



人口會議結果報告書

ELEVENTH POPULATION CENSUS CONFERENCE
SYDNEY/CANBERRA, AUSTRALIA

FEBRUARY 9-13, 1987

1987

經濟企劃院 調査統計局

National Bureau of Statistics
Economic Planning Board

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I. 第11次人口센서스會議概要

I. 第 11 次 人口센서스會議 概要

1. 會議開催

1) 主催：美國 East-West Center, Population Institute

2) 日 字：1987.2.9 - 2.13 (5 日間)

3) 場所：濠洲 시드니 및 캔버라

4) 參加：아시아太平洋地域 19 個國 代表 33 名

國際機構 3 機關 代表 10 名

5) 會議開催經緯 (隔年制로 開催)

- 第 6 次會議 - 1978. 5. 8 - 5.12 美國 하와이
- 第 7 次會議 - 1979. 9.24 - 9.29 美國 하와이
- 第 8 次會議 - 1981. 9.28 - 10. 2 韓國 서울
- 第 9 次會議 - 1983. 3. 1 - 3. 5 日本 東京
- 第 10 次會議 - 1985. 4.29 - 5. 3 美國 하와이
- 第 11 次會議 - 1987. 2. 9 - 2.13 濠洲 시드니 캔버라

2. 會議目的

同會議는 參加國의 統計機關 責任者 및 人口統計專門家들간에 相互 統計技術 協力增進 方案과 인구센서스의 效率的인 實施・分析 및 利用技術에 관한 論議가 目的임.

3. 討論議題

- 1) 各國 人口센서스概要에 관한 報告書發表 — 韓國, 日本, 中共, 香港, 濠洲, 뉴질랜드, 인도네시아, 필리핀, 피지, 캐나다
- 2) 測定에 관한 問題 — 泰國에 있어서 失業과 잠재적 失業의 把握
老齡人口研究을 위한 센서스資料의 利用
文盲者 把握을 위한 센서스資料의 利用
인도네시아의 都市·農村基準研究
컴퓨터를 利用한 家口構成分類研究
勞動力 測定에 관한 센서스資料의 利用
- 3) 센서스 自動化 — 日本의 1985 年 센서스의 評價
美國의 1980 年 센서스의 評價
컴퓨터를 活用한 職業應答項目的 부호기입
資料複寫에 관한 研究
- 4) 人口센서스資料의 政策的 活用 — 家族計劃 및 保健政策에의 活用
- 5) 小數民族 人口調査에 관한 各國 報告書發表 — 中共, 印度, 필리핀, 스리랑카, 美國, 濠洲, 캐나다
- 6) 出產力과 死亡力 — 印度의 最近 人口動態統計의 改善
妊娠記錄의 研究
네팔의 嬰兒死亡研究
- 7) 1990 年 人口센서스計劃 — 말레이시아의 1990 年計劃
人口센서스의 새로운 方向
파키스탄의 1991 年計劃
美國의 計劃
ESCAP 의 勸告案

4. 參加國 및 機關

Australia, Canada, China, Fiji, HongKong, India, Indonesia, Japan, Korea, Malaysia, Nepal, New Zealand, Pakistan, Papua New Guinea, Philippines, Singapore, Sri Lanka, Thailand, United States, ESCAP, South Pacific Commission, East-West Population Institute

5. 會議日程

日 字	日 程
2. 8	東西文化센터 主催 晚餐會
2. 9	開 會 式 各國 報告書 發表
	測定問題에 관한 論文 發表
2.10	測定問題에 관한 論文發表 繼續 센서스 自動化에 관한 論文發表 濠洲統計局 主催 晚餐會
2.11	資料複寫센터 訪問 캔버라로 移動
2.12	센서스資料의 政策的 活用に 관한 論文發表 小數民族 調査에 관한 各國報告書 發表 濠洲統計局 主催 晚餐會
2.13	出生力과 死亡力에 관한 論文發表 1990 년도 센서스計劃에 관한 論文發表 閉 會 式

II. 參 考 資 料

1. 參席者名單
2. 韓國代表의 基調演說文
3. 濠洲統計局長의 人事말
4. 韓國의 1985年 人口 및 住宅센서스 結果概要
5. 各國의 Country Report
6. 1990年代 各國의 人口센서스 計劃
7. 캐나다의 人口動態申告法
8. 蒐集資料 目錄

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February 9-13, 1987

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2. 韓國代表의 基調演說文

Ladies and Gentlemen, Distinguished Participants:

I would like to say at outset that it is a great pleasure and an honor for me to take part in this conference and to have this opportunity to present to you what we do with regard to the population census in the Republic of Korea.

Before going on to details of the main subject, please allow me to briefly mention some facts about pupulation size and population growth prospects in Korea. According to the preliminary result of the 1985 census, the total population of Korea is about 40,467 thousands, thus giving a total density of 408 persons per square Km. This means that its population size ranks 22nd in the world, and its density stands 3rd in the world if you exclude such city countries as Hong Kong and Singapore.

Also, from these preliminary results, we have made a population projection on the basis of the component method up to the year 2023. The assumption in this projection is that the total fertility rate will continue to decline from 2.1 children per female in 1985 to 1.8 children in 1995, and the life expectancy at birth will be increasing from 64.9 years for males and 71.3 years for females to 69.3 years and 76.2 years in 2000 onwards. The figures shown in this projection reveal that in Korea a one percent population growth rate will be attained in 1994 and a zero percent growth rate in the year 2023.

The most recent census in the Republic of Korea was conducted as of 1 November 1985. It was the thirteenth census of population and the fifth census of housing in the series of census taking in Korea.

The National Bureau of Statistics, which is a semi-autonomous organization under the Economic Planning Board of the Korean government, has the overall responsibility for the planning, execution, tabulation and publication of the census.

Legal basis for the census is provided by the Statistics Law in which population and housing censuses are named as Government Designated Statistics Numbers 1 and 2. Moreover, a provision of the Census Decree of Korea stipulates that a full-scale census is to be taken in years ending in zero and a simplified census in years ending in five. However, the distinction between the full-scale census and the simplified one disappeared in recent years, as the scope of the simplified census has expanded to meet the ever-increasing demand for census information.

In order to enumerate all population in a limited time, we divided the country into enumeration districts (EDs) using census base maps prepared by the National Bureau of Statistics. The total number of general EDs in the 1985 census was 152,368 with each ED consisting of 60 households on average.

With a view to assign two EDs to one enumerator, about 85,000 enumerators were employed on a temporary basis for the census. Among them about 27 percent were university students

and 40 percent were from heads of quasi-administrative neighbourhood units in urban areas and heads of village communities in rural areas. Meanwhile, approximately 40,000 census officials from the local administrative hierarchy worked as supervisors.

In the 1985 census, all survey items were covered by the complete enumeration method. The number of items covered were 30 items. Among them, 16 items were population characteristics such as name, age, sex, relationship to household head, religion, place of birth, place of residence one year ago, place of residence five years ago, school attendance, type of economic activity, industry, occupation, marital status, number of children, children surviving and children dead. The other 14 items were housing characteristics such as type of living quarters, type of household, tenure, etc.. Compared with the items in the 1980 census, the items on the origin of the family name, religion and floor area of a housing unit are newly appeared in the 1985 census. The population was counted on the basis of the de-jure concept.

As for the data preparation, particularly for manual editing and coding, about 300 female workers with the minimum qualification of high school diplomas were recruited on a temporary basis for one year. However, data entry onto magnetic disks for complete questionnaires will be executed on a contract basis with private business data centers. Upon receipt of the data input by private companies, we will carry out the computer editing and tabulation.

Preliminary counts of population, households and housing units by minor administrative units were released in March 1986. An Advance Report on the basis of two percent sample of households was also published in November 1986.

It was revealed from this advance report that the proportion of population living in urban area increased from 57.2% in 1980 to 65.4% in 1985, the median age increased from 22.2 years to 24.5 years, the proportion of population aged 65 years and over increased from 3.9% to 4.3% implying a tendency toward aging of the population, mean age at marriage for males and females increased from 27.3 years and 24.1 years to 27.8 years and 24.7 years respectively. It was also revealed that the proportion of population with more than high school diploma among aged 15 years & over were 39.1% which is an increase of 11.4% point from 1980, and the proportion of life-time migrants was 36.8%.

After completion of the entire count tabulation, a Report for the Whole Country, Provincial Reports for 13 provinces and Special Reports for Internal Migration and Fertility will be published in December 1987.

As for the evaluation, we employed two methods; post-enumeration survey (PES) and demographic analysis. The dependent method was formulated as the PES-design for the 1985 census (response-bias type).

In addition to the PES, the completeness in the census was checked by the cohort comparison method. It was estimated that

the net under-enumeration rate was 1.45 percent. It was also revealed that there might be under-enumeration in 0-4 age groups of both sexes, in 24-29 age groups in males and in 19-23 age group of females. It also seemed that there was age misstatement in ages where the year has 13 months according to the lunar calendar system.

As mentioned in previous sections, there are some distinctive features in the 1985 Population and Housing Census. We adopted the complete enumeration, abandoning sample survey; a number of new items such as the origin of the family name, which is an item of extreme interests to all Koreans, as well as religion and floor area of a housing unit were added; workloads for enumerators were markedly reduced from 150 households for eight days in 1980 census to 120 households for ten days in 1985; and we waged a strong publicity campaign through mass media to promote interests and cooperation among the public.

We all know that even with greatly increased budget and manpower accurate survey of the whole population and its characteristics within a limited time span is extremely difficult. Census conducting in an ever mobile society is usually subject to many errors, including coverage and content inaccuracies.

Finally major items for consideration for the 1990 census are as follows: First, we plan to introduce the OMR system to speed up data processing. The review of our past experiences of this system with regard to a survey covering 14,000 house-

holds in one county in 1984 was found to be encouraging, and accordingly we are going to adopt the OMR system for the special vital statistics survey which will be conducted in October this year as a trial for the 1990 population census. Second, in order to meet the demands of diverse users we will consider the adoption of sample enumeration for some specific items while maintaining complete enumeration for basic items. Third, we believe more efforts should be made to recruit more qualified enumerators.

This would mean, first of all, that more funds are to be secured for the salary to enumerators. Furthermore, recruit plan must be more carefully worked out, making use of all available government resources in personnel management area. Fourth, more attention has be paid to the preparation of effective training materials utilizing audio-visual aids. Fifth, the introduction of a mesh code for each enumeration districts to draw up various statistical maps will be made.

In closing, I would like to express my sincere appreciation to the East West Population Institute and the Australian Bureau of Statistics for their kind invitation, and I look forward to maintaining a relationship of close cooperation with the institute and also with statistics bureaus of all countries represented here.

Thank you.

3. 濠洲統計局長의 人事말

ELEVENTH ASIAN AND PACIFIC CONFERENCE

9 - 13 FEBRUARY 1987

SPEECH OF WELCOME BY IAN CASTLES, AUSTRALIAN STATISTICIAN

It is with great pleasure that I welcome you to Australia and to the Eleventh Asian and Pacific Population Census Conference.

The countries whose census experts are participating in this Conference have a total population of over 2,700 million, or about the same number as the population of the entire world 30 years ago.

In other words, most of us were born into a world in which, according to the best estimates we have, there were fewer people than are now living in the countries of the Asian and Pacific Region alone. It is necessary to say "according to the best estimates we have" because there had been no censuses in some parts of yesterday's world - the world we lived in when we were younger.

It is only in the 1980s that censuses have been conducted throughout the world, not only to count the numbers of people but to discover the information about how they live and work that is required to support effective national policies for economic and social development.

The countries represented here differ enormously in geographical size, in population, in the nature and scope of their national problems and opportunities and, not least, in the tasks faced by their census-takers. Yet, whatever those differences may be, it is clear that there are also shared problems and challenges: issues that can be discussed at Conferences such as this one, to the benefit of all.

All countries have an interest in looking for more cost-effective methods of obtaining information about their population and, in particular, in getting the best possible return for the resources they devote to census-taking. That means, obviously, taking full advantage of the benefits that advancing technology has to offer in processing census returns and in disseminating results; but it also means directing attention, from the outset of the census planning process, to the way in which census results will be used and to close consultation with the full range of users and potential users of data.

I am pleased to see that this Conference is paying close attention to the use of census statistics, particularly in the session on fertility and mortality.

It is increasingly becoming accepted that national statistical agencies themselves have an important role in the analysis of the data they collect. The further that analysts are from the available microdata, the more likely it is that the full potentialities of the data will not be exploited and the greater is the possibility that the data will be misinterpreted. This process of analysis focuses attention on shortcomings in the data and on how those shortcomings may be rectified, and it is best that those responsible for the planning of censuses and surveys should become aware at first hand of the limitations.

Most statistical agencies have a high reputation for impartiality and objectivity. Whilst it is important that that reputation is not prejudiced by comments that might be regarded as partisan or selective, there are opportunities for improving public understanding of complex issues if those responsible for collecting and compiling data devote their best efforts to explaining what the data show.

That is, at any rate, the view of our responsibilities that we have taken in the Australian Bureau of Statistics. It is, I know, a view which is widely shared in statistical agencies in the countries whose census experts are participating in this week's Conference.

It is now 15 years since the first Asian and Pacific Population Census Conference was held. This Conference is the eleventh, and the first which has been held in Australia. I hope that you will all have an enjoyable and memorable time in Australia, and that you will find the Conference - both in its formal and informal aspects - as rewarding as previous Conferences have been.

9 February 1987

4. 韓國의 1985年 人口 및 住宅센서스 結果概要

Outline of the 1985 Population and Housing Census in the Republic of Korea

**National Bureau of Statistics
Economic Planning Board
Seoul
Republic of Korea**

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The 1985 Population and Housing Census

1. Introduction

The Population and Housing Census which is taken in the Republic of Korea and in most other countries of the world at regular intervals-usually of five or more years-is the basic and comprehensive source of statistical information on the population and housing condition of a country.

Although the population and housing census, if considered as a field operation, has much in common with other kinds of field surveys, it is nevertheless sharply distinguished by its traditional background, legal sanctions, coverage, and by the whole scale of the operation and the resources normally devoted to it, which permit a far greater content and depth of analysis than can normally be encompassed in other types of field study. The Republic of Korea is no exception in this field, as briefly outlined in the following sections.

2. Historical Perspective and Legal Basis

Although Korea has a long history of the performance of population counting, census taking in the modern sense was introduced in 1925 and it has been carried out almost every five years since then.

The most recent census, the 1985 Population and Housing Census, was the thirteenth census of population and the fifth census of housing in the series of

census taking. Tables 1 and 2 in the appendix present a summary of Korean censuses since 1925.

The population and housing censuses are Designated Statistics Numbers 1 and 2 based on the provisions of the Statistics Law. The provision of the Census Decree of Korea stipulates that a full-scale census is to be taken in years ending in zero and a simplified census in years ending in five. However, the distinction between the full-scale census and the simplified one has virtually disappeared in recent years, as the scope of the simplified census has expanded to meet the ever-increasing demand for census information

3. Census Organization

The National Bureau of Statistics (NBOS) is an agency under the Economic Planning Board of the Korean government with a semi-autonomous status. The NBOS is headed by a director-general assisted by two deputy directors-general and includes 10 divisions. The Population Statistics Division, with a regular staff of about 20, was responsible for the planning and execution of the census including questionnaire design, table formats, analysis of the results, recruitment and training of enumerators. Besides the Population Statistics Division, the Data Processing Division is responsible for editing, coding, data preparation and tabulation.

In addition to central organization, local government hierarchy played an important role in the 1985 census as well. The Republic of Korea is divided into nine provinces (Do) and five special cities (Shi) which have the same status as provinces. Each province contains cities (Shi) and counties (Gun). The county is subdivided into collections of villages (Myeon) and towns (Eup). The five special cities and two large cities are subdivided into wards (Gu), which are again subdivided into sub-wards (Dong). The other cities consist of sub-wards only. In all, there are 45 cities besides five special cities, 50 Gu, 135 Gun, 187 Eup, 1,256 Myeon and 1,830 Dong offices as of 1 November 1985.

This local government hierarchy was particularly important in the designation of enumeration districts, the recruiting and training of enumerators, and the supervision of the enumeration. The Minister of the Economic Planning Board directed the governors of the provinces to supervise the execution of the census operation, and the governors appointed census officials down along the administrative hierarchy within their jurisdiction.

Additionally, two special committees to perform advisory functions, namely, the Technical Advisory Committee for Census under the Statistical Council which is the regular statistical advisory body and the Census Data Users' Committee, were organized. The technical Advisory Committee was mainly composed

of demographers, economists and statisticians, while the Census Data Users' Committee included the representatives of government agencies, research institutes and business associations.

4. Budget

The total budget required for the 1985 census was about 10.4 billion Won (equivalent to 12 million dollars), excluding salaries to be paid for regular staff in both central offices and local government agencies. Breaking down the total budget, about 200 million Won was allocated for the preparatory work in 1984; about 8,400 million Won was spent for field operation in 1985; an additional 1,800 million Won is allocated for the data processing and publication in 1986 and 1987.

5. Census Mapping and Establishment of EDs

The preparation of adequately maps, such as census base maps and ED maps is indispensable for carrying out the census operation successfully. The census base maps prepared for each Dong, Eup and Myeon on a single sheet show location, roads and other possible landmarks by which the boundary of EDs are delineated. The maps of EDs showing the locations of dwelling units as well as households are to be prepared by enumerators in each respective area during three days prior to the census date. But most of ED maps were drawn up by census officials in sub-ward offices.

In the preparation of census base maps, the following mapping materials were utilized: 1) aerial photographic maps with a scale of 1:1,200 mainly for large cities, 2) municipal planning maps with a scale of 1:5,000 mainly for small cities and 3) topographic maps and maps of land registers with a scale of 1:12,500 for rural areas.

From these basic mapping materials, the National Bureau of Statistics made a preliminary outline of the census base maps. They were then sent to the local administrative offices for editing and updating. After these tasks were completed, the local administrative offices delineated the boundaries of each of EDs on the basis of criteria laid down by the NBOS.

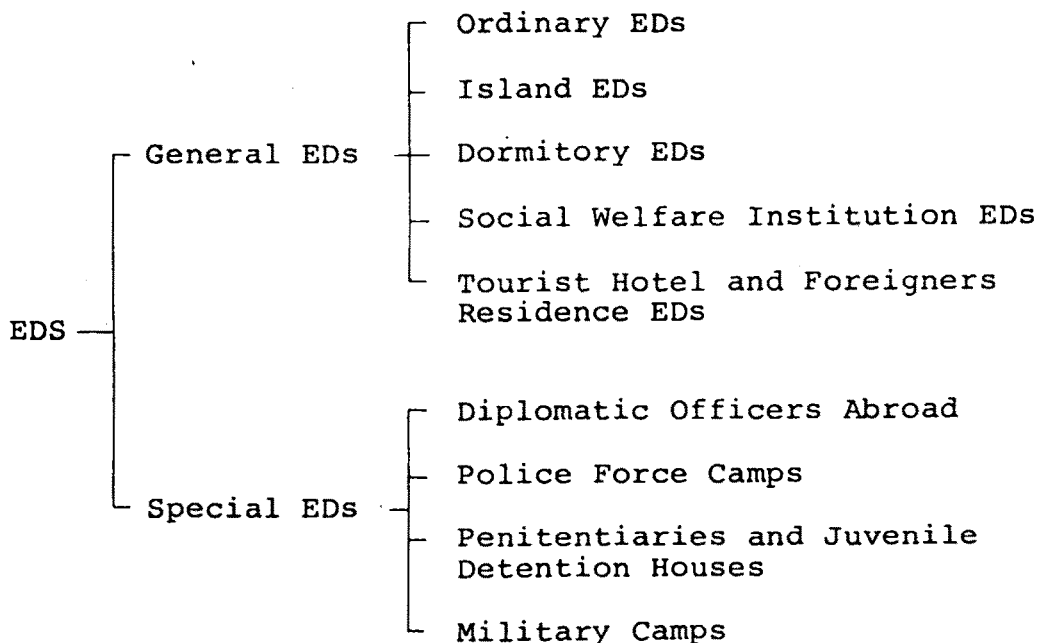
6. Enumeration

6.1 Enumeration Districts (ED)

The ED is the smallest spatial unit which has been designed for use in the census as the basic collection, coding and processing unit. The basic concept of a ED is that of a five day field workload area of an enumeration.

The census design in Korea defined two types of EDs, general EDs and special EDs. The general EDs were all areas where free access was permitted, while the special EDs were composed of collective institutions-such as military camps and fleets, prisons, police stations, and diplomats abroad-where free access was prohibited.

Each general ED covered 50-80 households, or 60 households on the average. General EDs are divided into ordinary EDs and quasi EDs. Quasi EDs were formed in districts that were not appropriate for ordinary EDs, such as boarding houses and social welfare institutions (e.g., orphanages). Ordinary EDs were defined in accordance with the boundaries of administrative areas or natural features such as roads, buildings or rivers. The total number of general EDs in the 1985 census was 152,368; this included 147,007 ordinary EDs and 5,361 quasi EDs.



6.2 Recruitment and Training of Enumerators

About 85,000 enumerators were employed on a temporary basis for the census. Among them, about 27 percent were university students and 40 percent were from heads of neighbourhoods unit in urban areas and heads of villages community in rural areas. Meanwhile, approximately 40,000 census officials from the Dong, Eup and Myeon levels of the administrative hierarchy worked as supervisors.

The training for enumerators was done in two channels. The training for enumerators recruited in 14 cities which have residents more than 300,000 was done directly by the staff of the National Bureau of Statistics. Meanwhile, the training for enumerators in other areas was carried out by a relay method through the local government hierarchy.

6.3 Enumeration Procedure

In the 1985 census, all survey items were covered by the complete enumeration method. On an average, two enumeration districts were assigned to one enumerator.

During the three day prior to the main enumeration period, which extended from November 1 to 10, each enumerator prepared a map of his/her ED showing the location of each household and prepared a list of all households in the ED. The enumerator was also instructed to paste slips of paper showing the

household serial numbers on the entrance of the housing units. Then, the enumerator delivered the reducing form of census questionnaire for each household only in urban areas in an effort to save time during the main enumeration period.

In the main enumeration period, the enumerator called at the household again and completed a questionnaire by interviewing the responsible member of the household. The population count was made largely on the basis of a *de jure* concept.

After completing and examining the questionnaires, the enumerator was requested to compare them with the household list for consistency. The completed questionnaires, household lists and ED maps were then submitted to the Dong, Eup and Myeon offices where they were checked by the census officials, and then forwarded to the National Bureau of Statistics through each level of the local government.

7. Census Items

In the 1985 census information on all items was collected via complete enumeration, whereas in the past censuses the basic items were collected on the basis of complete enumeration and other items concerning migration, fertility and labor force were on a sample basis. The number of items covered in the 1985 census were 30 items, 16 items for population

characteristics and the rest for housing characteristics. They are shown as follows and in Table 3 of the appendix.

A. Items for Population Sector

- 1) Name and origin of the family name
- 2) Relationship to head of household
- 3) Sex
- 4) Age
- 5) Religion
- 6) Place of birth
- 7) Place of residence one year ago
- 8) Place of residence five years ago
- 9) School attendance and educational attainment
- 10) Type of economic activity
- 11) Industry
- 12) Occupation
- 13) Marital status
- 14) Number of children ever-born
- 15) Number of children surviving
- 16) Number of children dead

B. Items for Housing Sector

- 1) Type of living quarters
- 2) Type of household (representative, attached, collective)
- 3) Tenure and cost of rent
- 4) Number of rooms used in a household
- 5) Cooking fuel used in a household
- 6) Kind of household appliances

- 7) Number of households in a housing unit
- 8) Number of total rooms in a housing unit
- 9) Total area of floor space in a housing unit
- 10) Type of heating system in a housing unit
- 11) Type of kitchen in a housing unit
- 12) Type of toilet in a housing unit
- 13) Type of bathing facilities in a housing unit
- 14) Items on multi-purpose housing units

8. Population and Housing Units to be Enumerated in the Census

8.1 Population

The population was counted on the basis of the de jure concept. In the census the de jure population refers to those persons who usually live in an area at the date of census. However, the persons who were living in Special EDs were enumerated exceptionally at their respective places, but were allocated to the usual residence of their family. In case of persons who had no usual residence, they were enumerated at the place where they were found at the time of the census.

Although the following persons were away from home at the time of the census they were enumerated at the usual residence of their family: 1) Civilians who were away from home for business or travel,

2) Those who were in police-station detention houses (not a penitentiary), 3) Those who were travelling abroad at the time of the census, 4) Hospital patients and their attendants, 5) Government officials abroad for trip or training purposes and 6) Crew members in vessels, airplanes and locomotives.

Excluded in the census enumeration are 1) workers and students who were living abroad at the time of the census, 2) foreign diplomatic corps, foreign personnel working in UN organizations their suites and their dependents, and 3) foreign military personnel, military civilians and their dependents.

8.2 Housing

All housing units within the area defined by the census were canvassed. Housing units were classified into detached dwellings, apartments, town houses and dwelling units in permanent buildings not intended for human habitation. But the following units were excluded.

- 1) Military barracks
- 2) Camps in prison, police detention houses, juvenile reformatory institutions
- 3) Housing units and office buildings where foreign diplomats, foreign military personnel and their dependents were living

9. Data Processing and publication

9.1 Data Processing

In order to carry out the data preparation particularly for manual editing and coding, about 300 females with a minimum qualification of a high school diploma were recruited on a temporary basis for one year. After receiving special training, they were first involved in manual editing and coding for a two percent sample of households selected systematically.

However, data entry onto magnetic disks were executed on a contract basis with private business data centers. Upon receipt of the data input by private companies the NBOS carried out the computer editing on the basis of the editing criteria. Records that failed to satisfy the editing criteria were maintained in separate files for verification and amendments, and then were corrected manually. Thus, the cleaned data for a two percent sample were prepared in the middle of August.

Meanwhile, manual edits, coding and data entry onto magnetic disks for complete questionnaires were finished by the end of 1986.

In addition, a series of computer editing will be run during January to July 1987, and complete count tabulation will be made in October 1987.

9.2 Publication

The first results of the 1985 census, the preliminary counts of population, households and housing units by minor administrative units (i.e. Dong, Eup and Myeon) were released in March 1986. These preliminary counts were based on summary sheets prepared by the enumerators.

To meet the urgent need for census data, an advance sample tabulation of the main characteristics on population size and its structure, migration, fertility, households and housing units was made on the basis of a two percent sample of households selected systematically. The Advance Report was published in November 1986.

After completion of the complete count tabulation, the Report for a whole Country, Provincial Reports for 13 provinces and Special Reports for Internal Migration and Fertility will be published in December 1987.

10. Evaluation

In order to get an estimate of the completeness of coverage as well as a measure of response variances of a few key items, post-enumeration surveys have been carried out in each Korean census since 1960. PES designs in 1970 and 1975 were essentially the response-variance type (dual system estimate).

However, matching records was found to be a very difficult task in the Korean context for the following reasons: 1) The addressing system is not systematic and orderly, 2) Some people keep addresses which are different from their actual usual residence, 3) It is difficult to obtain accurate information on the addresses of out-migrants and 4) It is difficult for enumerators for PES to identify the correct ED boundary which was canvassed in the census.

These considerations led to the adoption of a response-bias design for the 1985 PES, using dependent reenumeration as in 1960, 1966, and 1980.

The emphasis was on obtaining complete coverage and accurate responses and on eliminating the source of errors in the census. In order to ensure as complete coverage as possible, the PES enumerators were selected from experienced and qualified enumerators of the National Bureau of Statistics and were trained by the NBOS staff.

The PES attempted to confirm the items on both the household and the household members. The enumerators confirmed residential status at the time of the census during the PES as well as households movements. As for the household members, the enumerators confirmed name, sex, relationship to the household head, age, marital status, and residential status at the time of the census.

In addition to the PES, the completeness of the 1985 census was checked by employing the cohort comparison method. The basic data utilized in this method were the number of population by age and sex from the 1980 and 1985 census, age specific fertility rates and age specific death rates derived from the survey and derived from the life table and number of emigrants by age and sex as obtained from the Ministry of Foreign Affairs. Accordingly, it was estimated that the net under-enumeration rate in 1985 census was 1.45 percent.

It was also revealed from the analysis of cohort sex ratios and cohort survival ratios between censuses that there might be under-enumeration in 0-4 age groups of both sexes, in 24-29 age groups of males and in 19-23 age groups of females. It also seemed that there was age mis-statement in ages where the year has 13 months according to the lunar calendar system.

The question on attendance at an educational institution was asked of persons aged 6 and over. Evaluation of these data is possible by comparing the aggregated data against statistics on enrolment collected by the Ministry of Education. These statistics on student enrolment are comparable to census data on educational attendance, and the differences are minor as shown in the following table.

Comparison between two sources

	Students from Census	Students from Ministry of Education
Total	11,181,196	11,151,868
Primary School	4,872,793	4,856,752
Middle School	2,778,808	2,787,012
High School	2,351,342	2,230,279
Junior College	206,339	242,114
University & Over	971,914	1,035,711

11. Results of Utilization

According to the preliminary result of the 1985 census, the total population of Korea is about 40,467 thousands giving a total density of 408 persons per square Km. In general, its population size ranks 22nd in the world, and stands 3rd in the world with respect to population density excluding such city countries as Hong Kong and Singapore.

Meanwhile, on the basis of the preliminary results, a population projection up to the year 2023 was made. The figures shown in this projection revealed that a one percent population growth rate will be attained in 1994 and a zero percent growth rate will be attained in 2023 in Korea.

Besides, the census results will be utilized for policy-making, planning and administrative purposes,

for research purposes, and for setting up the frame for various sample surveys.

12. Brief Outline of Plans for Next Census

As mentioned in the previous section, there are some distinctive features in the 1985 Population and Housing Census, such as no adoption of the sample enumeration, the insertion of new items, the considerable reduction of workload for enumerators, and a strong publicity campaign.

It is, however, found to be very difficult to count all the people and grasp all the characteristics correctly within a limited time span. It is a well known fact that census conducting is usually subject to many errors including coverage and content inaccuracies.

Accordingly, some problems faced at various stages of census operation will be carefully examined for further improvement of forthcoming censuses. Major plans for the 1990 census are as follows: 1) The introduction of the OMR system to speed up data processing, 2) The adoption of sample enumeration to meet the needs of diverse users, 3) The recruitment of qualified enumerators, 4) The preparation of effective training materials, and 5) The introduction of a mesh code to draw up various maps.

Table.1:Censuses of Korea

Census year	Reference date	Title	Classification of residence	Census features
1925	Oct. 1	Simplified Population Census	De facto	First population census in a modern sense
1930	Oct. 1	Population Census	De facto	Included items on economic activity and occupation
1935	Oct. 1	Population Census	De facto and de jure	De jure concept was introduced
1940	Oct. 1	Population Census	De facto	Included items on place of birth and permanent domicile
1944	May 1	Simplified Population Census	De facto	
1949	May 1	Population Census	De facto	Included item on residence before 15 Aug. 1945
1955	Sep. 1	Population Census	De facto	
1960	Dec. 1	Population & Housing Census	De jure	1) First use of sampling theory for 10% sample tabulation 2) First housing census
1966	Oct. 1	Population Census	De jure	10% sample enumeration on labor force and fertility
1970	Oct. 1	Population & Housing Census	De jure	10% sample enumeration on labor force, fertility, migration and some specific items of housing
1975	Oct. 1	Population & Housing Census	De jure	5% sample enumeration on labor force, fertility, migration and some specific items of housing
1980	Nov. 1	Population & Housing Census	De jure	15% sample enumeration on labor force, fertility and migration
1985	Nov. 1	Population & Housing Census	De jure	Complete enumeration for all items

Table 2. Census Population^{a)}

	Korean only	Total population	Sex ratio	Population density	Proportion of urban population(%)	Average ^{b)} household member	Seoul population	Busan population
1925	19,020,030	19,522,945	105.5	88	4.35	5.24	342,626	106,642
1930	20,438,108	21,058,305	104.5	95	5.65	-	394,240	146,098
1935	22,208,102	22,899,038	103.8	104	7.01	5.30	444,098	182,503
1940	23,547,465	24,326,327	101.7	110	11.59	-	935,464	249,734
1944	25,133,352	25,917,881	99.0	117	12.90	-	988,537	329,215
1949	20,166,756	20,188,641	102.1	205	17.21	-	1,446,019	473,619
1955	21,502,386	21,526,374	100.1	219	24.53	5.45	1,574,868	1,045,183 ^{c)}
1960	24,954,290	24,989,241	100.8	254	28.00	5.56	2,445,402	1,163,671
1966	29,159,640	29,192,762	101.5	297	33.54	5.49	3,793,280 ^{c)}	1,426,019 ^{c)}
1970	31,435,252	31,465,654	100.8	320	41.17	5.24	5,535,725	1,879,904
1975	34,678,972	34,706,620	101.3	351	48.38	5.04	6,889,502	2,453,173
1980	37,406,815	37,436,315	100.5	378	57.25	4.62	8,364,379	3,159,766
1985	40,432,397	40,466,577	100.5	408	65.38	4.16	9,645,932	3,516,807

Note: a) Data before 1945 are for all Korea; data for subsequent years are for the Republic of Korea only

b) For ordinary households excluding foreigner's household

c) Korean only

Table 3: Questionnaire for 1985 Population and Housing Census

I. Characteristics on Population

Address						ED No.	Living Quarter No.	Household No.	
To all household members									
Name & relationship to household head	Sex	Age			Religion	Place of birth	Place of 1 year ago	Place of 5 years ago	To persons 5 years & over
Name	Relation-ship to house-hold head	Trad-itional age in years	Year of birth	Date of birth	Complete age in years	1.Same house 2.Same Gu, Shi, Gun 3.Differ-ent Gu, Shi, Gun or Pro-vinces	1.Same house 2.Same Gu, Shi, Gun 3.Different Gu, Shi, Gun or Provinces	1.Same house 2.Same Gu, Shi, Gun 3.Different Gu, Shi, Gun or Provinces	1.Primary 2.Middle 3.High 4.Junior college 5.College or more 6.Never attending 1)Can read & write 2)Can't
Origin of the family name			Animal symbol	1.Solar 2.Lunar					
Same as the above up to six persons									

To persons 14 years & over				To ever-married women 15 years & over		
Economic activity status	Industry	Occupation	Marital status	Children even born & still alive	Children ever born but dead	Children ever born
1. Mainly worked	Kind of business (activity of the establishment)	Kind of work	1. Single 2. Currently married 3. Widowed 4. Divorced			
2. Partially worked doing homework						
3. Partially worked attending school	Name of establishment	Position				
4. Partially worked doing some other work						
5. Looking for job						
6. Doing homework only						
7. Attending school only						
8. Others						
Same as the above up to six persons						

II. Characteristics on Household & Housing

A. To all households	B. To the representative household in a housing unit	C. To multi-purpose housing unit
1. Type of living quarters 2. Is this household representative, attached or collective household? 3. Tenureship and rental charge 4. Number of rooms occupied 5. Main cooking fuel 1) Coal briquette 2) Oil 3) Gas 4) Electricity 5) Wood 6) Others 6. Kind of household appliances 1) Color TV 2) Black & white TV 3) Refrigerator 4) Washing machine 5) Telephone 6) Private Car 7) Piano, organ 8) V. T. R. 9) Air conditioner	7. 1) Number of household residing in this housing unit 2) Number of total rooms 8. Total floor area 9. Main heating system 1) Coal-briquette fuel hole 2) Piped coal-briquette boiler 3) Piped oil boiler 4) Piped gas boiler 5) Central heating 6) Traditional fuel hole 7) Others 10. Installed facilities 1) Cooking system: (1) Conventional (2) Modern 2) Toilet System: (1) Conventional (2) Flushing 3) Bathing system: (1) Hot water (2) Cold water (3) None	11. To the representative household 1) How many households can independently live in this housing unit? 2) How many cooking places, toilets and entrances are in this housing unit? 12. To the attached household 1) Does this household use cooking place, toilet and entrance fully?

5. 各國의 Country Report

C O U N T R Y P A P E R
I N D I A

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OFFICE OF THE REGISTRAR GENERAL, INDIA
MINISTRY OF HOME AFFAIRS
GOVERNMENT OF INDIA
NEW DELHI

RECENT DEVELOPMENTS IN VITAL STATISTICS IN INDIA

I. INTRODUCTION

In India the main sources of vital statistics are; (i) Population census (ii) Civil Registration (iii) Sample surveys, in particular, the Sample Registration System.

The most important source of demographic data is national population census which is conducted once in 10 years. The census provides data on size, structure and growth of population. From the age structure of the population reported in the census vital rates like birth rate and death rate have been derived traditionally. However, these estimates are available only once in 10 years and are not relatable to any particular year.

The conventional source of data on births, deaths and marriages is the Civil Registration system. But in India collection of reliable vital statistics by this traditional method is handicapped by low levels of literacy, the overwhelmingly rural population, inaccessibility of some areas etc. Thus, though the system is very well organised in some areas and functioning with reasonable efficiency in many others, on the whole, the data from the Civil Registration System cannot yet be used for generating vital statistics.

As an alternative, sample surveys have been extensively used for collection of demographic data, in particular vital rates. During early fifties and sixties special rounds of the national sample survey have provided basic data on the demographic situation in the country. However, the national sample surveys were retrospective in nature and data collected were

subject to errors arising from the recall lapse. The rates were in general found to be underestimates. Hence, in 1964 the Sample Registration scheme was introduced by the Office of the Registrar General, India with the basic objective of providing reliable estimates of vital rates at state and national level.

In this paper each system in so far as it provides estimates of vital rates has been discussed in detail pointing out its limitations and the recent improvements in this area. In view of the importance being attached to Civil Registration, particularly in the year 1986 which had been declared as the year of good registration, the machinery for civil registration and the procedure adopted have been discussed in detail even though the system is deficient at present. This is followed by a discussion of the Sample Registration System and the census.

II. CIVIL REGISTRATION SYSTEM

History

The history of civil registration in India dates back to the middle of the nineteenth century. It started with the registration of deaths with a view to introducing sanitary reforms for control of pestilence and disease. Registration of births followed later on. The erstwhile Central Province of Berar was the first to introduce a system of registration of births as early as 1866. This was followed by Punjab and the United Provinces. In 1873, the Bengal Births and Deaths Registration Act was passed. It was later adopted by Bihar and Orissa. In 1886, the Births, Deaths and Marriages Registration Act was placed on the statute book to provide for voluntary registration through-

out British India. This Act was not to affect any law on the subject already in force or which might be passed subsequently for any particular local area and, therefore, had only limited force. Thus, registration was carried on under various legal provisions in different parts of the country. As there was no uniformity in the legal provisions, the registration practices and procedures obtaining in different parts of the country varied widely resulting in the production of unsatisfactory registration data so far as coverage and completeness were concerned. In this respect, the various commissions/committees appointed by the Government of India between 1924 and 1948 stressed the need for enforcing uniformity throughout India in the collection and compilation of vital statistics.

Registrar General, India convened the conferences of the state representatives in 1961 and 1965 with a view to improving the registration and vital statistics in the country. This led to an important decision in regard to the enactment of a Central law for regulation of registration of births and deaths throughout the Country. Accordingly, the Registration of Births and Deaths Act, 1969 was placed on the statute book. The Act replaced the diverse laws that existed on the subject, unified the system of registration throughout the country and made reporting and registration of births and deaths compulsory. It provided for a statutory authority of the centre and in each state. It enabled the Central Government to promote uniformity and comparability in registration and compilation of vital statistics allowing enough scope to the states to develop an efficient system of registration suited to the regional conditions and needs.

