses should be conducted jointly by NSO and Capital City district staff, but this was seldom possible in the 2000 census.

In late December 1999 NSO staff felt it necessary to conduct retraining in some aimags including Dornogobi, Dornod, Dundgobi, Zavkhan, Uvurkhangai, Selenge, Tuv, Khuvsgul, Khentii, and Darkhan-Uul. It is recommended that in future, as a minimum, enumerator training courses should be for three days. An additional day should added for supervisor training. Recruitment also began very late in some areas adding to the delay in training and difficulties in organizing the schedules of trainers.

There has been considerable discussion on the criteria for selecting and assessing field workers. During post-census evaluation, it was felt that in many areas there existed a ready supply of potentially suitable candidates for supervisors and enumerators that were not tapped, for example, educated people outside the workforce or retired. This led to a heavy reliance on schoolteachers. There were certainly some views expressed that these candidates would have performed at least as well as the schoolteachers, without the problems of organizing training and enumeration to fit school teaching schedules. The recruitment of additional trainees would permit the introduction of improved evaluation at the end of training courses and the selection of supervisors from a wider group resulting in improved criteria for selecting field workers. These comments should be taken into account in developing recruitment and training policies for the next census.

Chapter 5: MAPPING AND HOUSEHOLD LISTING

Maps play an important role in a well-conducted census. First, they are important to census managers who are able to visually plan the work within their jurisdiction and monitor progress as the census proceeds. Second, they are crucial to ensuring that all households are covered, that proper assignments are made to enumerators with the location of all census dwellings, and that the boundaries between the work of enumerators in adjacent EAs are clear. Thirdly, a systematically organized hierarchical geographic system permits the use of thematic mapping and thus enriches the range and type of census products available to the users.

The existence of good EA maps provided an assurance that enumerators cover all census dwellings and households during the census. Supervisors were trained to check assignments and question enumerators about dwellings that were marked on EA maps but had not been visited. Of course, it was also necessary that census dwellings and households discovered by the enumerators that were not included on the EA maps were also included in the census, and there is evidence that this was done.

While the EA maps provide an effective control over the inclusion of all census dwellings, it is also important that all persons living in these dwellings are included. For this reason it was necessary to complete a listing form for each household within each census dwelling. All persons usually resident or visiting the household at the time of the listing were recorded. This procedure thus provided a further control to ensure that all persons who should have been included in the census were in fact included. Again, the listing only served as a control and it was possible that persons were missed or wrongly included on the listing and in these circumstances it was the responsibility of the enumerators to ensure that the census was correct. But at least the process of providing two levels of control ensured that no enumerator could be grossly negligent without alerting the suspicion of the supervisor.

The mapping process

The Government Order No. 28, dated February 25, 1998 concerning "Conducting the Population and Housing Census-2000" stated that one enumerator will enumerate 300-350 persons in urban areas and 30-35 households in rural areas. Based on these requirements, the territory of Mongolia was divided into 12.7 thousand enumeration areas or EAs. For each of these EAs, a census enumeration map was required.

EA maps comprised the lowest level of the geographic hierarchy. Base census maps were first required at the higher levels to provide a visual platform for effective census planning. Recognizing this, the above order provided that Census Commissions must prepare maps of the Capital City, aimag centers and villages that must be send to NSO by September 1999. Similarly, maps of soums and baghs should be submitted by November 1999.

However, in reality it was not possible to meet these deadlines. In the urban areas all maps were completed soon after the deadline and submitted to the NSO by October 1999. But problems with resources and manpower delayed work in the rural areas. It was felt in the circumstances that it would be rational to combine some of the rural census mapping and household listing with the livestock census conducted from 8 December 1999. A decision was thus made to combine the household listing operation with the livestock census, conducted from 15 December 1999. It was only after this operation was completed that mapping commenced. Rural mapping was completed by 25 December 1999.

The rural situation was considered to be very different from the urban. In the urban areas it was essential that maps be produced at all levels down to the EA level to ensure all households were included and to clarify boundaries between EAs. Thus in the Capital City, maps were drawn for the entire Capital City, districts, khoroos and EAs. In the aimag centers maps were prepared for the aimag center soums, baghs and EAs.

In the rural areas, however, it was decided to produce maps at three levels, for aimags, soums and EAs. While EAs and baghs often coincided there was no systematic attempt to produce bagh maps and reconcile their boundaries with the EA maps. The argument used for this approach was that in the rural areas EA maps could be prepared directly from the soum maps given the considerable local knowledge of the staff of the temporary bureau who were able to identify all census households even without the help of bagh maps. In some places, the individual EA maps provided for enumerators were, however, not systematically produced, at times being very sketchy and not always easy to use. Thus, while the higher level aimag maps served their prime control purposes, there were some problems in attempting to map census details onto the soum and EA maps.

NSO itself printed the soum maps using ARCVIEW software and distributed them in October 1999. This was the first attempt to produce standardized maps for all areas. It would be useful in future if the scale of maps could be varied according to the size of the soum and the density of population. For the 2000 census all maps were produced on A3 size paper, but the scale on many of these was too small making it difficult to identify key features.

The absence of bagh level maps and the failure to digitize EA boundaries will impose some limits in the ability to generate thematic maps as an integral part of the census analysis. Further work is required to check and reconcile aimag and soum boundaries to prepare for this next stage, using ARCVIEW or some other mapping software package to extend the range of census products to include visual spatial analysis.

The listing process

In rural areas, at the time of the livestock census, the bagh officers were instructed to complete the census listing form, HAOST-3. In urban areas, census listing form was made by khoroos. This included information on each building, the number of households in each building and the names of all household members.

Issues raised and lessons learned

Mapping and household listing both serve to ensure high coverage. The linking of these census processes with the livestock census almost certainly saved costs in rural areas. In many areas the number of persons actually enumerated in the census exceeded the numbers on the lists by a considerable margin, suggesting that the listing process could have been improved. For the next census it is recommended that the EA mapping should either precede the household listing or be conducted simultaneously, since the EA maps provide clarity in defining boundaries that are essential for the listing operation. In urban areas especially it is preferable to complete the mapping at a relatively early stage and the listing as close to the enumeration as feasible. This minimizes the problems of population mobility between the listing and census enumeration.

It is also proposed that in keeping with UN recommendations more systematic maps should be prepared for each EA. This would ensure that maps would be of sufficiently large scale to include important features, including roads, paths, rivers and hills. They would also help clarify all issues of boundaries between EAs. Several census managers reported that the soum level maps were too small to contain the information they needed and the EA maps were not always easy to use. The need to understand individualized EA maps and the completed household listing forms should also be given greater emphasis during training.

The 2000 census did not make sufficient use of EA maps. For the next census the EA maps will provide the basis for a national census mapping system. Assuming that for the next census the EA boundaries and house locations will be systematically digitized, the EA maps would then serve two important purposes. First, they would provide the base information for all subsequent censuses and household surveys. Entirely new mapping would not be required as it should be possible to readily update existing maps. Second, the EA maps would provide the building blocks that could be combined to form any higher-level geographic area with clearly defined boundaries. These would be required for administrative purposes and to generate thematic maps.

All maps will need to be improved to serve their main purposes. At the aimag and Capital City level, maps should show clear boundaries for all soums and districts, with basic information on access routes and population size, location and densities. Soum maps will require details on all bagh and EAs boundaries with easy location of all human settlements including temporary winter settlements. The bagh and EA maps would show complete detail of all census dwelling locations, available access by road, path or other means and sufficient detail of main features to provide orientation to the map users. All maps would have consistent and integral boundaries, meaning that no EA, bagh, or soum boundary crossed the boundaries at the higher level. Note that this requirement is independent of the number of EAs or baghs an enumerator is expected to cover.

Almost certainly the next census will bring with it more advanced mapping technology than that available to the 2000 census. The facilities for scanning of maps, the availability of improved GPS and the use of intelligent character recognition are just a few of the areas that offer exciting prospects. It is also likely that an integrated mapping database will be available from the joint

resources of the NSO, the State Geodesy and Cartographic Agency and other agencies. Unfortunately, the current maps will likely be seen as inadequate as a basis for the next census. Some of the likely problems include scale and the absence of references such as longitude and latitude.

The second stage is the mapping of census results. To present census results using census maps provides a great opportunity to make census results easily understandable to users. The operational requirements and necessary financial resources to utilize the possibilities provided by census mapping need to be properly reflected in the census plan.

Chapter 6: ADVOCACY AND PUBLICITY

The success of the census owed much to the manner in which it was able to tap into and draw support from the political and administrative structures of the country. As a lesson in advocacy, the 2000 census therefore has much to offer. The serious lack of funding for the 2000 census of course pervaded into all operations and affected the full achievement of goals set in the census publicity plan, namely to ensure that all individuals in the population understood and were prepared for the census.

Census advocacy

The most important message that NSO needed to convey was that the census was a national undertaking that could not be carried out successfully by the NSO alone. It was necessary to build up a wide network of support that would give ownership of the census to the nation and ensure the widest possible participation. In the event, as described earlier in this Report, strong support was provided at all political and administrative levels creating a pillar for the census. At the highest level, the Prime Minister himself, as Chairman of the State Census Commission, played a key role as a census advocate. His radio broadcasts and exhortations to Ministers, Governors, agencies and individuals to work towards a successful census had a positive affect on the momentum of the national census.

To ensure wide support and effective census advocacy a formal network of census commissions was established. Key Ministers were involved as members of the State Census Commission. The presence of the NSO Chairman as a deputy of that Commission and the Vice-Chairman as its secretary ensured that members appreciated the role they could play in the census, not only as users but as advocates to support all census activities. Similarly, census commissions were established at the Ministry of Foreign Affairs, Ministry of Justice and Ministry of Defence. Under these special census commissions, census temporary bureaus, responsible for census activities, were established.

All levels of census commissions and temporary bureaus established national level advocacy network.

It was also important for NSO to bring the census to a wider audience in Ulaanbaatar to assist in the task of finding resources for the census and to support the census field programme. A number of meetings with Government departments, NGOs and donors were held to enable NSO to provide a background to the census and to develop an understanding about census requirements. These meetings culminated into a full-fledged census donors meeting held in June 1999.

At the more practical level a network of temporary census bureaus were established corresponding to each Census Commission. While these bureaus did not have the same advocacy brief, they were in a good position to keep in

touch with organizations and individuals able to support the census at each geographic level and were able to play an important part in effecting the census publicity programme.

Census publicity

As in other parts of the census programme, the budget for publicity was small and the strategy was to make as much positive impact as possible with the resources available. On the positive side the success of census advocacy made it unlikely that census publicity would fail, but it was also recognized that the plan was not as intensive as the NSO would have liked and its start was late. The publicity plan was presented to the chairmen of the aimag Commissions and temporary bureaus during their visits to the NSO for briefing and fieldwork training.

During the Dornod pretest, it was apparent that greater publicity would have helped even though Mongolian television and radio had been used and a number of visits had been made to the selected areas to convey information that the pretest was taking place. The publicity was improved for the Chingeltei pilot census conducted in May 1999. In addition to television and radio spots and special articles in the local *Unuuder* newspaper, posters and brochures were designed encouraging people to participate in the pilot census. These were placed in focal service centers in the selected khoroo.