The Act, governing the registration of births and deaths, has now been enforced throughout the country (except in some small pockets in the States of Assam and West Bengal due to some administrative reasons and these pockets are likely to be covered soon). In this regard, state rules framed under the aforesaid Act were notified by different states/union territories on different dates between July, 1970 and February, 1982.

ADMINISTRATIVE AND ORGANIZATIONAL STRUCTURE

In India, the Civil Registration System is a statutory activity with wideranging devolution of authority and dispersion of responsibility. The organization at national level is headed by the Registrar General, India, who is also the Census Commissioner of India (in the Ministry of Home Affairs). Under the Registration of Births and Deaths Act of 1969, Registrars General, India may issue general directions and shall take steps to coordinate and unify the activities of Chief Registrars of the States who shall be the chief executive authority in the state for executing the provisions of the Act and the rules and orders made thereunder and to coordinate, unify and supervise the work of registration in the state. The activities of the Office of the Registrar General, India in matters relating to Civil Registration and Vital Statistics inter-alia include (i) coordinating and unifying the work of registration and compilation of vital statistics in the states, (ii) providing, direction and guidance to the state authorities, (iii) standardization of forms and procedures for registration and compilation of vital statistics for promoting uniformity and comparability, (iv) providing clarifications on various provisions of

the Act and ensuring uniform interpretations of the law, (v) organising training programmes, (vi) initiating publicity and other promotional measures, (vii) preparation of annual report on the working of the Act for submission to the Central Government, (viii) preparation of annual statistical report for the country entitled 'Vital statistics of India' and (ix) various other matters for securing an efficient system of registration throughout the country in addition to the managing of the Sample Registration System and the Survey of Cause of Death in the rural areas.

The registration organisation in the states is usually headed by the Director of Health Services or the Director of Economics and Statistics, or Director of Panchayats appointed as the Chief Registrar of Births and Deaths. In a few states, Additional Chief Registrars, Deputy Chief Registrars etc. have also been appointed. The organisation at the state headquarters includes a vital statistics unit manned by fulltime officers and staff. The unit is generally headed by a Deputy Director or Assistant Director who assists the Chief Registrar in discharging his functions under the Act.

The organisation at the district level is headed by the District Medical and Health Officer or the District Statistical Officer who as the District Registrar is responsible for securing an efficient system of registration in the district. The organisation usually includes one or two fulltime staff (Statistical Assistants/Computers) and may also include an Additional District Registrar for assisting the District Registrar in carrying out inspection and supervision of the registration work in the district, organising training programmes, maintaining regular and timely flow of returns from the

Registrar to the state headquarters, initiating publicity and other promotional measures etc. The District Registrar and the Chief Registrar generally belong to the same administrative department.

At the field level, there are Registrars for registering the particulars of births and deaths occurring in their respective areas. The size of the beat of the Local Registrar especially in rural areas is often quite large. The Local Registrar functions in an ex-officio capacity and his job of registration is of part time nature. In order to assist him to net the events of births and deaths occurring in his jurisdiction and also to improve his effectiveness, the notifier system is being strengthened and expanded by including school teachers, multipurpose health workers, village health guides, family planning workers and the like. Attempts are being made to make the area of operation of the notifiers co-terminus with that of the Local Registrar. In each urban area, either the executive head or a member of the local self-government set-up is the Registrar though in the case of large cities he may be having zonal Registrars to help him.

CHARACTERISTICS OF THE SYSTEM

The enforcement of the Births & Deaths (RBD) Act, 1969 unified the system of registration throughout the country and made reporting and registration of births and deaths compulsory. Registration of marriages, divorces and judicial separation are not covered under this Act. Its scope is limited only to the events of live births, still births and deaths.

The birth register contains information on such items as ,

date of occurrence/registration, place of birth, sex of the child, age of mother, order of birth (in case of live births only), religion, literacy and occupation of parents, type of medical attention at birth etc. The death register contains information relating to date of occurrence/registration, place of death, age, sex, marital status, religion and occupation of the deceased, cause of death, whether medically certified, kind of medical attention received etc.

Information in respect of a birth is to be given within 14 days and that of a death within 7 days. There is a provision for delayed registration, that is registration beyond the stipulated period. Any birth or death of which information is given to the registrar after the expiry of the specified period but within thirty days shall be registered on payment of a late fee. Registration beyond thirty days but within one year is possible with the written permission of the District Registrar, or any other officer authorised by the State Government and on production of an affidavit made before a notary public or other officer authorised in this behalf. Registration after one year of the occurrence of the event can be done only on an order made by a first class or presidency magistrate and on payment of the prescribed fee.

There is incomplete coverage and under-registration in civil registration data in the country. As monthly returns form the basis of compilation of data at the State level, the coverage of area and population at the State level, becomes incomplete if the monthly returns from some units are not available for compilation at the State headquarters. Further, under-registration arises due to failure to register all the events that occur. The extent of incomplete coverage and under-registration vary from State to State. The reasons which can be

ascribed for deficiencies in the registration data are: (i) about 76 per cent of the population live in villages which are scattered far and wide, (ii) the majority of the population is agricultural and illiterate, (iii) there is lack of proper appreciation of the need for registering births and deaths as not much value is attached to the end product of registration i.e. Birth/Death Certificate, (iv) a lack of proper awareness of the rules and procedures on the part of the general public and (v) in some cases, there may not be easy access to the registrar because of lack of proper communication, long distances to be travelled and difficult terrain.

STATISTICS OF CAUSE OF DEATH

The Registration of Births and Deaths Act, 1969 has a provision for certification of cause of death by physicians. But this provision has been implemented only in the case of a set of medical institutions selected for the purpose by the Chief Registrars of States. As these medical institutions are generally located in urban areas, the data on cause of death emanating from such statutory certification would broadly relate to deaths occurring in urban areas. As for rural areas, there is a non-statutory continuing survey of a sample of village being headquarters of Primary Health Centres (PHCs) for eliciting cause of death through the lay-reporting system and this survey is called the Survey of Cause of Death in rural areas. The sample survey started in 1965 on a limited scale, initially covered a sample of about 600 PHCs and the sample size has since progressively gone up reaching a figure of 1163 PHCs during 1986, all over India. Some salient features of this survey are as follows:

The most probable cause of death is ascertained posthumously by a trained para medical person attached to the sample Primary Health Centre on the basis of a list of causes of death, arranged in groups of major cause-groups based on symptoms of ill-health. This list adopted in India generally follows the recommended pattern for lay-reporting of causes of mortality, of the orld Health Organisation.

To aid the field worker in his enquiry, a detailed structural questionnaire and a check-list of symptoms for each cause of death are set out in a two-volume manual designed for the purpose. The Medical Officer-in-charge of the selected Primary Health Centre would also check a sample of entries in the death register, by actual field visit.

A report based on the results of the sample survey is released every year and the latest publication relates to the year 1984.

EVALUATION

The data that are generated in the system are often deficient. The coverage is defective both quantitatively and qualitatively. Methods have been devised to measure the extent of underreporting of vital events. One of the methods is the record check study, whereby events recorded in the registration records are matched with independent records obtained through a survey using a set of matching criteria. Another way of evaluating the system is to compare the vital rates obtained from the system with that of the rates obtained from the Sample Registration System. Analytical techniques have also been used to evaluate the system. Brass (1979) has developed a technique

which makes use of census age distribution and survivorship data from a census or a survey to provide a measure of the extent of under-registration of births and cohort deaths of young children in the age-group 09 years. Yet another technique evolved by Brass (1979) relates to measuring the extent of completeness of adult death registration using mortality measures derived from inter-censal and registered deaths making use of the growth balance equation. Trussel & Menken (1979) have given a modified version of the Brass procedure.

The Office of the Registrar General, India conducted an under-registration survey in 1966 in the rural areas in major states. For this purpose the vital events recorded in the civil registration records were matched with those recorded in the sample census. The extent of under-registration of births and deaths was obtained from the two sets of records after matching. The number of villages covered was 342. The survey revealed that the extent of under-registration at national level for births was 47.5% and deaths 41.5%. There were wide variations among states. One of the limitations of the survey was that the sample size was not adequate to provide reliable estimates of the level of under-reporting at the state level. It gave only a broad indication of the level of reporting of births and deaths.

An attempt has also been made to evaluate, through the use of Brass Technique. The data based on registration of births and deaths for the inter-censal decades. The latest such evaluation related to the decade 1971-81 and a report thereon has been published in the year 1986. According to that evaluation, the extent of under-reporting of births at national level during 1971-1981 is 63% and the extent of under-reporting of deaths of young children, 0-9 years, is 76%.

As the Sample Registration System has become stabilised in its procedure and operations, its annual estimates provide a back-drop against which the performance of the statutory registration could be compared annually. Although the statutory system registers events on the de facto basis and the Sample Registration System records events on the de jure basis, the comparison of the data of the two sources is not likely to be vitiated much in the case of not too small states.

STRATEGIES FOR IMPROVEMENT OF CIVIL REGISTRATION AND VITAL STATISTICS

The main problem in improving civil registration is that of a lack of public awareness and interest and also, to some extent, constraint regarding funds. Also, there is no hierarchy exclusively meant for civil registration work and over the years the demands of developmental administration has resulted in the part-timers being left with less time for the civil registration work.

The following steps have been taken and/or are being taken to improve the civil registration and vital statistics systems in India:

1. Organisation of four All India Conferences of Chief Registrars of Births and Deaths were organised in 1970, 1974, 1980 and 1985. The recommendations of these conferences have been followed up.
2. During the last 5 years (1981-1985), six regional level meetings of Chief Registrars of Births and Deaths covering all States/Union territories in the country, were organised to review the functioning of Civil Registration System and measures

taken. A second round of regional meetings, starting with that for the States/UTs in the Southern Region and held at Bangalore during October 20-21, 1986, has been initiated to review the system and its performance. Similar regional meetings to cover the remaining States/UTs are on the anvil.

3. The year 1986 was declared as the 'Year of Good Civil Registration' in the whole country by the Government of India with a view to improving the registration system to the optimum level. In this connection the Hon'ble Union Home Minister sent an eleven-point action programme in January, 1986 to all Chief Ministers/Lt. Governors/Administrators of States/Union Territories, for implementation. The progress towards the implementation of the various action-points by the State authorities was vigorously monitored and follow up action continues to be taken. In this connection, over 350 communications have been issued to all States/UTs during 1986.

4. Holding meetings of Inter-departmental Coordination Committees on vital statistics in states to review periodically the civil registration system and to take remedial measures on deficiencies of the system.

5. Periodic evaluation of the CRS with a view to identify the good and bad patches of registration at District and state level. The CRS has also been evaluated and hoc vis-a-vis the SRS by using demographic techniques and a report in this regard was published in 1980.

6. Providing guidelines for compulsory production of birth certificate (i) at the first school admission in a manner without causing denial of admission of the child into school and (ii) at the time of addition of newborn child in ration card.

7. Introduction and extension of the scheme of medical certification of cause of death in a phased manner. The scheme has to begin in the teaching hospitals in the phase I, district hospitals in the phase II, PHCs in phase III and private doctors in the last phase.

8. A Workshop on medical certification of cause of death was organised in 1980 streamline the procedure of medical certification and the execution of the scheme in this regard in phases. Another Workshop on 'Statistics of Cause of Death' was organised in 1986 to review the functioning of the Survey of Cause of Death in rural areas and also to suggest measures for further improvement. In particular, it was decided to set up a working group to suggest ways for making the morbidity and mortality information conform to a scientific time series.

9. Publicity measures undertaken to create awareness among public: posters, wall hangers, pamphlets, advertisements, slides, documentary films, radio spots, TV spots and sponsored programmes, inscription of registration slogans on postal articles, evolving of a symbol etc.

10. Instituting awards for good registration areas at the local and district level to promote registration. A number of criteria for assessing the various aspects of performance such as recording, timely submission of returns, record management etc. were evolved into well thought out scores on each item of work.

11. Organising training courses thrice a year for registration officials at state/district/municipal levels and providing assistance in such training programmes organised by the states. Also organising training courses for doctors in the medical certification of cause of death.

12. Speeding up preparation and release of the statistical and annual report on the working of the RBD Act, 1969 and the report based on Survey of Rural Cause of Death.
13. Timely processing of monthly/annual returns from the states for the annual publication 'Vital Statistics of India' which includes scrutiny of the basic returns, preparation of tables and analysis of results.
14. Bringing out manuals like Physicians' Manual on Medical Certification of Cause of Death and Handbook of Civil Registration.
15. Pending the improvement of Civil Registration, development of SRS and rural survey of cause of death through lay-reporting for providing vital rates and cause of deaths statistics in the rural areas respectively.

FUTURE PLANS

Plans for immediate future are directed towards (i) expanding and strengthening the Sample Registration System (ii) Instituting and continuing publicity measures to promote the statutory registration of vital events (iii) streamlining the working of the civil registration system at its various levels (iv) evolving administrative measures to make the production of birth certificate compulsory at certain stages of life, like the first school admission, entry of the name of new born children in the ration cards of the public distribution system, first job entry in public sector establishments and the like gradually without creation of avoidable difficulties for the public and (v) periodic evaluation of the system through forums like All India conference of Chief Registrars, regional level

meetings of Chief Registrars, official visits to states for assessing the working of the registration at the state, district and local levels.

III. SAMPLE REGISTRATION SYSTEM AND SURVEYS

The increasing acuteness of the population problem in India and the deficiencies in the statutory registration system have greatly intensified the need for quick and reliable estimates of birth and death rates on a current and continuous basis. The population census provides decadal vital rates; it does not provide a measure of the change in population from year to year. To measure short-term changes in the growth of population for projecting its future trends and to evaluate the results of the family planning programmes, there is need for resorting to alternate sources of data. One of these sources is sample registration system. The Office of the Registrar General, India, popularly known as Sample Registration System (SRS) on a pilot basis in a few states in 1964-65. It now covers almost the entire country.

The main objective of SRS is to provide reliable estimates of birth and death rates at the state and national levels for rural and urban areas separately. The SRS also provides various other measures of fertility and mortality. The field investigation under SRS consists of continuous enumeration of births and deaths in a sample of villages/urban blocks by a resident part-time enumerator, preferably a local teacher, and an independent six monthly retrospective survey by a full-time supervisor. The data obtained through these two sources are matched.

The unmatched and partially matched events are reverified in the field to get an unduplicated count of correct events. The advantage of this procedure, in addition to elimination of errors of duplication is that it can lead to a quantitative assessment of the sources of distortion in the two sets of records. In that way it is a self-evaluating technique. The main components of SRS area:

- (i) Base-line survey of the sample unit to obtain usual resident population of the same area;
- (ii) Continuous (longitudinal) enumeration of vital events pertaining to usual resident population by the enumerator;
- (iii) An independent half-yearly survey for recording births and deaths occurring during the half-year under reference and up-dating the houselist and household schedule by the supervisor.
- (iv) Matching of events recorded during continuous enumeration and those listed during the course of the half-yearly survey.
- (v) Field verification of unmatched and partially matched events.

MEASURES FOR IMPROVING THE EFFICIENCY OF SRS

The SRS has several built-in checks to ensure completeness in reporting. The Population recorded in the baseline survey is updated in subsequent half-yearly surveys, before the baseline survey is carried out, the sample units are clearly demarcated by well-defined boundaries, notional maps are prepared

and all the houses in the sample units are numbered which ensure complete listing of the households and the population residing in the sample units. Since the population recorded in the subsequent half-yearly surveys would be the result of population recorded in the previous surveys plus the net addition resulting from births and deaths and also in-migration and out-migration, a simple arithmetical check is available for ensuring the correctness of the population recorded in each half-yearly survey. As regards the continuous enumeration of vital events, the enumerator is required to prepare a list of informants for frequent contacts for getting the information on births and deaths. He is required to maintain a list of pregnant women and to have contact with socially important persons in the unit and carry out quarterly field rounds which would help to ensure completeness in reporting all events.

The half-yearly surveys provide a check on the events recorded by the enumerators. For maximising the efficiency of the two operations, independence between continuous enumeration and half-yearly surveys is ensured by withdrawing the enumeration records from the sample units before the conduct of the half-yearly survey. Although each investigator has to attend to (i) conducting half-yearly survey in a set of units, (ii) supervising and monitoring of continuous enumeration in a set of units, and (iii) conducting post-desk-matching field verification of partially matched and unmatched events in a set of units, the programme provides that these separate sets of units are allotted for these three types of tasks. Again, such sets are also changed for each investigator per one half-year to the next. These procedures leave little scope for collusion between the investigator and the enumerator.

However, inspite of such built-in checks, both the enumerators and investigators sometimes fail to net a few events. Studies have revealed that the type of events missed by enumerators are usually those which have occurred to usual residents outside the sample unit. This happens because expectant mothers often go to their parents' house for delivery or members of a household move to a place outside the unit for hospital facilities. Another type of event which is missed is perinatal death (foetal death and death of a new born within 7 days). Events are also likely to be missed by both the enumerator and investigator in the case of single member households. Continuous monitoring of the performance in individual sample units, ensuring proper training of the field staff and intensifying supervision help minimise such omissions.

Several steps have been taken for improvement in the quality of data. These are:

- (a) Review of the performance of investigators and enumerators-An assessment of the efficiency of the enumerators and investigators is made by classifying events unitwise on the basis of common events, events listed by the enumerator but missed by the investigator, events listed by the investigator but missed by the enumerator and events not listed by both. A comparison of the total number of events in each of these categories over a number of years will provide an idea of the efficiency of the enumerators and investigators. Corrective steps can be taken wherever the work is not satisfactory.
- (b) Overlapping reference period-In order to ensure complete netting of events, the investigator while

conducting the half-yearly survey also enquires about the events that might have been missed in the earlier half-yearly survey. This overlapping reference period of one year at the time of half-yearly survey has been helpful in maximising the coverage of events.

- (c) Intensive enquiry in aberrant units-A control chart is maintained wherein events and population for each successive half-yearly surveys are shown unit-wise. On the basis of the half-yearly survey results, units which show abnormal values of births and deaths, either high or low, based on the state birth and death rates are identified as aberrant units. An intensive enquiry in such aberrant units is undertaken to find out possible omission/duplication of events. This type of enquiry in aberrant units has helped in improving the coverage of events.
- (d) Intensive enquiry in a 10 per cent sub-sample of SRS units-An intensive enquiry in a 10 per cent Subsample of SRS units is conducted periodically covering all the states and union territories through a special questionnaire containing probing questions. This enquiry is conducted by senior officials. The events and population recorded in the intensive enquiry are matched with those recorded in the regular SRS survey. The intention of such an enquiry is to obtain a correction factor for vital rates. Institution of such periodical intensive enquiries would provide a correction factor for vital rates. Two intensive enquiries have so far been conducted-one during the year 1980-81 and the other during the year 1986.

- (e) Replacement of SRS units-The original sample size of 3722 units was selected on the basis of 1961 census frame; another 1700 units were selected from 1971 census frame; and another 600 units were added in 1981. Some of these units especially those which had a population of just over 1500 in 1961 have crossed the limit of 2000 with the result that such units have become too large for a single enumerator. Also over a period of time some villages have been classified as urban units and vice versa. Because of these changes retention of the same sample indefinitely may lead to loss of its representative character. Considering all these factors the old sample units drawn from 1961 and 1971 frames were replaced using 1981 census frame. Thus the SRS has now been revamped by a choice of new sample drawn on the basis of 1981 census frame in phases by January 1984.

TABULATION AND ANALYSIS

The Final HYS results in the prescribed formats are sent to the Office of the Registrar General, India after scrutiny, for which a detailed scrutiny programme is specified. Initially the basic indicators, namely, birth rate, death rate and infant mortality rate pertaining to a calendar year are made available by the end of the succeeding year. Thereafter, the detailed fertility and mortality indicators such as age specific fertility rates, total fertility rate, general fertility rate, age specific mortality rates, neo-natal and post-natal mortality rates etc. are processed on computer and made available within a time gap of 2 years. A detailed analysis

of the results is brought out in the form of annual report which includes the following tables:

1. Percent distribution of estimated population by age and sex.
2. Estimated age specific fertility rates and other fertility indicators.
3. Mortality indicators.
4. Estimated age specific death rates.
5. Per cent distribution of sample births by type of medical attention at birth.
6. Per cent distribution of samples death by type of medical attention before death.

From 1984 onwards two additional tables are being introduced which consist of:

- (a) Per cent distribution of population by broad age-groups, sex and marital status.
- (b) Per cent distribution of married women by braod age-groups.

All these tables are generated separately for rural and urban areas for India and major states.

SPECIAL SURVEYS/STUDIES

A number of surveys have been carried out from time to time in SRS units along with regular half-hearly surveys. These are:

- (i) A fertility survey during 1972 in a sub-sample of SRS households in each unit with a view to studying the fertility differentials by socio-economic groups.
- (ii) Survey on infant and child mortality in 1979 to provide estimates of infant and child mortality and to study the pattern and differentials of fertility and mortality by socio-economic groups, health and child care of infants and children.
- (iii) Survey on Fertility and Mortality, 1984 to provide fertility and mortality differentials by infra-structural facilities and by socio-economic variates.

The field work of fertility and mortality survey, 1984 was completed during the year 1985 in the SRS units. The data have been transferred on tapes and are being processed. A detailed tabulation plan has been prescribed which would provide an in-depth analysis of the factors affecting fertility and mortality.

The SRS is also useful for evaluating data from other sources. For example, the SRS birth records were used to determine the extent of under-enumeration of children in the age group 0-4 years in the 1971 census. A similar study was undertaken in the 1981 census. The records of vital events in the SRS blocks for a period of 5 years are made use of to compare corresponding information with regard to children surviving as on the date of the census. Such a comparison of records permits the estimation of the extent of omission or duplication at younger ages and an estimation of the extent of age misreporting at younger ages in the census. The main objective of the census evaluation study based on a comparison of the SRS records is to

obtain an idea of the extent of omission or duplication of children below 5 years as recorded in the census and the accuracy of their age returns.

EVALUATION

Some sporadic attempts have been made in the past to assess the extent of completeness of events recorded under SRS. Such studies were highly localised and did not allow any generalisation at the state or national level. As noted earlier a systematic and coordinated effort was made to measure the extent of under-enumeration of events recorded under SRS in major states through an intensive field enquiry conducted by senior level personnel during 1980-81. The intensive enquiry was conducted in a 10 per cent sub-sample of SRS units in each major state separately for rural and urban areas. A specially designed schedule with probing questions was canvassed in each household in the selected sample units. The study revealed that the extent of under-estimation of birth rate in SRS at the national level is of the order of 3 per cent. In the case of death rate also the under-estimation in SRS is of the order of 3 per cent. A similar study has been undertaken in 1986 the results of which are being processed.

Attempt has also been made to evaluate SRS using indirect methods. Brass (1968) has developed a method popularly known as P/F method which is based on a comparison of life time fertility with current fertility. At the national level, the SRS estimate of birth rate for 1978 is under-stated to the extent of 2.4 per cent in relation to the estimate derived using P.F. method.

SOME KEY DATA

Table 1 presents the vital rates for India based on SRS for the years 1981-85. The birth rate was around 33.8 during 1981-84. In 1985, however, it has declined to 32.7. This, however, has been mostly compensated by the decline in death rate. As a result the growth rate of population is still around 2.1 per cent per annum. An infant mortality below 100 has been registered for the first time. Another noteworthy feature is the marked rural urban differentials in fertility and mortality rates.

A list of publications that are/have been brought out is enclosed (Annex. I).

IV. POPULATION CENSUS:

One other source of measuring fertility and mortality levels is the population census. The census provides data on the age composition from which the level of mortality and fertility can be estimated. Various techniques have been developed which use the census age data. As already mentioned such estimates generally relate to the inter census period and cannot be attributed to a particular year.

In the 1981 census, data was collected on age at marriage, number of children ever born, number surviving and births during last one year. While the first three were canvassed for all ever married women, the last item, namely, births during last one year was canvassed only for currently married women, for operational reasons. While data on age at marriage and

births during last one year were collected in 1971, for the first time data on children ever born and children surviving were collected in 1981. From this data estimates have been prepared of infant and child mortality rates using Brass's technique. Currently such estimates are being prepared at district level. It may be worth pointing out that civil registration or SRS in India may not be in a position to provide estimates of child mortality at district level.

The question on births during last one year was canvassed in 1971 and 1981 censuses. When retrospective data is attempted to be collected there is likelihood of omission of events, inadequacy in dating of births, distortions in age reporting. These limitations would imply that the estimates of current fertility like age specific fertility rate, age specific marital fertility rate, etc. derived from response to questions on births during last one year should be considered as indicative of broad trends rather than actual level. Since similar data have been collected both in 1971 and 1981 censuses, it may not be unreasonable to compare the broad rates during 1971 and 1981 censuses, to indicate whether fertility has declined or not, though the exact quantum may not be appropriate.

Recently a number of methods have been developed to combine the data on current fertility represented by births during last one year with the data on fertility-history represented by number of children ever born. The census of India has brought out a publication based on adjusting the data on births during last one year by using the P/F ratio method developed by Brass. The attached table 2 shows the crude birth rate derived by Brass technique and compares it with the SRS Birth rate for the period 1979-81. The table also presents the adjusted TFR for various states of India.

It is seen that in most of the states the adjusted birth rates by using P/F techniques indicate levels which seem very reasonable. In a few states like Kerala, Tamil Nadu, Maharashtra where family planning has been practised by a large proportion of couples, the estimates derived from P/F ratio technique may not be very reliable.

The conclusion that would emerge seems to be that if data on births during last one year are collected with some additional data on children ever born and the tabulations are so made as to enable us to calibrate the data on last one year it would be possible to estimate the rates better, particularly at lower levels. It has to be borne in mind that indirect estimation technique cannot be considered as a substitute for good civil registration system. However, in the Interim period there may be very few options left particularly if one were interested in estimates of fertility and child mortality at levels at which sample surveys cannot provide reliable estimates. In this context, the Management Information and Evaluation System of the Ministry of Health will also have to play a key role.

Table - 1: Vital Rates based on SRS - India 1981-85

	Years	Birth Rate	Death Rate	Growth Rate	TFR	IMR
1	2	3	4	5	6	7
TOTAL	1981	33.9	12.5	21.4	4.5	110
	1982	33.8	11.9	21.7	4.5	105
	1983	33.7	11.9	21.8	4.5	105
	1984	33.8	12.5	21.3	4.5	104
	1985	32.7	11.7	21.0	n.a.	95
RURAL	1981	35.6	13.7	21.1	4.8	110
	1982	35.5	13.1	22.4	4.9	114
	1983	35.3	13.1	22.2	4.9	114
	1984	35.1	13.7	21.4	4.9	113
	1985	34.0	12.9	21.1	n.a.	105
URBAN	1981	27.0	7.8	19.4	3.3	63
	1982	27.6	7.4	20.2	3.4	65
	1983	28.3	7.9	20.4	3.4	66
	1984	29.2	8.5	20.7	3.4	66
	1985	28.0	7.6	20.4	n.a.	57

n.a. - not yet available

Table - 2: Crude Birth Rate for 1980 & TFR Derived by
Brass Technique

Si. No.	India/ State	T R U	Census Birth Rate@	Adjusted Birth Rate P ₂ /F ₁	Adjusted Birth Rate P ₃ /F ₃	Ad- justed TFR	SRS Birth Rate 1979-81 average
1	2	3	4	5	6	7	8
1.	India	T	26.09	36.76	35.53	4.9	33.8
		R	27.38	37.79	36.13	5.1	35.3
		U	21.92	33.31	33.14	4.2	27.5
2.	Andhra Pradesh	T	22.48	33.57	33.36	4.4	31.6
		R	23.15	33.02	32.80	4.4	32.5
		U	20.30	35.04	34.65	4.2	27.0
3.	Bihar	T	25.12	39.18	36.21	5.1	38.4
		R	25.66	39.28	36.24	5.1	39.3
		U	21.34	38.03	35.53	5.1	32.8
4.	Gujarat	T	24.77	38.16	36.16	4.7	35.1
		R	26.08	38.92	37.01	5.0	36.4
		U	21.89	36.26	34.15	4.1	31.1
5.	Haryana	I	30.27	37.90	36.32	5.3	36.8
		R	31.98	39.88	37.13	5.7	38.0
		U	24.14	31.05	33.15	4.2	30.3
6.	Karnataka	T	21.02	34.68	34.66	4.6	28.0
		R	22.42	35.54	35.00	4.8	29.0
		U	17.56	32.58	33.31	4.1	25.3
7.	Kerala	T	20.68	28.33	30.40	3.5	26.0
		R	21.17	28.79	31.12	3.7	26.4
		U	18.60	25.85	27.16	3.0	24.3
8.	Madhya Pradesh	T	31.74	39.55	37.47	5.3	37.5
		R	32.70	40.24	37.65	5.5	38.6
		U	27.95	36.78	36.26	5.6	31.6

Si. No.	India/ State	T R U	Census Birth Rate [@]	Adjusted Birth Rate P ₂ /F ₁	Adjusted Birth Rate P ₃ /F ₃	Ad- justed TFR	SRS Birth Rate 1979-81 average
1	2	3	4	5	6	7	8
9.	Maharash- tra	T R U	25.19 27.78 20.40	32.18 33.05 30.87	31.55 32.03 30.43	4.2 4.4 3.8	28.3 29.8 25.0
10.	Orissa	T R U	24.14 24.38 22.33	34.62 37.28 34.43	34.88 34.87 34.72	4.8 5.0 4.6	31.9 32.1 29.6
11.	Punjab	T R U	24.06 24.70 21.87	36.98 36.87 36.14	36.09 36.31 34.99	4.8 5.3 4.3	29.6 30.0 28.3
12.	Rajasthan	T R U	36.12 38.21 28.21	41.53 43.26 38.31	39.97 40.33 37.39	6.0 6.2 5.2	37.1 38.0 32.6
13.	Tamil Nadu	T R U	23.85 24.17 23.21	31.73 32.19 30.90	31.69 31.73 31.56	4.0 4.1 3.7	28.3 29.6 25.2
14.	Uttar Pradesh	T R U	28.89 29.77 24.84	41.94 32.80 37.48	38.90 39.30 36.47	5.9 6.0 5.3	39.5 40.6 32.2
15.	West Bengal	T R U	25.00 27.00 17.00	35.85 37.75 27.05	35.63 36.99 28.21	4.6 5.1 3.7	32.5 36.3 19.9

[@] Based on births during last one year canvassed in census.

DISSEMINATION OF INFORMATION REGARDING VITAL STATISTICS

I. PERIODICAL PUBLICATIONS

Title of the Publication	Frequency
1. Vital Statistics of India	Annual
2. Mortality Statistics of Cause of Death	Annual
3. Registrar General's Report on the working of the Registration of Births & Deaths Act, 1969	Annual
4. Survey of Cause of Death (Rural)	Annual
5. Sample Registration System	Annual
6. Sample Registration Bulletin	Half-yearly
7. Registrar General's Newsletter	Quarterly

II. AD HOC PUBLICATIONS OF DATA BASED ON SAMPLE REGISTRATION SYSTEM

8. Sample Registration of births and deaths in India - an experimental study: Rural 1964-65 (1968)
9. Report on Sample Registration of births and deaths in India - an experimental study: Rural 1964-65 (1968)
10. Sample Registration in India - Report on pilot studies in urban areas; 1964-67 (1969)
11. Sample Registration of births and deaths in India: Rural 1965-68 (1970)
12. Sample Registration of births and deaths in India: 1969-70 (1972)
13. Report on Sample Registration System under Kaira project (1976)

14. Fertility differentials in India: 1972 (1976)
15. Survey on Infant and Child Mortality - A Preliminary Report (1980)
16. Report on Sample Registration System in Northern Zone: 1970-75 (1980)
17. Report on Sample Registration System in Central Zone: 1970-75 (1980)
18. Report on Sample Registration System in Western Zone: 1970-75 (1980)
19. Report on Sample Registration System in Eastern Zone: 1970-75 (1981)
20. Report on Sample Registration System in Southern Zone: 1970-75 (1981)
21. Report on Sample Registration System 1970-75 (1983)
22. Report on Sample Registration System: 1976-78 (1983)
23. Levels, Trends and Differentials in Fertility: 1979 (1983)
24. Survey on Infant and Child Mortality: 1979 (1983)
25. Report on Sample Registration System: 1981 (1985)

III. REPORTS ON SPECIAL STUDIES

26. Infant Mortality in India (SRS Analytical Series No. 1, 1971)
27. Measures of fertility and mortality in India (No. 2, 1972)
28. Sampling variability of vital Rates (No. 3, 1972)
29. Sex composition in India (No. 4, 1972)
30. Seasonality in vital events and rates (No. 5, 1973)

31. Survey on the extent of knowledge and practice of family planning methods in sub-sample of SRS units (No. 6, 1973).
32. Sampling variability of SRS vital rates 1975-77 (Occasional Paper No. 2 of 1981)
33. Estimates of Fertility and Child Mortality by Indirect Methods (Occasional Paper No. 1 of 1983)
34. Report on the Intensive Enquiry in a sub-sample of SRS units (Occasional Paper No. 2 of 1983)

THE 1980 CENSUS OF POPULATION AND HOUSING

IN TAIWAN-FUKIEN AREA, REPUBLIC OF CHINA

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THE 1980 CENSUS OF POPULATION AND HOUSING IN TAIWAN-FUKIEN AREA, REPUBLIC OF CHINA

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I. Introduction

There is no doubt that the population problem is the core of social problems produced in process of political, social and economic development. In order to maintain political stability and to achieve social and economic progress, the population problems must be tackled first.

Since all government policies aim at improving people's standard of living and promoting their welfare, the collection and provision of accurate population data have become an important task in many countries. In case of the Republic of China, the population data come from two sources: census and household registration system. Twelve censuses of population were taken during last eight decades. The household registration system in Taiwan-Fukien Area is one of the few universal population registers in the world.

The registration is undertaken in accordance with the provision of the Household Registration Law of the Republic of China. The aim of the registration is to identify the status of a Chinese national on one hand and to collect population data on the other. In the register, not only a great many items of every person are contained but the entries are processed and compiled into the following statistics at the ends of every month, every quarter and every year: (1) current population statistics, (2) internal migration statistics, (3) vital statistics which include live births, deaths, marriages, divorces, and adoptions.

Several studies indicate that household registration system has virtually complete coverage of total population, and information on age, sex, marital status and relationships to the head of household is also quite accurate. However, due to increasingly high degree of internal migration resulted from rapid economic growth in recent years, under-registration in large cities and urban townships and over-registration in rural villages are generally observed. Another defect in the system is the late reporting of changes in residence, occupation and educational attainment. Furthermore, a large proportion of babies dying before the end of the legal registration period 15 days are registered neither

as births nor deaths. A community map of household registration which locates the household numbers and names of roads or streets is attached on the first page of every register. Therefore there is no any difficulty to make census base book (housing list) and sample design, to estimate the total number of enumeration district, and to locate the places of every household the natural and men-made features on enumeration maps without the needs of much field work.

In the Republic of China, the whole territory is subdivided into five administrative order divisions. The first administrative order division is province or municipality. The second is county, or city. The third is urban township, or rural township, district, small city. The fourth is Village or Li. The fifth is Lin. A Lin consists of 15 to 30 households. There is a chief at every administrative order division at every order level. The boundaries of every division at every level are normally fixed. So it is very easy to combine two and more Lins into an enumeration district. The boundaries of every enumeration district are also easy to identify and the chief of every Lin will take the enumeration to identify the boundaries of Lin and accompanies him to make investigation from door to door, and from person to person.

(I) History of census taking

Seven censuses were carried out during the 1895-1945 period of Japanese occupation of Taiwan. The first was taken in 1905. This was the first modern and scientific census taken in Taiwan. The second was conducted in 1915, ten years after the first. Thereafter a comprehensive census was held every ten years (in 1920, 1930 and 1940) and a simplified one at five years intervals between two successively comprehensive ones (in 1925 and 1935). The data of every census were fixed at 0:00 hours on October 1 of the years ending in the numerals 5 and 10. The data of all censuses mentioned above were published.

After World War II, three complete population census were taken in the area of Taiwan and Fukien of the Republic of China in 1956, 1966 and 1980. The second and third complete population censuses incorporated with a housing census were taken to ascertain the quantity and conditions of dwelling units as a basis of improving the people's livelihood. The third complete census should be originally taken in 1976, however, the countries in the world mostly conduct the population census in the years ending with "0". With a view to facilitate the comparative study between our population and housing census data and those of other countries, our government took a sample census of population and housing in 1970 and another in 1975, while a complete census of population and housing was implemented in 1980. Thereafter a complete census of population and housing is taken at every

ten years, and a sample one is conducted at five-year intervals between two complete ones.

(II) Legal status for conducting census

The legal basis for the modern census of population was first established in the Statistics Law of the Republic of China in 1932. This Law authorized the Directorate-General of Budgets, Accounting and Statistics of Executive Yuan (DGBAS) to conduct a national census of population at 10-year intervals. And the DGBAS collected related reference materials from various countries and made studies on methods of modern census. The Population Census Act was promulgated in February, 1941. In accordance with the Act any county or city (the second administrative order division) can individually take a population census. During the period of 1933-1945, 25 counties in the Mainland China took a population census respectively. The Population Census Law was promulgated in March 1947. This Law authorizes both the Ministry of Interior (MOI) and the DGBAS to conduct jointly a national census of population every ten years. If necessary, a temporary or a regional population census may be taken. According to the Law, the census data and the regional census are fixed by a decree issued by the President of the Republic of China.

As specified in the Law, the Minister of MOI and Director-General of DGBAS assume policy responsibility for the census. Information obtained in the census shall not be used as evidence in any public office for or against any individual. Census results will be published or disclosed only in summary tabular form. Any employee of the government who is convicted of disclosing census information on individuals is to be fined. Those who refuse to respond, or give false answers, or impede other people providing information, or decree them to make false statement to the census questions will be fined too.

(III) Census organization:

There is no permanent census organization in the Republic of China. So it is not easy to cumulate experiences of past censuses, to assemble complete records on the methodology of each census and to evaluate the techniques employed and detailed records on costs and implementation of the census budget. However, Statistics Law and Organization Laws of the MOI and the DGBAS authorize both DGBAS and MOI to take charge of routine work of the population census. A census office is to be temporarily organized 2 years ahead census date, and after the census results are published the census office is to be deactivated. The unfinished affairs, files and properties are to be taken over by the MOI or the DGBAS.

The 1980 census organization of population and housing is described as follows:

(A) Planning organization:

The Council on Census Planning was organized by the MOI and the DGBAS two years prior to the census date. The Minister of the MOI & the Director-General of the DGBAS were the presidents of the Council. The Council included representatives of related agencies, demographers, statisticians and data processing specialists. Its major tasks were as follows: (1) set up census related rules and documents, (2) define census enumeration districts, (3) determine census methods (4) formulate census questionnaires, (5) establish census organization and procedures for recruiting and training of census personnel, (6) design data processing of census results, and (7) manage census budget to control the pace of census planning.

The whole design work was completed by December, 1979, and the Council on Census Planning was then enlarged into a Population and Housing Census Committee.

(B) Executive organization:

The 1980 Population and Housing Census Committee was set up under Executive Yuan (Central Government) in January 1980. The Minister of the MOI was concurrently the census Director-General. The Deputy Director-General of the DGBAS, Deputy Minister of the Defence, Deputy Minister of the Foreign Affairs, Governor of Taiwan Provincial Government, Mayor of Taipei Municipal government and Mayor of Kaohsiung Municipal government were concurrently the census Deputy Director-Generals. They took a full responsibility of the 1980 population and housing census. There were four sections, namely Investigation, Statistics, Data process & secretariate under the Census Census branch offices were set up under provincial (or municipal) Committee. government (the first administrative order division) in May 1980, sub-branch offices under county level government (the second administrative order division) in July 1980, and field offices under township level (the third administrative order division) in August 1980. The main responsibilities of field offices included preparing census enumeration lists, dividing enumeration district and crew leader's district, delineating census maps, recruiting census enumerators and crew leaders, delivering and editing census questionnaires, as well as packaging questionnaires back to central Census Committee after editing.

According to the census regulation, one to three Lin (the fifth administrative order division) in the same Village (or Li) (the fourth administrative order division) constituted one enumeration district which covered about forty to sixty households. There was one enumerator within each enumeration district, responsible for completing the questionnaires and compiling the preliminary statistical results which covered only number of male and female population in the households. Five to six enumeration districts within the same Village (or Li) (the fourth administrative order division) constituted one crew leader's district in which one census crew leader was appointed. The crew leader directed enumerators in the crew leader's district and checked the returned questionnaires in detail. If there was any error happened in the questionnaires, the crew leader should make enumerators re-investigation. The crew leader was also responsible for compiling a preliminary statistical table of his crew leader's district according to preliminary statistical results submitted by the enumerators. An inspection area was established in each urban township or rural township, district, small city (the fourth administrative order division) and one inspector was appointed in the area. The inspector, responsible for random checks in field of 10% of the questionnaires ^{was} in the inspection area and he also needed ^{to} compile preliminary census statistical table for the area. A direction area with one director was set up in each county, which was above the inspection area. In addition, there was a special census count for special populations living in camp, railroad station, port, hospital, jail, ... etc. The Director General of National Census Committee was in charge of the national census operation. The whole organization structure was as follows:

- Director General (National Committee) -- Director (direction area)
- Inspector (inspection area) -- Crew Leader (crew leader's district)
- Enumerator (enumeration district).

(C) Publication organization:

The 1980 Population and Housing Census Publication Committee was set up under the MOI and the DGBAS in July 1981. The Deputy Director-General of the DGBAS, and the Deputy Minister of the MOI are concurrently Conveners of the Committee. The Committee includes demographers, statisticians and data processing specialists. The responsibilities of the Committee are subject content and analysis of data, table preparation, text editing, design, publication standards, printing and public information.

II. Design and Execution

(I) Preparation and planning

- A. Coverage: The decision concerning the feasibility of achieving complete coverage of all persons, all housing and all the geographic districts in the area of Taiwan-Fukien in the Republic of China was early made by the Council on Census Planning.

All inhabitants and transients at the census standard time in all the parts of Taiwan Province, of Taipei Municipality, of Kashsiung Municipality, and of Kinmen County and Lienkiang County in the Fukien area, were included in the 1980 census. As a move toward this goal, a systematic inspection by the enumerator, crew leader and the chief of Lin (the fifth administrative order division) was set up immediately prior to the census enumeration to familiarize them with the districts for which they were responsible.

A combined census of the modified de jure concept and the de facto concept was used in the 1980 census. The former was that a person was enumerated at his or her usual place of residence. The latter was that a person was enumerated according to where he or she spent census day. According to the provision of the 1980 Census Implementation Program of the Republic of China, the following population and housing should be enumerated or should not be enumerated:

(A) The following population were enumerated:

1. Nationals of the Republic of China, residing in or being present at Taiwan-Fukien Area at the standard census time (including armed forces).
2. Aliens residing in or being present at Taiwan-Fukien Area at the standard census time.
3. Government officials stationed abroad and their dependents.
4. Nationals of the Republic of China travelling outside of the census area for a less than 6 months period.
5. Nationals of the Republic of China on board of a ship which left seaport in the census area before the standard census time do not stop over at any other seaport and will return to the original seaport or another seaport in the census area.

(B) The following population were not enumerated:

- 1) Transient travellers, on board of an aircraft or a ship arriving at an airport or a seaport in the census area at or before the census standard time, who would depart by the original aircraft or ship.
- 2) Foreign officials dispatched to the census area by their respective governments and their dependents.

(C) The following housing were enumerated:

- 1) Residences occupied by the nationals of the Republic of China or by the aliens in the census area.
- 2) Other buildings occupied by the nationals of the Republic of China or by the aliens in the census area.
- 3) Other places occupied by the nationals of the Republic of China, or by the aliens in the census area.

(D) The following housing were not enumerated:

- 1) The residences, other buildings and other places occupied by the foreign officials dispatched to the census area by their respective governments and their dependents.
- 2) Vacant other buildings and Vacant other places in the census area at the census day.
- 3) Other buildings and other places occupied temporarily by those persons on job, who had their own usual residences.

B. Sample design and coverage

We suggested to use both the short form questionnaire (full count) and the long form questionnaire (sample) for the 1980 census, but the Council on Census Planning did not adopt it due to time limitation for sample design. Therefore only a long form questionnaire of the 100-percent items of the census was used.

C. Mapping-Cartographic Operations and maps prepared

A major objective of the census is to improve substantially the area coverage so as to assure the complete enumeration of all the population in the country. Individual maps are needed to guide the enumerators in covering their assigned areas, and to guide census planners in controlling the accounting for all ones and avoiding duplication in enumeration and to help census staff in presenting the census statistics.

The census mapping programs for the last five censuses taken in the Republic of China were adopted. The following maps for the 1980 census of population and housing were prepared. Unfortunately most of them were sketch maps and did not standardized due to budget limitation.

(A) The national map

The map of the entire country of the Republic of China which showed major population agglomerations, terrain features, drainage patterns, communications transportation networks, and the boundaries of the first, the second and the third administrative order level. The scale of the map was one cm on the map represents 25,000 cm on the ground. After the map was updated with the new condition, the National Census Committee took it as the national map for distributing to the census agencies of the third order divisions.

(B) The township level census agency map

The township is the third administrative order division in our country. On the township level census agency maps the natural and man-made features, the boundaries of the crew leader areas and the enumeration areas were shown. The township level census agencies delineated the features and the boundaries of those maps based on the determination of the enumeration district, actual condition and those maps which were the township maps, the enumeration areas maps for the 1980 census, administrative township maps, community maps of household registration and patrolling maps of the police office. The scale of the map was 1:25,000. The map was used to coordinate field work.

(C) The crew leader map

The crew leader was to guide the work of several enumerators. The crew leader map should define the precise district which a crew leader covers. For a complete enumeration, all the crew leader maps put together would cover the entire area to be included in a census. On the basis of related maps, the township level census agencies indicated the boundaries of the related enumeration districts and the locations of the natural and man-made features. The scale of the map was 1:25,000.

(D) The enumerator map

Enumeration area was the smallest territorial division established for census purposes. It was such a size that could be covered by a single enumerator. The National Census Committee formulated the procedures in making enumerator maps. The procedures were distributed to the census agencies at the third administrative order division to make maps for each enumerator area. The following were stipulated in the procedures.

1. Prior to the enumerator map-making, the determination of enumeration areas should be made. That is to combine 2 to more Lin in the same village or Li into an enumeration district. The average number of household for an enumeration district is about 50 households.
2. Once the enumeration district was determined, the National Census Committee should devise a geocoding system so that a unique number is assigned to each enumeration district. The code for each district should also indicate the large administrative units in which it is located.
3. The township level census agencies should prepare a map for each enumeration district based on the administrative township map, the community map of household registration, the patrolling map of police office and other maps and the actual condition.
4. Each map should show the boundaries of the enumeration district, and the locations of the natural and man-made features in the enumeration district on it in details.

5. Each map should have a north arrow which helps the users to locate his position and direction, and follow the legend designed by the National Census Committee.
6. Each map should indicate the route of travel which the enumerator should take,
7. Each map should be drawn on good paper which reproduction can be made, and shown the date of compilation.
8. Each map can not be the same dimension, but the size should not be larger than that of half newspaper. Any map that needs to be larger than the limit should be drawn in section.
9. The scale of maps for urban areas should be one cm on the map represents 25,000 cm on the ground.
10. Each map should have a geocoding number which should follow the coding list provided the unique identification for each district by the National Census Committee.
11. Each map should be made 5 copies distributing to enumerator, crew leader, supervisor, and the National Census Committee.
12. The boundaries of an enumeration district should be carefully and clearly surveyed and identified together by the enumerator, related crew leader and the chief of the related Village or Li and Lin.
13. Prior to the start of the enumeration, the crew leader is expected to review the enumerator map to add or change the names of the road or street, or other natural and man-made features according to the actual situation at that time. But the crew leader should not change the boundaries of enumeration districts or crew leader districts.
14. The maps of enumerator should be entitled as X X enumeration district, X X crew leader areas, XX Township, X X County or City. The crew leader map should be entitled as X X crew leader area, X X Township, X X Country or City.

15. In case of the boundaries of a Village or Li, or Lin are uncertain or wiggly, the related township census agency should hold a meeting with the related offices to define the temporary boundary lines of the related enumeration district clearly.
16. The enumerator maps and the crew leader maps should be corrected based on the actual condition which they found during their field enumeration.
17. The enumerator maps should be returned to the National Census Committee for updating maps file. The crew leader maps should be given to the township household registration office for updating the community maps of household registration.
18. Part of the training for enumerator should be devoted to learning how to read and use the enumerator map.
19. The enumerator maps should be completed before October, 1980.
20. One of examples of enumeration district maps giving boundaries, household number, geocode, names and locations of natural and man-made features, scale, legend, route of census travel, etc., illustrated by the procedures in making enumeration maps is attached.

(E) Publication maps

In order to make the statistics more understandable and easier to use, the following publication maps and graphics decided to prepare for the 1980 census data.

1. Census area identification maps

The first and the second administrative order division maps of page size should be published, and on which the boundaries of these order divisions should be shown.

2. Statistical maps

Statistics maps show the geographic distribution of statistics data, and provide an immediate recognition of the data which may not be apparent from the statistical

tables. In order to supply the policy makers , who do not have time to read the statistical tables, with the immediate information, we decided to prepare statistical maps of page size to indicate such characteristics as age, sex, education, labour forces, industry, occupation, employment status, fertility, migration, employment, place of work, population density and the changes of population and housing between the censuses of 1975 and 1980.

(F) Publication graphs

The statistical graphs are widely used to show quantitative relationship in statistics that are not readily apparent from the statistical tables. In order to highlight the important relationship or changes and to interest the readers in examining the statistics tables for the further detail, it is decided to draw line graphs, bar graphs, divided circle or rectangular graphs and other variation graphs of page and less than page sizes for the important data for publication.

D. Schedule contents

The census schedule is the means for collecting and recording information obtained from respondents. A well-designed schedule is crucial to the success of the census. Therefore the schedule should be carefully designed.

(A) Principles of preparing census schedule

The following four basic principles for preparation of the 1980 census schedules were used.

1. Schedule contents should match with the items on the statistical tables

The final aim of the population and housing census was to tabulate the census data into statistical tables to meet the needs of all concerned. Thus the design of the census schedule had to attain the objectives of the census to obtain all information required by the government and private circles, but those not to be tabulated into the statistical tables or not to be stored in the tape should not be included in the census so as to avoid the waste of resources.

2. Schedule should be convenient for enumeration operation

Designing a census schedule should consider the enumerator or respondents easily and accurately filling up it. Therefore, the size of the format, the sequence of the questions, and the manner of enumeration should be specifically deliberate.

3. Schedule should be convenient for data processing

Since the census data was processed by computer, the system of pre-coded answers to each item should be adopted for saving the manual coding labour and to save possible errors.

4. Item wording should be consistent with its definition

The wording of questionnaires should be simple and clear and fully consistent with the definition of census items to avoid misunderstanding suspiciousness and taboo on the part of respondents. The wording of questionnaires should also consider the socioeconomic level and educational level of the respondents.

5. Schedule should be convenient for handling and transporting.

6. Paper and ink for schedule should be easy to read and to handle and enduring to use.

(B) Kind of the 1980 census schedules

1. Census schedule 1: This schedule was used to enumerate nationals of the Republic of China and aliens residing in or being present at the Taiwan-Fukien area and their housing units. It was the main schedule of the census. Therefore the census schedule referred to in this paper denotes this schedule.
2. Census schedule 2: This schedule was only used to enumerate those who happened to appear at their unusual residence at the census standard time.

3. Census schedule 3. This schedule was used only to enumerate the military and nonmilitary officers of the Republic of China stationed abroad and their dependents. The population items in this schedule were the same as the census schedule 1, but enumeration was much simpler.

(C) Features of the 1980 census schedule

1. The census schedule was used for both collecting population data and housing data.
2. The census schedule served the purpose of both enumeration and coding.
3. The statistics in some columns could be checked with one another. For example, the totals in Columns 3, 4, 5, 7, and 9, must be equal to each other. Otherwise, something wrong happened, and that household should be enumerated again.

(D) Types of schedule

Optical scanning is fast and can eliminate data keying and verification of the keying. Originally we intended to apply the optical scanning system, but finally the system was not adopted due to experience limitation. Therefore a combination of lead, abbreviated, open and closed questions in the 1980 schedule was used. The methods for recording responses in the schedule were pre-coding, enumeration coding, self-coding and write - in answer.

(E) Criteria of selecting the 1980 census items

Three criteria have been chosen to determine the appropriate items in the 1980 census:

1. Items are related to those included in the previous censuses, but those rarely used items are not included.
2. Items serve the needs of various government agencies, academic institutions and private organizations.
3. Items are consistent with the global recommendations made by the United Nations and by the Seventh Populations Census Conference held at East-West Population Institute, East-West Center.

(F) Census items expressed in the 1980 schedule:

Population items

1. Address (The names of the county or city, township, Village or Li, Lin, crew leader district, and enumeration district should be entered).
2. Type of households (selecting one)
 - (1) Family household
 - (2) Non-family household (The name of the non-family household should be entered)
3. Name of the enumerated
 - (1) At home
 - (2) Not at home
4. Relationships to household head (selecting one)
 - (1) Head of household
 - (2) Family member
 - (3) The hired
 - (4) Lodger
5. Sex (selecting one)
 - (1) Male
 - (2) Female
6. Date of birth
7. Domicile / Nationality
 - (1) Taiwan-Fukien Area (The name of the county or city should be entered)

- (2) Other province or municipality (The name of the province or municipality should be entered)
 - (3) Foreign country or area
8. Location of residence five years ago (residence on December 27, 1975) (selecting one)
- (1) Same Village, Li as of now
 - (2) Same township, but not the same Village or Li
 - (3) Same county or city as of now, but not the same township
 - (4) Same Taiwan-Fukien Area, but not the same county or city (The name of the county or city should be entered)
 - (5) Other Province, municipality
 - (6) The rest of the world
9. Marital status (selecting one)
- (1) Single
 - (2) Married: (selecting one)
 - a. Currently married or cohabited
 - b. Divorced or separated
 - c. Widowed
10. Fertility of woman
- (1) Age at first marriage
 - (2) Total number of births
 - a. Total numbers of males and females of livebirths:
 - b. Total numbers of her male and female children now alive:

11. Educational attainment (for age 6 and over)

A. Educational classification (selecting one)

- (1) Illiterate
- (2) Self-taught or private teaching
- (3) Primary school
- (4) Junior high, vocational or normal school
- (5) Senior high school
- (6) Senior vocational school, first 3 years of 5-year junior college, or ordinary normal school
- (7) Junior college (including last 2 years of 5-year junior college)
- (8) College or University
- (9) Graduate school (If one of codes 6 to 9 is filled up, the name of course, department or institute should be entered)

B. Attending school or not (selecting one)

- (1) Attending school
- (2) Not attending school
 - a. Attended
 - b. Graduated
 - c. Others

12. Economic characteristics (for age 15 and over) (selecting one)

- (1) Having a job
- (2) Not having a job

Reasons for unemployment

- a. Seeking for a job for the first time
 - b. Having left original job and seeking for a job again
 - c. Attending school
 - d. Studying oneself for advanced schooling
 - e. House-keeping
 - f. Disabled or handicapped
 - g. Invalid or old
 - h. In jail, custody or charity house
 - i. Not willing to work
 - j. Others
- (3) Main breadwinner of the household or not
- (4) Industry of the employed
- a. Location of establishment (The name of the county or city, and township should be entered).
 - b. Description of the main business or products of the establishment.
- (5) Occupation of the employed
- a. Title of operating unit
 - b. Kind of work
 - c. Job title
- (6) Employment status of the employed (selecting one)
- a. Working on own account without hired helper
 - b. Working on own account with hired helper(s)
 - c. Aiding the business run by family member without pay

- d. Employed by private enterprise with pay
- e. Employed by government, public enterprise or school

HOUSING ITEMS

1. Division of dwelling place (selecting one)
 - (1) Residence
 - (2) Other buildings
 - (3) Other places (If code 2 or 3 is filled up, items 2 to 9 will be left blank)
2. Residence occupied or not (selecting one)
 - (1) Having occupant(s)
 - (2) Not occupied
 - (3) No occupant but provided for other non-residential use
(If code 2 to 3 is filled up, complete selectively only item 5 and the rest will be left blank)
3. Usage of occupied residence (selecting one)
 - (1) Exclusive use for residence
 - (2) Part for residence and part for factory
 - (3) Part for residence and part for commerce
 - (4) Part for residence and part for others
4. Year of completing construction of the residence (selecting one)
 - (1) 1945 or earlier
 - (2) 1946-1960
 - (3) 1961-1975
 - (4) 1976-1977

(5) 1978-1979

(6) 1980

5. Type of construction of the residence (selecting one)

(1) Conventional or rural type

(2) Single house or duplex

(3) Several houses under one roof

(4) Apartment of five stories and lower

(5) Apartment of six stories and taller or mansions

(6) Others

6. Number of rooms (excluding bathroom, toilet and kitchen)
and total floorspace of the residence

7. Residence facilities

(1) Kitchen (selecting one)

a. Self-used

b. Shared

c. None

(2) Bath-room (selecting one)

a. Self-used

b. Shared

c. None

(3) Toilet (selecting one)

a. Flush type-self-used

b. Flush type-shared

c. Suction type-self-used

d. Suction type-shared

e. None

(4) Tap water (selecting one)

a. Self-used

b. Shared

c. None

8. Ownership and origin of residence (selecting one)

(1) Owned by respondent

a. General residence self-built or purchased

b. National housing purchased

c. Others (inherited or given)

(2) Rented or mortgaged

a. Public ownership

b. Private ownership

(3) Allotted

a. Public ownership

b. Private ownership

(4) Other (Residence other than self-owned, rented, mortgaged or allotted)

9. Number of households (Number of dwelling households as of now)

E. Household listing

The field office prepared enumeration lists according to the household registration data three months before the census date. The enumeration lists contained only names of household members and residential address.

F. Pretest

The primary purpose of pretesting was to try out plans, forms and procedures of the 1980 census to detect and correct weaknesses, inadequacies and oversight. The scope, objects, items, enumeration procedures and data processing of the pretest were in accordance with the provisions of the Implementation Program of the 1980 Census. The main points of the pretest were as follows:

(A) Time of the pretest

1. The pretest standard time was zero hour at the thirtieth day of June 1980.
2. The preliminary enumeration period for the pretest was June 28-29, 1980, and the verification enumeration time was June 30, 1980.

(B) Selection of pretest districts

Six pretest districts were selected. They were located respectively in the areas of factory, commerce, fishery, agriculture, residence and mineral. 40 households were enumerated in each district.

(C) Pretest in operation

1. The method of pre-census enumeration was applied to the pre-test. During the preliminary enumeration period enumerator and axaminer went together to the field to visit and enumerate de jure population in the enumeration district. The de facto population were enumerated and information for de jure population was updated during the time immediately after the pretest standard time.
2. The examiner took spot check 5 households with census schedules completed by the enumerator, in order to find out information in the census schedule collected by the enumerator whether complete or incomplete.
3. A system of pretest inspection journal by the pretest personnel was adopted to understand and solve the problems happened.

(D) Results of the pretest

The results of the pretest were discussed at a meeting held on May 13, 1980 by the Council on Census Planning. The following principal matters were revised:

1. Methods for preparing ED map.
2. Question wording, use of checkboxes and enumerator coding.
3. Training techniques and materials.
4. Assembly of materials for distribution to the field.
5. Field review procedures.
6. Manual editing and coding

Unfortunately, data keying, computer editing, manual correction and tabulation were not completed by the pretest.

(II) Publicity

Census publicity is an appeal to people to receive the enumerator and to answer the census questions willingly. A good public educational campaign not only can shorten the time to complete an interview, but also can obtain more complete and accurate information. The Information Office of the Executive Yuan handled the 1980 census publicity. The budget for it for the full census period was made available by the National Census Committee.

Two years in advance of the census date, the publicity campaign started officially with a government decree announcing the 1980 census. Through newspapers, radio, television, Village or Li citizens meeting, and other communication media, the residents were instructed concerning the information being requested on the census questionnaires. The announcements were stressed that the census is authorized by the Census Law, in which it is stipulated that the information supplied is kept strictly confidential (not used for taxation, police control, or other investigation). A curfew was made that the residents were expected to stay at home for interview during the verification period (00.00 hours to 06.00 hours in December 28).

To ensure the publicity reaching every household, a letter to heads of households was printed on the back face of the census schedule to explain the benefit of census data and to encourage people cooperating in the census.

(III) Enumeration

A. Enumeration districts

Six months before the census day, field offices estimated the total number of enumeration districts according to the statistics obtained from the household registrar. Each enumeration district contained of 40 to 60 households. Field offices also delineated census maps, the boundaries of enumeration districts, and the natural and man-made features. After the enumeration district was defined, households and their residential buildings were numerically labeled. Enumeration followed this numerical order.

B. Recruitment and training

(A) The recruiting of census personnel

Except temporary staffs were hired within the National Census Committee for delivering documents, packing, coding and editing census questionnaires, other positions were assigned to related employees in various levels of government. The director of civil registration office in each township usually undertakes the role of senior supervisor. As for census supervisors and enumerators, they are recruited from local household registration offices or they may be school teachers and college students. Census supervisors and enumerators were paid on a part-time basis.

(B) The training of the census personnel

Since most census workers were lack of adequate knowledge about census taking, a special census training session was essential for them. Two types of training seminars were provided: central seminars and local seminars.

Central seminars were held by the National Census Committee, and they were designed to train the following personnel:

- (1) Staff members of the National Census Committee
- (2) Staff members of the census branch offices
- (3) Staff members of the census sub-branch offices
- (4) Directors of direction areas

Local seminars were held by sub-branch census offices in each county or city and they were designed to train the following personnel:

- (1) Enumerators
- (2) Crew leaders
- (3) Inspectors
- (4) Staffs of field offices

Central seminars were held at the place where the National Census Committee was located, while local seminars at various places. The seminar training took three days, including one-day enumeration practice. Training materials were tape recorded, supplied by the National Census Committee. The members who have participated in the design work also undertook the training job. Their lectures were accompanied by tape recorded materials in order to avoid different interpretations.

C. Enumeration procedures

Enumeration procedures are the means of collecting the data required for the census purposes. Data items in the census were investigated on a complete count basis. The basis unit of enumeration for the census was the "Person". The basis for enumerating persons for the census was a combination of de jure approach and de facto approach. Direct interview and pre-census enumeration were also adopted for the census.

The steps of the pre-census enumeration applied in the census were as the followings:

(A) Identifying the boundaries of enumeration district

Two weeks ahead of the census day the crew leaders and enumerators accompanied by the chiefs of related Village (Li) and Lin identified the boundaries of the enumeration district, and the crew leader district.

(B) Arranging the preliminary enumeration time

Date of filling out the census schedule was arranged in advance with the head or representative of household in order to be assured of acceptance and cooperation. During the first visit for this end the unregistered new births and the new move-ins were entered into the household list while the deaths and the new move-outs were cancelled. All the housing units and households were duly numbered and marked. The work was completed within two days after the boundaries of enumeration district was identified.

(C) Preliminary enumeration

In order to shorten the time of filling up the census schedule on the spot, the enumerators entered the address, name of household head, the title of the non-family household, and the codes of enumeration district, Village (Li), township and county or city in the census schedule beforehand. The enumerators took the enumeration map, the household list, census schedules, other documents and materials to make second visit for enumerating the population conditions and housing situations of various households at the scheduled time. Arriving at a household the enumerator first checked the household register to identify the de jure population of the household. Everyday, after the completion of enumeration the enumerator filled up a daily activity report to the crew leader. All the preliminary enumeration were completed before the census day.

(D) Communicating with related field office in other township level units

Those who have household registration in the other township, or district, small city, but have lived in the present township level unit more than 6 months, or have intention to continue living in it, are regarded as de jure population in the present area, and should be enumerated. In order to avoid duplication, the related enumerator should fill in and send a post card to the related field office in which "Those persons have household registration in your area, but have been enumerated in our area" should be mentioned, then their names should be canceled from the census schedule by the field office.

(E) Supervision and contacts

To facilitate the census work, the chief of each township convened a census staff meeting with related crew leaders, enumerators and chiefs of Li or Village and Lin, and policeman to make good contacts and to solve problems.

The National Census Committee dispatched experienced personnel to supervise enumeration on the spot during the preliminary enumeration and the verification.

(F) Spot check by the crew leader

In addition to the enumerator reviewing the completed schedule himself immediately after he or she finished a household enumeration, the related crew leader checked all of the schedules and spot-checked 10% of the total number of the completed census schedules filled out by this enumerators, and the related inspector made a random recheck 5% of the schedules for quality control.

(G) Verification census at standard time

1. Census Liaison center

A Census Liaison Center in Taipei Municipality with its network throughout the whole census area was set up from 7:00 PM December 27 to follow up the progress of enumeration and to solve problems emerged on field.

2. Traffic control

There was a traffic control from 12 PM on December 27 to 06 AM on December 28, 1980 (Census day) to minimize population mobility during the period of verification enumeration.

3. Verification enumeration

The enumerator accompanied by the chief of Lin brought a census map, the completed census schedules, a household list and other materials, to revisit the same household to recheck the previous responses entered in the census schedule. If any inconsistency existed, proper corrections should be made.

(H) Local data checking

For the convenience of correcting data, the local agencies took the full responsibility of original data checking and correction before the census schedules were sent to the headquarter office. That is, under the direction of inspector, census schedules were examined again by a group of four persons who were familiar with data collection and data checking. Each person focused on different sections of the questionnaire, such as demographic characteristics, educational attainment, economic characteristics and housing conditions.

III. Data Processing

Information on census questionnaires are first entered into computer input medium. Through a computerized data checking and manual correction procedure, census data are ready for various cross-tabulations. The outputs will be printed out and also be stored on magnetic tapes.

(I) Data preparation and coding

1. Recruitment and training of personnel

Under the direction of higher level personnel from the Census Committee, DGBAS, the manual coding, manual editing and manual collection were done by

temporary employees who had been selected by a competitive examination. The qualified 180 were the graduates from university, junior colleges, and senior commercial schools. 8-10 persons constitute a group. There is a leader for every group. The leaders take charge of verification to ensure the accuracy of the work which did by their coders or editors, correctors.

A seminar was conducted on January 5-10, 1981 to familiarize the employees with the importance of the Population and Housing Census, the contents of the census schedules and how to code the entries, how to find out and correct errors or inconsistencies.

2.. Counting and checking census schedules

The completed census schedules were forwarded to the Population Census Committee in separate lots by the sequence of enumeration districts. After counted, the census schedules were stored in the storerooms according to the serial number assigned to each county (city) and township level unit.

The insides and outsides of the storerooms were written "No Smoking" sign. Extinguishers are available in every room. A register of picking and returning census schedules was also provided to avoid the loss or missing of census schedules.

3. Manual coding operation

Coding is a process of translating word classification into numbers so that the data can be tabulated by machine. All the entries in census schedules with Chinese characters must be coded with figures, i.e. residing place, domicile, place of residence 5 years ago, education department or course industry, occupation and work place.

The coding was done in accordance with the Complete and Detailed Instructions for Coding, It was started on February, 1981 and ended in August. There were altogether 3.9 million sheets and 46 million items to be coded.

(II) Editing and imputation

Editing can be done by manual labour or by machine. The entries in the 1980 census schedules not only edited by enumerators at conclusion of the interview, by the supervisor at the field, and by the local and central census offices, but also edited by computer. A set of precise and detailed instructions for manual editing, a precise set of rules of computer editing, and detailed methods for manual imputation were prepared and followed.

(III) Equipment

All data of 1980 Population and Housing Census are being processed by the Electronic Data Processing Center, DGBAS of the Executive Yuan. The following equipments were subsequently used by the EDP Center for this purpose:

A. Central processing unit (CPU)

IBM 3031-5

(A) Core storage 5 M Bytes

(B) Machine cycle 115 nanosecond

(C) Attached with 3036 consale

B. Data entry

CMC-5 16 stations

C. Disk drive

(A) 3350 12 drives

Capacity	317.5	MB/VOL
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Speed	1200	KB/SEC
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(B) 3340 12 drives

Capacity	70	MB/VOL
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Speed	885	KB/SEC
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D. Tape drive

3340 8 Drives

(A) 1600, 6250 Du-density 2 drives

(B) 6250 density 4 drives

(C) 1600 density 2 drives

Speed 780 KB/Sec

E. Card reader

2501 1 reader

Speed 1000 Cards/Minute

F. Printer

1403 2 Printers

Speed 1100 Lines/Minute

G. Local terminal

Local 3270 13 terminals

IV. Definitions

(I) Family household and non-family household

- A. Family household: A family household is composed mainly of family members, hired workers and lodgers who live at the same place and under the same head of household. A person occupying a living quarters and making independent living is also regarded as a family household. Family members living on a boat constitute naturally a family household. A family living usually at a public place is also regarded as a family household.
- B. Non-family household: A non-family household is a collective household composed of a group of people who live at the same place, such as public dormitory, hospital, hotel, government agency, military camp (post and station), school, temple, ship and jail, under a same person-in-charge, or are engaged in the same business.

(II) De jure population (usual residents) and de facto population

A. De jure population (usual residents) are those who have household registration and intention of taking the enumerated household as the usual place of residence, namely:

- (A) Population having household registration without being moved-out.
- (B) Population possessing one of the following documents and having intention of taking the enumerated household as usual place of residence.
 - 1. A copy of application for out-migration from other places in the census area.
 - 2. An entrance permit effective in application for household registration.
- (C) A fisherman having household registration but leaving his usual place of residence for working on the sea.

Students and businessmen who have gone abroad not over six months.

B. De facto population are those who were enumerated according to where each person spent the census standard time.

(III) Rural places and urban places

The administrative units, Village and Li, are the basic components of rural-urban classification in Taiwan. An urban place contains a group of contiguous urban Village or Li and its total population must exceed 20,000 people. A urban Village or Li must meet one of the following conditions: (a) It has a density of 2,000 or more people per square kilometer; (b) 60 percent or more of its labor force are engaged in non-agricultural activities. A Village or Li which is not classified as urban place is classified as rural place. A group of contiguous rural Village or Li constitutes a rural place. If a set of contiguous urban Village or Li has a total population less than 20,000 people, it is still classified as a rural place.

(IV) Metropolitan areas and non-metropolitan areas

Cities, townships and Village are the basic building blocks of a metropolitan area. The definition of an individual metropolitan area involves two considerations; first, a central city of specified legal status; and second, economic and social relationships with contiguous cities, townships or Village which are metropolitan in character.

An area outside metropolitan areas but within a geographic region is classified as a non-metropolitan area.

(V) Education attainment:

Educational attainment is defined as the highest level of instruction which the individual has attained in the regular educational system, or its equivalent for one not having had formal education but passing the examination recognized by the rules of examination. Those aged 6 and over who can read a newspaper in Chinese or in other language and write a simple letter are classified into self-taught group (literate), or into illiterate group, if they can not.

(VI) Economic activity, labour force, employed population and unemployed population

- A. Economic activity: Economic activity is defined as an activity which can produce goods or provide services of economic value.
- B. Economically active population: Economically active population is also called labour force. The economic activity of population is divided into two categories: (1) Economically Active Population and (2) Economically Inactive Population. The statistics on the economic activity of population deal with those of 15 years old and over in accordance with the "Standard Definitions and Classifications of Industry, Occupation & Employment Status" issued by the Executive Yuan in 1975. The economically active population comprises all persons engaged in or actively seeking productive works for rewards during the last 30 days preceding the census day. The economically inactive population, on the other hand, contains that part of population with no

economic activity during that period of time. This group normally includes housewives, students not economically active, retired persons, inmates of institutions, the elderly and sick, unsalaried workers in religion or for public benefit, and persons with unwilling to work, etc.

- C. Employed population: The employed population refer to those aged 15 years and over who are engaged in works according to the definition of occupation, whether the reward is in cash or goods, directly during the period mentioned above. Persons in employment include the following categories: (1) persons at work for rewards, (2) unpaid family workers who work at least three hours daily or two days weekly, (3) persons with jobs but not at work, (4) students economically active for rewards and (5) seasonal workers who are not on the job during the last 30 days preceding the census day.
- D. Unemployed population: Unemployed population, comprise all persons aged 15 and over in the following categories: (1) persons who had worked for rewards before but now are out of work and are seeking works and (2) persons who have never worked and are seeking jobs for the first time,

(VII) Industry, occupation and employment status

- A. Industry: Industry indicates the kind of establishment in which a person works, such as agriculture, manufacturing, etc. This kind of economic activity is determined by business unit or place of work. Any unit which performs a kind of prominent economic activity, such as a factory, a farm, a store etc., constitutes an independent department.
- B. Occupation: Occupation refers to the duty or work done by the person employed. However, it must be in accordance with the following criteria: (1) having payment, (2) having continuity and (3) permitted by law and recognized by custom.
- C. Employment status: Employment status (status of a worker) is the position of the individual in relation to his occupation or the status in employment relationships. It normally subsumes the four categories

as follows: (1) Employer, (2) Self-employed, (3) Employee and (4) Unpaid family worker. The employee is subdivided into two types, i.e. employed by the government, or by a private agency. Persons who work for public agencies include those employed by the government, public enterprises, etc., receiving a remuneration in wages, salary, food supplies or pay in kind. Soldiers and elected public servants are also covered in this category.

V. Tabulation and publication

(I) Table series planned

The 1980 census tabulations were intended to provide the most important census information for the programmes of economic and social development and for the research purposes. The statistical table series planned for the 1980 census will appear in two series publications. They are the preliminary result report and the final result report. The former is preliminary figures of population and housing compiled by the field personnel immediately after the census schedules were completed. 10 statistical tables were released by the National Census Committee at the end of February 1981. The latter is the final results of the census tabulated by computer which will be released in June 1982.

A. Tabulations dealing with the preliminary results of the census

1. Households by types and population by sex
2. Population by domiciles
3. Population by marriage status
4. Population by educational attainments
5. Population aged 6 and over by attending school or not
6. Population aged 15 and over by economic activities
7. Housing units by division of dwelling place.
8. Residence by type of occupancy

9. Occupied residence by types of usage
10. Occupied residence by ownership and origin
- B. Tabulations dealing with the final results of the census

Group (A), Tabulations dealing with de jure population,
de facto population and households

1. De jure population (usual residents) and de facto population by sex
2. De jure population by density and sex ratio
3. Average size of family household and non-family household.
4. Family household by size

Group (B), Tabulation dealing with de jure population
(usual residents)

- a. Tabulations dealing with age
 5. Populations by nationality, sex and single age
 6. Population under one year old by nationalities, days, weeks and months after birth.
- b. Tabulations dealing with domiciles and nationalities
 7. Population and household by nationality
 8. Chinese population by domicile
 9. Chinese population by domicile and single age
- c. Tabulations dealing with marital status
 10. Population aged 15 and over by marital status and single age.
 11. Married women aged 15 and over by marital status and age at first marriage.

d. Tabulations dealing with women fertility

12. Married women aged 15 and over by age at first marriage, fertility status and present age.
13. Married women aged 15 and over by marriage year, fertility status and present age.
14. Married women by present age and number of children born alive.
15. Married women by number of children born alive and educational attainment.
16. Married women by number of children born alive and industry.
17. Married women by number of children born alive and occupation.
18. Women by age, number of alive births within 12 months preceding the census day and number of children living at the census day.
19. Currently married women by single age and educational attainment.
20. Currently married women by single age, economic activity and industry.
21. Currently married women by single age and occupation.
22. Women given births within 12 months preceding the census day by single age and educational attainment.
23. Women given births within 12 months preceding the census day by single age and occupation.

e. Tabulation dealing with educational attainment

24. Attending school population aged 15 and over by sex, single age and educational attainment.

25. Population aged 15 and over by sex, single age and educational attainment.
 26. Population aged 6-34 by sex and attending school or not.
 27. Population aged 15 and over by sex, age group, marital status and educational attainment.
 28. Married women aged 15 and over by age at first marriage and educational attainment.
 29. Population at 15 and over educated in senior vocational school by sex and division of major courses.
 30. Population at 15 and over educated in senior vocational school by sex, age group and division of major courses.
 31. Population at 15 and over educated in junior college by sex, age group and division of major courses.
 32. Population at 15 and over educated in university and over by sex, age and major department.
- f. Tabulations dealing with economic characteristics
33. Population aged 15 and over by sex, age group and economic activity.
 34. Employed population aged 15 and over by sex, age group and employment status.
 35. Employed population aged 15 and over by sex, educational attainment and employment status.
 36. Employed population aged 15 and over by sex, employment status and industry.

37. Employed population aged 15 and over by sex, educational attainment and industry
38. Employed population aged 15 and over by sex, age group and industry
39. Employed population aged 15 and over by sex, industry and educational attainment.
40. Employed population aged 15 and over by sex, age group and occupation
41. Employed population aged 15 and over by sex, industry and occupation
42. Mainbread winner in family household by sex, economic activity and employment status
43. Mainbread winner in family household by sex, economic activity and industry
44. Mainbread winner in family household by sex, economic activity and occupation
45. Population aged 15 and over by sex, educational attainment and economic activity
46. Employed population at age 15 and over educated in senior vocational school by sex, occupation and division of major courses
47. Employed population at age 15 and over educated in junior college by sex occupation and divisions of major courses
48. Employed population at age 15 and over educated in university and over by sex occupation and major department
49. Population aged 15 and over by sex, domicile and economic activity
50. Population aged 15 and over by sex, marital status and economic activity

51. Employed population aged 15 and over by employment status.
52. Attending school population aged 15 and over by age group and working or not.
53. Employed population aged 15 and over by occupation and employment status.
54. Employed population at age 15 and over educated in senior vocational school by sex, employment status and division of major courses.
55. Employed population at age 15 and over educated in junior college by age and division of major courses.
56. Employed population at age 15 and over educated in junior college by employment status and division of major courses.
57. Employed population at age 15 and over educated in university and over by age and major department.
58. Employed population at age 15 and over educated in university and over by employment status and major department.
59. Unemployed population at age 15 and over by sex and age.
60. Unemployed population at age 15 and over by educational attainment and major department.
61. Unemployed population with work experience at age 15 and over by sex and previous industry.
62. Unemployed population with work experience at age 15 and over by previous occupation.

g. Tabulation dealing with migration

63. Population aged 5 and over by sex, residence in second level units lived five years ago and present residence in second level units.