Time was now short and it was clearly important that the major publicity campaigns should be waged before the commencement of fieldwork. A census logo was designed and approved in May 1999 and a campaign was proposed to ensure that as many people as possible became familiar with the logo and could identify it with the census.

A difficulty with census publicity was the need to appeal to different or fragmented audiences representing all walks of public and private life. A series of informative articles about the census, varying in length and detail, were prepared for distribution to the media and published in various magazines and newspapers and used in television and radio transmissions. With the assistance of UNFPA a series of census programmes were produced for television. Beginning in November 1999 these programmes, transmitted every second and fourth week of the month, introduced different census slogans, presented interesting census information and materials and promoted the census logo.

Four question and answer sessions were held for the media with senior staff from the NSO, in May, June and October 1999 and in very early January 2000. Articles based on these sessions were published in newspapers including *Zuunee medee*, *Unuuder*, *Mongoleen medee, Udriin sonin* and *Unen.* Moreover, a direct question and answer session was televised in November 1999 and another, on January 2000, was broadcast on Mongolian radio. Through the *Tsagiin Hurd* and the *Hurd* Mongolian television and radio programmes, regular information about the census, including a countdown on the days that remained, and messages for people to participate were transmitted. In the week before the census a short census publicity film was broadcast on television three times each day. A small dramatic presentation on how to ask

and respond to census questions was presented on television on 27 December 1999.

Publicity materials were also produced for the aimags and Capital City. Four thousand large colour posters, 60x40 cm in size, and 10,000 smaller versions, A4 size, 2,000 envelopes and 1,000 postcards were printed and distributed to the aimag and Capital City census Commissions. The aimags and Capital City Commissions in turn made sure that the posters and materials were delivered to the Census Commissions in the soums and districts for display at places where people gather, including central service centers, schools, hospitals, post offices, banks, Governors buildings, drugstores and other shops, and markets. In addition copies of articles, information about the census and other publicity materials were sent to all Commissions for use in local publicity campaigns.

To ensure the operation was proceeding smoothly, the Prime Minister conducted a direct radio conference with the aimag Governors to talk about progress in census publicity and field preparations and propose remedies for some of the problems discussed. This radio conference itself provided good publicity and wide coverage since it was broadcasted throughout the country and was later transmitted by the television channels. The demonstration that the highest level of Government was taking an active part in the census provided an excellent example to others and a motive for more people to become involved. Finally, on 4 January, the eve of the census, Mr. N. Bagabandi, the President of Mongolia, urged the Mongolian people to actively participate in the census.

During the census enumeration, four slogans promoting the importance of participating in the census were repeatedly broadcasted by FM radio. These slogans were:

> *From 5-11 January 2000 the population and housing census will be conducted throughout the country;*
>
> *every citizen must actively participate in the census;*
>
> *you will show that, by participating in the census, you are the person who has a name that others will call and you are a person who has been officially registered as belonging to the country;*
>
> *the results of the population and housing census provide the main source of information for the development of government policies.*

The *Tsagiin hurd* television programme reported regular reports on census progress. Daily television, regular radio broadcasts on FM channels, census information and reports appeared in most of the newspapers. During the week of enumeration two large boards were placed in the central street of Ulaanbaatar, each with a census message. The messages read:

> *The 2000 population and housing census is being conducting from 5-11 January 2000 throughout the country*

and:

Your participation and enumeration in the 2000 population and housing census is your responsibility as a citizen.

On the first day of the census, the television cameras were present when the enumerators visited the homes of the President, the Prime Minister and the Speaker of Parliament. With the permission of the respondents, film of parts of the interviews was televised and used in the on-going publicity campaign. All these activities ensured that the census had a wide exposure and contributed to the warm reception and willing assistance reported by most enumerators.

Even after the census it was seen as important to retain public interest in the census and how it would contribute to national well-being. Regular news items and information about how the census had been conducted, how people had participated, how the completed census forms and materials were being checked and sent on to the processing center, and what was involved in the various stages of processing the census were published or broadcast by the mass media. Other items of interest such as progress in processing the census were also shown. For the record, a short documentary film on the preparation and conduct of the 2000 census was produced.

This publicity created a great deal of interest about the results of the census. In April 2000, the census preliminary results were published in booklet form and distributed to internal and international users. These were eagerly awaited. As an example, details of the population at voting age by age, sex and place of residence were taken from the preliminary results and distributed to the Census Commissions and to the main political parties.

Issues raised and lessons learned

The overriding lesson from the 2000 census is that strong advocacy is the key to a successful census, especially in the Mongolian situation that demands a pooling of resources and a capable and responsive census organization at all levels. Efforts must also be made in the future to ensure that the proper national and sub-national census organization is put in place earlier than was possible for the 2000 census and to persuade the Prime Minister, the President, the Parliament Speaker and Ministers to join together to provide the fullest backing for such an important undertaking.

It was apparent from the 2000 census that the publicity campaign should have started earlier and should have been better funded. That would have prevented the needs for last minute changes to the master plan that occurred in the 2000 census. In the future, it is important to see that a full census publicity strategy and overall plan of action are developed for all phases of the next census at least a year before enumeration begins. Every effort should be made to ensure that the resources necessary to carry out this plan are available. Given the problems that can arise in attracting funds, a fall-back position identifying the key areas for publicity, and indeed, for all census operations, and the responsible parties for ensuring they are effectively implemented needs to be available. Plan implementation and evaluation should be seen as an integral part of the census programme.

Greater efforts are needed to delegate responsibilities for census publicity to ministries and agencies in a position to contribute know-how at all geographic levels. It is also important that financial provision for census advocacy and publicity activities be estimated in advance and included in the budgets of participating agencies. Similarly, the media should appreciate that they have an obligation to see that the census is successfully carried out and should be willing to fund their own participation in the census. State, aimag and Capital City Census Commissions need to take responsibility at an early stage to see that this process is followed.

Chapter 7: PRETESTING, ENUMERATION AND QUALITY CONTROL

Pretests and the pilot census

To ensure that the census is of a high quality it is essential to build into each operation a test or series of tests of efficiency and effectiveness. The most well known and established of these tests are the census pretests and the pilot census. The pretest is designed to consider alternative strategies and select the most appropriate. Some of the issues that needed to be resolved in the census pretests included the questions to be asked and their wording, the optimum size of enumeration teams, interview rates and enumerator training methods. These findings would have an important influence on the design of the fieldwork programme. The pilot census is intended to be a full-fledged dress rehearsal for the census, focusing less on technical issues and more on broader census logistics and management issues. Unfortunately, in view of the delays that had occurred, it was necessary to treat the pilot census as an extension of the census pretest phase.

The first informal pretest was conducted in 1998, as part of the 1998 RHS. This was intended to be a very limited pretest confined to testing the efficacy of census–type household and individual questions.

The first formal pretest was carried out from 5 to 11 January 1999 in 2nd and 9th baghs, of Kherlen soum (aimag center soum), and in Sergelen soum, both in Dornod aimag. In this major pretest, 2,850 households and 12,466 population (all households and population of two baghs of Kherlen soum and Sergelen soum) were covered. The main purpose of the pretest was to test the inclusion of specific topics and the order and wording of questions included in the draft population and housing census forms, based on the results of the earlier pretest. The pretest also provided an opportunity to review other aspects of the organization of census fieldwork, including the optimal size of field teams, the criteria for selection of fieldworkers, the average number of interviews that enumerators could complete during the pretest period, and the adequacy of training. From this information it was possible to provide improved estimates of the number of fieldworkers that would be required for the census and, as a result, to recast the census budget. The pretest demonstrated how much work remained. The questionnaires still needed improvement, enumerator training manuals and census mapping and household listing instructions still needed to be prepared.

Some but not all of these issues had been addressed by May 1999, when the pilot census was conducted in Ulaanbaatar in Chingeltei district. The pilot test comprised 2,609 households and 11,439 persons. In addition to the technical issues raised during the earlier pretests and their aftermath, it was hoped that the pilot census could focus on some of the more important logistical and management questions that needed to be answered. Most important was the involvement and coordination of the various administrative and operational

levels in the Capital City, including the Commissions and temporary bureaus at the Capital City, district and khoroo levels during actual enumeration. It was also hoped that the pilot test could be used to test and refine the census processing system, using the pilot census schedules to produce mock census tables.

These goals were very ambitious. The final questions still had to be determined and much of the effort of the pilot census was devoted to further testing the draft census questionnaire. Training manuals had not been fully developed and it was thus essential that training methods be tested during the pilot census. As a result of the delay in finalizing these census components, only a partial test of the processing system was possible immediately following the pilot census, since a full test would need to use the final census forms. However, this partial test proved invaluable from a number of standpoints. It proved useful in highlighting problems in the order and wording of questions; it made possible the testing of the ability of enumerators in following instructions for recording responses; it provided feedback on the effectiveness of coding and data entry instructions; it provided useful management data on the appropriateness of specific edits and a frequency distribution of edit failures; and it provided a database enabling census-type output tables to be generated.

Not all the goals of the pilot census were reached. The continued emphasis on the design of the census questionnaire and the preparation of census maps meant that it was necessary after the pilot census to devote much energy to these issues, despite the fact that the census date was very close. Other important issues such as training at the various geographic levels had not really been addressed.

The discussions that followed therefore had to draw whatever lessons it could from the pilot census, in agreeing the final draft of the census questionnaire and also in looking at other issues that had not been resolved. Before the pilot census, Census Commissions and temporary bureaus were established. The pilot census had only partially helped in defining the duties and functions at each level.

Final decisions were also made on the content and wording of the questionnaire and the concepts and definitions to be used. On the basis of work rates calculated from the pretests and the pilot census, the period of enumeration, the seven days, which was approved by Government order was appropriate. Based on these decisions it was possible to proceed with the work on completing training manuals.

The focus of training on the heads of the Commissions and temporary bureaus was also essential given the failure of the pilot census to provide guidelines. The pilot censuses had been planned and managed almost entirely by the staff of the PCSB, who needed to pass their skills to the newly appointed heads of the census entities.

Census enumeration

Problems are always experienced during the main census enumeration and by and large these are resolved satisfactorily during the fieldwork. Many of the problems are unique to a particular census, and though of interest, there is probably little to gain on dwelling too much on them unless of course the decisions made have an unintended effect on census coverage. Other problems, more general in nature, do raise important methodological questions and are worth greater consideration as they are likely to arise in subsequent censuses.

The timing of the enumeration in early January is one such issue. During the enumeration period the temperature reached at –50°C in Khuvsgul, Sukhbaatar and Dornod aimags, and, though not so cold, heavy snowfalls occurred in Bayankhongor, Dundgobi and Uvs aimags. These created personal difficulties for the enumerators and supervisors and made transportation hazardous. Reports were received of enumerators unable to start their motorcycles, unable to refill with petrol or of roads being blocked by snow. Thus, in many cases enumerators were forced to complete their assignments by foot or on skis.