64. Population aged 5 and over by sex, residence in Village or Li lived five years ago and present residence in third level units.
65. Population aged 5 and over by sex, age, and present residence in fourth level unit for more than or less than 5 years.
66. Population aged 15 and over by sex, education attainment and present residence in third level units lived 5 years and more or less.
67. Population aged 15 and over by sex, marital status and present residence in third level units lived 5 years and more or less.
68. Population aged 15 and over by sex, economic activity and present residence in third level units lived 5 years and more or less.
69. Population aged 15 and over by sex, employment status and present residence in third level units lived 5 years and more or less.
70. Population aged 15 and over by sex, industry, and present residence in third level units lived 5 years and more or less.
71. Population aged 15 and over by sex, occupation and present residence in third level units lived 5 years and more or less.
72. Population aged 5 and over by sex, age and lived in present county (city) 5-year and more or less.
73. Population aged 15 and over by sex, age, educational attainment and present county (city) lived 5 years and more or less.
74. Population aged 15 and over by sex, age, marital status and present county (city) lived 5 years and more or less.

75. Population aged 15 and over by economic activity and present county (city) lived 5 years and more or less.
76. Population aged 15 and over by employment status and present county (city) lived 5 years and more or less.
77. Population aged 15 and over by industry and present county (city) lived 5 years and more or less.
78. Population aged 15 and over by occupation and present county (city) lived 5 years and more or less.
- h. Tabulation dealing with residential location and working location
 79. Employed population aged 15 and over in Taipei Metropolitan Area by residence and working place in third level units.
 80. Employed population aged 15 and over in Hsinchu-Miaoli Area by residence and working place in third level units.
 81. Employed population aged 15 and over in Taichung Metropolitan Area by residence and working place in third level units.
 82. Employed population aged 15 and over in Chiayi-Yunli Area by residence and working place in third level units.
 83. Employed population aged 15 and over in Kaohsiung-Tainan Metropolitan Area by residence and working place in third level units.
 84. Employed population aged 15 and over in Ilan Area by residence and working place in third level units.
 85. Employed population aged 15 and over in Taitung-Hualien Area by residence and working place in third level units.

1. Tabulation dealing with housing condition

86. Housing unit by division of dwelling place.
87. Dwelling place by family household and persons.
88. Occupied housing unit by type of construction.
89. Occupied housing unit by type of usage.
90. Occupied housing unit by year of construction.
91. Occupied housing unit by total floorspace.
92. Occupied housing unit by number of rooms.
93. Occupied housing unit by average floorspace per person.
94. Occupied housing unit by average persons per room.
95. Occupied housing unit by residence facilities.
96. Occupied housing by ownership and origin.
97. Occupied housing by type of occupancy.
98. Occupied housing by total floorspace, number of rooms, and number of family household.
99. Housing unit occupied by family-household by types of usage and of construction.
100. Housing unit occupied by family-household by type of usage and total floorspace.
101. Housing unit occupied by family-household by type of usage and average floorspace per person.
102. Housing unit occupied by family-household by type of usage and number of persons per room.
103. Housing unit occupied by family-household by type of usage and residence facilities.
104. Housing unit occupied by family-household by type of usage and number of rooms.

104. Housing unit occupied by family-household by type of usage and number of rooms.
105. Housing unit occupied by family-household by types of usage and of occupancy.
106. Housing unit occupied by family-household by year and type of construction.
107. Housing unit occupied by family-household by year of construction and floorspace.
108. Housing unit occupied by family-household by year of construction and floorspace per person.
109. Housing unit occupied by family-household by year of construction and residence facilities.
110. Housing unit occupied by family-household by type of construction and floorspace.
111. Housing unit occupied by family-household by type of construction and number of rooms.
112. Housing unit occupied by family-household by type of construction and floorspace per person.
113. Housing unit occupied by family-household by type of construction and person per room.
114. Housing unit occupied by family-household by type of construction and residence facilities.
115. Housing unit occupied by family-household by type of construction, ownership and origin.
116. Housing unit occupied by family-household by types of construction and of occupancy.
117. Housing unit occupied by family-household by total floorspace and number of rooms.
118. Housing unit occupied by family-household by total floorspace and persons per room.

119. Housing unit occupied by family-household by total floorspace and residence facilities.
120. Housing unit occupied by family-household by total floorspace, ownership and origin.
121. Housing unit occupied by family-household by total floorspace and type of occupancy.
122. Housing unit occupied by family-household by number of rooms and residence facilities.
123. Housing unit occupied by family-household by number of rooms, ownership and origin.
124. Housing unit occupied by family-household by residence facilities, ownership and origin.
125. Housing unit occupied by family-household by residence facilities and type of occupancy.
126. Housing unit occupied by family-household by type of occupancy ownership and origin.
127. Housing unit occupied by family-household by persons in household and type of usage.
128. Housing unit occupied by family-household by persons in household and type of construction.
129. Housing unit occupied by family-household by persons in household and total floorspace.
130. Housing unit occupied by family-household by persons in household and number of rooms.
131. Housing unit occupied by family-household by persons in household and residence facilities.
132. Housing unit occupied by family-household by persons in household, ownership and origin.
133. Housing unit occupied by family-household by persons in household and type of occupancy.

134. Housing unit occupied by family-household by total floor-space, number of rooms and persons in household.
135. Housing unit occupied by family-household by total floor-space, number of rooms and educational attainment of main breadwinner.
136. Housing unit occupied by family-household by total floor-space, number of rooms and occupation of main breadwinner.
137. Housing unit occupied by family-household by occupation of main breadwinner and type of usage.
138. Housing unit occupied by family-household by occupation of main breadwinner and year of construction.
139. Housing unit occupied by family-household by occupation of main breadwinner and type of construction.
140. Housing unit occupied by family-household by occupation of main breadwinner and total floorspace.
141. Housing unit occupied by family-household by occupation of main breadwinner and number of rooms.
142. Housing unit occupied by family-household by occupation of main breadwinner and residence facilities.
143. Housing unit occupied by family-household by occupation of main breadwinner, ownership and origin.
144. Housing unit occupied by family-household by occupation of main breadwinner and type of occupancy.
145. Housing unit occupied by family-household by educational attainment of main breadwinner and type of usage.
- 146.. Housing unit occupied by family-household by educational attainment of main breadwinner and type of construction.
147. Housing unit occupied by family-household by educational attainment of main breadwinner and total floorspace.
148. Housing unit occupied by family-household by educational attainment of main breadwinner and number of rooms.

149. Housing unit occupied by family-household by educational attainment of main breadwinner and residence facilities.
150. Housing unit occupied by family-household by educational attainment of main breadwinner, ownership and origin.
151. Housing unit occupied by family-household by educational attainment of main breadwinner and type of occupancy.
152. Housing unit occupied by family-household by age of main breadwinner and type of usage.
153. Housing unit occupied by family-household by age of main breadwinner and total floorspace.
154. Housing unit occupied by family-household by age of main breadwinner, ownership and origin.

(II) Publications

Census final results will be published in three parts. The first part is the summary report, including demographic characteristics, socioeconomic characteristics and housing conditions. The second part is a set of statistical tabulations based on various levels of administrative units. The third part contains statistical tables presented according to various types of statistical areas.

1. Administrative units

The administrative system of the Republic of China consists of five levels of administrative units:

- (1) Province and municipality under jurisdiction of central government.
- (2) County and city under jurisdiction of provincial government.
- (3) Urban township, rural township, small city and district under jurisdiction of county or city government.
- (4) Village and Li: Li is a sub-unit within small cities or urban townships, districts while Village a sub-unit within rural townships. Both units have well-defined boundaries and contain approximately 200 to 300 households.

- (5) Lin: Lin is the lowest administrative unit and has 15 to 30 households. Its boundary may change with increase or decrease of households.

Village and Li are the smaller units. Census data for those units will be actually coded into census data file. Cross-tabulations by Village or Li will be only available on computer tapes.

2. Statistical areas

Three types of statistical areas have been defined: The rural-urban classification, the metropolitan and non-metropolitan classification, and a classification of statistical sectors.

(1) Rural places VS. urban places

The definitions of rural place and urban place have been described in section IV. All urban and rural places in Taiwan will be tabulated according to different categories of population size: (a) under 500 persons, (b) 500-999, (c) 1,000-1,999, (d) 2000-4,999, (e) 5,000-9,999, (f) 10,000-19,999, (g) 20,000-49,999 (h) 50,000-99,999, (i) 100,000-499,999, (j) more than 500,000 persons.

(2) Metropolitan areas VS. non-metropolitan areas

A metropolitan area in Taiwan contains three sections:

- (a) Central city: It must be a municipality under jurisdiction of central government or a city under jurisdiction of provincial government.
- (b) Urban fringe: It includes cities or townships surrounding the central city and is a complete urban area.
- (c) Suburb: It includes small cities, urban townships, rural townships or Village surrounding the central city or urban fringe, and there are some rural areas in the suburb.

An area outside metropolitan areas but within a geographic region is classified as a non-metropolitan area. Census results will be tabulated in accordance with metropolitan and non-metropolitan classification.

(3) Statistical sectors

The statistical sector is a statistical subdivision within a metropolitan area. It is designed to include a group of contiguous Li which are homogeneous with respect to land-use type and assessed land value. Most statistical sectors have a population of 20,000. The boundaries of statistical sectors are intended to be permanent, only in case of sectors that have had such a large population growth that they need to be subdivided. Cross-tabulations by statistical sectors may be of great value to urban planning and to research of small areas.

VI. Evaluation

Evaluating the 1980 Census is to measure accuracy of the census results, to identify sources of errors and to provide guidance for future statistical programs.

(I) Post-Enumeration Survey

Following the field work on the 1980 census, the DGBAS undertook the Post-Enumeration Survey in February 1981. In this survey a careful recanvass was made to evaluate the coverage of the census and the accuracy of the responses obtained. In order to gain this and superior interviewers were selected, more intensive training and closer supervision were also given to the interviewers.

The PES utilized two samples, household sample and area sample. Both samples were drawn by stratified two-stage systematic sampling. 2 percent Village (Li) were drawn from 7379 ones (total number of Villages or Li in the census area). 20 percent households (about 15,000 households) were drawn from the sampling Village (Li). All persons in the sampling households were re-interviewed. In order to check the census coverage of dwelling units and to measure associated errors in the coverage of individuals, 157 Lin (about 7000 households) were drawn from sampling Village (Li). All persons and housing in the sampling Lin were re-enumerated.

The PES information will be compared with the census information on a case-by-case basis by computer.

(II) Other evaluation measures

- A. The comparisons between the census total for a given characteristic and the total derived from the results of household registration, labour force survey, women fertility survey will be conducted.
- B. Evaluations of vital, age and sex statistics by means of balancing equations, Myers' index, and the United Nations Secretariat Methods will be computed.

VII. Budget

The preparation of a budget is one of the most important activities undertaken in planning a census. The 1980 Census budget estimate by calendar year and major activity is as the following table.

Budget Estimates By Calendar Year and Major Activity (in million NT\$, NT\$37= 1US\$)

Activity	Total	1979	1980	1981	1982
Total	412	16	279	45	72
1. Planning and preparatory work	29	11	18		
2. Data collection	251		251		
3. Data processing	54			34	20
4. Analysis and publication	51				51
5. Evaluation of Census	2			2	
6. General administrative and miscellaneous services	25	5	10	9	1

1980 POPULATION AND HOUSING CENSUS SCHEDULE OF THE REPUBLIC OF CHINA (FORM I)

STANDARD TIME: 00.00 A.M. DECEMBER 28, 1980

(1) POPULATION PANEL

This household filled up _____ sheet(s) of census schedule, this is the No. _____

Address	Hsien _____ City _____	Hsiang _____ Chen _____ Shih _____ Ch'u _____	Village _____ Li _____	Lin _____	St. _____ Rd. _____	Sec. _____	Lane _____ Alley _____	No. _____ Fl. _____
Code				Crew leader's district No. _____	Enumerator's district No. _____		Household (Housing) No. _____	

Enumerator: Record the data given here to a Chinese census schedule.

Survey code: No. 69-01-13
Approved expiring date: June 30, 1981

Those who evade the census inquiry, refuse enumeration or give untrue answers will be punished in accordance with the law.

Items in this schedule are exclusively for the use of statistical analysis; those who make unauthorized release will be punished accordingly.

1) Type of household	1. Ordinary household _____ 2. Non-ordinary household _____ Title _____
----------------------	--

2) Name	Code of household population _____	Name _____	1	2	3	4	5	6	Total of usually-living (de jure) population of this household
3) At home or not	1. At home _____ 2. Not at home _____								1. _____ 2. _____
4) Relationship to household head	1. Head of household _____ 2. Family member (For example: Father, Mother, Husband, Wife, Eldest son, Second daughter) _____ 3. The hired _____ 4. Lodger _____ Subdivision of family member _____	Subdivision of family member _____	Subdivision of family member _____	Subdivision of family member _____	Subdivision of family member _____	Subdivision of family member _____	Subdivision of family member _____	Subdivision of family member _____	1. _____ 2. _____ 3. _____ 4. _____
5) Sex	1. Male _____ 2. Female _____								1. _____ 2. _____
6) Date of birth	Day _____ Month _____ Year _____ Full age _____	Day _____ Month _____ Year _____ Full age _____	Day _____ Month _____ Year _____ Full age _____	Day _____ Month _____ Year _____ Full age _____	Day _____ Month _____ Year _____ Full age _____	Day _____ Month _____ Year _____ Full age _____	Day _____ Month _____ Year _____ Full age _____	Day _____ Month _____ Year _____ Full age _____	
7) Domicile/Nationality	1. Taiwan-Fukien area _____ Hsien, City _____ 2. Other province, municipality _____ Province, Municipality _____ 3. Foreign country (or area) _____	Hsien, City _____ Prov., Mun. _____	Hsien, City _____ Prov., Mun. _____	Hsien, City _____ Prov., Mun. _____	Hsien, City _____ Prov., Mun. _____	Hsien, City _____ Prov., Mun. _____	Hsien, City _____ Prov., Mun. _____	Hsien, City _____ Prov., Mun. _____	1. _____ 2. _____ 3. _____
8) Location of residence five years ago (residence on December 27, 1975)	1. Same village, li as of now _____ 2. Same hsien, chen, shih, ch'u as of now, but not the same village, li _____ 3. Same hsien, city as of now, but not the same hsien, chen, shih, ch'u _____ 4. Same Taiwan-Fukien area, but not the same hsien, city _____ Hsien, City _____ 5. Other province, municipality _____ 6. The rest of the world _____	Hsien _____ City _____	Hsien _____ City _____	Hsien _____ City _____	Hsien _____ City _____	Hsien _____ City _____	Hsien _____ City _____	Hsien _____ City _____	
9) Marital status	1. Single _____ 2. Married: _____ 3. Currently married or cohabited _____ 4. Divorced, separated _____ 5. Widowed _____								1. _____ 2. _____ 3. _____ 4. _____
10) Fertility status of woman	Age at 1st marriage _____ Full age _____ Total number of births _____ 1. Total number of livebirths: _____ Male _____ person(s); Female _____ person(s) 2. Number of her children now alive: _____ Male _____ person(s); Female _____ person(s) Number of births in the past 12 months _____ 1. Number of livebirths: _____ Male _____ person(s); Female _____ person(s) 2. Number of her infants now alive: _____ Male _____ person(s); Female _____ person(s)	Full age _____ 1. M. _____ F. _____ 2. M. _____ F. _____ 1. M. _____ F. _____ 2. M. _____ F. _____	Full age _____ 1. M. _____ F. _____ 2. M. _____ F. _____ 1. M. _____ F. _____ 2. M. _____ F. _____	Full age _____ 1. M. _____ F. _____ 2. M. _____ F. _____ 1. M. _____ F. _____ 2. M. _____ F. _____	Full age _____ 1. M. _____ F. _____ 2. M. _____ F. _____ 1. M. _____ F. _____ 2. M. _____ F. _____	Full age _____ 1. M. _____ F. _____ 2. M. _____ F. _____ 1. M. _____ F. _____ 2. M. _____ F. _____	Full age _____ 1. M. _____ F. _____ 2. M. _____ F. _____ 1. M. _____ F. _____ 2. M. _____ F. _____	Full age _____ 1. M. _____ F. _____ 2. M. _____ F. _____ 1. M. _____ F. _____ 2. M. _____ F. _____	
11) Educational attainment (for age 6 and over)	1. Illiterate _____ 2. Self-taught or private teaching _____ 3. Primary school _____ 4. Junior high, vocational or normal school _____ 5. Senior high school _____ 6. Senior vocational school, first 3 years of 5-year junior college, or ordinary normal school _____ 7. Junior college (including last 2 years of 5-year junior college) _____ 8. College or university _____ 9. Graduate school (If one of codes 6 to 9 is filled up, the name of course, department or institute should be entered in) _____ Name of course, depart. or institute _____	Course _____ Dept. _____ Institute _____	Course _____ Dept. _____ Institute _____	Course _____ Dept. _____ Institute _____	Course _____ Dept. _____ Institute _____	Course _____ Dept. _____ Institute _____	Course _____ Dept. _____ Institute _____	Course _____ Dept. _____ Institute _____	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____
	Attending school or not _____ 1. Attending school _____ 2. Attended _____ 3. Graduated _____ 4. Others _____								1. _____ 2. _____ 3. _____ 4. _____
12) Economic characteristics (for age 15 and over)	00. Having a job _____ Reasons for unemployment: _____ 10. Seeking for job for the first time _____ 11. Having left original job and seeking for job again _____ 12. Attending school _____ 13. Studying oneself for advanced schooling _____ 14. House-keeping _____ 15. Disabled or handicapped _____ 16. Invalid or old _____ 17. In jail, custody or charity house _____ 18. Not willing to work _____ 19. Others _____								00. _____ 10. _____ 11. _____ 12. _____ 13. _____ 14. _____ 15. _____ 16. _____ 17. _____ 18. _____ 19. _____
	Main breadwinner or not _____ 1. Main breadwinner _____								
	Location _____ Hsien, City _____ Hsiang, Chen, Shih _____	Hsien _____ City _____ Hsiang _____ Chen _____ Shih _____	Hsien _____ City _____ Hsiang _____ Chen _____ Shih _____	Hsien _____ City _____ Hsiang _____ Chen _____ Shih _____	Hsien _____ City _____ Hsiang _____ Chen _____ Shih _____	Hsien _____ City _____ Hsiang _____ Chen _____ Shih _____	Hsien _____ City _____ Hsiang _____ Chen _____ Shih _____	Hsien _____ City _____ Hsiang _____ Chen _____ Shih _____	
	Example: A. Sugar Refinery, Pingtung General Plant, TSC B. Self-owned paddy field C. Vegetables								
	Example: A. Sugar manufacturing B. Cultivation of rice C. Vegetables retail								
	Example: A. Sugar making branch B. Rice paddy field C. Vegetables stand								
	Example: A. Guidance of sugar manufacturing processes B. Tilling and cropping C. Selling of vegetables								
	Example: A. Sugar making engineer B. Farmer C. Faker								
	Employment status _____ 1. Working on own account without hired helper _____ 2. Working on own account with hired helper(s) _____ 3. Aiding the business run by family member without pay _____ 4. Employed by private enterprise with pay _____ 5. Employed by government, public enterprise or school _____								1. _____ 2. _____ 3. _____ 4. _____ 5. _____

Note: Please do not fill up the small boxes marked with *, these are reserved for coding by the Census Agency of the Executive Yuan.
Household telephone No. _____

Census item		Census sub-item	Entries to be filled up
1)	Division of dwelling place	1. Residence 2. Other buildings 3. Other places (If code 2 or 3 is filled up, items 2) to 9) will be left blank)	
2)	Occupied or not	1. Having occupant(s) 2. Not occupied 3. No occupant but provided for other non-residential use (If code 2 or 3 is filled up, complete selectively only item 5) and the rest will be left blank)	
3)	Usage of occupied residence	1. Exclusive use for residence 2. Part for residence and part for factory 3. Part for residence and part for commerce 4. Part for residence and part for others	
4)	Year of completing construction	1. 1945 or earlier 2. 1946 -- 1960 3. 1961 -- 1975 4. 1976 -- 1977 5. 1978 -- 1979 6. 1980	
5)	Type of construction	1. Conventional or rural type 2. Single house or duplex 3. Several houses under one roof 4. Apartment of five stories and lower 5. Apartment of six stories and taller or mansions 6. Others	
6)	Number of rooms and total floorspace	Number of rooms (excluding bath-room, toilet and kitchen) Total floorspace	Room(s) Ping(s)
7)	Residence facilities	Kitchen Bath-room Toilet Tap water	1. Self-used 2. Shared 3. None 1. Self-used 2. Shared 3. None 1. Flush type - Self-used 2. Flush type - Shared 3. Suction type - Self-used 4. Suction type - Shared 5. None 1. Self-used 2. Shared 3. None
8)	Ownership and origin of residence	Owned by respondent Rented or mortgaged Allotted Others	1. General residence self-built or purchased 2. National housing purchased 3. Others (inherited or given) 4. Public ownership 5. Private ownership 6. Public ownership 7. Private ownership 8. Residence other than self-owned, rented, mortgaged or allotted
9)	Number of households	Number of dwelling households as of now	Household(s)

Name		Sex		Usually-living location			
		M.	F.				
1				Hsien City	Hsiang, Shih Chen, Ch'u	Village Li	Lin
2				Hsien City	Hsiang, Shih Chen, Ch'u	Village Li	Lin
3				Hsien City	Hsiang, Shih Chen, Ch'u	Village Li	Lin
4				Hsien City	Hsiang, Shih Chen, Ch'u	Village Li	Lin
5				Hsien City	Hsiang, Shih Chen, Ch'u	Village Li	Lin
6				Hsien City	Hsiang, Shih Chen, Ch'u	Village Li	Lin
7				Hsien City	Hsiang, Shih Chen, Ch'u	Village Li	Lin
8				Hsien City	Hsiang, Shih Chen, Ch'u	Village Li	Lin
9				Hsien City	Hsiang, Shih Chen, Ch'u	Village Li	Lin
10				Hsien City	Hsiang, Shih Chen, Ch'u	Village Li	Lin
Total	*			Remark			

Classification	Usually living (De jure) population			Casually present (De facto) population		
	Total	M.	F.	Total	M.	F.
1) At home at standard census time						
2) Not at home at standard census time						
3) Present casually at standard census time						
Total						

Inspector's signature or seal

Chiu, Chuang-huan
Concurrently the Director-General
of Population Census

CENSUS MEMO

[illegible]

ELEVENTH POPULATION CENSUS CONFERENCE

(February 1987 - Australia)

The Hong Kong 1986 By-Census

Hong Kong
January 1987

1. Background

1.1 It is a well established practice in Hong Kong to undertake a full-scale population census every 10 years and a sample by-census on the fifth year after the full census. The last decennial population census was conducted in March 1981 and the sample by-census for this decade in March 1986. An important aim of the By-Census was to collect up-to-date small area statistics (as a result of changes in the spatial distribution of the population since 1981) and to provide up-to-date benchmark information on the demographic, social and economic characteristics of the population.

2. Planning of the 1986 By-Census

2.1 The By-Census was originally designed as a two-phase operation with a 15 per cent sample for short-form enumeration in the first phase and a five per cent sample for long-form enumeration in the second phase. This decision was made after detailed cost analysis. The relative workload between short-form and long-form enumeration was estimated to be 1:2, and the cost of the census operations to be \$21 million.

2.2 According to the By-Census plan, a pilot census had to be conducted in March 1985 (exactly one year before the main census) to test the census content, the field organisation (including the optimum workload for short-and long-form enumerators) and data processing. All preparatory work for the pilot census had to be completed by February 1985.

3. Data Processing

3.1 A computer project team consisting of a project manager, two system analysts and four programmers was set up within the Census and Statistics Department to help to establish a computerised frame of living quarters and to design a data processing system for the 1986 By-Census. The team looked into various approaches in forming a programming strategy and in identifying a suitable package to replace FILAN which was used in the previous censuses mainly for tabulation. The strategy finally adopted was to use a combination of COBOL and CENTS 4. While CENTS 4 was used for tabulation, special COBOL programmes were developed for the computerisation of the living quarters frame and for validation, imputation and the production of summary tabulations, standard error tables and phototypesetting tables from the main census.

4. Advantages and Disadvantages in Using CENTS 4

4.1 Advantages

Programming effort was greatly reduced. According to our record, the development time (coding and unit program testing) of 1 table using the CENTS 4 package was about 0.52 man-day. If these tables were coded in COBOL, it would take at least 1 man-day to complete 1 table. Program development time was reduced by about 50%. These savings in manpower decreased with increasing complexity of the CENTS 4 program.

4.2 Disadvantages

It was found that OCP (Order code processor) time consumption was tremendous when CENTS 4 was used to produce tables of a number of areas (control level breaks) from input files of a large size.

In a benchmark test (performed in May 1984 before the package was tuned*), 1.43 OCP hours were consumed in tabulating 0.93 million records to produce a table of 4 areas. It was also found that the OCP time for producing tables with 4 areas was about 3 times that for producing tables with 2 areas. Though it was advised by the U.S. Bureau of Census in November 1985 that input files could be broken down into smaller sub-files based on geographical units and that the program could be run separately to reduce the computer run time, yet in our case, most of our tables required more than one area break and involved other variables in the area break formation besides geographical units. The savings achieved was marginal and thus this optimisation method was not adopted.

- 4.3 In the actual live runs, the ratio of the OCP time consumed in the summary table production with programs developed in COBOL to the estimated OCP time consumed if the programs were written in CENTS 4 (the tuned version) was estimated to be in the range of 1:5 to 1:25. For small data files and simple tables, the difference in OCP time consumption between the two languages was not significant.

5. Computerisation of the Living Quarter Frame

5.1 Before any sample can be drawn for the By-Census, a comprehensive frame of all living quarters had to be established. A full reticulation had to be undertaken to update all records of permanent living quarters and temporary structures. The job began in late 1984 and was completed by September 1985. The whole of Hong Kong was divided into over four thousand street blocks/village clusters (SB/VC) and trained field staff were sent out to these SB/VC to record all buildings/structures found within the boundaries of these SB/VC. For permanent buildings in built-up areas, they were instructed to list down the addresses and names of buildings, the numbering system of the units (quarters) and other details on a specially designed form. These records of buildings were input into computer and individual records of living quarters were generated from the building records based on the numbering system and information on merging and splitting of units.

5.2 By inputting building records instead of living quarters records, it was possible to reduce the large amount of manual effort required for recording living quarters details unit by unit. Data preparation work had also been cut down substantially.

*CENTS 4 (ICL version) was tuned in September 1984. All counters in the programs are modified to word aligned to improve program efficiency. It has been tested to be about 45% faster.

5.3 For temporary structures in non-built-up areas, field staff were instructed to delineate the areas into segments of 8-12 structures, using relatively permanent landmarks such as foot-path, fence, lamp-post, wall and hill-side etc. Again, a special form had to be completed for each segment, listing all structures found within the boundaries of the segment. For these non-built-up areas (which housed about 9% of the population), area segments were the sampling units. All structures found within the boundaries of the sampled segment had to be enumerated whether or not the structures were previously listed. Part of the information (mainly the segment reference number and the number of structures) was input into computer to facilitate sample selection and the delineation of enumerator blocks.

5.4 The system covered all land in Hong Kong. Even for vacant lands such as building sites or open spaces, a vacant land record had to be created and a sample of these records had to be selected for field inspection in the 1986 By-Census to ensure that no one would be missed in the census enumeration.

6. New Features Brought About by the Computerization

6.1 With the computerization of the frame of living quarters, it was possible to introduce the following new features in the 1986 By-Census. These included :

- (a) Selection of samples and replicates in a relatively more complicated way by computer;
- (b) Production of up-to-date living quarters frame statistics and sample statistics for comparison and analysis;
- (c) Calculation of the workload for enumerators with reference to such variables as type of living quarters, average number of households per living quarters, average number of persons per household, average number of visits to each household, interviewing time for completing the enumeration of a household or a person, travelling time from field centre to living quarters and between living quarters, etc. by individual district;
- (d) Automatic delineation of enumerator blocks based on calculated workload and pre-assigned sequence;
- (e) Printing of assignment lists and control lists by computer;
- (f) Printing of appropriate addresses on the first householder letters to inform sampled households of their being selected for the By-Census and to seek their cooperation;
- (g) Printing of appropriate addresses and enumerator details (name and identity card number) on the second householder letters so that householders could check the identity of the enumerator who would visit them. (This was introduced as a security measure.)

- (h) Printing of enumerator details (name in English and Chinese, identity card number, field centre and team number) and area/living quarters covered by individual enumerators to facilitate control at the headquarters and field centre and verification of enumerator's identity by householders on telephone;
- (i) Control of respondent burden (to ensure that the addresses selected for the By-Census will not be selected again for a post-census survey within a specific period of time).

6.2 For non-census applications, the computerized frame of living quarters will provide a complete and up-to-date sampling frame for the continuous General Household Survey and other post-census ad hoc surveys. It will also enable estimates of population at sub-territorial levels (based on up-to-date information on housing stock derived from the computerized frame and data on occupancy rates obtained from the General Household Survey) to be produced during the intercensal period.

7. Pilot Census

7.1 The pilot census conducted in March 1985 was based on a sample of about 9 500 living quarters and 230 segments of temporary structures. Due to this relatively smaller sample size as compared with that for the main census, a random sample of living quarters covering all areas in Hong Kong would fail to simulate the main census enumerator block conditions in the pilot census, and it would be difficult to ascertain the travelling time required for the enumeration of the sampled households in the main census. Failing this, it would not be possible to fully test the workload for enumerators. Hence, only some areas in eight districts were selected for the pilot census with a view to including in the sample most of the problem areas of fieldwork. The sample was selected soon after the computerization of the living quarters frame for the selected districts was completed in February 1985. Apart from the enumeration work, enumerators were required to record detailed information on interviewing time, travelling time and number of visits to each household. Supervisors were also instructed to do the same independently in their induction checks (a quality control measure). Based on their feed-back, it was calculated that the relative workload between short-form and long-form enumeration was 2:3 and not 1:2 as originally estimated based on the experience of the 1981 Census. Other shortcomings in the questionnaire design, field organisation, etc. were also identified

8. Change in Design

8.1 With the much reduced cost margin between short-form and long-form enumeration as revealed by the 1985 pilot census, a one-phase sample covering all census questions would be more cost-effective than the original two-phase design for the given resources. A one-phase sample design (the sample size being one in seven or 14.3 per cent) was therefore adopted for the main census. The decision was made on the understanding that the gain due to a reduction in sampling error for detailed characteristics would outweigh the loss due to an increase in sampling error for basic characteristics. There was also significant savings in having a simpler operation system of one questionnaire and one set of training/instruction/coding manuals. Simpler processing system would be required under the one-phase design and this would bring about additional savings.

9. The Marine By-Census

9.1 The survey of the population living on board vessels in Hong Kong waters was taken just before the Chinese New Year (4 to 8 February 1986) when all vessels returned to port. The major anchorages and the coast lines of Hong Kong were divided into 98 sections and 14 such sections were selected for enumeration. Aerial photos covering all 98 sections were taken to provide supplementary data on the number of vessels which were used for the estimation of the marine households and population. The field operation was carried out by a team of 43 permanent field staff working for a period of 4½ days.

10. The Land By-Census

10.1 Surveys of the land population was taken from 7 to 16 March 1986. A total of 48 permanent field staff and about 3700 temporary enumeration staff (who were mainly students from post-secondary colleges) participated in the field operation. These temporary staff were grouped into 230 teams each headed by a chief enumerator. Other than the chief enumerator who looked after the performance of his team members, two field editors and one checker were posted to each team to strengthen quality control of the By-Census. All entries in a census questionnaire including the coding work were checked by the field editors. All cases reported as vacant, non-domestic and non-contact were followed up by checkers. The checkers also carried out quality checks on a sample of enumerated households assigned by the chief enumerators. They also assisted the chief enumerators in carrying out induction checks and follow-up checks. Face-to-face interview was required in the By-Census. Only in cases where an enumerator failed to contact the respondent in more than 4 visits at different time and in different days were proxy answers from a responsible person of the household accepted.

10.2 The enumeration work was completed on 16th March, 1986. Self-administered questionnaires were left to those non-contact households for them to fill in and return to the Department.

10.3 A preliminary count record book was completed by each enumerator based on the questionnaires which they completed during the 10-day period. Data on these record books were input to the computer and processed immediately. Preliminary estimates of population by area which incorporated the results of the self-administered questionnaires were released in early May 1986.

11. Data Preparation

11.1 Data preparation for the By-Census began in early April, 1986 after the preliminary count record books had been processed. Data input, computer editing, manual amendment and data re-input proceeded simultaneously. Data validation and imputation followed closely. The whole process took about 4 months to complete and clean data tapes were prepared by late July 1986. Summary results together with some basic data at district levels were tabulated and produced in August 1986. Based on these 5 advanced reports were published and released in late October 1986 - about 7 months after the field operation.

12. Publication Programme

Census tabulations will be produced in stages following computer program developments. As planned the publication programme of the By-Census is as follow :

	<u>To be issued in</u>
(1) District Summary Tables	Jan 87
(2) Constituency Area Summary Tables	Jan 87
(3) Tertiary Planning Unit Summary Tables	April 87
(4) District Tabulations	June 87
(5) Graphic Guide and Census Maps	Sept 87
(6) Population Projections	Sept 87
(7) Life Tables	Sept 87
(8) Main Report	Dec 87

Census & Statistics Department
Hong Kong Government
January 1987

For the Eleventh Population Census Conference
February 9-13, 1987
Sydney/Canberra, Australia

BRIEF ACCOUNTS OF 1% POPULATION SURVEY IN CHINA

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Introduction

The Chinese Government has made a decision that China will conduct a national population census every ten years and a micro census between every two censuses.

It is five years already since 1982 when China conducted its third national population census. The first micro census will be conducted in 1987 to obtain information on population size, composition, geographic distribution, cultural benefits, educational attainment, industrial distribution, marital status, fertility, mortality, migration, etc.; to provide a reliable basis for making population policies and plans; and to provide significant data for short-term and long-term planning of economic and social development.

The micro census in 1987 is the largest population sample survey in China.

Questionnaire

In consideration of the fact that one of the main purposes of the 1987 survey is to observe population changes from 1982, the questionnaire keeps all the items used in the 1982 population survey and includes additional items on migration and mortality.

There are 9 household items:

1. Type of household (familial or institutional),
2. Code of living quarters,
3. Number of household members,
4. Births in the household at first half of 1986,
5. Births in the household at second half of 1986,
6. Births in the household at first half of 1987,
7. Deaths in the household at first half of 1986,
8. Deaths in the household at second half of 1986, and
9. Deaths in the household at first half of 1987.

The above items are designed to estimate the birth rate, death rate and natural growth rate of the population in 1986 and to check the data from local registration records.

There are 17 personal items:

I. Each person should report the following 7 items:

1. Name,
2. Relationship to household head,
3. Sex,
4. Date of birth,
5. Nationality,
6. Civil registration, and
7. Duration of residence.

II. Each person residing at the enumeration place less than five years should report the following 2 items:

1. Place of previous residence, and
2. Reason for migration.

The migration items are included for the first time in this kind of survey with the purposes of having information for individual years since 1982 on migration among provinces, migration between urban and rural areas, and reason for migration. The information is very useful as it can help understand the impacts on the population of the socio-economic development and economic reform in the past five years.

III. Each person at the age of 6 and over should report the following item:

1. Educational attainment.

IV. Each person at the age of 15 and over should report the following 5 items:

1. Industry,
2. Occupation,
3. Reason if not employed,
4. Marital status, and
5. Age at first marriage.

V. Each woman at the age of 15-64 should report the item of number of children born alive and living.

VI. Each woman at the age of 15-50 should report the item of live births between January 1, 1936 and July 1, 1987.

The items about age at first marriage and live births enable us to obtain up-to-date information on fertility and are very useful for decision-making and planning.

The item of live births between January 1, 1986 and July 1, 1987 also requires information on sexes of the children born. Up-to-date information can thus be obtained for the estimation of sex ratio of the children born.

In order to have sufficient information on mortality which did not appear on the 1982 census questionnaire, the 1% population survey will include a special form with the following 9 items:

1. Name,
2. Code of household,
3. Sex,
4. Nationality,
5. Date of birth,
6. Date of death,
7. Educational attainment,
8. Marital status, and
9. Principal occupation when alive.

It is not difficult to see the fact that the above information will enable us to make more detailed and more valuable analysis of mortality.

Sampling

The results of the population survey intend to satisfy the needs not only at the national level but also at the provincial level. The national sample size is therefore determined by the average sample size at the provincial level.

In order to yield precise results as expected for all the items, the item of death rate should be selected as a basis for the determination of sample size due to the fact that the estimates of death rate require the greatest precision.

The average random sample size at the provincial level is estimated with the following formula:

$$n = \frac{t^2 q}{r^2 p} = \frac{2^2 \times 0.99365}{0.055^2 \times 0.00635} = 210,000 \text{ (persons)}$$

Where

- p: death rate is 0.635% from the 1982 population census;
- t: Interval of confidence is 2 standard errors when confidence probability is 95%;
- r: sampling error rate is 5.5% ($0.6\% \leq p \leq 0.67\%$);
- q: 1-p.

The average cluster sample size at the provincial level is estimated the following formula:

$$n_{(\text{province})} = n \cdot \text{deff} = 210,000 \times 1.7 = 357,000 \text{ (persons)}$$

Where

deff: equal to 1.7 from experience.

The national sample size is more than 10 million persons or the national sample fraction is roughly 1% of the national population. The more than 10 million person are proportional to the square root of the population of each province.

The survey will employ a combined method of stratified, three-stage and cluster sampling.

Stratification:

On the basis of individual geographic conditions, economic conditions, population sizes, etc, the counties and cities in China are stratified as urban areas and rural areas, mountain areas and plain, crop areas and pastoral areas, city proper and suburbs, etc.

Three stage:

At the first stage, counties and cities, are selected from the 26 provinces and autonomous regions while subdistricts, towns and townships are selected from the 3 municipalities. The sample is to be selected by the statistical offices of individual provinces, autonomous regions and

municipalities under the unified organization of the State Statistical Bureau.

At the second stage, 4 to 8 subdistricts, towns and townships are selected from each of the selected counties or cities of the 26 provinces, autonomous regions while 4 to 8 neighbourhood areas, villages and institutional households are selected from the selected subdistricts, towns and townships of the three municipalities.

At the third stage, neighbourhood areas, villages and institutional households are selected from the selected subdistricts, towns and townships of the 26 provinces and autonomous regions. The number of units is determined in accordance with probability.

The statistical offices of the provinces, autonomous regions and municipalities are responsible for the work at the above second and third stages with the assistance from the statistical offices of the selected counties and cities.

Survey Operation and Data Processing

The 1987 population survey will be organized by the State Statistical Bureau and the statistical offices of the provinces, autonomous regions and municipalities under the leadership of the State Council and the governments of the provinces, autonomous regions and municipalities.

The point of time of the survey is set at 00:00 hour, July 1, 1987.