Because of "dzud", a number of livestock breeders from Dundgobi aimag moved to other aimags to spent winter. Enumerators had difficulties reaching and interviewing them. A related problem was that in some areas the school vacation started on the first day of enumeration, introducing problems in defining place of residence. Difficulties were experienced with interpretation of the maps and household lists, many of which were already out of date by the time of the census as a result of the movements to temporary residences.

The 2000 census was conducted during a seven-day period, starting at 8 a.m. on 5 January 2000 and finishing at 12 p.m. on 11 January 2000. Enumeration was easier during the early part of the enumeration period as it was often necessary to travel long distances near the end to enumerate the few people who were difficult to contact. Thus, during the first two days 42.3 percent of the urban population had been counted and by the end of the fourth day 84.0 percent of the total population had been enumerated.

During the enumeration period a hotline (with well-advertised telephone numbers) was provided for all inquiries and to discuss field problems with the census commissions and temporary bureaus. This hotline was open from 9 a.m. until 11 p.m. each day. A large number of inquiries were directed at the hotline operators.

The coverage rules were not always fully understood by census managers and fieldworkers. Elaborate rules were established to avoid omission and double-counting and measures were put into place to track certain population groups. Special control posts were established in transient centers such as airports, custom offices, bus stations, railway stations, hotels and main roads, to find persons who had not been enumerated. Also, if a person was likely to be traveling during the census night, that person was enumerated in advance and a census certificate was issued to avoid double-counting.

A more serious census problem was the enumeration of persons who had no place of usual residence. These included street children and homeless people, those who lived in makeshift homes such as on roofs or in derelict basements, and persons who slept in the forests or in the mountains. Attempts were made to identify and enumerate such people with the help of the police on 7th and 10th of January.

Quality control

An elaborate system of quality control measures was established for the main field phase of the census. These quality control measures were established to ensure that census procedures were properly followed and to see that serious problems were resolved speedily. This would ensure high census coverage and accurate responses.

Some of the important quality control measures have already been discussed in detail. These include the levels of census mapping that were produced for the census, particularly the EA maps for use during the census enumeration and the household listing completed during the livestock census. In addition, the local registration of citizens, believed to be useful as a reference for the census, was updated.

Most important were the layers of supervision established during the fieldwork. The PCSB staff traveled widely to provide support and supervision to as many temporary bureaus as possible, particularly at the aimag level. Additionally, daily contact was maintained with the temporary bureaus of the Capital City and districts and assistance was provided wherever it was thought to be necessary. The various Commissions and temporary bureaus provided an important network penetrating to the lowest levels that were able to accompany field workers, check maps and completed assignments, provide guidance and serve as local advocates to ensure that cooperation of the people was at a high level. During the enumeration period, enumerators were instructed to visit their temporary bureaus at least twice to review progress and discuss particular problems encountered in the field.

Compared to 1989, the introduction of field supervisors was a crucial development. The ability of the supervisors to assist the enumerators throughout their work, to review and check on the quality of interviews, and to provide advise or re-training contributed a great deal to overall quality. The systematic programme of re-interviewing that was developed played a particularly important role in ensuring that enumerators were guarded and diligent in their work.

Following the completion of field assignments, the Commission and temporary bureaus staff assisted in checking census coverage. Enumerated households were checked against the maps and lists of households and population and areas were revisited if problems were found. The temporary bureaus also checked a sample of census questionnaires for legibility and accuracy before certifying that the assignment had been satisfactorily completed. Attempts were also made to ensure that residential status was properly recorded. Thus temporary absentees were matched against reported current addresses when

visiting at the bagh, khoroo, soum, district and aimag level to ensure that no major discrepancies existed.

Issues raised and lessons learned

Pretesting is an integral part of the census operation. If pretesting is running late, it is not, without high risk, possible to proceed with important aspects of the census preparation. The delays in resolving these issues, in part a result of uncertainties in funding, meant that the pretests were not as effective as they might have been in ensuring all census phases were on time and were effective in achieving their desired results.

The pilot census conducted in May 1999 did not really serve its main purpose mainly because it was conducted when many census questions were still subject to argument and the questionnaire was not finalized. While it provided an indispensable opportunity to complete the technical pretests, there was no later occasion to run through the entire census process, emphasizing logistical and management issues, and involving the Commissions and temporary bureaus staff in a census simulation. These provide important lessons for the next census. The elements for testing must be clearly understood and integrated into the workplan. Tests should be timely and all formal technical pretests should be completed within about six months of enumeration. A planned pilot test should be conducted several months before enumeration in which all elements required for a successful census should be properly integrated, including mapping, listing, training, fieldwork and field control and data processing. Since it is intended to test the management of the census at various levels, the pilot census should involve as many census managers as feasible. Moreover, to ensure that the pilot census is used as a final hands-on training exercise, opportunities to involve staff from census commissions and temporary bureaus and discuss problems should be built into the programme.

By and large, the quality control measures were effective. Some improvements could be made to ensure that the controls worked even better. Of course, maps and household lists need to be improved. In addition, safeguards are needed to see that no person works on more than one of the tasks of mapping, listing, supervision or enumeration for the same EA. This would ensure that each stage was prepared independently and served as a proper control over the quality of fieldwork.

Chapter 8: DATA PROCESSING

The processing system in brief

During the early planning stages it was clear that the existing hardware and peripherals in NSO were not sufficient to enable it to process a modern census. Indeed, the recognition of the advances made in computing technology over the past decade meant that the Data Processing Department (DPD) of the NSO was not in a position to begin the basic design of the processing system. However, with the assistance of UNFPA and UNSD, from the first quarter of 1998 NSO was provided with new equipment, components and software. It was thus able to establish the basis for strengthening the technical capacity required for the 2000 census. As a result of these initiatives, the NSO was able to purchase a range of equipment including 38 *Compaq* computers, two *ACER* server computers and other equipment.

On the software side, the NSO decided to process the census using IMPS (Integrated Microcomputer Processing System). This software was developed at the International Statistical Program Center at the United States Bureau of the Census and has been used widely in the Asia Pacific region for census processing. Staff training was also an important consideration. Four programmers of the NSO participated training in Japan, Kazakhstan and at the Bureau's headquarters in Washington D.C. that were being planned by the United Nations. UNFPA and UNSD were also in a position to provide technical expertise to support the application of IMPS in Mongolia. Apart from the use of IMPS, the NSO developed other census applications, for example, using the CLIPPER and VISUAL BASIC languages. A special application to speed coding named SEARCH was also developed. Data entry was designed for LAN using a Windows NT Server V4.0 as the control center. The center-server computer was a Pentium II, 366 Mhz, 128 MB, and 9 GB SCSI HDD and the operators' computers were Pentium 133-166 Mhz CPU, 16MB RAM, 1.2-2.1 GB HDD. The system facilitated data processing, restricting archiving and control functions to the server. Daily progress reports were also provided as part of the Data Control System.

Thus the hardware configuration and software applications underwent considerable change compared with earlier censuses in Mongolia. By 1999, the NSO was well positioned to process a census more speedily and more accurately than ever before. As can be seen in the following table, the capacity and speed of the installations had risen dramatically and the new Pentium computer network opened up new possibilities in the design of the census system. The new configuration and the introduction of the IMPS packaged software also contributed to the need to change the organization structure within the DPD, with the need to develop and introduce specialized applications into the processing system. The effects of these changes on the way the census processing system was designed were profound. Similarly, as software applications could be utilized from many available sources, there was no longer the need to retain a large staff of computer programmers or system

design experts. These trends are well illustrated in Table 5. Compared with the 1989 census, the number of engineers required was reduced from twenty to three; for programmers and systems designers the corresponding reduction was from eight to four.

Table 5. Changes in selected system components and applications, 1969-2000

System Component	Year of census			
	1969	1979	1989	2000
Hardware system	Tabulator, sorter	ES- 1040/IB360	One-ES-1040, Two-ES-1045/IBM 370	'Server' computers Pentium II
Means of transferring information	Card with holes	Magnet tape, disk 29 MB	Magnet tape, disk 100 MB	Computer network
Capacity of main computer	Speed of circulation of motor	380,000 actions per sec.	880,000*2 actions per sec	30,000,000[2] actions per sec
Capacity of disk		180 MB	1,000 MB	30,000 MB[3]
Software	Board of program	PL/1	PL/1	IMPS, MS SQL Server, VB
Number of programmers	Foreign specialist	14	8	3
Number of data entry terminals and operators	8	12/3 in shift	20-24 * 2 shift	30 (after one month 34+2)/2
Number of engineers	-	12	20	2

However, even as the census proceeded there was a need to review requirements that would enable the processing center to keep apace with the demand for fast outputs. The capacity of the current server computer was not seen as sufficient to generate and process the large national census file. Therefore, a new server was purchased from Dell and installed at the beginning of September 2000, thanks to the generous support of the Australian Government.

To test the data processing system, census data were entered for Khan-Uul district of Ulaanbaatar and Dundgobi and Umnugobi aimags. These were then edited and draft output tables were prepared for review. Following this review, the tabulation plan was rationalized, a process that involved a reduction in the number and detail particularly at the lower geographic levels. Additionally, some new tables were added, existing formats were modified, and definitions of variables and algorithms were revised.

Before computer processing could even start, however, a great deal of work was needed to upgrade and prepare the data entry site and facilities. Among the tasks facing the staff of the Data Processing Department of NSO were to replace or update computers that had been operating in a DOS environment, to re-build an internal network, to connect data entry computers with the internal network and to develop an operational system for data entry. However, due to the existence of old equipment, the network was often disrupted and delays occurred.

Coding and data entry

Before the census data processing could even start, the major undertaking was the recruitment and training of coders and operators. Recruitment of coders and data entry operators began in January 2000 when 114 persons were selected for training. Selection was based on education, computer skills, health and willingness to undertake shift work. Training was conducted in two stages. The first stage was conducted over five days at the end of January 2000. Training covered many topics, including the structure of the census questionnaire, the completion of census control and other documents, coding of occupation and industry questions and editing. Following the test at the end of this course, 84 persons were selected to attend the second stage of training.

The second stage covered preparation of census materials for data processing, introducing software for coding, data entry and editing. Following the second stage training 60 persons were selected and recruited for work on coding, checking, data entering and editing operations. Four experienced persons who had worked on the population census or in a statistical office were recruited as supervisors.

For a period up to 18 April 2000 the recruits worked according to plans on the various census data preparation tasks. Further training on the data entry software was conducted for all coders and data entry operators. Practice in data entry was provided to adapt trainees to the work place and to check their ability to achieve minimum norms or speed of data entry. To ensure training was realistic and confronted real problems, computers were connected to the network.

Immediately following the census, all records were checked for completeness at the aimag and district levels before being dispatched to the NSO for further processing. From early March, the coding and data entry operations commenced.

On arrival at the NSO, the batches were again checked and receipt was recorded. An important task was in data preparation involved the coding of census responses. While most of the coding was done manually the system was designed to undertake limited computer assisted coding for the more complex questions. This automatic coding saved valuable time and resulted in more uniform and high quality coding.

Before coding could commence it was necessary to complete a coding manual that contained classifications for all variables. For some variables, the census classifications were prepared in consultation with other organizations. For example the classification of ethnic groups, though based on the classification used in 1989, was revised by the Academy of Sciences of Mongolia and completed by May 1998. The list of foreign countries for use in the residence and migration questions was revised with the assistance of the Mongolian Civil Registration authorities. The national occupational classification, based on the International Standard Classification of Occupations, was developed by the Ministry of Health and Social Welfare. It was simplified by NSO and used for the first time in the 2000 census. In 1998 the NSO approved the National Classification of All Industrial Activities, that had been tested during the 1998

economic census. Both occupation and industry coding proved difficult since the information provided by enumerators was often incomplete and the classifications were complex.

Fortunately, computer assisted coding was used for occupation and industry variables, reducing much of the training and coding workload that would otherwise have been required. The automated industry and occupation coding was completed within 44 working days. Checking of coding took a further 34 working days, but was largely done in parallel with the main coding activities. Thus the entire coding operation was completed by 10 May 2000, within about two months of its commencement.

Data entry operations began on 24 April 2000. A number of controls were set up to ensure the operation went smoothly. A computer program was developed to record progress in data entry and in the performance of individual operators. To further monitor the efficiency and accuracy of data entry, all census materials of all districts of Ulaanbaatar and all aimag center soums were double-entered.

On completion of editing, in September 2000, preliminary tables were produced as a basis for a review of the tabulation plan. For data entry, computer editing and tabulation, modules of the IMPS package were used. Apart from the use of IMPS, the NSO developed other census applications, for example, using the CLIPPER and VISUAL BASIC languages. A special application to speed coding named SEARCH was also developed.

Thirty-six computers (workstations) were available for data entry, two computers for supervisors. Two servers were operating and connected to the network. During actual operations 49 persons were working as data entry operators, nine persons were working as re-entry operators and eight persons were working as supervisors. Until July 2000 all staff operated in two shifts, each working for six days per week. By the end of July, at which time most of the data entry had been completed, data entry reverted to a single shift. By the end of July 2000 all data entry other than the special batches provided by the Ministries of Foreign Affairs, Defence and Justice had been completed. The coverage rules for these Ministries were complex and special edit rules needed to be developed.

Editing

Editing was completed in two stages. In the first stage records were edited manually and in the second they were automatically edited using the editing module of the IMPS package, Concor. Batch files were created and once these had been keyed they were edited and merged to form a national master census file. After creating the national level census file, a further round of editing was undertaken to ensure that errors had not occurred during file generation. PCSB subject-matter statisticians developed the specifications both for manual and automatic editing and provided a list of variables to be edited. The PCSB staff monitored editing work. All editing was completed by 15 October 2000.

Census output tables

The first draft 36 output tables were prepared from the pretests conducted in Dornod aimag and the Chingeltei district of Ulaanbaatar, based on the United Nations recommendations and principles and the comments of visiting data processing and subject-matter advisers. No tables on employment were prepared at that time as occupation and industry classifications were not yet ready.

For the preliminary census results six output tables were produced on 25 March 2000 and were submitted for the approval of the State Census Commission. Following its review the SCC gave its consent to the dissemination of the preliminary results.

The tabulation plan for the 2000 census included 92 tables, 58 covering the population questions and 34 covering the housing questions. Sample output tables were produced in June 2000 for Umnugobi and Dundgobi aimags and Khan-Uul districts. The PCSB staff reviewed these tables, checking for invalid relationships and other program and content errors. Based on the comments received, the output tables were modified and rerun. The revised tables were in turn vetted by senior staff of PCSB and Laurence Lewis, the NSO census advisor. They provided invaluable suggestions for improving the output tables and, mainly based on these comments, a final set was produced in October 2000.

Security and archiving

It was important to ensure the safe-keeping of and easy access to completed census forms and materials during the census processing. The NSO needed to construct special shelving, taking account of local and international experience in avoiding water and fire damage. All forms, after receipt and registration, were labeled, stored, and organized by aimag, soum and district in the order prescribed in the census manual. Each operation of extracting and replacing census materials was recorded in a log book. Following census processing, a more robust system was required to ensure completed questionnaires were kept and easily accessed from archives. It was thus very important to build a system that provided security and confidentiality for census questionnaires. Indeed, advice was sought from the National Archive Office. On the basis of their advice, the NSO printed detailed labels that provided the names of heads of household, household size, age structure of members of each household. These served as the cover to each file.

Issues raised and lessons learned

Many issues were raised during the 2000 census. Attempts to tackle the problems encountered have certainly resulted in a more streamline data processing service within the NSO. But in a sense the lessons learned are few, since by 2010 or whenever the next census will be, it is likely that the advances in technology will change entirely the platform and architecture that have provided the basis for this census. It would probably prove futile to predict what the census processing system will be like.

Nevertheless a few points do come to mind that might be useful to consider over the coming years. As the distinction between subject matter and data processing staff blurs, it will be essential to provide training in data or information processing to all senior census officers. The development of the LAN has demonstrated its power and only hinted at the advantages to NSO in adopting more integrated approaches to census and survey management.

The question of geographic distribution of processing also needs pursuing. The centralized approach taken for the census 2000 was perhaps necessary given the time constraints and the concentration of skilled staff in the NSO. But it also placed an unnecessary burden on the NSO staff that might have been shared. In the future, it is important to pay an attention to establish technical, communication, computer programming and human capacity at the aimag level. Given the advances in automatic data transmission that can be expected, it is likely that some tasks perhaps including data preparation, coding, data entry and certain aspects of editing, might easily be undertaken in some of the aimags where required infrastructure would be available as far as hardware, man power and e-communication facilities are concerned.

It is further likely that as technology evolves, techniques of data capture and the need to keep physical track of the flow of questionnaires will reach entirely new levels. Who knows, improved scanning and intelligent readers able to interpret most handwriting combined with better form design could transform data entry. But if data entry does become much faster, new approaches to coding and editing will also need to be streamlined to maximize the potential saving in processing time. The 2000 census has thus provided a valuable testing ground for some newer approaches. Computer-assisted coding was successfully attempted for some questions and there is little doubt that more research into ways of developing applications further will be well rewarded. More important still is the need to improve the speed of editing as it will no longer have the cushion provided by lengthy key entry. In 2000, automatic imputation was, quite rightly, introduced with caution. But automatic editing is clearly the direction of future developments and the NSO will have to find the right balance between speed and accuracy.

Chapter 9: CENSUS BUDGETING

Budget strategy and financial planning

There is no question that difficulties in raising finance for the 2000 census affected all census phases and forced the NSO to propose a number of shortcuts. At the time of the 2000 census, the Government of Mongolia faced severe financial difficulties in its transition towards a market economy.

Initially the census was planned for January 1999, exactly ten years after the last census in 1989. However, the lack of a clear commitment to provide the funds required for an early start to census preparatory work meant that a decision to delay, while regretted, was seen as necessary. Thus the new date of January 2000 was set.

The census is an expensive undertaking and once the go ahead was given, it was still necessary for the NSO to proceed cautiously. Indeed, at no time were there sufficient funds to guarantee a successful census. However, all stages were planned in the census workplan, implementation of each stage could only proceed once finance had been obtained. Thus the total budget made provisions for the most urgent tasks in census preparation including the funding of national staff in the PCSB, development and printing of questionnaires, training materials and other documentation, field testing, training of trainers, mapping, household listing and census publicity. It also provided cost estimates for the main enumeration stage that included field training, census enumeration and the post enumeration survey, and for the post enumeration stage that included, data processing, analysis, product dissemination and record archiving. It was also important to make provision for the visits of experts and consultants who were expected to assist on the census, particularly as it was intended to adopt and adapt many of the international recommendations and principles to the Mongolian census.

The broad 2000 census strategy was to reduce costs as far as practicable without at the same time jeopardizing the quality or utility of the census results. During 1990s the estimated average global cost for a population census was in the order of five US dollars per person. In the budget proposals, Mongolia planned to spend an average 1.3 US dollars per person, in local currency about three billion tugrics in total.

Three possible sources were available for census funding, the state government, local government and international organizations. The financial plan envisaged that about one half of the budget would be obtained from national sources and one half from international donor sources. Of the amount sought nationally, it was hoped that one billion tugrics would be provided by the State Government and about 500 million tugrics would be funded from local budgets.

Fund raising and census expenditure

It is impossible to calculate the real cost of a census. Many organizations and individuals participated in one or more of the main phases of the census. While some of these activities were funded entirely or in part from the NSO census budget, many were not. To illustrate this point it will suffice to mention a few.

Many of the members of the State Census Commission established their own ministerial census commissions and temporary bureaus to carry out their assigned responsibilities under the census. The costs of these organizations were funded, essentially, from departmental budgets. The budget includes direct costs of managing the temporary bureaus at the various geographic levels throughout the country. But it does not include an estimate of the notional costs of utilizing the many individuals who assisted the temporary bureaus in planning and organizing fieldwork, most often on a voluntary basis. The same can be said of publicity. The census budget covered much of the formal publicity through the media, but other census events were reported free of cost or charged to other budgets. And as in other areas many volunteers worked to promote the census contributing to the publicity campaign.

Even within the NSO, not all census costs were charged directly to the census budget. Where new data processing or printing equipment was purchased specifically for the census, the cost was clearly attributed to the census. But where existing equipment and infrastructure were used such as in the provision of printing or data processing services, much of the cost was absorbed into the regular NSO operating budget or charged to other projects. Modern printing equipment was purchased and installed as part of the TACIS project funded by the European Union. To print the census forms on time, it was also necessary to call upon the assistance of the administrative and information departments within the NSO.

While most training was provided under the census budget, some of the training workshops on census related topics, particularly those conducted overseas, were funded under other projects, and thus do not appear in the direct budget. Similarly, the visits of advisers, especially those from the various United Nations organizations were partly or wholly funded by those organizations. Thus the salary component paid to an adviser from the UNFPA Country Support Team in Bangkok was paid directly from the United Nations budget, while airfares and daily allowances were mostly funded from the UNFPA-supported Mongolian census project. Longer-term advisers with specific census tasks, in contrast, were usually funded entirely from the census budget. Other advisers, funded from other projects, but with relevant skills, were sometimes called upon to assist in the census.

But even taking into account the fact that it is not possible to estimate the total cost of the census, the estimated direct cost is exceptionally low and far lower than the planned budget.