There will be two main methods of enumeration. In the enumerator method, information for individual households and persons is collected and recorded on the questionnaire through his or her visit to the households. In the enumeration station method, one or several enumeration stations are set up in a clearly defined area, household heads or competent householders visit the enumeration stations for enumeration through the organization by local officials of the area. The enumeration work is to be completed before July 10, 1987. In order to reduce survey errors and to well control the quality,

strict checking procedures have to be followed. The enumerator is requested to check and to correct all the items on the questionnaires completed the same day. the supervisor will again check all the items on the questionnaires submitted to him or her. When the supervisor finds any errors or has any doubts on the questionnaire, it will be sent back to the enumerator for further checking and correction. All the checked questionnaires should be delivered to coders before July 15, 1987. The coding work is to finish before August 15, 1987. Following assessment procedures in the statistical offices of the provinces, autonomous regions and municipalities, the information will be entered into computers. the data entry will be completed before September 30, 1987.

The data processing of the survey as a whole is the responsibility of the Computer Centre of the State Statistical Bureau and should be accomplished before January 31, 1988. The final results of the survey will be published with the approval of the State Statistical Bureau.

QUESTIONNAIRE OF NATIONAL POPULATION SURVEY

Questionnaire No.: GTJB

Designer: State Statistical Bureau

File No.: (87)TZ

Reference Time: 00:00 hour, July 1, 1987

Respondents must provide information honestly

Enumerators must record answers accurately

HH address: _____

Name of insitutional HH: _____

I. Type of HH

1. Familial

2. Institutional

II. Code of HH address

III. Number of HH members

Total

Male

Female

BIRTHS IN HH

IV. At first half of 1986

Total

Male

Female

V. At second half of 1986

Total

Male

Female

VI. At first half of 1987

Total

Male

Female

DEATHS IN HH

VII. At first half of 1986

Total

Male

Female

VIII. At second half of 1986

Total

Male

Female

IX. At first half of 1987

Total

Male

Female

Remarks:

FOR ALL PERSONS

I. Name

II. Relationship to HH head

1. HH head
2. Spouse
3. Child
4. Grandchild
5. Parent
6. Grandparent
7. Other relative
8. Non-relative

III. Sex

1. Male
2. Female

IV. Age

Age of years _____

Born in ____ (m) ____ (y)

V. Nationality

VI. Civil registration

1. Residing and registered here
2. Residing here but registered elsewhere
3. Living here with registration unsettled

VII. Duration of residence

1. Less than 1 year
2. Over 1 year but less than 2 years
3. Over 2 years but less than 3 years
4. Over 3 years but less than 4 years
5. Over 4 years but less than 5 years
6. Over 5 years

FOR PERSONS WITH DURATION OF RESIDENCE LESS THAN 5 YEARS

VIII. Previous residence

Previous residence in _____ province

1. City
2. Town
3. County

IX. Reason for migration

1. Change of job
2. Assignment of job
3. Business
4. Studies or training
5. Visiting relative or friend
6. Resigned or retired
7. Following HH members
8. Marriage
9. Other

FOR PERSONS AT AGE OF 6 AND OVER

X. Educational attainment

1. University graduate

2. University undergraduate
3. Senior middle school
4. Junior middle school
5. Primary school
6. Illiterate or semi-literate

FOR PERSONS AT AGE OF 15 AND OVER

XI. Industry

To enter name of employing unit

XII. Occupation

To enter detailed information on job

XIII. Reason if not employed

1. Student
2. Housekeeping
3. Awaiting school enrollment
4. Awaiting State employment
5. Awaiting job assignment in city/town
6. Resigned or retired
7. Other

XIV. Marital status

1. Never married
2. Married
3. Widowed
4. Divorced

XV. Age at first marriage

At age of _____ years

FOR WOMEN AT AGE OF 15-64

XVI. Number of children born alive and living

Number of children born alive _____

Number of children living _____

FOR WOMEN AT AGE OF 15-50

XVII. Live births between January 1, 1986 and June 30, 1987

_____ birth

1. Male

2. Female

Date of birth

1. At first half of 1986
 2. At second half of 1986
 3. At first half of 1987
-
-

Name of respondent_____

Name of enumerator_____

Date ____ (m) ____ (d)

Name of HH head (showing on second page if HH size over 5)_____

Number of pages of HH_____

Page No._____

Page No. in booklet_____

Annex to Questionnaire of
National Population Survey

QUESTIONNAIRE ON DEATHS

Questionnaire No.: GTJB

Designer: State Statistical Bureau

File No.: (87)GTZ

Limited to HH with Deaths Only

I. Code of HH

II. Name

III. Sex

1. Male

2. Female

IV. Nationality

V. Date of birth

Born in ____ (m) ____ (y)

VI. Date of death

At age of years in ____ (m) ____ (y)

~~FOR DEAD PERSONS AT AGE OF 6 AND OVER~~

VII. Educational attainment

1. University graduate

2. University undergraduate

3. Senior middle school

4. Junior middle school

5. Primary school

6. Illiterate or semi-literate

FOR DEAD PERSONS AT AGE OF 15 AND OVER

VIII. Marital status

1. Never married

2. Married

3. Widowed

4. Divorced

IX. Principal occupation when alive

Name of enumerator_____

Name of supervisor_____

Date of reporting____(m)____(d)

Number of pages for village or neighbourhood area_____

Page No._____

QUESTIONNAIRE OF NATIONAL POPULATION SURVEY

Questionnaire No.: 673B
 Designer: State Statistical Bureau
 File No.: (87)T2

Reference time: 00:00 hour, July 1, 1987
 Respondents must provide information honestly
 Enumerators must record answers accurately

HH address:

Name of institutional HH:

I. Type of HH		II. Date of HH address		III. Number of HH members		BIRTHS IN HH				DEATHS IN HH				Remarks:		
1. Family	2. Institutional	1. Date	2. Address	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total		Male	Female

FOR ALL PERSONS

1. Name	II. Relationship to HH head	III. Sex	IV. Age	V. Nationality	VI. Civil registration	VII. Duration of residence	VIII. Previous residence		IX. Reasons for migration
							1. Less than 1 year	2. Over 1 year but less than 3 years	
	1. HH head				1. Residing and registered here	1. Less than 1 year	1. City	1. Change of job	
	2. Spouse				2. Residing here but registered elsewhere	2. Over 1 year but less than 3 years	2. Town	2. Business	
	3. Child				3. Living here with registration omitted	3. Over 3 years but less than 4 years	3. County	3. Studies or training	
	4. Grandchild					4. Over 4 years but less than 5 years		4. Studying relative or friend	
	5. Parent	1. Male				5. Over 5 years		5. Designated as relative	
	6. Grandparent	2. Female						6. Following HH members	
	7. Other relative							7. Marriage	
	8. Non-relative							8. Other	

FOR PERSONS AT AGE OF 15 AND OVER

FOR PERSONS AT AGE OF 15 AND OVER		FOR WOMEN AT AGE OF 15-44		FOR WOMEN AT AGE OF 15-44	
I. Educational attainment	II. Industry	III. Occupation	IV. Marital status	V. Age at first marriage	VI. Live births between January 1, 1986 and June 30, 1987
1. University graduate		1. Student	1. Never married	At age of _____ years	Number of children born alive _____
2. University undergraduate		2. Unemployed	2. Married		Number of children living _____
3. Senior middle school		3. Unemployed	3. Widowed		
4. Junior middle school		4. Unemployed	4. Divorced		
5. Primary school		5. Unemployed	5. Remarried		
6. Illiterate or semi-literate		6. Unemployed			

Name of respondent: _____
 Name of enumerator: _____
 Date: () () ()

Page No.: _____
 Page No. in booklet: _____

QUESTIONNAIRE ON DEATHS

Questionnaire No.: GTJH
Designer: State Statistical Bureau
File No.: (87)GTZ

Limited to HH with Deaths Only

I. Code of MS	II. Name	III. Sex	IV. Nationality	V. Date of Birth	VI. Date of Death	VII. Educational attainment	VIII. Marital status	IX. Principal occupation when alive
						1. University graduate 2. University subgraduate 3. Senior middle school 4. Junior middle school 5. Primary school 6. Illiterate or semi-literate	1. Never married 2. Married 3. Widowed 4. Divorced	

— Bureau of Commerce

Statement of Inspector General

Date of revision (a) (4)

Number of posts for village or neighbourhood area _____

Page No.

**FINDINGS OF THE
INDONESIAN INTERCENSAL
POPULATION SURVEY 1985 :
ABSTRACT**

**CENTRAL BUREAU OF STATISTICS
JAKARTA - INDONESIA**

ABSTRACT

1. INTRODUCTION

The 1985 Intercensal Population Survey (SUPAS 85) was carried out in October 1985 with the primary objective of providing demographic data in the midpoint between the 1980 and 1990 Population Censuses. Specifically, SUPAS 85 was designed to produce an estimate of 1985 population; rates of fertility, mortality and migration; the socio-economic characteristics of the population and the housing condition of the people.

2. POPULATION SIZE AND DISTRIBUTION

The survey estimated the population of Indonesia in 1985 at 164 million, an increase of approximately 26.5 million from the 1980 figure. As such, the growth rate in the 1980 - 1985 period is 2.15%, lower than the 1971 - 1980 rate of 2.32%.

One continuing feature of the Indonesian population is its uneven distribution. In 1985 the island of Java, which comprises of less than 7% of the land area of the country, is inhabited by 60.88% of the total population, a slight decline from 62.16% in 1980. In all other islands or groups of islands the proportion is higher in 1985 than in 1980.

3. AGE-SEX COMPOSITION

Although an apparent decline in fertility and mortality is observed from the 1985 survey, the age-sex structure of the Indonesian population remains typical of a wide-based pyramid. A dent in the 15-30 age groups may be brought about by a combination of inaccurate age reporting and higher mortality during the war.

4. EDUCATION

A greater part of development programs in the educational sector is the provision of schooling facilities throughout the country. This has shown its success in bringing children to school and keeping them there at least until they finish primary school. In this case, girls seem to have reached the same level as boys. In the ages 7 - 12 practically all (94%) children are in school. The gap between girls and boys gradually increases with age. In the 13 - 15 age group the percentages are 76 for males and 56 for females, and in the 16 - 18 age group they are 53% and 41% respectively.

Along with the increase in the number of persons attending school, illiteracy drops from 29% in 1980 to 19% in 1985. Figures for males and females are 12% and 26%. Educational attainment is enhanced in the same direction; more people finish all levels of formal education.

5. POPULATION MOBILITY

The 1980 Population Census results show that Indonesians become more mobile. This finding is supported by the SUPAS 85 data which demonstrate that more people have changed residence in the 1980 - 1985 period. This survey also shows that Java still attracts people from other islands, and that the flow of migrants into Java outnumbers migrants leaving Java.

6. MARRIAGE, FERTILITY AND FAMILY PLANNING

As more women continue their education, their age at first marriage is higher. A measure calculated using the Hajnal method ¹⁾ put the singulate mean age at marriage (SMAM) for the Indonesian women in 1985 at 21.2 years, an increase of 1.2 years from that in 1980. Figures for urban and rural areas in 1985 are 23.2 and 20.3 years respectively.

A comparison of 1980 and 1985 data shows that fertility continues its downward trend. Measured by the average number of children born during the entire reproductive period, (10 to 49 years) the 1980 figure is 2.64 children whereas in 1985 it is 1.75 children. This is a decline of almost one child in 5 years.

In the meantime, family planning is used by 38.5% of married women in the 10 to 49 age bracket. It is more popular in the urban (43.5%) than in the rural

¹⁾ John Hajnal. 1953. Age at marriage and proportions marrying. Population Studies Vol. VII (2). London

areas (36.9%). The most widely used method is pill, taken by 40% of all acceptors, followed by IUD (31%) and injection (19%).

7. LABOR FORCE

In 1985 the labor force constituted 53% of the total population, an increase of 3% from the 1980 figure. This increase is largely due to a decline in the percentage of people in the "housekeeping" category in which females are predominant.

An examination into the age-sex composition of the labor force shows that except in the younger age groups (10 to 24), in all ages for both sexes the labor force participation rates in 1985 are higher than those in 1980.

The structure of labor force by industrial sector did not undergo a significant change during the 1980-1985 period. However, one may note that the proportion of persons engaged in agriculture declines from 55.9% to 54.7% while those in trade increases from 13.0% to 15.0%. These changes are in line with the shift in occupation. The proportion of farmers drops from 55.8% to 54.8%, whereas for sales persons the proportion increases from 12.9% to 14.7%. Other sectors or occupation categories remain the same.

8. HOUSING CONDITION

Electricity is becoming a more popular fuel for lighting in the urban areas, while in the rural areas the majority of households use kerosene. The percentages of households using these fuel are 73% and 70% respectively. For cooking, kerosene is used by 70% of the urban households, and wood or charcoal is used by 88% of the households in the rural areas.

More than half (57%) of the rural households get their drinking water from wells, while in the urban areas 32% of the households use piped water. For bathing and washing in both areas water from the well is the most widely used.

In line with the growing number of houses provided through government-sponsored projects, the percentage of households having their own bathing and toilet facilities increases. On the other hand, those using shared or public facilities decline. In total, 35% of the households have private bathing facility, an increase of almost 10% from the condition in 1980. The figures for toilet facility are 34% and 27% respectively.

Tabel : 1
Table

PERSEBARAN PENDUDUK INDONESIA SERTA
PERKEMBANGANNYA MENURUT PROVINSI
POPULATION DISTRIBUTION AND GROWTH
BY PROVINCE

1980 - 1985

No.	PROVINSI PROVINCE	Penduduk/Population (1.000.000)				Rata-Rata Pertumbuhan Annual rate of growth	
		1980		1985		1971- 1980	1980- 1985
		Penduduk Popula- tion	%	Penduduk Popula- tion	%		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	Daerah Istimewa Aceh	2.61	1.78	2.97	1.81	2.93	2.62
2.	Sumatera Utara	8.35	5.69	9.42	5.74	2.60	2.42
3.	Sumatera Barat	3.41	2.32	3.70	2.25	2.21	1.65
4.	R i a u	2.16	1.47	2.55	1.55	3.11	3.28
5.	J a m b i	1.45	0.98	1.74	1.06	4.07	3.83
6.	Sumatera Selatan	4.63	3.15	5.37	3.27	3.32	3.01
7.	Bengkulu	0.77	0.52	0.94	0.57	4.39	4.19
8.	Lampung	4.62	3.15	5.91	3.60	5.77	5.01
	SUMATERA	28.00	19.06	32.60	19.85	3.32	3.08
9.	DKI Jakarta	6.48	4.42	7.89	4.81	3.93	3.93
10.	Jawa Barat	27.45	18.71	30.83	18.79	2.66	2.35
11.	Jawa Tengah	25.37	17.28	26.94	16.43	1.64	1.21
12.	D.I. Yogyakarta	2.75	1.87	2.93	1.79	1.10	1.27
13.	Jawa Timur	29.17	19.88	31.26	19.06	1.49	1.38
	J A W A	91.22	62.16	99.85	60.88	2.02	1.81
14.	B a l i	2.47	1.68	2.65	1.62	1.69	1.42
15.	Nusa Tenggara Barat	2.72	1.86	2.99	1.83	2.36	1.91
16.	Nusa Tenggara Timur	2.74	1.86	3.06	1.87	1.95	2.26
17.	Timor Timur	-	-	0.63	0.38	-	2.58
	NUSA TENGGARA	7.93	5.40	9.34	5.70	2.01	1.92
18.	Kalimantan Barat	2.49	1.69	2.82	1.72	2.31	2.55
19.	Kalimantan Tengah	0.95	0.65	1.12	0.68	3.43	3.21
20.	Kalimantan Selatan	2.06	1.41	2.27	1.39	2.16	1.94
21.	Kalimantan Timur	1.21	0.83	1.51	0.92	5.73	4.41
	KALIMANTAN	6.71	4.58	7.72	4.71	2.96	2.81
22.	Sulawesi Utara	2.12	1.44	2.31	1.41	2.31	1.80
23.	Sulawesi Tengah	1.28	0.88	1.51	0.92	3.86	3.22
24.	Sulawesi Selatan	6.06	4.13	6.61	4.03	1.74	1.74
25.	Sulawesi Tenggara	0.94	0.64	1.12	0.68	3.09	3.51
	SULAWESI	10.40	7.09	11.55	7.04	2.22	2.11
26.	Maluku	1.41	0.96	1.61	0.98	2.88	2.66
27.	Irian Jaya	1.17	0.75	1.37	0.84	2.67	3.15
	MALUKU+IRIAN JAYA	2.58	1.71	2.98	1.82	2.79	3.17
	I N D O N E S I A	147.49	100.00	164.05	100.00	2.32	2.15

Tabel : 2 KEPADATAN PENDUDUK PER KILOMETER
Table PERSEGI MENURUT PROVINSI
POPULATION DENSITY PER SQUARE
KILOMETER BY PROVINCE

No.	PROVINSI PROVINCE	Luas/Area		Kepadatan penduduk per kilometer persegi Population density per square kilometer	
		Kilometer persegi Square kilometer	%	1980 .	1985
(1)	(2)	(3)	(4)	(5)	(6)
1.	Daerah Istimewa Aceh	55 392	2.88	47	54
2.	Sumatera Utara	70 797	3.69	118	133
3.	Sumatera Barat	49 778	2.59	68	74
4.	R i a u	94 562	4.93	23	27
5.	J a m b i	44 924	2.34	32	39
6.	Sumatera Selatan	103 688	5.40	45	52
7.	Bengkulu	21 168	1.10	36	45
8.	Lampung	33 307	1.74	139	177
	SUMATERA	473 606	24.67	59	69
9.	DKI Jakarta	590	0.03	11 023	13 365
10.	Jawa Barat	46 300	2.41	593	666
11.	Jawa Tengah	34 206	1.78	742	788
12.	D.I. Yogyakarta	3 169	0.17	868	925
13.	Jawa Timur	47 922	2.50	609	652
	J A W A	132 187	6.89	690	755
14.	B a l i	5 561	0.29	444	476
15.	Nusa Tenggara Barat	20 177	1.05	135	148
16.	Nusa Tenggara Timur	47 876	2.49	57	64
17.	Timor Timur	14 874	0.78	37	42
	NUSA TENGGARA	88 488	4.61	96	106
18.	Kalimantan Barat	146 760	7.64	17	19
19.	Kalimantan Tengah	152 600	7.95	6	7
20.	Kalimantan Selatan	37 660	1.96	55	60
21.	Kalimantan Timur	202 440	10.55	6	7
	KALIMANTAN	539 460	28.10	12	14
22.	Sulawesi Utara	19 023	0.99	111	122
23.	Sulawesi Tengah	69 726	3.64	18	22
24.	Sulawesi Selatan	72 781	3.79	83	91
25.	Sulawesi Tenggara	27 686	1.44	34	40
	SULAWESI	189 216	9.86	55	61
26.	Maluku	74 505	3.88	19	22
27.	Irian Jaya	421 981	21.98	3	3
	MALUKU+IRIAN JAYA	496 486	25.87	5	6
I N D O N E S I A		1 919 443	100.00	77	85

Tabel : 3
Table

PENDUDUK MENURUT KELOMPOK UMUR DAN
JENIS KELAMIN
POPULATION BY AGE GROUP AND SEX
1980 & 1985
(x 1000)

Kelompok Umur	Laki-Laki/ Males		Perempuan/ Females		Laki-Laki + Perempuan Both Sexes	
Age Group	1980	1985	1980	1985	1980	1985
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0-4	10 816.0	11 007.8	10 374.7	10 542.6	21 190.7	21 550.4
5-9	10 832.4	11 378.1	10 399.5	10 738.5	21 231.9	22 116.6
10-14	9 131.9	10 783.2	8 487.2	10 113.4	17 619.1	20 896.6
15-19	7 512.5	8 335.1	7 770.7	8 231.8	15 283.2	16 566.9
20-24	5 978.6	6 384.8	7 023.0	7 902.9	13 001.6	14 287.7
25-29	5 612.7	6 544.2	5 730.9	7 265.4	11 343.6	13 809.6
30-34	4 022.6	5 481.8	4 144.5	5 177.3	8 167.1	10 659.1
35-39	4 190.9	4 655.5	4 358.9	4 585.8	8 549.8	9 241.3
40-44	3 644.1	3 883.1	3 775.9	3 899.5	7 420.0	7 782.6
45-49	3 012.8	3 589.5	3 137.5	3 555.5	6 150.3	7 145.0
50-54	2 717.9	2 828.0	2 692.3	2 959.0	5 410.2	5 787.0
55-59	1 720.5	2 271.8	1 669.8	2 484.1	3 390.3	4 755.9
60-64	1 559.2	1 878.2	1 669.4	1 989.8	3 228.6	3 868.0
65-69	811.1	1 127.7	902.8	1 144.4	1 713.9	2 272.1
70-74	689.1	762.2	841.6	892.8	1 530.7	1 655.0
75+	688.4	729.0	837.0	916.8	1 525.4	1 645.8
Tak Terjawab Not Stated	11.0	4.0	9.4	3.3	20.4	7.3
JUMLAH/TOTAL	82 951.7	81 644.1	73 825.1	82 402.9	146 776.8	164 047.0

Tabel : 4 PERSENTASE PENDUDUK MENURUT AGAMA
 Table PERCENTAGE OF POPULATION BY RELIGION
 1980 & 1985

Agama/Religion	1980	1985
(1)	(2)	(3)
Islam	87.1	86.9
Katholik/Catholic	3.0	3.1
Kristen lain/ Other Christian	5.8	6.5
Hindu	2.0	1.9
Budha/Budhist	0.9	1.0
Lainnya/Others	1.2	0.6
JUMLAH/TOTAL	100.0	100.0

Tabel : 5 PERSENTASE PENDUDUK MENURUT KEWARGANEGARAAN
 Table PERCENTAGE OF POPULATION BY CITIZENSHIP
 1980 & 1985

Kewarganegaraan/ Citizenship	1980	1985
(1)	(2)	(3)
I n d o n e s i a	99.66	99.79
RRC, Taiwan, Cina Stateless Chinese, Taiwan, Stateless	0.31	0.19
Lainnya/Others	0.03	0.02
JUMLAH/TOTAL	100.00	100.00

Tabel : 6 PERSENTASE PENDUDUK BERUMUR 10 TAHUN KE ATAS
 Table YANG DAPAT MEMBACA DAN MENULIS MENURUT
 KELOMPOK UMUR DAN JENIS KELAMIN
 PERCENTAGE OF POPULATION 10 YEARS OF AGE AND
 OVER WHO ARE LITERATE BY AGE GROUP AND SEX
 1980 & 1985

Kelompok Umur Age Group	Laki-Laki/ Males		Perempuan/ Females		Laki-Laki+ Perempuan Both Sexes	
	1980	1985	1980	1985	1980	1985
(1)	(2)	(3)	(4)	(5)	(6)	(7)
10-14	90.6	97.8	89.2	97.7	90.0	97.7
15-19	90.1	96.5	83.8	94.2	86.9	95.4
20-24	88.8	94.4	79.2	88.4	83.6	91.1
25-29	86.6	91.9	74.3	83.3	80.4	87.4
30-34	83.6	90.5	64.8	79.9	74.0	85.3
35-39	80.2	88.7	54.2	72.5	67.0	80.7
40-44	72.6	86.2	40.4	60.0	56.2	72.6
45-49	65.6	79.6	33.7	50.1	49.3	64.9
50+	53.2	64.0	20.0	30.3	36.2	46.5
Tak Terjawab Not Stated	48.5	60.7	25.2	9.1	37.9	37.3
JUMLAH/TOTAL	79.8	87.8	62.7	74.3	71.1	80.9

Tabel : 7 PERSENTASE PENDUDUK YANG MASIH BERSEKOLAH MENURUT
 UMUR DAN JENIS KELAMIN
 PERCENTAGE OF POPULATION WHO ARE ATTENDING SCHOOL
 BY AGE AND SEX

1980 & 1985

U m u r A g e	Laki-laki/Males		Perempuan/Females	
	1980	1985	1980	1985
(1)	(2)	(3)	(4)	(5)
5	11.3	1.3	13.3	1.7
6	32.4	23.2	35.8	24.8
7	70.6	86.3	72.6	87.2
8	84.1	94.1	84.3	94.7
9	88.3	96.6	87.9	96.5
10	89.3	97.1	87.8	97.1
11	90.0	97.0	88.5	96.4
12	83.5	93.7	79.9	92.9
13	76.7	83.7	70.1	81.1
14	66.3	76.4	56.2	68.9
15	53.2	67.2	41.7	59.3
16	48.1	62.4	34.8	53.0
17	38.7	53.2	24.3	42.8
18	29.7	45.5	15.7	30.2
5-6	21.5	11.4	24.3	12.5
7-12	83.9	94.0	83.2	94.0
13-15	64.9	75.8	55.6	70.0
16-18	38.5	53.4	24.1	41.4
19-24	12.5	19.3	5.3	9.2
25 +	0.8	0.8	0.4	0.2
Tak Terjawab Not Stated	7.4	0.0	6.9	0.0
INDONESIA	28.2	31.7	23.8	27.2

Tabel : 8 PERSENTASE PENDUDUK BERUMUR 10 TAHUN KE ATAS
 Table MENURUT PENDIDIKAN TERTINGGI YANG DITAMATKAN
 DAN JENIS KELAMIN
 PERCENTAGE OF POPULATION 10 YEARS OF AGE AND
 OVER BY EDUCATIONAL ATTAINMENT AND SEX
 1980 & 1985

Pendidikan tertinggi yang ditamatkan Educational attainment (1)	Laki-Laki Males		Perempuan Females		Laki-Laki+ Perempuan Both Sexes	
	1980	1985	1980	1985	1980	1985
1. Tidak pernah sekolah No schooling	18.9	12.1	35.9	25.8	27.5	19.1
2. Tidak/belum tamat SD Did not finish Primary School	43.9	38.6	38.2	36.9	41.0	37.7
3. Sekolah Dasar Primary School	23.4	29.1	18.0	24.6	20.7	26.8
4. SLP/Junior High School						
- Umum/General	6.0	8.8	4.0	6.3	4.9	7.5
- Kejuruan/Vocational	1.4	1.6	0.7	1.1	1.0	1.3
5. SLA/Senior High School						
- Umum/General	2.9	4.8	1.4	2.6	2.2	3.7
- Kejuruan/Vocational	2.8	3.9	1.5	2.3	2.2	3.1
6. Diploma I/II Diploma I/II	-	0.2	-	0.2	-	0.2
7. Akademi/Diploma III Academy/Diploma III	0.4	0.4	0.2	0.2	0.3	0.3
8. Universitas/University	0.3	0.5	0.1	0.0	0.2	0.3
9. Tak Terjawab/Not Stated	0.0	-	0.0	-	0.0	-
JUMLAH/TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Tabel : 9 PENDUDUK MENURUT TEMPAT LAHIR DAN TEMPAT TINGGAL SEKARANG
 Table POPULATION BY PLACE OF BIRTH AND PLACE OF CURRENT RESIDENCE
 1980 & 1985

Tempat lahir Place of birth	Tahun Year	Tempat tinggal sekarang/Place of current residence					
		Sumatera	Jawa	Kali- mantan	Sula- wesi	Kep lain Other island	Jumlah/ Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sumatera	1980	24825271	718420	25474	22651	19879	25611695
	1985	29543245	898822	30987	16620	19273	30508947
J a w a	1980	2906014	89999829	374097	167393	137364	93584697
	1985	2829682	98467946	448284	198882	173061	102117855
Kalimantan	1980	19594	121807	6165294	9758	4626	6321079
	1985	14419	154116	7092949	17116	5146	7283746
Sulawesi	1980	145417	136745	123413	10108689	139614	10653878
	1985	126321	154573	132700	11239025	154790	11807409
Kep. Lain Other islands	1980	30789	114883	11282	74185	10126012	10357151
	1985	64185	134060	9753	73290	11958632	12239920
Luar Negeri Abroad	1980		59310	10220	7990	7525	124748
	1985	26172	42506	6992	7984	4668	88322
Tak Terjawab Not Stated	1980		65976	7116	9882	11112	123225
	1985	-	789	-	-	-	789
JUMLAH TOTAL	1980	27995927	91216970	6716896	10400548	10446132	146776473
	1985	32604024	99852812	7721665	11552917	12315570	164046988

Tabel : 10
Table

PERSENTASE MIGRAN ANTAR KABUPATEN/KOTAMADYA
BERDASARKAN TEMPAT TINGGAL TERAKHIR
SEBELUMNYA MENURUT ALASAN PINDAH
PERCENTAGE OF INTERREGENCY MIGRANTS
BASED ON PLACE OF PREVIOUS RESIDENCE
BY REASON FOR MOVING

Alasan pindah Reason for moving	Kota Urban	Pedesaan Rural	Kota+Pedesaan Urban+Rural
(1)	(2)	(3)	(4)
1. Transmigrasi/ Transmigration	0.26	8.73	4.16
2. Pekerjaan/Work	26.54	18.95	23.05
3. Sekolah/ Education	9.16	3.56	6.59
4. Lainnya/Other	63.96	68.62	66.10
5. Tak terjawab/ Not stated	0.08	0.14	0.11
JUMLAH/TOTAL	100.00	100.00	100.00

Tabel : 11
Table

PENDUDUK BERUMUR 10 TAHUN KE ATAS MENURUT
JENIS KEGIATAN
POPULATION 10 YEARS OF AGE AND OVER BY
TYPE OF ACTIVITY
1980 & 1985

JENIS KEGIATAN TYPE OF ACTIVITY	1980		1985	
	Banyaknya Number (000 000)	%	Banyaknya Number (000 000)	%
(1)	(2)	(3)	(4)	(5)
1. Angkatan kerja/ Economically active	52.2	50.0	63.8	53.0
Bekerja/Employed	51.3	49.1	62.4	51.8
Mencari pekerjaan/ Looking for work	0.9	0.9	1.4	1.2
2. Bukan angkatan kerja/ Not economically active	52.2	50.0	56.6	47.0
Sekolah/Attending school	18.8	18.0	26.2	21.8
Mengurus Rumah tangga/ Housekeeping	22.2	21.3	20.8	17.3
Lainnya/Other	11.2	10.7	9.6	7.9
JUMLAH/TOTAL	104.4	100.0	120.4	100.0

Tabel : 12 TINGKAT PARTISIPASI ANGKATAN KERJA MENURUT
 Table KELOMPOK UMUR DAN JENIS KELAMIN
 LABOR FORCE PARTICIPATION RATE BY AGE GROUP
 AND SEX
 1980 & 1985

KELOMPOK UMUR AGE GROUP	Laki-Laki Males		Perempuan Females	
	1980	1985	1980	1985
(1)	(2)	(3)	(4)	(5)
10-14	12.7	11.5	9.4	8.0
15-19	47.4	42.1	31.1	30.4
20-24	79.2	78.6	34.0	41.0
25-29	92.1	94.4	35.9	43.6
30-34	94.8	97.7	39.2	48.1
35-39	95.3	98.0	42.4	51.6
40-44	94.8	98.0	45.7	54.5
45-49	93.7	97.2	46.5	56.6
50-54	89.7	95.0	44.0	54.3
55-59	84.2	87.8	40.5	48.6
60-64	76.4	79.2	32.6	39.1
65 +	53.1	57.9	18.8	22.6
Tak Terjawab/ Not Stated	47.4	2.8	15.8	15.2
JUMLAH/TOTAL	67.1	68.9	32.4	37.6

Tabel : 13
Table

PERSENTASE PENDUDUK YANG BEKERJA MENURUT
LAPANGAN PEKERJAAN
PERCENTAGE OF EMPLOYED PERSONS BY INDUSTRY
1980 & 1985

LAPANGAN PEKERJAAN INDUSTRY	1980	1985
(1)	(2)	(3)
1. Pertanian/Agriculture	55.9	54.7
2. Pertambangan/Mining and quarrying	0.8	0.7
3. Industri/Manufacturing	9.1	9.3
4. Listrik, Gas dan Air/Electricity, Gas and Water	0.1	0.1
5. Bangunan/Construction	3.2	3.3
6. Perdagangan/Trade	13.0	15.0
7. Angkutan & Komunikasi/Transport & Communication	2.8	3.1
8. Keuangan / Finance	0.6	0.4
9. J a s a / Services	13.9	13.3
10. Kegiatan lain / Other	0.0	0.0
11. Tak Terjawab / Not Stated	0.6	0.1
JUMLAH / TOTAL	100.0	100.0

Tabel
Table : 14

PERSENTASE PENDUDUK YANG BEKERJA MENURUT
JENIS PEKERJAAN
PERCENTAGE OF EMPLOYED PERSONS BY OCCUPATION
1980 & 1985

JENIS PEKERJAAN OCCUPATION	1980	1985
(1)	(2)	(3)
1. Profesional & Tehnisi <i>Professional & Technical</i>	2.9	3.4
2. Kepemimpinan dan Ketatalaksanaan <i>Managers & Administrators</i>	0.1	0.2
3. Tata Usaha / Clerical	3.5	3.9
4. Penjualan / Sales	12.9	14.7
5. Jasa-Jasa / Services	4.3	3.7
6. Petani / Farmers	55.8	54.8
7. Produksi dan Operator Alat Pengangkutan <i>Production and Transport Equipment Operators</i>	19.0	18.3
8. Lain-lain / Others	0.7	0.5
9. Tak Terjawab / Not Stated	0.8	0.5
JUMLAH / TOTAL	100.0	100.0

Tabel
Table : 15

PERSENTASE PENDUDUK YANG BEKERJA KURANG DARI
35 JAM SELAMA SEMINGGU YANG LALU MENURUT
KELOMPOK UMUR DAN DAERAH TEMPAT TINGGAL
PERCENTAGE OF PERSONS WHO WORKED LESS THAN
35 HOURS DURING THE PREVIOUS WEEK BY AGE GROUP
AND URBAN/RURAL AREAS
1985

KELOMPOK UMUR AGE GROUP	K O T A URBAN	PEDESAAN RURAL
(1)	(2)	(3)
10-14	47.7	80.5
15-19	26.6	53.8
20-24	19.4	41.8
25-29	15.5	36.3
30-34	14.5	33.4
35-39	17.1	34.6
40-44	16.6	35.2
45-49	19.0	36.6
50-54	20.0	39.2
55-59	23.8	43.5
60-64	30.5	47.8
65+	36.1	54.4
Tak Terjawab/Not Stated	-	-
JUMLAH / TOTAL	19.2	41.5

Tabel : 16
Table

PERSENTASE WANITA BERUMUR 15-34 TAHUN YANG
BELUM KAWIN MENURUT KELOMPOK UMUR DAN
DAERAH TEMPAT TINGGAL
PERCENTAGE OF WOMEN 15-34 YEARS WHO ARE
SINGLE BY AGE GROUP AND URBAN/RURAL AREAS
1980 & 1985

Kelompok Umur Age Group	Kota/ Urban		Pedesaan/ Rural		Kota + Pedesaan Urban+Rural	
	1980	1985	1980	1985	1980	1985
(1)	(2)	(3)	(4)	(5)	(6)	(7)
15-19	82.2	91.0	65.4	76.5	69.9	81.2
20-24	37.3	47.0	17.1	21.8	22.3	29.7
25-29	14.5	17.5	5.2	5.6	7.4	8.9
30-34	6.4	8.2	2.5	2.6	3.4	4.1
Rata-rata umur kawin Singulate mean age at marriage	21.8		19.4		20.0	

Tabel : 17 RATA-RATA ANAK YANG PERNAH DILAHIRKAN
 Table PER WANITA PERNAH KAWIN MENURUT
 KELOMPOK UMUR DAN DAERAH TEMPAT TINGGAL
 AVERAGE NUMBER OF CHILDREN EVER BORN
 PER EVER MARRIED WOMAN BY AGE GROUP
 AND URBAN/RURAL RESIDENCE
 1980 & 1985

Kelompok Umur Age Group	Kota/ Urban		Pedesaan/ Rural		Kota+Pedesaan Urban+Rural	
	1980	1985	1980	1985	1980	1985
(1)	(2)	(3)	(4)	(5)	(6)	(7)
10-14	0.00	0.00	0.00	0.00	0.00	0.00
15-19	0.12	0.05	0.20	0.12	0.18	0.10
20-24	0.98	0.73	1.26	1.05	1.19	0.95
25-29	2.28	1.89	2.62	2.32	2.54	2.21
30-34	3.60	3.04	3.91	3.42	3.84	3.32
35-39	4.74	4.02	4.90	4.27	4.87	4.21
40-44	5.20	4.65	5.29	4.75	5.27	4.72
45-49	5.45	4.82	5.41	4.86	5.42	4.85
JUMLAH/TOTAL	2.33	1.59	2.73	1.81	2.64	1.75

Tabel : 18 PERSENTASE WANITA BERUMUR 10-49 TAHUN YANG
 Table BERSTATUS KAWIN MENURUT JENIS KONTRASEPSI
 YANG SEKARANG DIPAKAI DAN DAERAH TEMPAT TINGGAL
 PERCENTAGE OF MARRIED WOMEN 10-49 YEARS BY
 CONTRACEPTIVE METHOD CURRENTLY USED AND
 URBAN/RURAL AREAS

1985

Jenis Kontrasepsi yang dipakai Contraceptive method currently used	Kota Urban	Pedesaan Rural	Kota+ Pedesaan Urban+ Rural
(1)	(2)	(3)	(4)
1. M O W	2.5	0.8	1.2
2. M O P	0.8	0.3	0.4
3. Spiral/IUD	11.6	12.0	11.9
4. Suntikan	9.9	6.6	7.4
5. Pil/Pill	13.8	15.9	15.4
6. Kondom/Condom	1.5	0.4	0.6
7. Lainnya/Other methods	3.4	1.0	1.6
8. Tidak pakai/ Do not used	56.5	63.0	61.5
JUMLAH/TOTAL	100.0	100.0	100.0
Persentase terhadap wanita kawin 10-49 tahun	43.5	36.9	38.5
Percentage of married women 10-49 years			

Tabel : 19
Table

PERSENTASE RUMAH TANGGA MENURUT PENGGUNAAN BAHAN
BAKAR UNTUK PENERANGAN DAN MEMASAK DAN DAERAH
TEMPAT TINGGAL
PERCENTAGE OF HOUSEHOLDS BY TYPE OF FUEL USED
FOR LIGHTING AND FOR COOKING AND URBAN/RURAL AREAS
1980 & 1985

BAHAN BAKAR TYPE OF FUEL	Kota Urban		Pedesaan Rural		Kota+Pedesaan Urban+Rural	
	1980	1985	1980	1985	1980	1985
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Untuk Penerangan /</u> <u>For lighting</u>						
Listrik/Electricity	48.5	73.1	5.4	15.9	14.2	30.5
Minyak tanah/ Kerosene	28.6	17.5	71.1	69.8	62.4	56.4
Lainnya/Other	22.4	9.3	23.3	14.3	23.1	13.1
Tak Terjawab/ Not Stated	0.5	0.0	0.2	0.0	0.3	0.0
JUMLAH / TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
<u>Untuk Memasak /</u> <u>For cooking</u>						
Listrik/Electricity	0.9	1.8	0.1	0.3	0.2	0.7
Gas/Gas	1.4	3.3	0.2	0.3	0.4	1.1
Minyak tanah/ Kerosene	74.0	69.8	11.7	10.9	24.4	25.9
Kayu, Arang/ Wood, Charcoal	22.6	23.6	87.6	88.0	74.4	71.5
Lainnya/Other	0.6	0.7	0.3	0.2	0.4	0.3
Tak Terjawab/ Not Stated	0.5	0.8	0.1	0.3	0.2	0.5
JUMLAH / TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Tabel : 20
Table

PERSentase RUMAH TANGGA MENURUT SUMBER
AIR MINUM DAN SUMBER AIR UNTUK MANDI/
CUCI, DAN DAERAH TEMPAT TINGGAL
PERCENTAGE OF HOUSEHOLD BY SOURCE OF
WATER FOR DRINKING AND FOR BATHING/
WASHING, AND URBAN/RURAL AREAS
1980 & 1985

SUMBER AIR SOURCE OF WATER	Kota Urban		Pedesaan Rural		Kota+Pedesaan Urban+Rural	
	1980	1985	1980	1985	1980	1985
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Untuk Minum /</u> <u>Drinking water</u>						
1. Leding/Pipe	26.6	32.4	2.1	3.3	7.0	10.7
2. Pompa air/Pump	11.3	16.3	2.1	4.9	4.0	7.8
3. Sumur/Perigi/Well	52.8	44.8	58.7	56.8	57.5	53.8
4. Mata air/Spring	2.7	2.3	21.0	20.4	17.3	15.8
5. Sungai/River	2.1	1.3	12.7	11.1	10.6	8.6
6. Air Hujan/Rain	1.4	1.5	1.5	1.7	1.5	1.6
7. Lainnya/Others	3.1	1.4	1.9	1.8	2.1	1.7
JUMLAH / TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
<u>Untuk Mandi/Cuci/Water</u> <u>for Bathing/Washing</u>						
1. Leding/Pipe	14.9	20.4	1.4	2.3	4.1	6.0
2. Pompa air/Pump	13.5	18.9	1.5	3.9	4.0	7.7
3. Sumur/Perigi/Well	57.9	50.8	48.5	48.9	50.3	49.3
4. Mata air/Spring	2.6	2.2	16.2	16.7	13.4	13.0
5. Sungai/River	8.4	6.2	28.1	24.2	24.0	19.6
6. Air Hujan/Rain	0.4	0.4	0.6	0.5	0.6	0.5
7. Lainnya/Others	2.3	1.1	3.7	3.5	3.4	2.9
JUMLAH / TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Tabel
Table : 21

PERSENTASE RUMAHTANGGA MENURUT
TEMPAT MANDI
PERCENTAGE OF HOUSEHOLD BY
BATHING FACILITY
1980 & 1985

TEMPAT MANDI BATHING FACILITY	Kota Urban		Pedesaan Rural		Kota+Pedesaan Urban+Rural	
	1980	1985	1980	1985	1980	1985
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Kamar mandi sendiri <i>Private</i>	51.0	60.7	19.8	26.5	26.2	35.2
2. Kamar mandi bersama <i>Shared private</i>	27.3	22.5	17.6	15.3	19.6	17.2
3. Kamar mandi umum <i>Public</i>	8.6	6.4	14.7	12.3	13.4	10.8
4. Lainnya/ <i>Others</i>	12.7	10.4	47.6	45.9	40.5	36.8
5. Tak terjawab <i>Not stated</i>	0.4	0.0	0.3	0.0	0.3	0.0
JUMLAH / TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Tabel : 22
Table

PERSENTASE RUMAHTANGGA MENURUT
TEMPAT BUANG AIR BESAR
PERCENTAGE OF HOUSEHOLDS BY
TOILET FACILITY
1980 & 1985

TEMPAT BUANG AIR BESAR TOILET FACILITY	Kota Urban		Pedesaan Rural		Kota+Pedesaan Urban+Rural	
	1980	1985	1980	1985	1980	1985
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Kakus sendiri dengan tangki septik/ Private with septic tank	28.9	38.4	3.9	6.8	8.9	14.8
2. Kakus sendiri tanpa tangki septik/ Private, without septic tank	17.4	17.1	17.8	20.5	17.8	19.7
3. Kakus bersama/umum Shared/Public/Other	53.3	44.5	77.9	72.7	72.9	65.5
4. Tak terjawab/Not stated	0.4	0.0	0.4	0.0	0.4	0.0
JUMLAH / TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

EAST-WEST POPULATION INSTITUTE

ELEVENTH POPULATION CENSUS CONFERENCE

February 9 to 13, 1987 Sydney and

Canberra, Australia

Co-sponsored & Hosted by Australian Bureau of Statistics

PLANNING CONSIDERATIONS FOR THE NEXT POPULATION
AND HOUSING CENSUS OF PAKISTAN

By

G. Mujtaba Mirza, Census Commissioner,
Population Census Organization, Pakistan.

PLANNING CONSIDERATIONS FOR THE NEXT POPULATION AND
HOUSING CENSUS OF PAKISTAN

The objective of a population & housing census is generally stated to be to provide the required population & housing data with reasonable accuracy within the provided funds and available time. It thus requires ascertaining data requirement of all types of users whether in government or the public. The scope of data in terms of topics and their details is increasing day by day. A sincere effort is made to meet the data requirement of all types of users. But it is usually a trade-off between what the users want and what a population census office can provide with its resources and to the extent and reliability the required data is made available by the respondents. Therefore, unless sufficient funds, required expertise, technology & material resources are available, the needs of all administrators, planners, evaluation experts and researchers cannot be met. Another most important factor is the type and quality of enumerators if interview method is adopted.

Planning for the next population and housing censuses in Pakistan has been started with the review of the census legislation. It is thus quite pre-mature to give an outline of the whole census plan and innovations proposed to be carried out in the next censuses. It is likely to be on the pattern of 1990-91 Housing and Population Censuses with necessary improvements to overcome the shortfalls observed in these censuses and lessons learnt from the census experiences of other countries. The UN and ESCAP recommendation for the 1990 round of population and housing censuses and the recommendations emerging from this conference will be given due consideration keeping in view the Pakistan's own requirements and resources to be made available for these censuses.

Separate or Combined Housing & Population Censuses

The first issue which is likely to enage the attention of the census planners will be concerned with conduct of separate population and housing censuses or their combination and dates of their enumeration periods. In the last census the housing census was carried out in the first fortnight of December, 1980 which was followed by the population census in the first fortnight of March, 1981.

The population censuses before the 1981 Population Census had been preceded by an exercise of household listing primarily because of the inadequacy of proper maps and absence of control lists of living quarters for census enumeration purpose. Subsequently the scope of indepent household listing was extended to that of a housing census, which was conducted separately before the population census.

It was initially planned to conduct the housing census at least six months in advance of the population census, so that its household listing could be used as sampling frame for the sample count of the subsequent population census and for necessary revision of the housing census delineation work for the purpose of the population census. But unfortunately the housing census was delayed and was conducted only three months in advance of the population census, which did not permit revision of the housing census delineation work though found necessary but the list of census enumeration blocks was used as sampling frame for the population census.

Conducting of the housing census and population census separately was found to be not only expensive but difficult to

manage within a period of three months and further to elicit the same response and cooperation from respondents and work zeal and enthusiasm from enumerators. In the next census, therefore, the possibility of a combined housing & population census will necessarily be examined. But it pre-supposes availability of well delineated census areas with their adequate description to assist the enumerators in locating and identifying each and every living quarter. The assistance of the local administration authorities will be sought in this regard. A lot of efforts will, however, be required for preparing the maps of delineated enumeration areas with adequate details. In case this exercise does not mature, the housing census may have to be conducted separately but quite well in advance of the population census, so as also to provide the necessary sampling frame for the agriculture census of Pakistan which is conducted on sample basis.

Census Enumeration Period

While considering the question of separate or combined population and housing censuses, the choice of enumeration period in both the cases will eventually be considered. The choice of the enumeration period is determined primarily keeping in view movement of population, availability of enumerators and their supervisory staff, weather conditions, etc. at the time of census enumeration, beside absence of any nation-wide activity such as elections, etc., normalcy of period, administrative convenience, etc. at that time. In Pakistan the censuses have been conducted during some fortnight in the first quarter of the year primarily with the consideration that this period is dry and rather slack from economic activity viewpoint in rural area and the rural population, which constitute 70% of total population is available

at their homes for census enumeration. But it has always presented the problem of coverage of snow-bound and extremely cold areas at that time. In the last census, mostly school teachers were used. Their availability during this period poses some problems since it coincides with the period of annual examinations. Thus if the present practice of utilising school teachers is to be followed or the proposal of using high school students is considered, the period of any fortnight during the first quarter of the year may not suit them. Better period under this situation could be the short spell of winter-vacation during the second fortnight of December except for snow-bound and extremely cold areas. Keeping in view the other considerations of the least movement of population and moderate weather conditions, the month of April or September may also be considered. The disadvantage of the present period of enumeration also relates to the question of measurement of economic activity, since this is a slack period of employment so far as the rural population is concerned.

In case it is decided to conduct separate housing and population censuses, it would be desirable to conduct the housing census sufficiently in advance of the population census in order to utilise their results as sampling frame for the population census and the agricultural census and to review the housing census delineation work, if need be. If due consideration is given to selection of proper period for enumeration in case of population census, the housing census may be conducted exactly one year in advance, alternately in the first week of September, if the earlier enumeration period of the population census is followed.

Use of Sampling in Enumeration

The next issue which may be considered in planning the next census is expected to be the use of sampling for enumeration purposes. In the 1981 Population Census use of sampling for enumeration was made and two census questionnaires were introduced for this purpose. A large questionnaire was canvassed in respect of sample population comprising ten per cent of the total population and a short one for the remaining population. The short questionnaire included the topics of sex, age, marital status, religion & educational attainment and the long questionnaire all topics of the short questionnaire plus topics of field of education, place of previous residence and duration of residence at the present place, employment & its status, occupation and economic activity, children born alive, surviving and born during the past year & disability. This procedure was adopted to increase the reliability of the additional topics in the long questionnaire which were considered comparatively difficult-to-enumerate and also to reduce the burden of questions on ninety per cent of the population. It was provided that for canvassing the long questionnaire better qualified enumerators will be used who would be given exhaustive and intensive training for this purpose and would also be closely supervised, but in practice it could not be implemented completely and the desired results remained elusive. The issue of use of sampling for enumeration may have to be re-examined and complete enumeration of all topics may have to be resorted to particularly because of the need of small area statistics for local planning & administrative purposes. Alternately, the topics of the complete and sample count questionnaires may have to be reviewed for necessary changes.

In case of separate housing census use of sampling in enumeration is likely to be considered for rural areas and a few urban localities where there is not expected to be much variability in housing characteristics.

Enumeration Staff

The quality of enumeration, among other things, is dependent upon the type of staff used for enumeration, their training and supervision, though the ability and willingness of the respondents to provide the requested information is of equal importance. In Pakistan, teachers and local government officials of the concerned area are used as enumerators. It was found difficult to create sufficient interest and devotion in enumerators for carrying out the census work because of various reasons. First, they are required to carry out the census work in addition to their own job which carries some prestige at the local level as compared to the enumeration work where they are required to solicit information by visiting households. Secondly, the honoraria they get for census work is hardly enough to provide the required incentive to them. Thirdly, the census job is required to be done in addition to their own duties though for census work they are relieved of their normal duties except of urgent nature, but it requires extra hours of work and sometimes personal inconvenience. This is the gravest problem of the census which has to be resolved but there is not an easy solution to it. There is no other field force than the teachers and local government official except the students who could be utilised for census enumeration work. Employment of high school students for this work has also some problems particularly when annual examinations mostly take place around the census enumeration period. Under the circumstances the only choice is

to pay the enumerators quite handsomely, for which a huge amount will have to be requested.

Various manuals for supervisory staff, trainers and enumerators were prepared in the last census. Use of college lecturers and high school teachers for training paid some dividend but the situation demands more effort in this regard. Training material of self-study type may be proposed to be prepared to improve the situation but preparation of such material would not be an easy task.

Census Questions

The quality of data emerging from the last census was found to be lacking particularly on age, economic activity, children born alive and surviving.

Since the quality of data on ages is very important for both administrative purposes and demographic research, the question on age will require thorough review to provide the required quality data. Particular attention will be given to proper reporting of ages of infants, children below 5 years and avoidance of reporting of ages around 0 & 5 and even numbers. The month and year of birth along with age on last birthday and asking of age in months in case of infants will be considered for inclusion beside provision of probing and verification for this purpose.

In the last census the usual activity status approach was used because of the seasonality aspect in employment. But unfortunately this approach failed to capture the economic activity of females and to some extent of rural population meaningfully.

There were only four questions for measurement of economic activity population, namely,

- i) what does he/she do,
- ii) what is his/her main job, profession, trade or what kind/type of work does he/she usually do,
- iii) what is the activity of organization or business in which he/she works, and
- iv) what is his/her working status or capacity in which working?

Though the census questionnaire does not permit including many questions because of the cost, limitation of questionnaire space and heavy burden of coding and processing yet it is possible that more questions may have to be asked to improve the quality of the economic activity data irrespective of the fact whether current or usual activity status approach is used. The concept of earner is likely to be introduced in this regard.

The quality of data on migration which was canvassed on sample basis was considered to be on sufficiently reasonable quality, though it lacked in comparison with data available from other sources. There were only two questions on migration, namely,

- i) for how many years is he/she living continuously in this district and
- ii) in case of migrants, the district in Pakistan with urban or rural indication or country where he/she was last living before migrating.

There were no questions on place of birth and place of residence at a fixed date in the past. Though it is argued that place of residence at a fixed date in the past is less complicated for obtaining time-oriented migration data yet it will have to be examined before inclusion. However, the data on place of birth is likely to be considered for inclusion, irrespective of the custom of mothers going

to their parents' place for birth particularly of the first child and occurrence of births in hospitals in places other than the usual place of residence of the mother. In such cases the possibility of rephrasing the birth place question will be considered.

No question on nationality was asked in the last census because of the insignificant number of foreigners in the country. But it created the problem of comparability of census tabulation with the previous censuses. In the previous censuses all tabulations were made in respect of Pakistanis only and there were only one or two tables for foreigners. It is thus possible that the question on nationality may be included again.

The quality of data on disability was far from satisfactory because of the well known problems of collection of this data through censuses. It is, therefore, likely to be dropped in the next census unless the pressure for its inclusion mounts high.

The quality of data on children born alive and surviving was not satisfactory because of the problem of recall lapse and likely omission of children dying during their infancy. The quality of data on children born alive during the last one year was all the more poor. However, because of the importance of these data in demographic analysis, these questions will be introduced again but with the required modifications.

Census Tabulation & Publications

For expediting the tabulation of census results the possibility of using optical mark reader (OMR) type of census questionnaire was examined but it was dropped primarily because of their printing problems within the country and the anticipated apprehension of damaging of census questionnaires by dust and dampness and their

crumpling while handling and transmitting these. Though the system of decentralized data entry through micro-computers will also be considered the possibility of introduction of OMR questionnaires will also be taken into account.

It has been felt that the census data needs to be disseminated extensively. Unless it is done so, the required feed-back in the form of criticism & other requirement of data may not be forthcoming, without which no meaningful improvement in the census can be effected. The statistical tables produced during the last census were quite adequate but not quite suited to the direct requirements of data analysis for demographic and economic research. The work on analysis of census data has recently been started by the population census office, as it also leads to knowing the limitations of data in terms of its quality & quantity, which help in improving the future censuses. The scope of census tabulations & consequently of the census publications is, therefore, expected to be enlarged in the next census.

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1985 POPULATION CENSUS OF JAPAN

— Backgrounds and some of the measures taken —

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* The views expressed in this paper are those of the author and are not necessarily those of the Statistics Bureau.

Abstract

To take the 1985 population census of Japan, careful consideration was given to several problems. Among the problems especially important were: (1) to obtain full cooperation from respondents; (2) how to effectively enumerate households of which members were apt to be away from home; (3) to review the method of recruitment and training of enumerators; (4) to make the process of census-taking more efficient; and (5) to harmonize various demands for the census results. In this paper, the backgrounds of these problems and some of the measures to overcome the difficulties are presented.

Introduction

1. Population censuses of Japan have been taken almost every five years since 1920, full-scale censuses and simplified censuses by turns. The difference between the full-scale census and the simplified census is the number of questions asked. The 1985 population census, conducted as of 1 October 1985, was a simplified census, and the fourteenth one of the series of those censuses. Approximately 121 million persons or 38 million households were covered by the 1985 census.

2. The population census of Japan has its legal basis in the Statistics Law and orders including the Cabinet Order for the Population Census which was established in the current form before the execution of the 1980 population census. These orders were amended before conducting the 1985 census. As the amendment was small, however, the fundamental structure of the 1985 population census was not much different from that of the 1980 census. (See Appendix 1.)

3. At the planning stage, however, several problems pertaining to census-taking in recent years had to be carefully considered to conduct the 1985 population census both smoothly and highly accurately. Among the problems especially important were: (1) to find measures to obtain full cooperation from respondents; (2) to study enumeration methods in case the enumerator cannot easily meet with members of a household; (3) to review the method of recruitment and training of enumerators; (4) to consider possibilities of making the total process of census-taking more efficient including reduction of the burden to the local governments; and (5) to harmonize various demands for the census results with resources available for tabulation work.

Backgrounds

Problems in obtaining full cooperation from respondents

4. In Japan, it is widely recognized, among those who are involved in census work, that it is getting difficult to obtain full cooperation from respondents, though, in general, people are still cooperative to the census. It may be partly due to a growing tendency of the public concern about protection of privacy or confidentiality in the census, and partly due to indifference of a considerable portion of the general public towards the census.

5. Concerning protection of privacy or confidentiality, answers from respondents to the census questionnaires must be kept confidential by such persons as enumerators, supervisors and officials of the local governments and the central government in charge of census work according to the provisions of the Statistics Law. Moreover, it is prohibited to use the filled-in questionnaires for other purposes than producing statistics

originally planned by the census-taker, that is, the Statistics Bureau, without permission from the Director-General of the Management and Coordination Agency. This may, however, not be sufficiently understood by a considerable number of respondents; even if it is known, some respondents may not wish the contents of their questionnaires to be seen by the enumerator, or they may criticize the potential insufficiency of the methods that have been taken for the protection of privacy or confidentiality in the past censuses.

Difficulty in meeting with respondents

6. Another factor that makes census-taking more difficult in recent years than in the past decades is the increase of those cases in which enumerators cannot meet with household members in spite of frequent visits to the households. The greater part of such households are those whose members are apt to be away from home, and a fairly large portion of the households whose members are apt to be away may be one-person households.

7. According to the census results, the number of one-person households living in dwellings, excluding rented rooms, was 2.9 million (10.8 percent of private households living in dwellings excluding rented rooms) in 1970, and it amounted to 6.4 million (17.6 percent) in 1985. It was also shown from the tabulation of the 1985 census that the number of households consisting of only commuting employed persons and persons attending school was 10.6 million (29.1 percent of all households living in dwellings). From those results, it may not be an exaggeration to say that enumerators had no chance to meet with the members of one-third of all households in the daytime during the workday.

8. In addition to those households, the emergence of those apartment buildings in which a visitor cannot enter without agreement of the resident, has made it more difficult to meet with household members.

Problems in recruiting and placing enumerators

9. Because enumerators play a large part in making the results complete and accurate in many surveys in Japan, it is very important to recruit competent enumerators and to train them properly. The system of always registering candidates for enumerator to ensure easily employing suitable enumerators is one of the measures taken for that purpose. For the population census, however, these measures have been considered not necessarily sufficient, partly because of the large number of enumerators to be appointed.

10. For the population census, it has been conventional in many municipal offices to ask such organizations, as an association of block inhabitants (jichikai or chonaikai), to recommend an enumerator to be allocated to the enumeration district in which he/she lives. From the point of view of avoiding undercounts or inaccurate answers, it may be desirable that the enumerator is acquainted with the situation of the enumeration district

allocated to him/her, and therefore, the above-mentioned method of recruiting enumerators is not necessarily unfavorable. Under the said tendency of the public concern about the protection of privacy, however, there is the strong possibility that this method may no longer work well in some areas, especially in some newly developed areas. According to the results of the opinionnaire made to the sample households after the 1980 census, 23.6 percent of households answered that they preferred enumerators they did not know.

Necessity of making census-taking process more efficient

11. In Japan, the number of government employees has been decreased year by year due to continuing financial difficulties. Because the budget for employing staff members of the statistics divisions in the prefectural governments is at the expense of the central government in Japan, the number of these staff members has been decreased in correlation with the reduction in the central government. Although, for example, the budget for employing temporary workers has been allocated to the prefectural governments at the time of the census, the burden of census-taking is getting larger for the local governments as well as for the Statistics Bureau and the Statistics Center without making the total process of census-taking more efficient.

Problems in harmonizing various demands for the census results

12. The tabulation plan of the census is usually decided by taking demands from users of the central and local governments, researchers, etc. and resources available for tabulation work into account. In the tabulation of the census of Japan, one of the most time-consuming jobs is the coding of industrial and occupational classifications, and therefore, the tabulation plan is greatly affected by how and when those codings are done.

13. In the case of the 1985 census, there were strong demands to use such basic results as the final counts of population and households and population classified by age and sex. On the other hand, considering demands from users who wished to use the results on economic characteristics of population, it was not desirable to release those results too late by giving high priority only to tabulation of the basic results.

14. In addition to the time of release of each result, adding some new tables and modifying the existing tables in the past censuses were considered necessary, taking into account the rapid changes in the structure and distribution of Japan's population. Among the changes, one of the most important was a rapid aging of population.

Some of the measures taken in the 1985 census

15. Considering the problems described above and reflecting on the results of a legal and practicable study made through

holding meetings with officials of local governments, jurists, etc., several new or modified measures, including those explained in the following paragraphs, were taken.

Preparation of multipurpose instruction leaflet

16. One of the measures taken in terms of obtaining cooperation from respondents was to prepare an instruction leaflet that could be used for folding and sealing the completed questionnaire when a respondent did not wish to hand the completed questionnaire directly to the enumerator. In such cases, in the 1980 census, the supervisor visited the household, persuaded the household members to cooperate in the census and collected the completed questionnaire if necessary, or the enumerator delivered a large envelope to the household upon request and collected the completed questionnaire sealed in the envelope. Because the proportion of households which sealed questionnaires using envelopes in the 1980 census was less than one percent and a great number of envelopes were wasted as a result, it was decided in the 1985 census to prepare instruction leaflets having the function of sealing the completed questionnaires.

17. The instruction leaflet itself was prepared to be distributed to each household, and was designed so as to contain the instructions for completing the questionnaire, the filled-in example of the questionnaire, the explanations on the purpose of census-taking, confidentiality of individual answers and utilization of the census results, etc. However, the instruction leaflet could be also used for sealing the completed questionnaire as mentioned above if necessary. These matters mean that the instruction leaflet had functions for four kinds of materials prepared in the 1980 census, namely the instruction leaflet (of the 1980 census), the leaflet explaining the purpose of census-taking, the large envelope for the sealed return of the questionnaire and the envelope for the questionnaire for an absent household. This combination was effective in reducing the handling of the census documents by the local government as well as the budget of the Statistics Bureau.

18. By adopting the above measure, however, there was a possibility of a significant increase of sealed questionnaires. As a supervisor or an official of the municipal office had to open the sealed questionnaires and examine all entries on the questionnaire instead of the enumerators doing so themselves, the high percentage of the sealed questionnaires might result in increasing the burden of those engaged in census-taking and lowering the accuracy of the census results. For this reason, persuasion by the supervisor was done as much as possible, as in the 1980 census. The percentage of sealed questionnaires using the instruction leaflets resulted in being only slightly higher than in the 1980 census.

Preparation of leaflet in braille, etc.

19. To make the field operation run smoothly, a leaflet printed both in braille and in large characters for blind persons or those partially handicapped in eyesight were newly prepared. In the leaflet, the purpose of census-taking, the use of the census results and so forth were explained. Moreover, taking into consideration an increasing number of households not having pencils, each enumerator was supplied with ten pencils of half size for lending to households, in addition to three pencils of regular size for his/her own work. In the 1980 census, five pencils of regular size were given to each enumerator.

Distribution of questionnaires in institutional households

20. In Japan, the questionnaire of the population census has been designed as a household schedule. From the viewpoint of protecting privacy, in the 1985 census, however, it was allowed in such institutional households as a student dormitory and a household of inpatients in a hospital to distribute one questionnaire to each household member if necessary. By taking this measure, when necessary, it was avoided that answers of a member of an institutional household were seen by other members.

Publicity

21. In view of obtaining public cooperation, publicity was considered very important to get the full cooperation of people in census-taking, and a considerable amount of resources were appropriated for publicity activities. To the utmost extent, newspapers, television and radio broadcasting, films, magazines and other media were utilized for the publicity campaign, both on national and local levels, with the cooperation of the Government Publicity Office. Several kinds of posters, pamphlets and leaflets were also prepared. These publicity campaigns were conducted not only to let the residents know that the census was to be taken as of 1 October 1985, but also to make people better appreciate the necessity and importance of the census and to assure them that all the information obtained would be treated in strict confidence. (See Appendix 3.)

22. In this connection, the meeting of the officials in charge of publicity was held for the first time to make the publicity campaign for the census by the local governments more efficient. The manual for publicity was prepared for this purpose. Furthermore, considering the great influence of mass communication, meetings with editorial writers, news commentators and/or chief reporters of newspapers and television networks were held to obtain understanding for the census. These meetings were held four times in the Tokyo area and in the Osaka area respectively, and once in the Nagoya area and in the Fukuoka area.

Prolongation of period of collecting completed questionnaires

23. In the 1970, 1975 and 1980 censuses, enumerators were instructed to collect the questionnaires completed by households within five days starting from 1 October. In the 1985 census, the period of collecting the completed questionnaires was prolonged to one week starting from 1 October, so as to include Sunday. By taking this measure, it was expected that the enumerators visiting the households whose members were apt to be away from home could meet them relatively easily.

Enumeration methods for absent households

24. When all members of a household were apt to be away from home and the enumerator could not meet with them in spite of frequent visits to the household, as in the 1975 and 1980 censuses, the enumerator left the questionnaire for an absent household with a message to the household in the 1985 census. Unlike in the past censuses, however, the form of the questionnaire for absent households was designed so as to be same as that of the ordinary questionnaire except the quality of paper, the printing color and the deletion of some notes, aiming at making the household members easily recognize that the questionnaire left was surely the one of the 1985 census. It was not machine-readable type but could be folded. When the answers were obtained through this questionnaire, the enumerator transcribed all entries by the household to an ordinary mark-sheet type questionnaire.

25. When it was impossible for an enumerator or supervisor to enumerate a household by any means including the use of a questionnaire for absent households for such reasons as absence of its members for a long period, as in the 1980 census, it was allowed to collect information to fill out the questionnaire from a person who was presumed to be agreed upon by the household members concerned. If such a person could not be found and there was a possibility of omission of the household from the enumeration, only the name and sex of each member and the number of the household members were filled in on the questionnaire by asking a person such as a neighbor, under directions from a supervisor or the municipal office. It was instructed, however, that these methods should be applied only for truly unavoidable cases, and that confirmation in accuracy should be made whenever possible.

Appointment and placement of enumerators

26. Enumerators were appointed, in principle, from among private persons as in the past censuses. Their minimum qualifications were as follows:

- (1) To be between the ages of 20 to 64, in principle
- (2) To be reliable as an enumerator, for example, in keeping contents of the completed questionnaires confidential
- (3) To be able to devote him/herself to the activities as an enumerator during the enumeration period and be enthusiastic in conducting field work
- (4) To have no connection with an election campaign

(5) To have no direct connection with taxation work
Although the above qualifications were those following the 1980 census, the underlined part was added from the viewpoint of keeping strict confidentiality.

27. As the success of the census depends largely on the quality of work performed by the enumerators, municipal offices were instructed that, according to the circumstances of each area, they should recruit appropriate candidates for enumerators and assign them to the enumeration districts with a view to achieving the correct and smooth conduct of the census. For example, in an area where most people dislike to have their personal matters known by neighbours, it would be desirable to avoid assigning an enumerator familiar to them. For another example, in such an area where the enumeration was expected to be difficult, it would be advisable to assign an enumerator having much experience such as one selected from the registered candidates for enumerators in the said system. In this connection, for such areas where the enumerators have to frequently visit households late in the evening, it was allowed for the first time in the 1985 census that, if necessary, two enumerators were assigned to two enumeration districts and did the work cooperating mutually.

28. Considering those mentioned above, it was recommended to the local governments not only to rely too heavily on the conventional way of recruiting enumerators through the jichikai or chonaikai, but also to make efforts at the same time in introducing such means as the open recruitment and the assignment from among the registered candidates for enumerators and those who retired from the municipal offices.

Improvement in documents and materials for training of enumerators

29. To make the field operation run smoothly under the surroundings mentioned already, the videotape recording the ABC of enumeration, expecting the training for the enumerators to be more intensive, was prepared for the first time. In addition, an effort was made to improve the enumerator's manual as much as possible to make the enumerators understand the principle and the correct methods of enumeration fully and easily. It included adding typical questions from households and sample answers by an enumerator, and concrete explanations on how the census results were to be used.

30. Further, the pseudo-questionnaire, in which the part to be filled in by the enumerator was indicated by color printing, was newly prepared for the training of the enumerator, in addition to such enumeration materials already introduced in the past censuses as the enlarged copy of census questionnaire, the charts, the slides and the transparent sheets for overhead projector.

Promotion of setting up of headquarters for the census execution

31. In order to carry out the census work smoothly and

efficiently in the local governments as well as in the Statistics Bureau/Statistics Center, it was considered effective to set up the headquarters for the execution of the 1985 population census. By setting up such headquarters that cover the related sections in the office, it was expected that the importance of the census would be appreciated by the senior staff members of the local government, that resources of other sections would become available, that publicity campaign, for example, would be conducted easily if the section in charge of publicity was also covered, and so forth. In the 1985 census, all the prefectural governments set up the headquarters as in the 1980 census, and 32.6 percent of the municipal offices (63.5 percent, when restricting to the municipal offices of the cities) did, which was 5.6 (7.6 for the cities) percent points higher compared with the 1980 census.

Rationalization of documents and materials for the census

32. In the population census of Japan, the number of the documents and materials prepared has reached almost one hundred, even if those for publicity are excluded. Although each material has served for the specific purpose, it was considered important to review them from the viewpoint of rationalization and of lessening the burden of those involved in the census work. As mentioned already, preparation of the instruction leaflet was to meet this point of view. One of the other kinds of rationalization was modification of the supervisor's manual. In the censuses of 1980 and before, a supervisor had to keep one enumerator's manual as well as one supervisor's manual. In the 1985 census, the supervisor's manual was edited so as to include the part corresponding to the enumerator's manual. By doing so, not only was the work of manual distribution by the municipal offices reduced, but it became easy to explain to the supervisors the important points in instructing the enumerators by giving notes on the part of the enumerator's manual in the supervisor's manual. This kind of rationalization was also made in preparation of some other materials. (See Appendix 2.)

33. From the above viewpoint, the questionnaire of the 1985 census may be also regarded as a rationalization. As in the 1980 population census, the mark-sheet type questionnaire printed on both sides and designed as a household schedule was used in the 1985 census. Compared to the questionnaire of the 1980 census in which up to four persons could be entered, the questionnaire of the 1985 census was designed so as to have columns for five persons. As a result, the number of the questionnaires to be prepared became smaller compared with the case where the design of the 1980 census was followed. This rationalization might be possible, however, simply because the 1985 census was a simplified one.

Rationalization in sending documents and materials

34. One of the time and labor consuming tasks in the census of Japan may be forwarding the documents and materials for census-taking, including the questionnaires, to the local governments.

This task has been done by contracting with a forwarding agent. In the 1985 census, special attention was paid in making mutual communication between the Statistics Bureau, the head and branch offices of the forwarding agent and the local governments on the names of persons in charge, the time of sending out and in, how to send in, etc. Through this measure, many possible accidents or mistakes in forwarding the documents and materials were prevented.

Tabulation plan

35. Considering the strong demands to use the basic results of the census as early as possible, it was determined in the 1985 census to publish the basic results excluding the economic characteristics of population and households about five months earlier than in the 1980 census by performing the complete tabulation in three stages. In the first complete tabulation, the basic results excluding those on economic characteristics were to be tabulated. In the second complete tabulation, the coding of major groups of industrial classification was to be performed, and the fundamental results on economic characteristics excluding those on occupational structure were to be produced. Further, in the third complete tabulation, the remaining results on the occupational structure of the population were to be tabulated by coding major groups of occupational classification. In the 1980 census, the complete tabulation was performed in two stages. The first stage of the 1980 census corresponds to the first and second stages of the 1985 census. Other kinds of tabulation were carried out in the similar manner as in the 1980 census. Those included the preliminary counts of the population, the prompt sample tabulation (one-percent sample), the detailed sample tabulation (approximately twenty-percent sample), the tabulation on commuting population, the tabulation by enumeration districts and the tabulation by grid squares.

36. By taking the measure mentioned above, however, it was unavoidable that the results on economic structure of population and households were to be tabulated later than in the 1980 census. Mainly for this reason, for the prefectural governments or the municipalities in principle with a population of 200,000 or more that wished to obtain such results early, it was decided to provide them at an early stage with the magnetic tapes containing the individual records, only when they coded major groups of industrial classifications at their own expense before submission of the questionnaires to the Statistics Center. The records in those magnetic tapes contained information on major groups of industrial classifications coded by the local governments as well as the codes given through marking in the field operation. Therefore, it became possible for them to tabulate the results on their own responsibility under the permission of the Statistics Bureau. This measure was taken for the first time and the questionnaire of the 1985 census was designed so as to contain the part used for coding of major groups of industrial classifications by the local governments.

37. Other methods taken in the past censuses that enabled the local governments to tabulate the census results on their own responsibility and expense under the permission of the Statistics Bureau were also taken in the 1985 census. Those methods included counting the population or the number of households using the Prefectural Summary Sheets of Population and Households, the Municipal Summary Sheets of Population and Households or the Household Listing Sheets; using the magnetic tapes copied from those prepared and used for tabulation at the Statistics Center after completion of its work; and transcribing the contents of the completed questionnaires to some form prepared by the local government. Considering that the choice by the local governments for their own tabulation was widened and that it became necessary to call attention to the local governments on confidentiality in tabulation and publication of the results more intensively than ever, the manual of tabulation by local government was newly prepared.

38. For more extensive use of the census results, it was decided to provide some new tables. These included tables to show commuting status of household members or, in other words, to show the status of households after those members who are commuting or going to school have left home, and tables for the analyses from the viewpoint of the life cycles. Furthermore, several improvements were to be made on the tables on the aged population, taking into account the importance of statistics on aged persons in current Japanese society. The tables on aged persons themselves were already introduced in the censuses of the 1970's in the form of households with aged relatives, for instance. And in the 1980 census, statistics on one-aged-person households and aged couple households were newly tabulated along with introduction of tables on such specific households as mother-child(ren) households and father-child(ren) households. In the 1985 census, those statistics were to be released in the first stage of complete tabulation as far as possible and gathered at the same place of the volumes of the census reports.

39. To overcome the reduction of human resources available for the tabulation work in the Statistics Center, several measures were taken, including replacement of the computer main frame, increase of computer terminals, development of an automated system of editing, etc. To describe those details would be, however, beyond the scope of this paper.

Conclusion

40. It could hardly be expected that the seriousness of the problems referred to in this paper would diminish prior to the 1990 census. On the contrary, for an issue such as confidentiality, it may become necessary to thoroughly consider again. For the planning of the 1990 population census, the preparatory studies have commenced already and the organization, like the Planning Committee of the 1985 Population Census, is to be set up soon. Through these measures and based on the experiences in the 1985 census, it is expected that the 1990 census plan will be further improved.

Outline of the Population Census of Japan

Legal basis of the census

The population census of Japan has its legal basis in the Statistics Law (Law No. 18 of 1947) and the following orders established under the Law.

- (1) Cabinet Order for the Population Census (Cabinet Order No. 98 of 1980)
- (2) Regulation for the Execution of the Population Census (Prime Minister's Office Order No. 21 of 1980)
- (3) Prime Minister's Office Order for Instruction for the Establishment of Enumeration Districts for the Population Census (Prime Minister's Office Order No. 24 of 1984)

The Statistics Law includes in Article 4 a provision specially made with regard to the population census. It defines the population census as "a census which is designated and notified to the public by the Director-General of the Management and Coordination Agency to be undertaken by the Government for the information of the whole state of national population" and states that "the population census shall be conducted every ten years, provided that an interim census shall be conducted in a simple way in the fifth year after the census year". The census taken every ten years has been called a "full-scale census", and the census taken in the fifth year after the full-scale decennial census a "simplified census". The difference between the full-scale census and the simplified census is the number of questions asked as provided in the Cabinet Order for the Population Census.

The population census is also a designated statistics according to other provisions of the Statistics Law. It is "Designated Statistics No. 1" by the "Designation of the Population Census" (Cabinet Notification No. 21 of 1947). Therefore, the population census is subject to the provisions related to the designated statistics in the Statistics Law and in the Cabinet Order for the Enforcement of the Statistics Law (Cabinet Order No. 130 of 1949), as to obligation to report, confidentiality, publication of results and so forth.

The Cabinet Order for the Population Census includes such provisions as date of the census, areal coverage of the census, population to be enumerated in the census, place of enumeration, topics to be investigated, duties and responsibilities of the central government, prefectural governments, municipalities, supervisors and enumerators, delineation of enumeration districts and method of enumeration. Several related provisions including those for the form of census questionnaires, for the form of certificates of supervisors and enumerators, for the enumeration period, for the criteria of delineating enumeration districts and so forth are made by the Regulation for the Execution of the Population Census and the Prime Minister's Office Order for Instruction for the Establishment of Enumeration Districts for the Population Census. Some of the fundamentals of the population census prescribed in these orders and the

instructions given on the basis of them are as follows.

Date of the census

The population census is taken as of 0:00 a.m. of 1 October in the year of census-taking.

Population to be enumerated and place of enumeration

In the census, the so-called de jure population concept is used in enumerating the people. That is, a person is enumerated at the place where he/she is usually living, and is counted as the population of that area. The "persons usually living" are defined as those persons who have lived or are going to live for three months or more at their respective households on the census date. Persons who have no usual places of living are enumerated at the places where they are present at the time of the census. There are, however, exceptions to this general rule for the following groups of population.

- (1) Students and pupils of regular schools as well as those attending special training schools or miscellaneous schools who are living in school dormitories, boarding houses or the like, are enumerated at the places where they live regardless of their period of stay.
- (2) Inpatients in hospitals are enumerated in the hospitals only when they have been hospitalized for three months or more at the date of census. Otherwise, they are enumerated at their homes even if they are expected to be in the hospital for three months or more.
- (3) Crews aboard ships, except ships of the Self-Defense Forces, are enumerated at their residential places on land if any. Otherwise, they are enumerated on the ships, if the ships are of the Japanese flag and are at anchor at a port of Japan on the census date or enter a port of Japan within five days after the census date.
- (4) Residents in the camps of the Self-Defense Forces are enumerated in the camps. Crews aboard ships of the Self-Defense Forces are enumerated at the places where the local general headquarters to which their ships belong are situated.
- (5) Prisoners in prisons and inmates of reformatories and women's guidance homes are enumerated at their institutions.

In accordance with the rules mentioned above, all persons in Japan are enumerated whether or not they are foreigners. However, the following persons are excluded from the enumeration.

- (a) Foreign diplomatic corps, their suite and their dependents
- (b) Foreign military personnel including both military corps and civilians, and their dependents

Topics to be investigated

The following topics are to be investigated both in the

full-scale census and in the simplified census.