The total direct cost of the census was considerably less than the original budget. Of the total direct budget about 50 percent was contributed by international organizations, principally UNFPA and Australian Agency for International Development (AusAID). Without this assistance, it is likely that the

census project would have been further delayed or abandoned altogether. The recognition that national funding would not be sufficient to conduct a high quality and modern census led to early negotiations with UNFPA to assist with the more important census activities. The UNFPA Mongolian Field Office recognized the absence of accurate and up to date socio-economic data in the country and the potential value of a census and gave priority to the census project even though its budget was reduced. To elicit wider support from the donor community, in June 1999 the NSO together with UNFPA organized a census meeting that provided an opportunity for NSO to brief government and international agencies on the dire financial status and highlighted the potential benefits of an accurate census. Following this meeting NSO and UNFPA entered into discussions with a number of prospective donors on the possibilities that existed for financial and technical support. Early in 2000 the Government of Australia announced its intention to provide non-reimbursable assistance. This contribution contributed significantly to the post-enumeration phase of the census. This contribution was provided through, and managed by, UNFPA. Total UNFPA support to NSO for 1997-2000 was substantial and included institutional support, direct support to the census and to the 1998 RHS.

Despite the generosity of donors, the total direct cost of the census was very low. To conduct the census with the constant need to adjust to the financial realities demanded many cost-saving measures, some of which almost certainly were undesirable. For example, the combination of the housing and population questionnaires into a single form did much to reduce the costs of printing, handling and transportation of the forms. It also reduced the workload making it feasible to print the forms in-house rather than farm out the task to a commercial enterprise. But at the same time it imposed limitations on the number of questions that could be asked and the space that was available to enumerators for recording responses.

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Throughout the census, the management was plagued by problems of uncertain funding. In the budget estimates provided in 1999, for example, it was felt that a contribution of 200 million tugrics approved by the State Government would be adequate to conduct the census. In the event more than this amount was provided. At the beginning of December 1999, the NSO received about 10 million tugrics for the payment of salaries to the PCSB staff. In August 1999 a further 50 million tugrics were received. But it was still not clear whether the remaining 140 million tugrics requested would be provided. At least with the 50 million tugrics it was now possible to print census questionnaires and manuals. Considerable doubt still remained, however, about funding of other key census activities, including training, provision of field allowances and publicity. The problem was only resolved with the intervention of the Prime Minister personally requesting the Minister of Finance to provide sufficient funding for the census.

The NSO recognized that the entire country was in the grip of a financial crisis that affected all national and local programmes. Thus, while it was agreed in principle that local governments would finance key activities that included field training, salaries of enumerators and supervisors, daily allowances for staff of aimag census commissions and temporary bureaus and other field costs, most field offices reported problems in raising the necessary funding. The procedures had at first seemed clear. The 28th Government Order issued in 1999 provided

that local government raise the finance for specific census activities. In accordance with this Order, each aimag prepared a budget for expected outlays related to the census and these were submitted to the Ministry of Finance. However, the Ministry of Finance argued that their understanding was that all census related expenditures would be allocated to the NSO and not to local government, creating considerable confusion throughout the country and delaying the training and field preparation stages of the census.

Thankfully, in the end sufficient funds were found. The Ministry of Finance provided the full amount required by the end of December 1999. However, even this was not straightforward and required some hasty revisions to the programme.

The financial arrangements between State and local government was also finally agreed. In a letter dated 1 November 1999, the Ministry of Finance approved expenditure on census activities from local budgets. At the same time the Prime Minister requested governors of aimags and Capital City to provide funding for census activities in their aimags and in the Capital City. The source of funding of training was thus resolved, though rather late in the operation. During November and December 1999, 72 million tugrics were spent on training, mostly from the UNFPA project but including a significant contribution from local government.

The census budget is still not complete. During 2000 and beyond there will be a continuing need for financial support to the data analysis and dissemination programme, including the need to strengthen user services within the NSO. This will require additional training and the payment of salaries to ensure that capacity building of staff in the PCSB remains a priority.

Issues raised and lessons learned

It is essential that as full a budget as possible is prepared in the initial stages to make it clear what the census is likely to cost.

The final budget and census strategy are tied to an effective testing programme. Flexibility can be built into the early budgeting process and a number of possible contingency plans could be prepared to ensure that the total operation was not jeopardized by the need to make changes to the master plan.

But the most important lessons from 2000 are clear. Once the decision has been made to conduct a census, it is essential that sources of funds are found and a real financial commitment to the census is made. In the next census it will be important to avoid the two major financial difficulties that were faced in the 2000 census. First, total funding must be sufficient to carry out the agreed census plan. Second, the entire budget must be approved in advance to avoid the pitfalls that resulted from funding uncertainty, with the resultant delays and shortcuts that did not serve the best interests of the national census.

Chapter 10: CENSUS EVALUATION*

Some of the techniques described in this chapter are complex and demand a specialized knowledge of census evaluation techniques. But to provide information to those who wish to assess the quality of the census, it is essential that a range of useful material be provided. It is hoped that the specialist and non-specialist will gain a better understanding of the strengths and weaknesses of the census from this evaluation.

As in all aspects of the census, the plans for evaluation were less elaborate than hoped for as a consequence of the acute shortage of funds. Nevertheless, a variety of techniques are available and it was possible to use the more appropriate of these to provide a good indication of the overall accuracy of the census. Not all the evaluation methods used in censuses could be drawn upon. The real changes in population that occurred between 1989 and 2000 made some of the more direct comparisons between censuses difficult to make. Thus a starting point for evaluation might normally have been a forward projection of the 1989 population or the reverse survival of the 2000 population, using plausible assumptions of fertility and mortality, in either case providing expected and actual populations for comparison.

But for a number of reasons this approach would not be very sensitive to detecting census errors in 2000. Among the reasons are the changes in coverage rules between 1989 and 2000, the existence of relatively large migration between the censuses and the delay of the 2000 census for one year, compounding the alignment of 5-year age cohorts.

Fortunately there are other methods for evaluation. The most important is the attempt to compare the results of the census with data from other sources. In Mongolia, the most recent sources for fertility estimates are the 1998 RHS and the civil registration records. Though the census was not intended primarily to measure fertility, as the relative strengths of each of these sources is known, it is possible to construct estimates from the census data for the principal purpose of assessing its quality. However, due to the very different methodologies used in estimating fertility from the three sources that have been used in the evaluation, a good deal of circumspection is needed in interpreting the results of the comparisons.

Other methods are also used to assess both coverage and content errors in the census. Following the completion of fieldwork for the 2000 census, a small Post Enumeration Survey (PES) was conducted with the main purpose of evaluating the coverage of the census. While the PES was small and confronted a number of problems, it does provide a useful additional guide to the completeness of the census.

* This chapter was prepared by Mr. Laurence Lewis, census adviser.

It was not intended that the PES be used as a major source of information on the quality of census responses. Thus only a few questions were asked to PES respondents. Nevertheless, for a small sub-sample an attempt has been made to match the census and PES responses to the same questions to provide some insights into the consistency of the interviews. In addition standard tests have been made of the accuracy of age and sex reporting in 2000. These tests have the added advantage that they permit a comparison of the accuracy of reporting in 2000 with earlier censuses.

In this evaluation attempts have also been made to assess the extent of error and the impact on quality of misapplication of census coverage rules.

While none of these approaches alone would be sufficient to gauge the accuracy of the census, together they provide a useful set of tools to highlight any problems. They might also suggest to users areas in which caution in interpreting data is needed and to future census-takers areas in which improvements might be expected.

Consistency between the census and other sources

At first glance it may appear difficult to reconcile the population census with the 1998 RHS. First there was a difference in their timing. The fieldwork for the census was conducted from 4-11 January 2000 while the fieldwork for the RHS was undertaken during the period October to December 1998. Second, there were important differences in the scope and coverage of the two statistical inquiries. The RHS focused on a sample of women of reproductive age, although some characteristics were sought for all household members. The census covered all persons in Mongolia who met the coverage rules. In the RHS detailed fertility histories were constructed for all respondents as the basis for estimating fertility. In the census, no specific fertility questions were asked as it was felt this topic had been adequately covered in the RHS.

Fortunately, using a range of techniques, it is possible to reconstruct a common measure, the Crude Birth Rate (CBR), from the two sources and to align the reference periods.

Starting with the 1998 RHS, it may be observed that in the past similar fertility surveys were noted to perform well in the selection of representative samples of women of reproductive age, but did rather less well in ensuring that the household population distributions were representative of the entire populations. This feature does also seem to be present in the 1998 RHS. Suggestions of problems with the survey age distribution emerge when the fertility distribution obtained from the survey is applied to a standardized census population. The resultant schedule of births and CBRs from the survey (non-standardized) and census (standardized) vary quite widely.

Table 6. Estimation of births from the 1998 RHS and age distribution of census female population

Age range	Age specific fertility (RHS)[1]	Female population (Census)	Estimated mean annual births[1]
15-19	.054	132,314	714
20-24	.216	119,059	25,717
25-29	.169	107,443	18,158
30-34	.105	94,036	9,874
35-39	.050	86,887	4,344
40-44	.018	64,317	1,158
Total			59,965

[1] relates approximately to the three-year period from November 1995 to November 1998

As a first step in the reconciliation process, as shown in the table above, age specific fertility rates obtained from the survey are applied to the 2000 female population by age group to yield an estimate of births and a corresponding CBR.

The standardized CBR for the 1998 RHS is estimated from the formula (Σbi/P)*1000, where Σbi is the sum of births at all ages during the year and P is the total population census count, giving

(59,965/2,381,236)*1000
or 25.2 births per thousand population

Obtaining a reasonable estimate of fertility from the census is a little more complicated. The numerator, the number of births during the reference period, can be obtained by assuming the census population counts represent the survivors from births occurring in the years before the census.

The first task is to align census births with the reference period used in the 1998 RHS, that is the three-year period prior to the survey. As the interval between the 1998 RHS and the census was a little over one year, the estimation of fertility during the period when persons aged 1-4 at the time of the census were born would conveniently overlap the reference period used for the calculation of fertility in the 1998 RHS. To estimate fertility from the census it is necessary to treat the persons at each age as the survivors from their birth cohort, that is to assume the population was closed to migration. It is also necessary to estimate the number of deaths occurring to the each birth cohort between the time of birth and the census to generate a reverse-survived estimate of births. These calculations are presented in the following table.

Table 7. Estimated births using reverse survival

Census age (A)	Census count (survivors) (B)	Reverse survivorship rates[1] (C)	Estimated births (D)= (B)/(C)
1	48,628	.907	53,614
2	47,468	.899	52,571
3	49,525	.896	55,289
4	52,387	.893	58,672
Total			220,146

[1]To calculate these rates model life tables were used. The so-called East models were selected as the most appropriate, assuming an expectation of life during the reference period of a little over sixty years.

In "normal" times, it would be reasonable to obtain an estimate of the denominator, the exposed population, by reverse surviving the census population at the constant inter-censal growth rate to yield an estimated population at the mid-reference period for the estimated births. Unfortunately linear interpolation is not helpful, given the skew of annual growth rates arising from the pattern of inter-censal migration. A comparison of the 1989 and 2000 censuses, for example, shows that net outward migration of ethnic Kazaks and Russians amounted to approximately 85,000. Most of this is known to have occurred during the early part of the decade.

Although the census does not provide an accurate estimate of emigration, it is possible to make some reasonable assumptions to obtain population denominators for fertility estimation. Fortunately, the estimation of fertility is not particularly sensitive to small errors in these assumptions.