For household members:

- (1) Name
- (2) Sex
- (3) Year and month of birth
- (4) Relationship to the head of the household
- (5) Marital status
- (6) Nationality
- (7) Type of activity
- (8) Name of establishment and kind of business (Industry)
- (9) Kind of work (Occupation)
- (10) Employment status
- (11) Place of work or location of school

For households:

- (12) Type of household
- (13) Number of household members
- (14) Type and tenure of dwelling
- (15) Number of dwelling rooms
- (16) Area of floor space of dwelling rooms
- (17) Type of building and number of stories

In the full-scale census, the following five topics are also to be investigated.

- (a) Time moved into the present house
- (b) Previous address
- (c) Education
- (d) Journey to work or to attend school
- (e) Sources of household income

Census organization

The work of the population census is carried out through the following channel:

Director-General of Management and Coordination Agency ---
Governors of prefectural governments --- Governors of
municipal governments --- Supervisors --- Enumerators ---
Households.

The Statistics Bureau of the Management and Coordination Agency is responsible for the execution of the census and the publication of the census reports, and the Statistics Center of the same Agency is responsible for the tabulation of census data.

Under the supervision of the Statistics Bureau, the statistics divisions of the prefectural governments take responsibility for the census operation in respective prefectures. These include distribution of census documents and materials to municipal offices, supervision of the field work, receipt of completed questionnaires and related documents from municipal offices and submission of those questionnaires and documents to the Statistics Center.

Under the supervision of the prefectural governments, municipal offices, namely shi (city), ku (ward), machi (town) and mura (village) offices, perform such work as establishment of the enumeration districts, selection and training of supervisors and enumerators, distribution to and collection from supervisors and enumerators of census questionnaires and docu-

ments and scrutiny of them.

The field enumeration is to be carried out by enumerators who are temporarily appointed for this census. Moreover, supervisors are temporarily appointed to take the responsibility of training and supervising enumerators, of scrutiny of entries in the census questionnaires and so forth. Supervisors and enumerators are appointed by the Director-General of the Management and Coordination Agency on the recommendation of the heads of municipal offices.

Delineation of enumeration districts

Before the census-taking, the whole area of the country is divided into enumeration districts and accurately mapped as of 1 October of the year of census-taking. Thereafter, the enumeration districts are to be amended up to the census date in such inevitable cases as changes of boundaries of municipalities and remarkable increase or decrease in the number of households. Thus, the enumeration districts are to be finally demarcated as of the census date.

There are three types of enumeration districts: Ordinary Enumeration Districts, Special Enumeration Districts, and Water Enumeration Districts. Special Enumeration Districts are established in the areas of mountains, forests, prairies, etc. where there are few or no inhabitants, or in the areas containing social institutions, large dormitories and so forth. Water Enumeration Districts are set up on the water of major harbours, and on the water of local harbours, mouths of rivers and canals where people are living in boats or ships. Ordinary Enumeration Districts are set up in areas other than Special Enumeration Districts and Water Enumeration Districts. They are to be delineated to contain about 50 households on the average, utilizing geographically apparent features for their boundaries.

Work of delineating enumeration districts for the census is carried out by the municipal offices. On the basis of field work, the municipal offices delineate the enumeration districts in accordance with the criteria set forth by the Statistics Bureau, and they prepare maps showing boundaries of the enumeration districts and a list of enumeration districts providing information on location, approximate number of households and population and characteristics of the enumeration districts.

Enumeration districts are delineated to provide a basis for census-taking. At the same time, they are used as areal units for obtaining small area statistics and providing the basic frame for various kinds of sample surveys.

Method of enumeration

Each enumerator is to visit every household within the enumeration district assigned to him/her from 24 through 30 September of the year of census-taking, deliver a questionnaire (or two or more questionnaires depending on the number of the household members) and an instruction leaflet, and request to fill out each item of the questionnaire.

During the specified period starting from 1 October, the enumerator is to visit every household in his/her enumeration

district again, receiving completed questionnaires and examining all the entries.

When an enumerator is not able to perform his/her duties due to an extraordinary situation such as an accident or a household in which it may be difficult to obtain cooperation, a supervisor is to complete the work instead of him/her. If it is impossible for an enumerator or supervisor to enumerate a household by the above-mentioned method by any means for such reason as absence of its members for a long period, it is allowed to collect information to fill in the questionnaire from a person who is presumed to be agreed upon by the household members concerned. If such a person cannot be found and there is a possibility of omission of the household from the enumeration, only the name and sex of each member and the number of the household members are filled in on the questionnaire by asking a person such as a neighbor, under directions from a supervisor or the municipal office.

Enumerators and supervisors are obliged to bear the certificates issued by the Director-General of the Statistics Bureau whenever they are engaged in the field operation, and they have to show the certificates upon request.

Appendix 2.

List of documents for enumeration and related materials (1985 Population Census of Japan)

(Documents for enumeration)

1. Questionnaire
2. Questionnaire (for 11 major cities 1))
3. Questionnaire for absent household
4. Questionnaire for absent household (for 11 major cities)
5. Questionnaire in English
6. Instruction leaflet
7. Instruction leaflet (for 11 major cities)
8. Leaflet in Braille
9. Household listing sheet
10. Special listing sheet for the Self-Defense Forces and the reformatory institutions
11. Sheet for summary map of enumeration district
12. Municipal summary sheet of population and households
13. Prefectural summary sheet of population and households
14. List of codes of prefectures and municipalities for supervisor
15. List of codes of prefectures and municipalities for enumerator 2)
16. Cover sheet of questionnaires
17. Cover sheet of questionnaires of one-percent sample household
18. Cover sheet of questionnaires of households with 30 persons living alone or more
19. Cover sheet of questionnaires for absent household, etc.
20. Parting sheet for questionnaires of households with 30 persons living alone or more
21. Cover sheet of household listing sheets, etc.
22. Small slip to show the questionnaire has been distributed
23. Memo pad to leave messages to absent households
24. Certificate of supervisor
25. Certificate of enumerator
26. Certificate of enumerator in English

(Documents for training and supervision)

27. Enumerator's manual
28. Manual of enumeration at reformatory institution
29. Manual of enumeration at camp of Self-Defense Forces
30. Supervisor's manual
31. Typical questions and answers for municipalities
32. Point of work of municipal office
33. Instructions for prefectural governments
34. Outline of work of prefectural governments and municipalities
35. Outline of work of municipal office
36. Manual of tabulation by local government (part 1)
37. Manual of tabulation by local government (part 2)

38. Basic concepts of industrial and occupational classification
39. Illustrations of industrial classification
40. Illustrations of occupational classification
41. Manual of compensation for accidents in line of duty
42. Manual of trust expenses to local governments for the 1985 population census

(Other documents, excluding those for post enumeration survey, etc.)

43. Skeleton of population census
44. Cabinet Order for the Population Census and Regulation for the Execution of the Population Census
45. List of planned statistical tables
46. Listing sheet of names of supervisors
47. Listing sheet of names of enumerators
48. Written appointment of supervisor
49. Written appointment of enumerator
50. Letter of appreciation for supervisor
51. Letter of appreciation for enumerator
52. Letter of appreciation for person cooperated greatly in census work
53. Certificate of commendation

(Materials for enumeration)

54. Pencil set 3)
55. Ball-point pen with water base ink
56. Questionnaire holder
57. Vinyl case for keeping questionnaires
58. Bag for carrying census documents 4)
59. Name tag for bag for carrying census documents
60. Badge for person engaged in field operation
61. Tiepin for key officer engaged in census work 5)
62. Armband for person engaged in field operation
63. Flag to show completion of enumeration on board
64. Pseudo-questionnaire for training of enumerator
65. Pseudo-questionnaire for training of enumerator (for 11 major cities)
66. Enlarged copy of census questionnaire
67. Charts for training of enumerator
68. Slides for training of enumerator
69. Transparent sheets for overhead projector for training of enumerator
70. Videotape and 16-millimeter film for training of enumerator
71. Box for keeping questionnaires
72. Box for keeping questionnaires (for 11 major cities)
73. Indicating sheet of questionnaire type to be put on the box for keeping questionnaire
74. Transport box for questionnaire
75. Transport box for questionnaire (for 11 major cities)
76. Address sheet to be put on the transport box (for returning the questionnaire)
77. Transport box for documents for enumeration and related materials

(Documents for post enumeration survey)

78. Questionnaire
79. Instruction leaflet
80. Household listing sheet
81. Enumerator's manual
82. Cover sheet of questionnaire
83. Certificate of enumerator

(Documents for opinionnaire on the 1985 population census for household)

84. Opinionnaire on the 1985 population census
85. Annexed documents (for opinionnaire on the 1985 population census)
86. Return envelope

(Documents for delineation of enumeration districts)

87. Skeleton of delineation of enumeration districts
88. Instructions for prefectural governments (at the meeting of the chiefs of statistics divisions of prefectures)
89. Instructions for prefectural governments (at the regional instruction meetings of the officials)
90. Outline of work of prefectural governments and municipalities
91. Manual of delineation of enumeration districts
92. Listing sheet of enumeration districts
93. Listing sheet of cho and aza (smaller area than municipal level)
94. Listing sheet of the number of enumeration districts and enumeration district's maps
95. Listing sheet of enumeration district numbers by census tracts

- Notes:
- 1) Ku area of Tokyo, Sapporo-shi, Yokohama-shi, Kawasaki-shi, Nagoya-shi, Kyoto-shi, Osaka-shi, Kobe-shi, Hiroshima-shi, Kitakyushu-shi and Fukuoka-shi.
 - 2) 47 types.
 - 3) Consisting of three pencils of regular size, ten pencils of half size for lending households, an eraser, a pencil sharpener and a case.
 - 4) Containing cardboard.
 - 5) Liquid crystal type.

**List of documents for publicity
(1985 Population Census of Japan)**

1. Block copy of symbol mark of the 1985 population census of Japan
2. Block copy of badge for person engaged in field operation
3. Outline of publicity work plan
4. Manual of publicity
5. Leaflet of the 1985 population census of Japan (for recruiting enumerators)
6. Booklet of the 1985 population census of Japan
7. Topics of the 1985 population census of Japan (for general use)
8. Topics of the 1985 population census of Japan (for teaching materials of school)
9. Pamphlet of the 1985 population census of Japan (for establishments)
10. Leaflet for obtaining cooperation (from residents of rented houses managed by Japan Housing and Urban Development Corporation)
11. Leaflet for obtaining cooperation (from residents of government employee's house)
12. Leaflet for obtaining cooperation (from university students)
13. List of the 1985 T.V. and radio programs of government publicity
14. Magazine for government publicity, titled "Photo" (September 15, 1985)
15. Magazine titled "Statistics" (August 1984; January, July and August 1985)
16. Poster for "Prize contest for the motto and poster of the 1985 population census of Japan"
17. Skeleton of prize contest for the motto and poster of the 1985 population census of Japan
18. Set of posters specially selected
19. Panels of the winning posters and mottos for the use of traveling exhibition
20. 16-millimeter film and videotape of "Professor polymath talks about the Population Census"
Leaflet of "Professor polymath talks about the Population Census"
21. Videotape of "Professor polymath talks about the Population Census" (in English)
Scenario of "Professor polymath talks about the Population Census" (in English)
22. 16-millimeter film and videotape of "Like a spring breeze"
Leaflet of "Like a spring breeze"
23. Videotape of "Like a spring breeze" (in English)
Scenario of "Like a spring breeze" (in English)
24. Horizontal banner and vertical banner
25. Sticker for publicity to be put on the rear window of taxi
26. Small publicity bulletins of the population census of Japan

27. Posters for publicity (for enumeration districts and general use)
28. Posters for publicity (for government and municipal offices and establishments)
29. Posters for publicity (for elementary schools)
30. Posters for publicity (for junior high schools)
31. Posters for publicity (for hanging in trains)
32. Posters for publicity (for stations)

Post 1980 Census Activities and Planning
for the 1990 Census in Malaysia

Department of Statistics,
Malaysia,
Kuala Lumpur.

January, 1987.

Post 1980 Census Activities and Planning
for the 1990 Census in Malaysia

Summary

1980 Census data:

1. The 1980 Census data have been widely disseminated. In addition, analysis of some of the data has been undertaken to provide further insights into the weaknesses in the data and ways of further improving their better collection. It was found that users mostly requested simple cross-tabulations and frequency counts of key variables. The greatest demand was for data at sub-national level.

2. The programme of analysis of the 1980 Census data is drawing to a close with the completion of six major projects: (a) the revision of the intercensal population estimates from 1970-80, (b) the estimation of district fertility rates using the 1970 and 1980 Census data which forms part of a regional study initiated by ESCAP, (c) the development of life cycle profiles which forms part of an international project organized by the Development Centre of the OECD and the Institute of Development Studies at the University of Sussex, (d) preparation of new life tables for 1970 and 1980, (e) development of consistent estimates of levels and trends of fertility and mortality in Sabah and Sarawak, and (f) the preparation of population and housing projections as major inputs to the formulation of the Fifth Malaysia Plan 1986-90.

Towards the 1990 Census - Planning and Strategy

3. Three major themes frequently recur in our discussions of the 1990 Census programme. These are: (a) improvement in the coverage, (b) reduction in cost, and (c) more timely release of data.
4. To assist in the further improvement of the coverage, small-scale field tests are currently being undertaken to establish more clearly the observed relationships among the various stages of the census results. New formats of questionnaires are also being experimented.
5. The main approach being considered to further reduce cost of the census is the wider application of sampling methods, both at the collecting and processing stages.
6. Towards more timely release of census data, besides the proposed adoption of wider sampling applications, decentralized processing is being planned for the first time. It is envisaged that the ready access to micro-computers and electronic scanning devices would greatly facilitate the achievement of decentralized processing.

Post 1980 Census activities and planning
for the 1990 Census in Malaysia

Introduction

1. Malaysia has a fairly long history of census taking, the earliest census being held in 1750 in one of the states. The first census covering the whole of Peninsular Malaysia was, however, conducted in 1911, while the states of Sabah and Sarawak had their first census in 1901 and 1939 respectively. The 1980 Census is the second Malaysian-wide census, the first being held in 1970.
2. The details of the 1970 and 1980 Censuses are published in Cho and Hearn (1984)¹ and it is sufficient to mention that in many respects the two censuses are very similar. For example, both used a de facto approach and the census questions were all canvassed and processed on a 100 percent basis. Even the same computer editing and tabulating software was used.

Analysis of the 1980 Census data

3. While dissemination of the census data to users in both public and private sectors formed a large part of our programme after the completion of the main census work, we are also very conscious of the need for our statisticians to use and to analyse the census data themselves. It is only in this way that weaknesses in the data can be revealed and insights into ways of collecting better data can be developed. For example, analysis of the types of data required by users after the

¹ Cho, Lee-Jay and R.L. Hearn, 1984 Censuses of Asia and the Pacific, 1980 Round, East-West Population Institute, East-West Center, Honolulu.

1980 Census revealed that simple cross-tabulations and frequency counts of key variables were mostly required. In addition, the greatest demand was for data at the sub-national level, including special regions earmarked for various government projects. This points to the possibility of reducing the number of complex tabulations as well as the number of census topics but more sub-national level tabulations will need to be prepared in the next census.

4. The programme of analysis of the 1980 Census data is coming to a close with the completion of 6 major projects. These include: (a) the revision of the intercensal population estimates from 1970-80, (b) the estimation of district fertility rates using the 1970 and 1980 Census data which forms part of a regional study initiated by ESCAP, (c) the development of life cycle profiles which forms part of an international project organised by the Development Centre of the OECD and the Institute of Development Studies at the University of Sussex, (d) preparation of new life tables for 1970 and 1980, (e) development of consistent estimates of levels and trends of fertility and mortality in Sabah and Sarawak where such information from the vital registration system is of poor quality and, lastly, (f) the preparation of population and housing projections which have been of considerable importance in the formulation of the Fifth Malaysia Plan, 1986-90.

5. Like many other census organisations around the world, discussion and work within the Department of Statistics in Malaysia have increasingly been focussed on the planning of the 1990 Census. It was therefore very timely that ESCAP organised a regional group meeting of 25 member and associate countries of the Asian region at the end of 1986 to discuss key issues pertaining to the conduct of the next round of censuses. A second meeting to be organised for the countries of the Pacific region is scheduled for mid-1987.

6. Three main themes recur frequently in our discussions of the 1990 Census programme. These are: (a) improvement in the coverage of the next census, (b) reduction in the cost of holding the census and (c) a more timely release of the data collected.

(a) Improvement in coverage

7. Our experience with the 1970 and 1980 Censuses and other on-going sample surveys indicate that lessening the workload of the enumerator could improve census coverage. Table 1 shows the number of persons enumerated in the first and second stage of the 1970 and 1980 Censuses and the final results after adjustment for census under-enumeration obtained from the Post Enumeration Surveys (PES) of 1970 and 1980. In both the 1970 and 1980 Censuses, the listing and housing census schedules, which were much shorter than the full population census schedule, were completed in the first stage while the population census was conducted in the second stage.

Table 1: Population by region, Malaysia, 1970 and 1980

	<u>First Stage</u>		<u>Second Stage</u>		<u>Post-Enumeration Survey</u>	
	<u>1970</u>	<u>1980</u>	<u>1970</u>	<u>1980</u>	<u>1970</u>	<u>1980</u>
	(in thousands)					
Peninsular Malaysia	8929	11223	8810	10945	9182	11427
Sabah	N.A.	1007	654	956	N.A.	1011
Sarawak	N.A.	1295	976	1236	N.A.	1308
Malaysia	N.A.	13525	10439	13136	N.A.	13745

Note: N.A. denotes available.

8. From Table 1, it can be seen that the size of the enumerated population in the second stage is smaller than that in the first stage for both the 1970 and 1980 Censuses and that those in the first stage are nearer to the figures provided by the Post Enumeration Surveys. For example, for Malaysia as a whole, the second stage figure is only 96 per cent of the PES figure while the first stage figure is 98 per cent for 1980.

9. While the above results are consistent with general expectations, they, however, need to be used with some caution since they are not completely comparable. The reference periods for the two stages are different. The number of household members in the first stage was based on the number who stayed in the household the previous night while that for the second stage was based on the number who stayed in the household on census night, that is, the night of 10/11th June, 1980, which can be as far back as two weeks from the time of interview at the end of the second stage enumeration. These figures may have been affected by response errors arising from memory lapse. Moreover, the results of the second stage were obtained after the completion of the first stage

which may also be affected by the loss of interest of some of the enumerators. The lower figures obtained in the second stage could therefore be partly due to these factors in addition to the effect of a heavier workload.

10. Small-scale field tests on coverage are being done now to establish more clearly these relationships. In these studies, we have also experimented with new formats of questionnaires which provide due attention to groups such as babies, young adults and the very old which are known to have high under-enumeration rates.

(b) Reduction in cost

11. The current economic recession and the expected slow recovery will require a drastic reduction in the costs of holding the next census in Malaysia. There is therefore the need to collect some of the 1990 Census data on a sample basis. The major topics would be included in a short questionnaire which would be canvassed on a 100 per cent basis while the other census topics would be canvassed from a sample of the population. The use of sampling in the enumeration phase of a census can enlarge the scope of a census by canvassing most of the topics on a sample. In Malaysia, this is seen to be a means of maintaining the large number of topics covered in the census and also a means of reducing the workload of the census enumerator so that information of better quality and coverage can be collected. This approach would, of course, help to reduce the 1990 Census costs as well and lead to a more timely release of the 1990 Census information because of the expected sharp reduction in the volume of data that has to be processed.

Several points, however, will have to be considered when sampling is to be incorporated in the census undertaking. Firstly, the data collected on a sample basis may not be sufficiently precise to provide small area statistics. This is important because users rightly take the census as the main source of small area statistics. The final decision is likely to be based on a balance of the following considerations: (a) what data are needed at sub-national levels which cannot be provided with enough precision even from a fairly large sample, (b) what size of sample is feasible, (c) what types of data are required at higher levels and thus can be based on a sample and (d) the reduction in the cost of holding the census. In this context, the analysis of the types of census data required by users, as mentioned earlier, provides useful information for decision making in planning for the 1990 Census.

12. Another important consideration is the control of the selection of the sample to ensure that biases are not introduced. The approach of requiring census enumerators to pick a sample of households or living quarters within their enumeration blocks often suffers from selection biases. An alternative procedure would be to select whole enumeration blocks in the main office and arrange for these to be completely enumerated to avoid selection by enumerators. The disadvantage of this design is that it is less efficient than one involving a sample of living quarters or households since, with a given sample size, more enumeration blocks can be included in the first type. A third possibility is to have an independent sample selected in the main office which will be enumerated by

experienced staff of the Department after the main census, based on a short form, has been completed. However, the required sample size will necessitate the use of additional inexperienced staff.

13. From the experience of the last two censuses, it is apparent that the main component of the census cost is wages and salaries for field and office workers. For example, this cost amounted to 72 per cent of the total cost of the 1980 Census and wages paid to field enumerators were 50 per cent of the total cost. Based on results from preliminary studies, we find that if the approach of the 1980 Census based on 100 per cent enumeration were to be adopted, the 1990 Census could cost as much as M\$70 million which is M\$20 million more than the 1980 Census. Further, if a long and short form approach is adopted, a cost reduction in salaries and wages of M\$13.5 million or 27 per cent of this cost item could be achieved.

(c) Timely release of data

14. The timely release of data collected is also an important consideration in the planning of the next census. The use of a short and long form should, of course, contribute to more timely releases of data as processing time would be reduced because of the smaller volume. A sample tabulation based on the short forms could also be made to provide advanced information before the processing of all the short forms is completed.

15. The speeding up of the occupation and industry coding would also contribute greatly towards more timely releases of census data. We hope to achieve this by using pre-coded descriptions of industrial and occupation groups in the short form which will be canvassed on a 100 per cent basis. In addition, if this information is found to be consistent, they would provide good controls for the development of ratio estimates, particularly at the sub-national level, of detailed occupation and industry classifications obtained through office coding of detailed descriptions of occupations and information of establishments at which respondents are employed.
16. A particularly important issue on which the success of this approach depends is whether field enumerators can select the correct codes at the time of interview. Preliminary results from a 2 percent sample tape of the 1980 Census in which these two approaches were used indicate that the abbreviated approach does not produce information consistent with those obtained from the more elaborate approach. While the two types of data are not strictly comparable, one being for a long reference period of one year and the other is based on a short reference period of one week, this was found to be not the main factor. It is clear that further field tests are essential before a method of pre-coding of occupations and industrial sectors can be used in the next census.
17. Finally, as part of the plan to speed up data processing, particularly that of preliminary census counts, data processing of the 1990 Census is expected to be decentralised. This is a new direction for us since both the 1970 and 1980 Censuses data were centrally processed.

18. It is envisaged that part of the data processing for the 1990 Census will be done in the Department's regional centres in Peninsular Malaysia and in the two branch offices in the states of Sabah and Sarawak. While the types and extent of activities in data processing to be decentralised have yet to be decided, it is clear that data capture and tabulation of the preliminary census counts can usefully be done at the regional centres, especially if cheap micro-computers are capable of handling the expected workloads. A further step would include the validation and imputation of the data so that a clean tape or diskette from each regional centre can be sent to headquarters for further aggregation and tabulation.
19. Several advantages are likely to result from decentralising the data processing for the next census. More timely results, particularly preliminary census counts, can be expected to be released to users. In addition, transport, storage and office space rental problems arising from a centralised approach would be greatly reduced. We expect that decentralised processing and tabulation of census preliminary results at regional centres can improve overall census coverage if such tabulations at the enumeration block level could highlight blocks with unusually low population counts and lead to immediate rechecking on the ground. However, we realise that these benefits are likely to bring about an increase in processing costs and stretch the capabilities of our small group of experienced supervisory staff.

Department of Statistics,
Malaysia,
Kuala Lumpur.

January, 1987.

**PROBLEMS ENCOUNTERED IN THE 1980 CENSUS OF POPULATION
AND IMPROVEMENTS OVER THE 1970 CENSUS**

- Singapore -

**Mrs Leow Bee Geok
Department of Statistics
Singapore
January 1987**

Problems Encountered in 1980 Census and Improvements over 1970 Census

Singapore is a small tropical island of only 620 square kilometres. The population was 2,413,900 persons in June 1980 and 2,558,000 persons in June 1986. The first census of population after her independence was conducted in 1970 and the second census in 1980.

The 1980 Census of Population, Singapore canvassed 25 personal items and 2 housing items. The 16 basic personal items and 2 housing items were included in the main schedule collected from 100 per cent of the population and the 9 additional personal items were included in the sample enumeration schedule collected from 20 per cent of the population.

Problems Encountered

(a) NON-CONTACTS

The most common problem was "non-contact", that is, the existence of a household in a house was established but the enumerator could not contact any member of the household after several visits. Such households mainly consisted of young working couples and one-person households. To overcome the problem, a letter informing the households of the date and time of the enumerator's next visit and requesting someone to be present at the appointed time was issued. For unco-operative households which ignored the letter, the enumerator first checked with their neighbours on the times the householders were most likely to be at home and then visited them.

(b) NON-CO-OPERATION

The cases of non-co-operation were from persons who bore certain hostility towards the census. They were usually the better educated, among them were foreigners, who were obsessed with their

privacy. They often inappropriately treated the census as an intrusion on their privacy. They tended to be arrogant to the enumerators and usually questioned the legality of the census. All such cases were personally interviewed by the assistant superintendents of the census divisions concerned.

The assistant superintendents drew their attention to the relevant sections of the Census Act. The intervention of the assistant superintendents and the judicious mention of the penalties under the Census Act were effective in persuading them to comply.

(c) WORKSITE QUARTERS

Owing to the booming construction sector, there were many temporary or make-shift "dormitories" or worksite quarters in 1980. The difficulties in enumerating occupants of these quarters stemmed mainly from their fast turnover and the futility of trying to reach them in the day, apart from the physical hazard. In the case of smaller worksites, the quarters consisted of only a couple of small huts or even just some space in the partially erected building.

For the large construction sites, the enumeration of a large number of workers was undertaken with the help of the relevant authority in charge of the projects. The unaccompanied workers were interviewed in groups at the worksites while those accompanied by their families were enumerated at their own quarters together with their families.

(d) LANGUAGE

Language was not a problem in the enumeration of the local population. However, in census divisions where there were a concentration of non-English speaking expatriates, mainly Japanese, some language problems were encountered because the informants (usually

wives of expatriates) could only speak their own languages. The enumerator had to return in the evening to interview the head of the household who usually knew sufficient English to enable the enumeration to be completed. Otherwise, an enumerator who could speak the particular foreign language from another census division assisted in the enumeration.

(e) BOUNDARY IDENTIFICATION

Singapore is fortunate to have generally good census maps with well-defined and easily identified boundaries. However, in some areas where extensive redevelopment or slum clearance were carried out after the maps were completed, difficulties in identification of census district were encountered. For such cases, supervisors had to jointly survey the area to mutually agree on what are the houses that should be their responsibility.

(f) COMPLAINTS OF TOO FREQUENT VISITS

The census procedure was so planned that an enumerator must make at least three visits to the household, once at house and household numbering stage, another during preliminary enumeration and again during final enumeration. If the household was selected for post enumeration survey, a fourth visit was necessary. Generally, householders complained about this and wondered why all the information could not be collected in one visit. Much time had to be spent to explain the rationale. In future censuses, consideration would be given to amend the procedure to reduce to two visits for example, by combining house-household listing with preliminary enumeration.

(g) OTHER SURVEYS CONDUCTED AT THE SAME TIME

During the planning stage, the census planning committee decided that the annual labour force survey of the Ministry of Labour, covering about 5 per cent of the households, could continue as usual,

even though it coincided with the census. This was found to be a mistake as it caused confusion and irritation to householders. In future, such surveys could either be incorporated into the census or conducted after the census.

The census encountered some difficulties in relation to sensitive items like income from work, year of first marriage and number of children born alive. Answers to these items were obtained after much explanation, persuasion and assurances of confidentiality of information supplied. Some supplied such data in "Personal Reply Form" direct to census headquarters under confidential cover.

Enumerators also had difficulties obtaining details of occupation, industry and address of workplace from respondents who were mainly housewives. Anticipating this problem, census office supplied "Personal Reply Form" so that the person concerned could enter the details. Unfortunately, the answers were not sufficiently detailed for coding and further interviews with the person concerned was necessary.

Improvements over 1970 Census

(a) INTENSIVE CENTRALISED TRAINING

Intensive centralised training was undertaken for each of the three level of the field staff - assistant superintendents, supervisors and enumerators. Centralised training was to help achieve the objective of ensuring uniformity in understanding and in applying the concepts and procedures adopted. It also made more effective use of the specialized knowledge of the trainers. Besides lectures, role-play and mocked interview sessions were conducted to illustrate how questions should or should not be asked and to give simulated practices to the class in completing the enumeration schedules. Another improvement was the use of audio-visual aids to better explain and convey concepts and ideas and to break the monotony of lectures. Transparencies and

colour slides were used to show summaries, diagrams and illustrations such as the types of census houses. Specimen pre-taped (audio) interviews to demonstrate the line of questioning and the likely response were played. Elaborate preparations were made and much resources spent in the training of fieldstaff. Some six weeks were devoted to training more than 2,600 fieldforce.

(b) WELL-QUALIFIED ENUMERATORS

The 1980 census had the best ever qualified workforce with more than four-fifths of the enumerators possessing qualifications of GCE 'A' level or higher. Many of these were female pre-university II students who were having their long vacation while awaiting entry to universities. To encounter the problems of rapid turnover of enumerators and the relative shortage of male enumerators who were more suitable for deployment in the outlying areas, the Ministry of Defence was requested to release 500 national servicemen to work as enumerators. The success in recruiting a large number of well-qualified enumerators and maintaining a stable core of enumerators had greatly helped census office in its quest for quality in the data collected.

(c) STREAMLINED FIELD OPERATIONS

The duration of three weeks each for house numbering and preliminary enumeration adopted in 1970 census was shortened to one week for house numbering and three weeks for preliminary enumeration. Besides streamlining the operation of house-numbering and preliminary enumeration, a sufficiently large number of enumerators were recruited and trained both in numbering and enumeration at the outset. This helped to dovetail the two phases thereby reducing administrative work and allowing for better control and deployment of staff.

As the enumerators had been trained in both numbering and enumeration before commencing fieldwork, they could both number and enumerate householders who were difficult to contact or often not at home or those who informed that they would be away during the second

phase. This approach improved both operational efficiency and comprehensiveness in coverage.

(d) EXTENSIVE PUBLICITY PROGRAMME

To secure the willing co-operation of the population and to allay any apprehension, census office prepared an extensive programme to publicize the 1980 census both before and during the enumeration period. The publicity programme was designed to inform the public through all possible media of the whens, where's, how's, why's and what's of the census as well as the ways they could help in this important national undertaking. Publicity was channelled through the press and Singapore Broadcasting Corporation, colour slides with voice announcements were screened over television, spot announcements made over radio and Rediffusion, census posters were distributed and placed in prominent places, special article published in magazine "Our Home" which were distributed by Housing and Development Board (HDB) to all households living in HDB and Jurong Town Corporation flats. Other less common channels of publicity including imprinting a census message onto the franking dies of the cancelling machines for local mails by the Postal Services Department, a census slogan was inserted as an interlude between two consecutive time announcement at 15-second intervals by the Telecommunication Authority of Singapore's time announcing service, etc.

The comprehensive census publicity programme reached virtually all persons in Singapore. This had helped improve the quality of response and facilitate the conduct of the different phases of enumeration.

(e) THE CONDUCT OF POST ENUMERATION SURVEY (PES)

For the 1980 census, the PES was planned and carried out as an integral part of the exercise to assess the quality of the census data. In addition to evaluate the completeness of coverage and the reliability of information collected in the census, a topic of interest was incorporated into the PES for special study. The topic chosen was the language of the various mass media and their utilization by the public.

The FES covered a two per cent sample which was a sub-sample of the reticulated units selected for the sample enumeration. The PES schedule contain 15 personal items, consisting of 2 identification items, 8 items which were canvassed in the census and 5 additional items on languages of mass media. The same definitions and concepts were used for the items common to both census and PES. Fieldwork of the PES was carried out within a few days after final enumeration to minimise problems due to changes arising from births, deaths, and particularly, the shifting of households to different addresses.

The PES showed that the coverage of houses, households and persons in the census were very good, exceeding 99 per cent.

(f) RELEASE OF CENSUS RESULTS IN STAGES

In order to achieve timeliness in making available the results without unduly sacrificing comprehensiveness, census office decided to make periodic census releases on special topics as and when such results were ready. The census releases contained the more important statistical tables of each of the topics and some basic analysis together with concepts and definitions of the terms used. There were nine releases on demographic characteristics, education and literacy, economic characteristics, geographic distribution, houses and households, income and mode of transport, languages and dialects spoken at home and religion and fertility. The first release was published in December 1980 and the ninth in September 1981.

The early release of basic tables covering all topics of the census helped satisfy the demand for a wide range of up-to-date data. For more detailed and in-depth analyses of the census data, specialists and researchers in various fields were invited to write monographs on topics of their speciality. The specialists were mainly academicians and research workers in the field of demography, sociology, economics, manpower and other disciplines. The first monograph was published in February 1982 and the rest between 1983 and 1986.

Developments since 1980 Census

The records of all houses listed during the 1980 Census of Population were computerised and updated monthly to provide a Master List of Houses in Singapore. One of the main uses of the list is to provide a comprehensive sample frame for the selection of houses for household surveys. The Department of Statistics provides the service of selection of houses for sample surveys to interested users in both public and private sectors. There have been many users since the department began to provide the service from 1 Aug 84.

With the decentralised system of computerization adopted by the government, many government ministries had set up their own Computer Information Services Department to cater for their computerization needs. The Department of Computer Information Services under Ministry of Trade and Industry was set up for the purpose. It looks after the computerization need of the Department of Statistics and Ministry of Trade and Industry. A mainframe computer FACOM M360 was installed in 1984. As at end 1986 there were 63 workstations connected to the mainframe and 6 stand-alone micro-computers. Many statistical systems were developed or re-developed in the past 3-4 years. Statisticians and statistical officers who have the right aptitude were trained in computer programming and the use of computer software packages for editing, statistical tabulations, retrieval of data and graphic presentation of data.

With better computer facilities and more experienced programmers and system analysts, the data processing of the future census of population should be further improved. In view of the manpower and cost constraints, census taker has to look into other ways and means to reduce costs. We would explore more efficient methods of enumeration, coding, data entry and correction; acquire better computer software for editing and tabulation as well as look into computer assisted direct printing facilities to enable census results to be published as soon as possible.

MID-DECADE CENSUS IN FIJI*

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February, 1987

* Comments on the Paper are by the author and not necessarily reflect the view of the Government of Fiji.

MID DECADE CENSUS IN FIJI

Fiji has a history of successfully conducting decennial censuses over the past one hundred years but has never attempted to conduct one mid-decade census so far. The question that should be asked now is "Is it going to conduct one in the 1990's?" Pros and cons on conducting such a mid-decade census have to be weighed carefully before a decision is made on the issue. This paper, will therefore; first described a brief account of Fiji's past decennial censuses and then discuss the question on whether to conduct a mid-decade census in five years' time or not.

I HISTORY OF DECENNIAL CENSUS TAKING

Fiji's first population census was taken in 1881, seven years after the country was proclaimed a British Crown Colony. Since then, censuses were then taken every ten years until 1921. The depression prevailing in the 1920's postponed the next census until 1936. Following that census, the decennial pattern was resumed and the most recent census was conducted in 1986.

The growth of Fiji's population over the past one hundred years are as follows :

<u>CENSUS DATE</u>	<u>TOTAL POPULATION</u>	<u>ANNUAL RATE</u>
		<u>GROWTH</u> <u>(%)</u>
4th April, 1881	127,486	-
5th April, 1891	121,180	-0.5
31st March, 1901	120,124	-0.1
2nd April, 1911	139,541	1.5
24th April, 1921	157,266	1.2
26th April, 1936	198,379	1.6
2nd October, 1946	259,638	2.7
26th September, 1956	345,737	2.9
12th September, 1966	476,727	3.3
13th September, 1976	588,068	2.1
31th August, 1986	714,548	1.9

A note on the 1986 Census are as follows :

- . The census was the 11th in a series going back to 1881.
- . The timings :-

1985	Preliminary planning, budgetting etc.
6 January, 1986	Census Office established.
24 February	Pilot Census
31 August	Census Night
6 October	Preliminary results published
28 February	Data capture completed
31 March	First priority tables produced
14 April	Tables available to official users
1 June	First publications available.

So far, the work has run to time and it is expected that data capture will be completed two weeks ahead of schedule.

While it is too early to state conclusions as to the completeness of coverage and the quality of reporting, the following observations may be of general interest :

- a The census was de facto.
- b The count was conducted as a house to house canvass by enumerators and was everywhere complete within six days of census night.
- c The information was recorded on household forms bound in accountable pads.
- d Design considerations :

The main constraint was the extremely tight schedule for preparing the census.

Potential users in government and the private sector were consulted and made recommendations. As always, far more requests were received than could be accommodated in the census and many were unsuitable for inclusion in a survey of this kind.

The objectives of the census were defined as :

- to determine the number and distribution of the population,
- to determine the rates of fertility and mortality,
- to determine the nature and rate of internal migration,
- to obtain information on labour force and economic activity,
- to obtain basic information on housing and services.

It was apparent that while inter-censal sample surveys can to a large extent provide data and valid rates at national level, there is no substitute for the census as a source of information for smaller geographical units and for that part of the economically active population which cannot be reached through surveys of establishments, for those active in subsistence occupations, for the unemployed and for those not economically active. It is in just these areas that the demand was most pressing and the difficulty of definition was most intractable.

There was a clear need for some indication of the volume and direction of internal migration.

- e The geographical frame :

There was no time for elaborate mapping. Fortunately the 1976 frame was basically sound and the rural population is relatively stable in location.

The 1986 frame allows direct comparison with 1976 at the level of the enumeration area (approximately 100 households). This was done by adding an extra digit to the EA identifying codes so as to permit subdivision of EA's where necessary - mainly in peri-urban areas.

The definition 'urban' and 'rural' were maintained in order to keep direct comparability of urban population characteristics 1966, 1976, 1986 notwithstanding changes to municipal boundaries and the creation of Lami Town. If changes were shown to be necessary, they would be made after the enumeration on the basis of census results as to the proportion of non-agricultural occupation etc.

Field work was concentrated on urban and peri-urban areas where there had been rapid development. Base maps were those used in 1976, for there had been no significant new mapping undertaken since. There were no air photo mosaics up to date. There was some recent air photography from 1984/85. Enlargements were obtained, rough photo mosaics were compiled in the Census Office and were used in the field to re-establish 1976 boundaries and make viable sub-divisions where necessary. The staff who did this work subsequently briefed those responsible for the enumeration.

In rural areas, the scale 1:50,000 topographical base maps from 1976 were up-dated to show recent physical development - mainly rural roads - and over large EA's were either subdivided or staffed with extra enumerators.

f Migration :

The earlier practice of showing population movement in a province matrix was defective because it did not properly allow for urban-rural, rural-urban, and urban-urban movements to be considered. (Some urban areas extended over two provinces and some provinces had two or more urban areas). The province matrix was maintained to preserve comparability with past censuses and a more useful one was constructed. (The 1986 data will be plotted in both matrices).

g Labour force and economic characteristics :

This is not the place to rehearse the familiar difficulties associated with these topics. The solutions adopted are shown in the form of the questionnaire and in Instructions to Enumerators.