For illustrative purposes, suppose that net out-migration of all persons during the decade 1990-2000 totaled 125,000 persons, that most of this emigration occurred in the early part of the decade, and that natural increase has declined during the period. While all these assumptions can be shown to hold to a large extent, the levels selected are somewhat arbitrary.

Table 8. Estimation of the inter-censal population distribution

Year (A)	Census population '000 (B)	Out-migration '000 (C)	Natural increase		Inter-censal population[2] '000 (F)
			Population[1] '000 (D)	Rate of growth (r) (E)	
2000	2,381		2,506	1.50	2,381
1999		5	2,468	1.50	2,348
1998		5	2,431	1.50	2,316
1997		5	2,395	1.50	2,285
1996		5	2,359	1.50	2,254
1995		5	2,324	1.85	2,224
1994		10	2,282	2.20	2,192
1993		15	2,232	2.20	2,157
1992		20	2,183	2.20	2,128
1991		25	2,136	2.20	2,106
1990		30	2,089	2.20	
1989	2,044		2,044		

[1]The estimate for the first year is obtained by adding in the total 125,000 net out-migrants. The estimates for inter-censal years are obtained from the calculation, first, of an annual growth rate using the formula $r=(P_2/P_1)/n$, where P_2 is the estimated population in 2000 and P_1 is the estimated population in 1989 and n is the number of years between the two counts. This mean growth rate is then graduated to give the growth rates shown in (E) that are applied using an adaptation of the above formula to obtain the estimates in (D)

[2]The population estimates for natural increase shown in (D) less cumulative net out-migration derived from (C)

Using the number of births occurring between one and five years before the census obtained earlier and the average population (exposed to those births) during that period, that is the population at about three years before the census, the mean CBR for the period can be calculated as:

(220,146/4)/2,285 or 24.1

Note that this estimate, obtained essentially from the age distribution of the 2000 census, compares reasonably well with the standardized rate of 25.2, obtained essentially from the schedule of age specific fertility rates measured in the 1998 RHS. In fact it is the non-standardized CBR of 28.5 shown in the 1998 RHS report that seems a little out of line.

All the fertility estimates discussed above are higher than the corresponding rates obtained from the civil registration records. Using the census and the assumed growth rates estimated earlier, the following CBRs are obtained from civil registrations:

Table 9. Estimation of CBR from civil registration records

Year	Registered births	Estimated mid-year population	CBR
1995	54,052	2,332	23.2
1996	51,618	2,300	22.4
1997	49,317	2,270	21.7
1998	49,062	2,239	21.9
1995-98	**204,049**	**2,285**	**22.3**

Assuming therefore that the reasonable agreement between the census and the 1998 RHS, the mean CBR from civil registrations of 22.3 appears, based on the census, to cover only about 90 percent of births and less based on the results of the 1998 RHS. But again, given the uncertainties in the methods and bearing in mind that this evaluation is not primarily concerned with civil registration, some care will be required in interpreting this finding.

Measuring coverage errors: the PES

In discussing the evaluation of the census, it was decided in view of the acute funding crisis that existed at the time that emphasis should be placed on quality control rather than on a PES. This view was based on the argument that it was better to have good coverage and high a quality census, even with poor evaluation than poor coverage and quality with good evaluation. Nonetheless, it was also felt that a limited PES would serve some purposes. If it were restricted to the most difficult areas it might establish an upper level of error and perhaps demonstrate that large census errors had not occurred.

Thus a small PES was conducted and was focused on measuring coverage errors. It was restricted largely to urban areas where from experience and the field reports received, it was likely that most of the coverage problems were likely to have arisen. The PES was conducted three days after the completion of census fieldwork. There was no real attempt to select a representative sample for the PES. Twenty-one aimag center soums and six districts were purposively

selected for the survey, from which EAs were selected at random. The overall sampling fraction was about 0.5 percent, although the number actually interviewed, for reasons discussed below, slightly exceeded the expected number.

The PES form was adapted from the census questionnaire. The personal questions asked were restricted to name, age, sex, residence, date moved in, and work in the last seven days, as the main purpose of the PES was to measure coverage and not content errors. NSO played an active role in the selection of PES enumerators, using the best available staff from the aimag center soums and khoroos staff, with the proviso that they had not worked as enumerators in the census. To further encourage independence between the PES and census, the enumerators selected for the PES were not notified of their selection until after the census fieldwork had been completed.

The aimags and Capital City census Commissions and temporary bureaus were responsible for conducting the PES. Instructions identical to those used in the census were issued for rules of coverage and household definitions. Following the PES, the names and characteristics of persons included in the census and the PES were matched and the results compared. This raises some important questions. Mongolia is not alone in experiencing difficulties in interpreting the PES. The first and most serious problem with the PES is the failure of some aimag and district Commissions and temporary bureaus to understand the importance of sample selection in the PES. This could be seen from several reports that areas were enumerated (in Selenge and Dornod aimags for example) that had not been selected in the PES sample. As a consequence of this problem, it was not possible to "find" census and PES matches in all areas, resulting in an artificially high estimate of "PES only" records and a corresponding high overstatement of coverage error. A second problem reported by some visiting advisers to the NSO was that the operations of the census and PES were not always independent and it was therefore possible for some managers to see that high agreement between census and PES was achieved. Note that this problem would have the opposite affect by understating true coverage error.

A close look at the detailed results does provide a hint that these problems occurred. In four selected areas, Arkhangai, Bayan-Ulgii, Darkhan-Uul and Khan-Uul, there were no differences between the census and PES results, not impossible from a well-conducted census, but admittedly very unlikely. By contrast, some areas display large errors, consistent with problems in sample overlap and thus probably unrepresentative of census coverage.

A solution that has been tried is to dismiss the extreme high and low ends of the distribution of sample areas to remove most, if not all, of the suspect aimags or districts from the analysis. This effective regression towards the mean yields the following results:

Table 10. Coverage in restricted matched sample of PES and census questionnaires

Persons included in						Persons missed both in Census & PES		Total Revised Sample	
Census only (A)		PES only (B)		Both Census& PES (C)					
No.	%	No.	%	No.	%	No.	%	No.	%
191	1.9	74	0.8	9,573	97.3	1	-	9,839	100

The matching task itself is for obvious reasons confined to persons included in either the census or the PES or in both. But it is possible that some persons were missed from both the census and the PES. This is conventionally measured as the product of persons included only in the census and included only in the PES divided by persons included in both, that is:

((A)*(B))/(C) or 191*74/9,573
approximately 1 person

Note that the theoretical total of persons in the selected EAs is now 9,839. Considering that persons included in the PES only or missed altogether were omitted from the census, the undercount for the census can be estimated as (74+1)/9,839, about 0.8 percent. While this analysis is still far from ideal, it does provide a useful rate of undercount that is in all likelihood reasonably accurate and thus very useful. Indeed, given the difficult nature of enumeration in the areas covered, the PES estimate of census error may even be on the high side. In any case, bearing in mind that the point of conducting a small purposive PES was to provide evidence of error, with the hope of demonstrating that large errors in coverage had not occurred, the PES can be said to confirm the essential validity of the census.

Even a limited PES was thus shown to be worthwhile, although some caution needs to be taken in interpreting the results, since they should not be taken as a final authoritative statement on the accuracy of the census. Indeed, as can be seen in the following section, errors of omission can also arise as a result of mis-classification.

Measuring coverage errors: errors in applying coverage rules

It is not easy to assess the consequences of coverage errors for the census. Even if it were possible to estimate the difference in numbers, where coverage errors have resulted in both erroneous inclusion and exclusion, the implied substitution of groups with different characteristics will have some unknown effects on the quality of responses.

One source of error is the misapplication of the coverage rules. At least two possible weaknesses in the approach to the 2000 census can be identified. The first is the ambitious attempt to conduct both a de facto and de jure census simultaneously. The second is the possible contamination affects of using the registration system as a control over census coverage. The affects of these and other problems in defining and applying the coverage rules are set out in the following table.

Table 11. Sources of error in applying the coverage rules

Method	Sub-groups		Classification		Comments
	Conceptual	Actual	International standards	2000 census	
De facto	Usual residents present at census	Registered residents	Usual residents	Usual residents	
		Unregistered residents	Usual residents	Usual residents	
				Visitors	The treatment of some usual residents as visitors has no effect on de facto coverage, although it will affect other questions such as migration
	Visitors	From within Mongolia	Visitors	Visitors	
		From overseas	Visitors	Omitted	The exclusion of visitors from overseas restricts de facto coverage
De jure	Usual residents present at census	Registered residents	Usual residents	Usual residents	
		Unregistered residents	Usual residents	Usual residents	
				Visitors	The treatment of some usual residents as visitors excludes them from de jure coverage
	Temporarily absent residents	Within Mongolia	Temporary absentees	Temporary absentees	
		Overseas	Temporary absentees	Temporary absentees	
Other	Long term absentees	Long-term absentees overseas	Out of scope	Long-term absentees overseas	Attempts to include some long-term absentees extends the recommended definition of de jure coverage

Starting with the de jure count it can be seen that two groups have been treated erroneously. The misclassification of some usual residents as visitors will exclude them from the de jure census resulting in undercount. The second misclassified group contains some Mongolians who had remained or intended to remain overseas for longer than six months. This group is theoretically out of scope and its inclusion has resulted in population overcount. Note the opposite affects of the treatment of these two groups on the de jure count.

It is not easy to identify either group fully from the census records. By comparing the temporary absent population who were in Mongolia at the time of the census with visitors who were usually resident elsewhere in Mongolia, some indication of the size of the problem can be ascertained. In theory these two categories are identical and can thus be checked from the census database. In practice, coverage of visitors is often easier than coverage of temporarily absent persons, as they are physically present at the time of the census. But the comparison does show that the number of visitors exceeded the number of temporary absent persons and suggests that some mis-classification occurred. The attempt to distinguish between temporary and long-term absence overseas is more difficult. From a review of some of the responses, for example on industry and occupation, and by making inferences about non stated ages (being less likely when information is collected from a household by a trained enumerator), a guess can be made that perhaps 15 thousand persons residing overseas at the time of the census were incorrectly included in the census.

The de jure census net-undercount from all sources is probably not large and almost certainly is less than 1 percent of the population. But as already stated the impact on data quality is more difficult to determine and needs to be born in mind. However, as a proportion of the total population the number of records in error is not significantly large and the affects on data quality should not detract from the essential validity of the census or from the conclusions drawn from the analysis.

For the so-called de facto census, the problems are rather different. The misclassification of some usual residents as visitors will have no effect on the actual count as persons enumerated in their place of usual residence and visitors are both included. But the de facto figures do not include visitors from overseas. The affects on population size of omitting this group cannot be accurately estimated. Again, the impact on quality will also need to be taken into account, especially when viewing tabulations that might be expected to include visitors from overseas. Examples of such tables might include tabulations cross-classified by country of birth or citizenship.

Measuring content errors: the PES

As noted, the main purpose of the PES was to measure coverage errors in the census. However, a small sub-sample of 1,192 persons was selected to provide a rough indication of the consistency of responses between the census and PES. For this sample, responses to the question on age and, for persons aged 15 and above, whether working in the week before the census or PES were compared.

Table 12. Matching responses in census and PES

Variable	Records matched	No difference		Difference		Comments
		#	%	#	%	
Age	1,192	1,178	98.8	14	1.2	Among the 14 records in which a difference was observed in 11 the difference was a single year
Worked last week	847	841	99.3	6	0.7	

The results of this comparison are shown in the table above. Almost 99 percent recorded the same age in the census and PES. Bearing in mind that the PES was conducted about three days after census fieldwork, it could be expected that some differences would occur through natural aging, about one percent would be expected to have had a birthday since the census. Thus the results do show that age was very consistently reported.

For those reporting that they had worked last week, more than 99 percent of matched records showed the same response in the census and PES. It might be argued that a shift in the reference period had occurred and thus some differences not related to census errors would be expected. Again, therefore, though the sub-sample is small, the conclusion does seem to be that high levels of consistency have been demonstrated.

Measuring content errors: age accuracy indexes

One of the problems with age recall, or with poor interviewing, is a tendancy to round age estimates, resulting in "heaping' at ages ending in zero or, to a lesser extent, five. However, where, as in Mongolia, age is derived from a question on date of birth, digital preference will arise from a choice of year of birth and heaping at particular age digits will depend on the differences between year of birth and date of census. In Mongolia we might thus expect that if any preference existed it would be reflected in the ages ending in nine.

Two tests for digital prefence have been used. The first, the so-called Whipple's index expresses the number of persons aged 23-62 at ages ending in zero or five as a percentage of one fifth of the total population in the age range. Thus a "perfect" score would be 100 percent with the two selected digits representing exactly one fifth of all digits. Given the comments above on the use of date of birth, the method is used in the Mongolian context to test the distribution based on the selection of somewhat arbitrary digits. Indeed, if there were to be a preference for the digit nine, this should be reflected in an index below 100 percent. As can be seen from the table, the indexes for all censuses do indeed fall below 100.

Without evidence of strong preference at any particular digit, a more useful measure is probably the so-called Myers blended index. Underlying the Myers index is an expectation of equal sums at each terminal digit; hence the expected percentage of each digit would be 10 percent of the total population. The deviation from this expected even distribution is added at each digit, without regard to sign, to provide a summary index of digital preference. In this case a "perfect" score would be zero with each terminal digit accounting for exactly 10 percent of the total.

As the above table shows, for both indexes the 2000 census performs better than for the earlier censuses. For Whipple's, as expected, scores lie below 100. But as the year 2000 is approached the scores approach 100, suggesting the reduction of digital preference or an improvement in age estimation over time. The differences in the census scores are particularly marked for Myer's index providing a gratifying comment on the quality of age reporting. Again the decline in the indexes over time suggest continuous improvements since 1979, but especially between 1989 and 2000. It should be noted that the terminal digit with the highest deviation and thus contributing most to the index was the digit nine, clearly derived from the combination of a preference for date of birth ending in zero and a census conducted early in the year also ending zero.

Table 13. Age and sex accuracy indexes, 1979 to 2000

Index	Score		
	1979	1989	2000
Whipple's	97.8	99.2	99.3
Myers'	2.6	2.1	1.3

There are of course other measures that could have been obtained, such as the UN sex-age accuracy index for which sex ratio scores are calculated for successive age groups. However, the current tests have already suggested that

age reporting in Mongolia is very good and, more importantly, the quality has improved significantly between 1989 and 2000. Moreover, given the problems associated with age and sex selective out migration in the past decade, the results of sex-age tests may not be easy to interpret.

To appreciate the essential quality of the census, the affects of the various approaches taken to evaluation in this chapter should be seen in total. On the positive side, it is possible to draw some broad conclusions, all of which support the view that the census was an overall success. First, the parameters that have been derived from the census, such as the measure of fertility, suggest that the census age distribution and absolute numbers of women at reproductive age were consistent with the results obtained from the most reliable alternative sources. The results of the PES, although based on very small numbers and restricted to selected urban areas, further suggested that absolute error rates were not unduly high and certainly not high enough to detract from the usefulness of the census analysis. Second, wherever it was possible to compare the quality of the 2000 census with earlier censuses, it was shown that considerable improvements in coverage and quality had occurred.

Concluding remarks

Bearing in mind the inherent difficulties in conducting the census, including the financial constraints and the broad changes in methodology required to conduct a modern census appropriate for a nation in transition to a market economy, the relative success of the census should be viewed as an achievement. Many other aspects of the improvements since 1989 have not specifically been included in the evaluation but will be reflected in more comprehensive and accurate information. Thus, for example, the improved measures of migration, education attainment and literacy obtained from the census will improve the database available to national planners. Additional information on the labour force, including unemployment, will contribute to labour force planning and national development.

All this is not to say that the census was problem free. Far from it. Many of the difficulties encountered in the census have been highlighted in the various chapters of this report. Some specific problems have been raised in the evaluation chapter. Coverage, although generally high, introduced some difficulties. Persons who had moved recently to the towns, for example, were not always enumerated at their place of current usual residence. Moreover, short-term visitors to Mongolia were excluded, resulting in a census count restricted to the Mongolian resident population. As a result of these coverage problems it is probably best to restrict published data to the usually resident population and not attempt to release de facto counts. While it may for some purposes be necessary to take the evaluation results into account in interpreting census tables, for the most part they will have little affect on the value of the census data to the broad range of users. The main purpose of providing the evaluation and highlighting difficulties is to ensure that the next census can take them into account and provide ever more useful and accurate results to census users.

CALENDAR OF POPULATION AND HOUSING CENSUS ACTIVITIES

ACTIVITY		1999												2000								2001			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	3 quarter	4 quarter	1 quarter	2 quarter	3 quarter	4 quarter
1. Preparation	-To establish legal basis for the census (1997-1998)																								
	-To establish the state census commission																								
	-To update census budget																								
	-To find insufficient financial resources for the census																								
	-To establish census commissions in capital city, aimags and soums																								
	-To conduct the pilot censuses in Dornod aimag and Ulaanbaatar																								
2. Questionnaire design and tabulation design	-To finalize the census questionaire																								
	-To finalize manual for the questionnaire																								
	-To develop output tables																								
	-To finalize occupational classification and ISIC																								
3. Mapping	-To develop the methodology of the mapping																								
	-To test the methodology of the mapping																								
	-To finalize the census mapping:																								
	in urban area																								
	in rural area																								
4. Training	-To develop training work plan and handouts for trainers																								
	-To train the chairs of aimags' census commissions																								
	-To train the chairs of aimags' census temporary bureau																								
	-To train the staff of the census commissions and temporary bureaus of soums																								
	-To conduct training for enumerators and supervisors																								
	-To train the NSO staff																								
	-To train coders and data entry operators																								
5. Advocacy	-To develop the publicity program																								
	To advertise the importance of the census:																								
	for whole population																								
	for decision makers																								
	for vulnerable population																								
	-To print posters, calendars, slogans																								
6. Other organizational activities	-To recruit enumerators and supervisors																								
	-To print and distribute quesionnaires and manuals																								
	-To send the NSO's staff to aimags for organizing and monitoring fieldwork																								
	-To prepare the households and population listing																								
7.Enumeration procedure	-To conduct enumeration																								
	-To conduct the post-enumeration survey																								
	-To produce preliminary results at the census																								
8. Data processing	-To develop and test data processing programs																								
	-To acquire equipment for the data processing																								
	- To check and receive the census materials in aimags																								
	-To receive the census materials at the NSO																								
	-To develop census data imputation specification																								
	-To prepare census data processing programm																								
	-To make coding																								
	-To enter the census data into the computer																								
9. Print out the final result of the census	-To print out the detailed output tables																								
	-To disseminate the census results to users																								
	-To publish year books on census results																								
	-To analyse and conduct research work based on the census results																								
10. Documentation of Census Activities	-To develop historical documentation																								
	-To deliver census the materials to the National Archive																								

Census Day

Proposed period. Single blue line means the coincidence proposed period with actual period.
Actual period

EXTRACT FROM THE LAW ON STATISTICS

Article 1. Purpose of the law

The purpose of this law is to establish a unified system for the collection of statistical information of Mongolia and the principles that govern it, define the full rights of statistical organizations and respondents and regulate the relations that arise between them and the users of the statistical information.

Article 2. Legislation on statistics

The legislation on statistics shall consist of the Constitution of Mongolia, this law, and other relevant legislative acts issued in conformity with them.

Article 7. Conducting censuses and surveys

1. The National Statistical Office is responsible for conducting a national population and housing census every ten years and developing input-output tables every 5 years. The National Statistical Office is also responsible for conducting a livestock census, including censuses of domestic animals, wells and fodder, a census of establishments and other special sample and comprehensive surveys, as necessary. The required funding for censuses and surveys shall be included in the central and local budgets for the particular year.

2. The schedule of censuses and surveys that are listed in paragraph 1 of this Article shall be determined by the Government and the schedule of samples or complete surveys shall be defined by the National Statistical Office.

3. The Government, in consultation with the State Ikh Khural, shall establish the timing of censuses other than those mentioned in paragraph 1 of this Article that may be required.

Article 9. The rights and obligations of statistical respondents

Statistical respondents shall exercise the following rights and obligations:

1/ to offer a proposal on the improvement of indicators and their methodology of reports and surveys to a statistical organization;

2/ if not provided for in the law, to refuse to provide statistical information or respond to surveys especially if the indicators and methodology are not approved and adopted by the organizations which are engaged in producing official statistics;

3/ to require all data and information obtained from legal persons and individuals to be kept confidential;

4/ to receive and become familiar with the final results of statistical information and surveys;

5/ to keep the primary information recording used for statistics and surveys;

6/ to provide accurate statistical data and information in due time by using approved and adopted indicators and methodologies;

7/ to be covered by national censuses;

8/ business entities and institutions shall be registered in accordance with the rules and regulations;

9/ to provide official statistical information to the organizations which are engaged in producing official statistics at own side cost.

Article 22. Illegal use of statistical information, confidentiality of information

1. The use of statistical information for illegal profit making purposes by statistical respondents, users and any other relevant bodies is prohibited.

2. The alteration or adjustment of the results of official statistical information and surveys by users is prohibited.

3. The publication or dissemination of information which is still being processed as well as information which has been identified by the appropriate lawful authorities as information concerning national interests or confidential information about individuals, business entities or other organizations is prohibited.

4. The sale or transmission of results of official statistical information by users without the permission of statistical organizations is prohibited.

5. The transmission, sale or deletion of raw data from censuses and surveys kept in computer-readable media before the permitted date of release of information is prohibited.

Article 23. Penalties

1. If a violation of the Law on Statistics does not constitute a criminal offence administrative sanction shall be imposed on the guilty party in accordance with relevant regulation..

2. The court shall decide complaints made by a citizen and/or executive as a result of being fined by the State statistical inspectors.

APPROVED BY THE NATIONAL STATISTICAL OFFICE OF MONGOLIA. 1999. № 125

QUESTIONNAIRE PHC-1

MONGOLIA
POPULATION AND HOUSING CENSUS 2000

All census staff should keep responses confidential in accordance with Mongolian legislation on "Confidentiality of private information" and Mongolian legislation on "Statistics" (article 3, chapter 22)

Census commission number ☐☐☐

Aimag, capital city ☐☐
(WRITE NAME)

Soum, district ☐☐
(WRITE NAME)

Village ☐☐
(WRITE NAME)

Bag, horoo
(WRITE NAME)

Residence [Capital-1. Aimag center-2. Village-3. Soum center-4. Countryside-5.] ☐

Enumeration area number ☐☐

Household number ☐☐☐

Street name ☐☐☐
(WRITE NAME)

House number ☐☐☐

Apartment (fence) number ☐☐☐

Household owns house/ger 1

Shared house 2

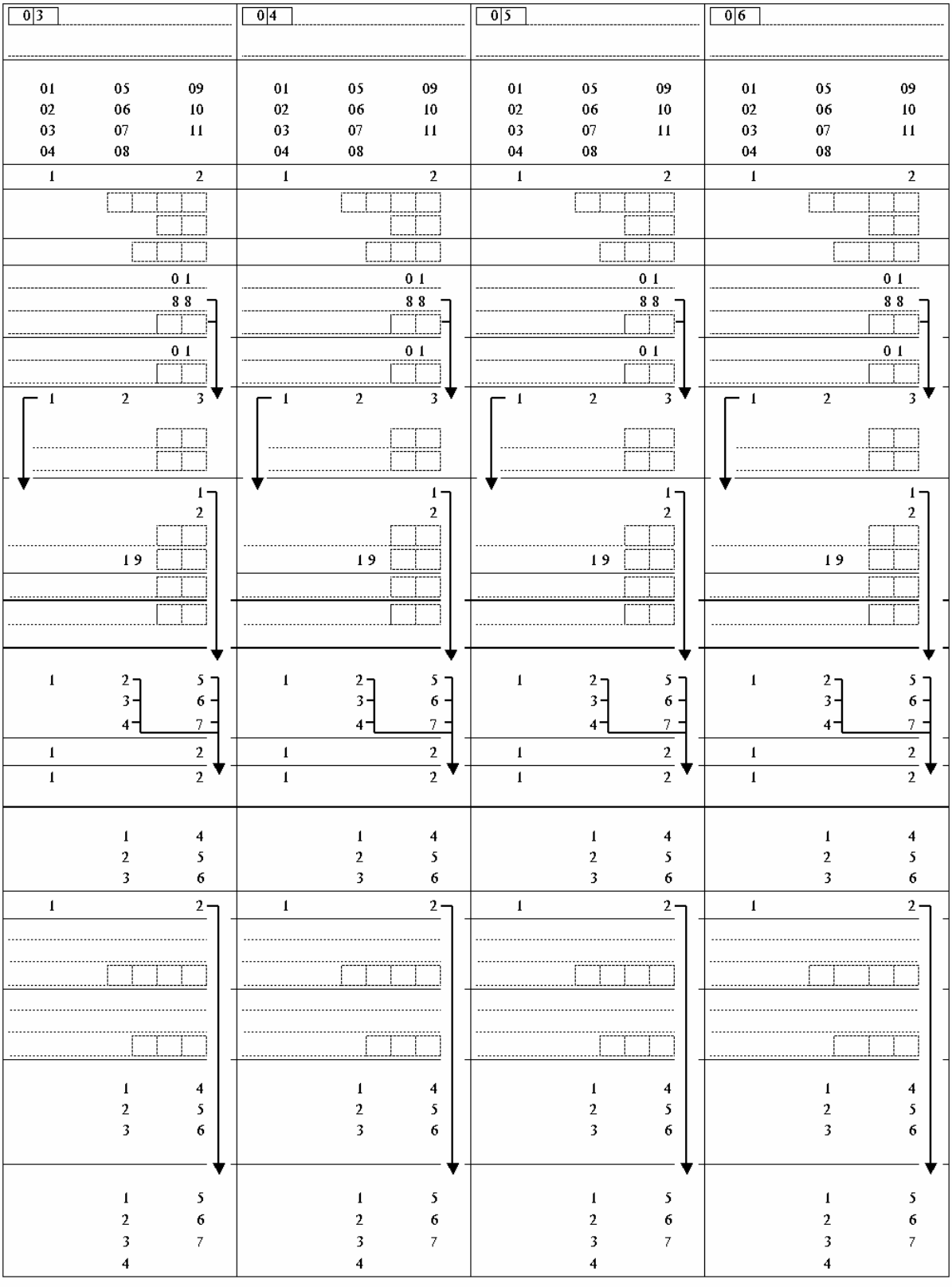
Dormitory or other house 3

Number of persons enumerated ☐☐

Number of questionnaires completed ☐☐

	QUESTIONS																	
		Family name							0 1						0 2			
		First name																
All persons should answer	**1. Relationship to household head**	Household head -01	Sister/brother -05	Grandchild -09	01	05	09							01	05	09		
		Wife/husband -02	Parents in law -06	Other relatives -10	02	06	10							02	06	10		
		Daughter/son -03	Daughter/son in law -07	Non-relative -11	03	07	11							03	07	11		
		Parents -04	Grandparents -08		04	08								04	08			
	2. Sex	Male -1	Female -2		1	2								1	2			
	3. Date of birth	Year																
		Month																
	4. Age (in completed years)																	
	5. Citizenship	Mongolian							0 1						0 1			
		Non-citizenship							8 8						8 8			
		Foreign (specify country)																
	6. Ethnicity	Khalkh							0 1						0 1			
		Other (specify name)																
	7. Residence	Resident -1	Temporary absen -2	Visitor -3	1	2	3							1	2	3		
	Write usual address for visitors and address at census for temporary absentees	Aimag, capital city/country/																
		Soum, district/city/																
	8. How long have you been living at usual residence?	Since birth -1											1					1
		Moved in -2											2					2
		Aimag, capital city/country/																
		Year moved in											1 9					1 9
	9. Place of birth	Aimag, capital city/country/																
	10. Place of usual residence on 1 January 1995? (persons aged 5 and over should answer)																	
Persons aged 7 and over should answer	**11. Education**	Less than primary -1	Primary -2	Technical vocational -5	1	2	5							1	2	5		
			Grade 4-8 -3	Diploma -6		3	6								3	6		
			Grade 9-10 -4	High -7		4	7								4	7		
	12. Literacy	Literate -1		Illiterate -2	1		2							1		2		
	13. Are you studying now? (persons 7-29 years should answer)	Yes -1	No -2		1		2							1		2		
Persons aged 15 and over should answer	**14. Marital status**	Never married -1		Separated -4		1	4								1	4		
		Married -2		Divorced -5		2	5								2	5		
		Living together -3		Widowed -6		3	6								3	6		
	15. Have you worked during the last week?	Yes -1	No -2		1		2							1		2		
	16. Occupation																	
	17. Sector name, type of activities at place of work																	
	18. Employment status	Employee -1	Member of cooperative -4			1	4								1	4		
		Employer -2	Household member working without			2	5								2	5		
		Self employed -3	payment in family's business or farm -5			3	6								3	6		
			Other -6															
	19. Why haven't you been working?	Studying -1	No work available -5			1	5								1	5		
		On pension/retired -2	Looking for a job -6			2	6								2	6		
		Disabled -3	Other -7			3	7								3	7		
		Home duties -4				4									4			

CONTINUATION: **YES - 1** **NO - 2**


0 3
0 4
0 5
0 6
01 05 09
02 06 10
03 07 11
04 08
1 2
0 1
8 8
1 2 3
1 9
1 2 5
3 6
4 7
1 4
2 5
3 6
1 5
2 6
3 7
4

CONDITIONS AND TYPES OF HOUSES/GERS

№	Questions			Skip
01	**Type of house/ger**	House Ger	1 2	 → Question-11
	HOUSE			
02	**Type of living quarters**	House Apartment Students dormitory Public dormitory Other public apartment Non-living quarters Other	1 2 3 4 5 6 7	
03	**Number of rooms**			
04	**Living area**	square m		
05	**Type of heating**	Centralized Non-centralized Other	1 2 3	
06	**Water supply**	Hot and cold water pipe Cold water pipe only Water from outside: Well Water from outside: Hand well Water from outside: Other	1 2 3 4 5	
07	**Disposal of household waste**	Through tube Special hollow Outside of house No special place for waste	1 2 3 4	
08	**Toilet**	Inside of house: Separate Inside of house: Public Outside of house	1 2 3	
09	**Kitchen**	Kitchen in house-sole use No kitchen in house Kitchen in house-shared	1 2 3	
10	**Bathroom/shower**	Bathroom/shower in house-sole use No bathroom/shower in house Bathroom/shower in house-shared	1 2 3	 → Question 17
	GER			
11	**Number of gers**			
12	**Number of walls**	First		
13	**Source of water supply**	Well Hand well River, spring Lake, pool Other	1 2 3 4 5	
14	**Waste disposal**	Yes No	1 2	
15	**Toilet**	Yes No	1 2	
16	**Burrowhole for dirty water disposal**	Yes No	1 2	
	WILL BE FILLED UP BY ALL HOUSEHOLDS			
17	**Type of property**	Government Private Mixed	1 2 3	
18	**Electricity**	Yes No	1 2	
19	**Telephone**	Yes No	1 2	

Enumerator _____ Supervisor _____

. . .th of ... , 2000 . . .th of. . . , 2000

PARTICIPANTS IN POPULATION AND HOUSING CENSUS 2000

Aimag, Capital city	Members of Census Commission& Temporary Bureaus	Enumerators	Supervisors	Other	Total Number of Census Workers
Arkhangai	257	781	195	76	**1,309**
Bayan-Ulgii	191	547	137	56	**931**
Bayankhongor	261	624	156	80	**1,121**
Bulgan	216	416	104	64	**800**
Govi-Altai	231	462	115	72	**880**
Dornogovi	191	269	67	56	**583**
Dornod	200	409	102	56	**767**
Dundgovi	211	362	90	64	**727**
Zavkhan	338	662	166	96	**1,262**
Uvurkhangai	249	890	222	76	**1,437**
Umnugovi	199	318	80	60	**657**
Sukhbaatar	182	367	92	52	**693**
Selenge	223	431	108	68	**830**
Tuv	340	672	168	108	**1,288**
Uvs	262	600	150	80	**1,092**
Khovd	228	510	127	68	**933**
Khuvsgul	308	832	208	96	**1,444**
Khentii	248	446	112	76	**882**
Darkhan-Uul	70	347	87	16	**520**
Ulaanbaatar	1,704	2,435	609	476	**5,224**
Orkhon	45	267	67	8	**387**
Govisumber	53	60	15	12	**140**
Other*	170	-	-	-	**170**
Total	**6,377**	**12,707**	**3,177**	**1,816**	**24,077**

*Census State Commission, NSO and Ministerial Census Commissions & Temporary Bureaus