The pilot census demonstrated that to use the word 'unemployed' on the questionnaire was merely an invitation to enumerators to interpret the word in whatever way they wished, irrespective of what might be said during training or written in the manual. Similar preconceptions surround the word 'work' which is normally taken to mean 'cash employment.'

It was hoped that careful wording on the questionnaire, Manual instructions written in the simplest possible language, and careful training might have some effect in improving accuracy. Whether this was the case remains to be seen.

At the pilot census two questions were asked in order to allow classification of industry - a description of the business, industry or service and details of the employer. It was found that each was equally effective in permitting classification. The two questions were therefore merged in the form shown in the questionnaire.

The question on employment status was so framed as to avoid the term 'self employed' which was shown at the pilot census to be misinterpreted frequently.

While the working of the questions cannot yet be evaluated, it can be said that they did allow of classification by coders to the designed degree of precision (three-digit occupation and four-digit industry).

The practice of conducting the enumeration as a double round of visits, in use since 1956, was abandoned. It had been thought that a canvass before census night to record particulars of persons dwelling in a household and likely to be there on the night, followed by a quick round of visits after census night to bring the record up to date was efficient and productive of more accurate results than could be obtained otherwise. It is undeniably more expensive in manpower and time; it can never be shown to have cost/benefit advantages over a single round; and it is quite certain that an instruction to climb a hill twice will have been honoured in the breach as often as not, thus promoting errors in coverage. To accommodate the procedure it had been necessary in the past to extend school holidays in order that teachers, still an essential component of the enumerator force in rural areas, might complete the count. This could not be arranged in 1986 because of the many extra demands on school time in the third term.

The practice was abandoned at no discernible cost in terms of coverage - in fact the reverse is thought to have been the case.

A comparison of population by race and EA between 1976 and 1986 has shown nothing anomalous.

Savings in manpower have been considerable.

Data processing :

A clerical edit has been carried out as codes have been over written on the record. Codes have been input to a Digital VAX on-line to the Census Office.

Edit programmes have been written in COBOL, tabulation will be using SAS.

Following data capture, records are subjected to a structural edit designed to ensure they are sound (ie all batches have headers, households contain persons and so forth). Structural errors are corrected on line and no further processing is permitted until the data are structurally sound. At this stage unedited records are backed up as an archive. Records are then subject to a full edit procedure in accordance with pre-determined rules. Limited use is made of imputation.

It is intended that it should be easier to access the census data than has been the case in the past and that users wanting extra cross-tabulations can, with the authority of the Census Commissioner, be served in days rather than weeks or months.

Results and publication :

It is thought more important than ever before that result should be made available quickly.

Once the first priority output is produced and checked, official users will have access to the raw tables which will be reproduced ad hoc on a photocopier. Authorisation will be by the Census Commissioner.

Next, it is proposed to produce a number of volumes to meet special needs - those of the general user, those of the demographer, those of labour force analysts and economists, those of migration specialists, those requiring small area data, and those for popular use in the schools and so forth. These will be produced cheaply and fast on a Rank Xerox Model 9400.

With immediate requirements met, analysis and further publication can proceed at a more traditional pace.

On the evidence so far available, it seems clear that the objectives of the census will be met as planned and that first priority tables, catering for all likely needs, will be available within seven months of the census.

11 MID-DECADE CENSUS

Fiji has to decide soon whether to conduct a mid-decade census in 1991 and if so, in what format? In considering the question one must consider the followings :

- a) The demand for such information by users - especially from administrators and policy makers in the country.
- b) Whether those demands for information can be met from other means as apart from the mid-decade census.
- c) What are the operational costs and whether it is economical to conduct such mid-decade census.
- d) Timely releases of census results.

1) Demand for information by users

Fiji is a young developing nation and is going through its sixteenth year of Independence. The government had implemented five years' National Development Plan - current being the Nineth Development Plan for 1986 - 1990. Development programmes are designed to cater for the need of its growing population and, at the most, to utilise its available resources. The planning of such economic and social developments require adequate and current information on the economic and social characteristics of the population. Without base data, planning of any kind will not be achieved effectively.

Various ministries/departments of government and private institutions are more aware of the need and importance of timely and current information on population data for various purposes for the formulation of development plan. The mid-decade census therefore was favoured by the users of data who had always relied on the Census figures. It was felt that 10 years is a long interval of time.

Therefore, planning within the inter-censal years were usually based from rough estimation.

Presently, there have been some attempts by the Government for macro planning and development. The initial input information is usually obtained from the census. As the programme increases, there will be greater need for data base, therefore, mid decade census will provide timely and accurate information to meet this demand.

The existence of Vital registration system in Fiji needs to be evaluated for its quality and reliability. A census every five years will continuously check on its completeness and coverage thus allowing room for improvement and ultimately when this is achieved, it increases its utility. Moreover, it will provide a permanent, reliable and continuous source of demographic data.

Information gathered from mid decade census will help evaluate the effectiveness of some of the national programmes already adopted. Consequently, this will help the administrators to monitor further programmes depending on the outcome.

b) Meeting the demands from Users

Preparation of the Tenth Development Plan (1991-1995) will be carried out between 1989 and 1990 and the information from the 1986 Census of Population; with projections and estimates in some cases, will be still useful. The result of any mid-decade census in 1991 will not be available until early 1992.

As for the demand for information on the social and economic characteristics of population during inter-censal period, it was thought that most of these information could best be achieved by the development of data base at regional level. It is for information that the Bureau of Statistics is now in the process of developing its information systems to cater for regional (or district level) Statistics. Other information could also be available for the Annual Adhoc Household Survey on selected topics.

c) Cost of Census Operations

A census of population whether it be a mid-decade census or a decennial census is a national operation. Census taking is a very enormous task. Most of the countries conduct censuses at a decennial pattern because of its vast expense.

A mid decade census for Fiji depends largely on the resources. The cost of conducting a census is very great. Experience with the last two censuses conducted after Independence revealed that Fiji had always requested assistance for funds whether it be in the form of cash grant or funding of qualified officials to work on the Census. But one thing is obvious, Fiji has limited resources in the form of funds and manpower.

Before planning for the mid-decade census, one needs to examine whether data from the previous Census had been thoroughly utilised. It must be remembered that censuses are conducted with very great cost and if data is not fully used, then there is wastage of resources. It is the aim of the Census Office to encourage full utilisation of the 1986 Census data by ministries/departments as well as for other users.

d) Timely release of census results

Fiji has learnt from countries conducting mid-decade censuses that, in most cases, the results were not released and fully utilised when they have to start preparation of the next decennial census. In some cases, some countries continued to conduct censuses without their products being fully utilised or used by users.

III CONCLUSION

As evident from the paper, Fiji has a good history of conducting decennial censuses over the last one hundred years. It's intention is to continue in that regards for the near future. As for the mid-decade census in 1991, it is evident that demand for such information by users doesn't warrant the heavy burden on limited resources on the country. It is, therefore, the current thinking of the writer that a mid-decade census for Fiji in 1991 is not advisable.

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REPORT ON MID-DECADE CENSUS

INTRODUCTION

The 11th Australian Census of Population and Housing was held on 30 June 1986. The census forms were collected during July 1986 and information from them is currently being coded and entered onto computer records at the Data Transcription Centre in Sydney. This stage of data processing will be completed by July 1987. The first results of the census are expected to be released in late March 1987.

This paper discusses innovations for and problems experienced during the 1986 Census.

THE CENSUS FORM

There were a number of changes to topics covered in the 1986 Census form. For the first time, questions were included on each person's ancestry and on language other than English spoken at home; a new question on residents temporarily absent was also included to overcome problems in family statistics associated with the conduct of the census on an actual location basis; an additional question was included for those attending an educational institution; and there was a change to the question on relationship within a household, to allow statistics to be produced on 'blended' families and de facto relationships.

Overall, there was very little public criticism of the form. The areas of concern were that:

- . census questions on name and address were over-intrusive and unnecessary;
- . exclusion of stillbirths from the question on how many babies each woman had had caused distress to the parents of stillborn babies;
- . exclusion of a question on home duties caused persons undertaking these duties on a full-time basis to feel diminished;
- . The information provided was not confidential; and
- . the long standing government policy of destroying census forms after completion of data transcription would continue to apply.

FIELD SYSTEM

The 1986 Census included 2 of Australia's external territories - the Cocos (Keeling) Islands and Christmas Island. Previous censuses in these territories were conducted under the relevant statistics ordinances. While separate outputs will be produced

for these territories, the standard definition of Australia for statistical purposes will exclude them.

In previous censuses, the field system was largely controlled by the Australian Electoral Commission - another government department with regional offices all over Australia. Due to a disagreement with the unions involved, the ABS established in two States, an independent field system under its direct control. This system appeared to work at least as satisfactorily as the system based on the Australian Electoral Commission.

There is considerable user demand for accurate statistical data on Aborigines and Torres Strait Islanders, and for recent censuses the ABS has developed strategies to improve the methods of enumerating this section of the population. For the 1986 Census, improvements included increased emphasis on enumeration of urban Aborigines, including a special awareness campaign; greater involvement of Aboriginal people in the field system and better coordination of all aspects of the system.

The availability of 29,500 collector and group leader positions was first advertised on 1 March 1986. By 1 April 1986, 58,000 applications had been received, but in some areas insufficient applications were received to enable selection of suitable field staff. This problem was eventually remedied by personal contact recruiting, radio advertising, extra advertising and 'community

service' articles in local newspapers. While this did not cause major problems for the field system, it meant that in some areas recruitment was slower and more expensive than expected.

Proper training of the large number of temporary field staff was crucial to the success of the census. For the 1986 Census, training videos for collectors and group leaders were produced. Three thousand copies of the video were produced - one for each group leader. Each group leader trained about 10 collectors in a venue such as a school, near the area they would be working in. Video recorders were hired for use in venues which didn't have them.

In 1986, for the first time, household forms rather than personal forms were delivered to caravans and mobile homes in caravan parks, to allow family coding of people living in these parks.

A telephone enquiry service, known as the Census Hotline was for the first time available to people in country areas for the cost of a local call. A Telephone Interpreter Service operated on the same basis.

The availability of the Census Hotline was referred to on the census form and was prominent in the explanatory booklet delivered to every household. It was also constantly referred to

in newspaper, radio and television reports about the census and as a result, was very heavily used by the public and was a very positive aspect of census public relations.

The Hotline was available from the commencement of the form delivery phase and this created the problem of people ringing to complain that they hadn't received a form, before the collector had a chance to reach them. The fact that the delivery phase would take several days was widely advertised, but some people were still concerned that delivery to them had yet to occur.

The pay system for collectors was computerised for the 1986 Census. In previous censuses, Divisional Field Supervisors had been issued with a trust account and had arranged the payment of collectors. In 1986, payment was arranged through a commercial pay bureau. Divisional Field Supervisors prepared the computer input documents and pays were calculated, and cheques and group certificates were despatched by the pay bureau under the supervision of ABS officers.

The computerised system, while allowing greater control and providing more management information for planning purposes next census, was much slower than the former manual system. The greater delay in payment concerned many field staff, especially those who were usually unemployed, as they had lost or had reduced their social security benefits for the duration of their

employment as collectors. For these people, provision existed for interim payments, which partly alleviated the problem.

A decision was made in 1986 to proceed with prosecutions under the Census and Statistics Act 1905 in serious cases of refusal to supply a completed census form. A Notice of Direction to supply the form must first be issued, and if it is not complied with, prosecution can ensue. Ninety-six Notices of Direction have been approved for issue.

The security of census forms is a continuing problem. While every effort is made to ensure that forms are secure at all times, in 1986 some forms were misplaced, which resulted in adverse media coverage.

The public is becoming increasingly concerned about household security. It was sometimes difficult for collectors to gain entry to security buildings, which are now quite prevalent. Also, a number of collectors were bitten by dogs. Another matter arising from increased public concern about security is establishing the bona fides of applicants for collector positions and their suitability for the job.

The Geographic Data Base (GDB) is an internal ABS computer file which contains information about each collection district (CD).

It encompasses all geographic information used for census output purposes, together with selected person and dwelling characteristics.

For the 1986 Census, mapping provided a relatively quick and simple method of validating the information stored on this very important computer file. Every code was mapped, and the maps were checked for irregularities - for example a CD mapped away from a cluster. Any incorrect codes found in this way would then be amended.

INPUT PROCESSING

Australia produces estimates of the resident population which are different from the census counts. The estimated resident population at 30 June 1986 is based on the census count adjusted for underenumeration at the census and Australian residents temporarily overseas.

'Preliminary processing' of the 1981 Census was carried out for the timely revision of population estimates. This involved extracting preliminary data on age, sex, marital status and state of usual residence. As part of a general cutback on government expenditure, this process was not carried out in 1986. As a result, population estimates based on the results of the 1986 Census will not be available until September 1987, (6 months

later than would be the case if preliminary processing had been carried out) although estimates based on the 1981 Census counts will continue to be produced in the meantime.

For the 1986 Census, a new classification developed by the ABS and the Department of Employment and Industrial Relations, called the 'Australian Standard Classification of Occupations' (ASCO), is being used to code responses to census questions on occupation. The ASCO replaces the 'Classification and Classified List of Occupations' (CCLO) used in previous censuses.

The ASCO is a set of skill-oriented occupational categories organised in hierarchically linked levels designed to be as homogeneous as possible, and contains 8 major groups, 52 minor groups and 337 unit groups.

To aid comparison of occupation data between censuses, a quantitative link between ASCO and CCLO will be produced. A 5% sample of responses to the 1986 Census question on occupation is being coded to both ASCO and CCLO classifications.

Computer assisted coding is being used to code responses to the occupation questions to the ASCO. This method of coding enables savings to be made in time and the number of staff needed, and allows for a high degree of consistency of coding with a complex classification.

In recent censuses, coded data were clerically transferred to special documents read by Optical Mark Reading (OMR) machines. For the 1986 Census, however, coded data are being entered by keyboard operators directly to computer disk and transferred by a communication link to the ABS's central computer.

At the 1986 Data Transcription Centre (DTC) the flow control of packs of census forms through the Centre has been automated by the use of bar code readers. This allows immediate updating of the location of packs, and more accurate records of the movement of packs can be kept.

There have been some innovations in staffing at the 1986 DTC, such as the appointment of an Industrial Relations Officer, and the provision of training in supervision and industrial relations for permanent ABS officers located at the DTC.

Many things can affect the efficiency of processing at the DTC, such as staff attrition, coding delays and computer problems. The excellent training opportunities afforded by the DTC can be a problem because many staff, once trained leave to take up permanent employment.

The normal problems of achieving a satisfactory rate of coding were faced. Factors affecting the rates, such as the complexity of the task; unsatisfactory reference material eg incomplete street indexes, and the level of checking maintained to ensure the quality of the data needed to be constantly assessed.

Problems have also arisen in achieving a satisfactory key entry rate. In part, this may have arisen from job design factors. In an effort to minimise the health problems that can be caused by using a keyboard all day, most of the keyboard operators spent half of each day at the keyboard and the other half in one of the clerical coding areas.

Some computer problems only become apparent when the system was in full use, and correcting the faults and amending any affected data was a time consuming exercise.

OUTPUT PROCESSING

A new classification is being used for coding geographic areas for the 1986 Census. The Australian Standard Geographical Classification (ASGC) is an hierarchically structured classification used for the identification and classification of geographic areas. Each geographic area in the classification is identified by a unique numeric code. The ASGC has been adopted as the standard geographic classification for ABS output. This

will ensure greater comparability of statistics within the ABS and a standardisation of terminology.

In September 1986 the '1986 Census Dictionary' was released. It is a basic reference for the 1986 Census of Population and Housing, providing users of census data with definitions of concepts and terminology used in the census.

A greater range of data on a usual residence basis will be produced from the 1986 Census. This is possible because although Australian population censuses are conducted on an actual location basis, people enumerated at a residence other than their usual residence are coded to the Statistical Local Area of their usual residence.

As a result of changes to the relationship question, and the additional question on usual residents temporarily absent, a major revision of family coding was undertaken and consequently, a greater range of data on families will be produced from the 1986 Census.

To accommodate user needs there will be an increase, compared with 1981, in the amount of statistical data released in printed form, particularly for a range of thematic publications containing data for local government areas.

EVALUATION

As in previous censuses, the Post Enumeration Survey, together with demographic analysis, will be used to assess census coverage of the general population.

Coverage of the Aboriginal population will be evaluated by a special evaluation study based on a post censal survey undertaken in a similar manner to the Post Enumeration Survey. A wide range of data from other sources will also be used. Other evaluation studies on ethnicity, family and education data are being undertaken.

COST

The taking of the 1986 Census required \$A64 million to be added to the ongoing budget of the ABS over a number of years and was thus a significant element in the total ABS budget. The full cost would be much higher if account were to be taken of the cost of permanent ABS staff and associated overheads, not to mention the cost to respondents in filling in the forms.

The ABS budget, along with that of other Government agencies, for the 1986 Census was subjected to close scrutiny and increasing

scrutiny in the future is anticipated as constraints on Government expenditure continue.

As part of the development phase for the next Australian Census, several means to contain expenditure are being investigated, including changes to collection methods, but major cost reductions can only be achieved by reduced census content or reduced frequency of censuses.

**EAST-WEST
POPULATION INSTITUTE**

**ELEVENTH POPULATION CENSUS CONFERENCE
AUSTRALIA**

February 9-13, 1987

**Processing the 1986 Census of
Population and Dwellings
in New Zealand**

**Population Census Division,
Department of Statistics,
Private Bag,
Christchurch,
NEW ZEALAND.**

January 1987

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INTRODUCTION

The processing system used for the 1986 New Zealand Census of Population and Dwellings has altered dramatically from those used to process previous Censuses. The system involves an initial clerical processing phase to ensure questionnaires are in a format suitable for key to disk capture, followed by an automated coding and editing phase (CAC/edit).

The 1986 Census processing system replaced the clerically intensive method used for the last two Population Censuses (1976 and 1981) which involved the transcription of codes onto machine readable forms which were then processed using an optical character reader (OCR).

The new system has a number of significant advantages over the previous processing systems. It is more efficient as the questionnaires are used as data input documents. Significant reductions in processing staff are possible. (A 50 percent reduction in numbers was possible for 1986 Census). This has also resulted in savings in the accommodation required to house the processing centre. The more efficient processing system also allows the more timely production of output.

As the same computer files of codes and descriptions are used throughout the operation, consistency of coding is improved. The coding files are also easily and uniformly updated while transcription errors are eliminated with the use of the CAC/edit system.

OPERATION OF THE PROCESSING SYSTEM

Completed Census questionnaires are used as data input documents for the 1986 Census processing. Questionnaire design, therefore, focused on ensuring that the question formats were suitable both for data capture and respondent coding, (i.e. - by ticking the appropriate answer box or writing a numerical or descriptive answer in the panel provided).

(a) Pre-capture processing

Following the receipt of the questionnaires and associated documents at the processing centre, the pre-capture processing phase commenced. This involved checking that each dwelling had the correct number of personal questionnaires and ensured that responses were in a format suitable for later processing. Questions such as "Relationship to Occupier" and "Temporary Absentees" were manually coded at this stage as they could not be easily actioned during later processing.

Pre-capture processing commenced on 19 March 1986 and was completed on 27 August 1986. Some 67 person years were required to process the questionnaires, with the peak number of staff (189) being employed in May 1986.

(b) Data capture

The questionnaires were then captured using INFOREX key-to-disk equipment. Only the codes alongside ticked boxes and numeric responses were keyed at this stage.

A group of 48 punch operators were employed to complete the data capture (4.4 million records) in a period of six months. After an initial training period, work commenced on data capture in mid-April 1986 and was completed by October. It is estimated that 23% of the key depressions were verified and that the operators achieved an average of 7,600 key depressions per hour. The overall punch error rate was estimated at 2,500 key depressions per error (i.e. 0.04 percent). This compares with Census planning estimates of 25% verification level and 8,000 key depressions per hour.

The quantity of work completed was dependent upon the level of verification. This in turn was dependent upon the experience of the punch operators. All new operators had their initial work fully verified. The verification levels were adjusted depending on the quality of the work punched and the production targets.

Two methods are available on the Inforex data capture equipment for checking the quality of data capture.

- Firstly a limited set of range checks was programmed. Only 6 of the 43 fields could be checked in this manner.
- Secondly the data was verified. This involved punching the complete batch a second time. Any difference between the data was automatically noted and the differences reconciled.

The level of verification was altered by reducing the number of fields to be checked. It was not possible to verify only a sample of records within a batch.

Four different levels of verification were used during the data capture process. The levels, expressed in number of fields and percentage of key depressions, were:

Full verification	(all fields,	100% kd)
Partial verification	(11 fields,	50% kd)
Minimum verification	(6 fields,	40% kd)
Nil verification	(batch identifier,	0.1% kd)

In addition to the above, a series of seven independent checks were carried out on the data. These normally involved about 2,000 records which were punched a second time (unverified) and compared with the corresponding production data.

After seven weeks of production some operators who were achieving an acceptable level of quality (and quantity) were started on partial verification. With production below target, minimum verification was introduced two weeks later. This remained the major check, along with full verification for new operators, for the next five weeks when it was replaced by nil verification.

The operation was completed in 28 weeks. It is estimated that 15% of the records were fully verified, 5% partially verified, 10% minimum verified and 70% nil verified.

(c) Preliminary Processing

Tapes from data capture are loaded to the Census Processing computer. Out of range values were flagged, missing age, sex and hours worked data imputed, and the data reformatted for CAC/edit processing. This preliminary data was also used to produce a limited range of provisional output.

(d) CAC/edit system

CAC/edit processing commences by loading the editing parameters and reading the first dwelling record for the batch of work. Each field of this record is checked by the program to see if it requires actioning. Coding is required for out of range values, where an other specify option has been ticked and for descriptive responses or by-passed fields.

Where an action is required the operator is presented with an appropriate display to either enter a description, select from a 'short code list' or specify a numeric value.

For descriptive answers the operator keys in the information from the questionnaire. Each word entered is used as a key to access a dictionary file and any exact matches are stored. If no exact match is found for a word then it is truncated one letter at a time from the right until a match is obtained. After all entered words have been processed, the matched entries are scanned to find the most frequently occurring references. These references are used to retrieve from the code file and display the descriptions and codes containing the largest number of matched words. The operator selects the appropriate displayed response by placing the cursor next to it and pressing enter. If no suitable description is presented, the answer can be re-worded and entered again or the question by-passed for later referencing. Selected codes are automatically transferred to the data record.

For questions that have relatively few codes, "short" code lists are displayed on screen, showing all the codes and descriptions applicable to the question. The operator selects one of the descriptions by cursor placement. When numeric values are entered by the operator, they are validated and transferred to the data record.

When every field in the record has been coded the inter-field edit checks are carried out. Edit parameter instructions are used to check relationships between the fields and determine the field(s) most likely to be in error. All fields involved in failed edits are displayed so the operator can select those needing correction. The procedure for correcting a question in error is the same as for coding. Editing is repeated until the record is error free or by-passed.

Each record in the batch is processed in a similar way until all records are correctly coded and edited. At this point a separate program is used to carry out the inter-record edit checks and produce a computer listing of any households requiring correction. Again corrections are actioned using the CAC/edit system until both the inter-field and inter-record edits are all cleared. The batch of data is then available for quality control and output processing.

Although the processing system proceeds automatically through each record, prompting the operator when a coding or editing action is required, it does possess some flexibility of operation.

At any stage it is possible to by-pass a field, or a complete record, if it is necessary to manually refer to alternative reference material to obtain a solution which can be input during the next on-line session.

At any stage during processing it is possible to access a screen display of the code values allocated to each field of a record. It is also possible to access the coding screen applicable to any particular question through this display. The CAC/edit processing system also allows the operator to move to selected records as desired.

During processing the operator can expand any industry, country of birth, ethnic origin, religion or tertiary qualifications code so that they can observe all the descriptions applicable to that code. For occupation a description of tasks is also available. Failed Edit numbers can also be 'expanded' to display a full description of the failed edit as it was specified.

One operator can load a number of batches of work and access any of these as required. Batches are automatically transferred when completed.

Early planning scheduled the start of CAC on 14 April 1986, which allowed for 6 weeks training of the operators. It was intended that processing would be completed by 26 April 1987 (i.e. 52 working weeks).

Hardware and punching problems delayed the start of CAC until 28 April 1986; at 30 January some 69% of questionnaires had been achieved, and it is estimated that CAC will be completed in mid-May 1987.

Information on the throughput rate and error rate of operators is shown in the technical appendix and the graphs following.

(e) Quality Control

A quality control scheme was developed in order to provide feedback to CAC/edit operators regarding the standard of their performance and also to provide management with necessary data to plan and take action for both 1986 and future Censuses.

The quality control system is largely dependent on the CAC/edit system for the information which it provides. The initial data is obtained from a comparative analysis of a batch of work, processed once by the CAC/edit operator and then again totally independently by a quality control operator. The two files containing the same batch of work are then matched against each other and a listing of all inconsistencies is produced. This listing is subsequently checked independently by a third person, known as a verifier. All errors are recorded by subject matter field for both the CAC/edit operator and the quality control operator. The batch is recalled from the output file and all errors are returned to the CAC/edit operator to correct. To date approximately 5% of all records processed by CAC/edit operators have been subjected to this independent quality control check.

The quality control system is written in SAS (Statistical Analysis System) software and incorporates data from the CAC/edit system as well as the internal accounting system of the IBM computer being used to process the Census. This information is contained within a SAS database which produces the following information on request:-

- error rate per CAC/edit operator per work batch, per month and year to date.
- overall error rate for all CAC/edit operators per month and year to date.
- throughput rate per CAC/edit operator per month and year to date.
- throughput rate for all CAC/edit operators per month and year to date.
- all the above for quality control operators.
- consistency rates per subject matter field for year to date.
- error rates per subject matter field per operator for year to date.
- vague coding rates per subject matter field, per operator, per month and year to date.
- not specified coding rates per subject matter field, per operator, per month and year to date.
- frequency of edit failure and percentage of each edit to total edit failings.
- logon time per session, per month and year to date for each CAC/edit operator and quality control operator.
- CPU time session, per month and year to date for each CAC/edit operator and quality control operator.
- cost per session, per month and year to date for each CAC/edit operator and quality control operator.

Ultimately the data will provide an estimate of the overall quality of each subject matter field and the total cost of processing each record. (Refer to the technical appendix for further details.)

Conclusion

Following the success of the CAC/edit system it is planned to adopt this method of processing for the next Census to be held in 1991. Prior to the 1991 Census, the CAC/edit system will be evaluated and any modifications incorporated and tested. All reference files will be updated to make them as comprehensive as possible. Further enhancements to improve efficiency include the incorporation of a facility whereby direct matches are accepted without the need for the operator to select a code, and the automatic editing and correction of certain pre-specified conditions.

TECHNICAL APPENDIX

1. Hardware

CPU	IBM 4361/4
MIPS	1.0
Main store	12 mb
Disk store	7 x 3370/2 In two strings 5,100 mb
Tape units	2 x 3420
Printer	1 x 4245 2,000 lpm
CAC VDUs	30 x telex 028

2 Software

Operating system	IBM VM/SP REL 3.1 CMS
Language	COBOL
Screen management	IBM/DMS

The CAC/edit system comprises a main program and two sub-modules containing a total of 7,623 lines of code. In addition to this, separate programs are used to perform the inter-record editing, update the control system and build the reference files.

3. File Creation

Two direct access (VSAM) reference files are created; a code file and a dictionary file.

The code file contains for each Census question all the descriptions associated with each valid code. It is essentially the information which is displayed to the CAC/edit operator.

The dictionary file is derived from the codes and descriptions in the code file and contains relevant descriptive words with a reference to the parent code and description entry.

Several programs are used to set up these files depending on the data being loaded. The Address and Workplace questions require additional set up processes to format the data for efficient processing.

The inter-field edits are also specified via a formatted screen, validated and stored as parameters in a file. This enables the edits to be modified without requiring changes to the CAC/edit system.

<u>File</u>	<u>Number of Records</u>	<u>Bytes/Record</u>
Code	572,997	79
Dictionary	915,062	31
Edit	3,500 (approx.)	9

The total space required for all reference files used is 74 mb.

<u>Question</u>	<u>Consistency Achieved (%)</u>
Usual Residential Address	99.0
Address 5 Years Ago	96.5
Birthplace	99.9
Ethnic Origin	99.8
Religion	99.2
Highest Tertiary Qualification	97.2
Occupation	81.4
Industry	90.6
Economic Sector	95.0
Workplace Address	88.1

<u>CAC Response Time (seconds)</u>	<u>Number of Responses</u>
0 - 1.9	90.20
2 - 4.9	6.54
5 - 9.9	1.96
10 - 14.9	0.55
15 and over	0.75

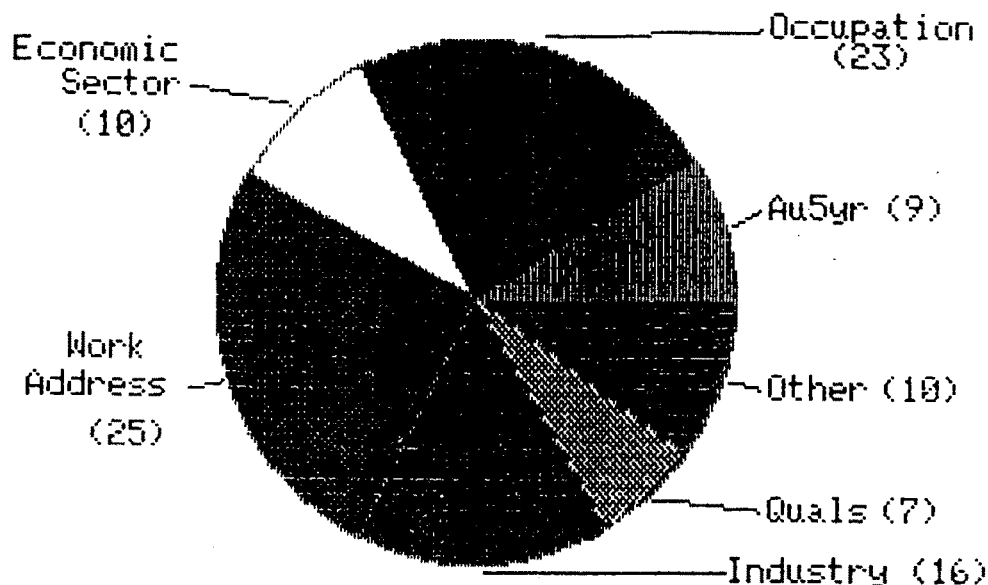
Performance of CAC/edit Operators

	<u>Minimum</u>	<u>Maximum</u>	<u>Average</u>
Error Rate (Percent)	0.38	1.89	0.81
Throughput Rate (records per hour)	23.19	147.17	54.27

Performance of Quality Control Operators

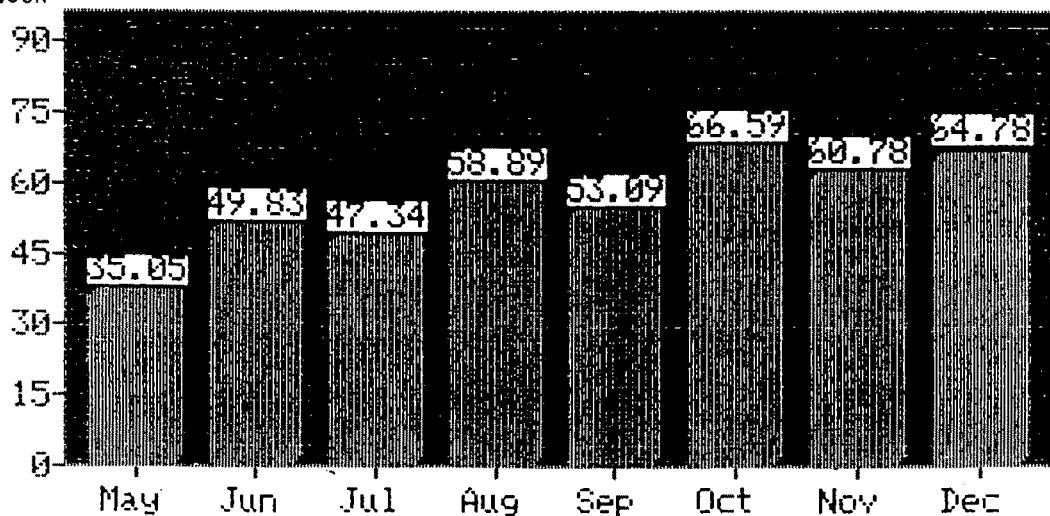
	<u>Minimum</u>	<u>Maximum</u>	<u>Average</u>
Error Rate (Percent)	0.26	0.57	0.40
Throughput Rate (records per hour)	23.47	51.77	39.87

CAC/EDIT OPERATOR ERRORS PERCENT OF ERRORS BY FIELD



Records per
Hour

CAC/EDIT THROUGHPUT RATES



■ RATES

THE 1986 CENSUS OF CANADA: CURRENT STATUS REPORT

by Statistics Canada

1. The Census in Canada has a long tradition, beginning in 1666. Regular decennial censuses were instituted in 1871, to meet the requirements of the British North America Act under which Canada was created. This Act assigned "census and statistics" as a responsibility of the federal government, and provided for census data to be used to determine the number of provincial distribution of seats in the federal House of Commons. Recently these requirements were retained in the country's new Constitution Act. Quinquennial censuses of three western provinces were introduced under the terms of union when these provinces entered Confederation in 1905 and in 1956 these quinquennial censuses became national in scope. National quinquennial censuses are a statutory requirement since 1971.
2. The Census of Canada is a "de jure" census rather than a "de facto" census. Foreign residents are excluded from census counts.

Content

3. The Canadian census is conducted as a household survey. Information with respect to all members of the private household and the dwelling are collected on a single schedule. Not all questions are collected on the basis of a complete enumeration. In the 1986 Census, only nine of the total of thirty-two questions were put to the entire population, the remaining twenty-three questions being put to a one-fifth sample of all households, except in the Canadian north. There, in view of the sparse

population, a complete enumeration was carried out using the long questionnaire in order to obtain reliable small area data for this region. Complete enumeration was also used on the Indian Reserves as a measure to improve the quality of the information on those reserves.

4. Previous quinquennial censuses were much more limited in scope than the 1986 Census. They were used mainly to update the basic set of population characteristics and to provide labour force data on small geographical areas. In contrast, the 1986 census was almost as comprehensive as the 1981 census. The short form included questions related to name, sex, age, marital status, relationship to other household members, mother tongue, aboriginal status and home ownership. The short form was a bilingual form in English and French. In addition to the questions asked on the short form, the long form included questions related to housing, place of birth, citizenship, ethnic origin, languages spoken, disability, education, migration, employment and income. Due to its size, the long form was unilingual but delivered in the respondent's preferred official language, either French or English. Three questions were asked for the first time in a Canadian census: aboriginal status, disability and field of specialization in education. The question on disability was a screen question used to identify a sample frame for a more comprehensive post-censal disability survey.

Collection

5. Canada employs self-enumeration as its principal method of data collection. Over 98% of the country's population was covered using self-enumeration in 1986 with the remainder, mostly in institutions and remote northern areas, being canvassed by enumerators. The self-administered questionnaires were distributed in one of two ways. A method known as "drop-off/mail-back" was used for the 70% of the population located in large urban centres. In small urban and rural areas a "drop-off/pick-up" method was employed. This latter method was adopted to facilitate the collection of the Census of Agriculture forms, as Canada conducts both censuses at the same time.

6. The Enumeration Area - the area covered by a single enumerator - forms the basic building block from which data are aggregated and tabulated. For the 1986 Census, a temporary workforce of approximately 44,000 individuals was hired to enumerate the over 9 million households. Each enumerator was assigned one or more Enumeration Areas, of which over 44,000 were defined. Due to the unique problems involved in enumeration of collective dwellings (e.g. hospitals, prisons, nursing homes, hotels, etc.) special enumerators were employed for this purpose. Sample questions were not asked in institutional collective dwellings (e.g. hospitals, jails, orphanages, etc.).

7. In deciding to conduct the full-scale 1986 census that for a period had been cancelled, the Government asked Statistics Canada to achieve substantial savings from the original approved budget of about \$150 millions. Those savings were achieved through several means such as: (i) making use of \$30 million of funds earmarked for youth employment programs to create some 25,000 temporary Census jobs for students and unemployed young people; (ii) reducing planned expenditures on the Census by nearly \$10 million (achieved via a slight reduction in content, increased operational risk including the elimination of a \$2 million paid advertising program, and a reduction of data evaluation and extent of preplanned products.); and (iii) increasing revenues from the sale of statistical census products and services to \$10 million. Efficiency gains and increased revenues from the sale of statistical products and services in other Statistics Canada programs, over a five year period, are to provide the remaining \$50 million.

8. Notwithstanding the above-mentioned financial restrictions, the collection phase of the Census was performed on time and within budget. More than 85% of the respondents who were asked to return their questionnaires by mail did so without a need for follow-up by the enumerators. In 1981, this rate was 90% and in 1976, 80%. By June 30, we had in our possession more than 98% of the expected forms. The month of July and part of August were used to collect the information from the remaining respondents.

9. In spite of a special program to encourage our aboriginal respondents to actively participate in the Census, some 90 Indian bands out of a total of some 600, decided that their members living on Reserves should boycott the Census. The population missed on those Reserves is estimated at about 42,000. Statistics Canada is still, through a number of avenues, trying to enlist the collaboration of these bands, but it will not be possible to enumerate them before final census results are published.

10. Aside from this specific problem, very few people fail and to comply with the legal requirement to complete the Census questionnaire. We are now in the process of following up for the last time a remaining few hundred cases. Legal action is expected to be initiated in a small number of cases.

Processing

11. For 1986, all questionnaires for completed Enumeration Areas were initially shipped to one of six Regional Offices for processing, together with maps used in collection and Visitation Records completed by the enumerators. In the Regional Offices, quality checks were performed for each Enumeration Area. Geographic and other (e.g. industry/occupation) written responses requiring coding were manually coded and documents were prepared for data entry. In addition to these activities, Regional Offices carried out a special study (known as the reverse record check) used in

the estimation of Census undercoverage.

12. As in 1981, to improve efficiency and reduce total costs, Statistics Canada and Revenue Canada-Taxation, the federal department responsible for the collection of income tax, agreed to share space and facilities for regional office processing and data capture, after provision had been made to assure the confidentiality of census records.

13. Key-Entry was the method used to convert the data into machine-readable form. This method was selected both in 1981 and 1986 due to the lower costs resulting from the utilization of the existing space and facilities of Revenue Canada. As at every other stage of processing quality checks were implemented to ensure a high quality of data entry. On completion of data entry, records were transmitted to Revenue Canada-Taxation's computer facilities in Ottawa where they were transferred to magnetic tape and delivered to Statistics Canada's Head Office Processing operation.

14. Head office processing is the third and final stage of data processing. This stage of processing receives three inputs from the field: Visitation Records (summary lists of dwellings and households enumerated for each Enumeration Area), data tapes and

questionnaires for each Enumeration Area. Receipt of these items is registered using an automated control system which ensures that no stage of processing was overlooked. If errors are found corrections are made on the documents and the data base. Data tapes are also checked for errors.

15. After the three inputs have been registered and corrections made, the data tapes are submitted for analysis. Data analysis includes structural edits for document and household types, the reconciliation of document and household counts, the processing of "outside Canada" questionnaires and the processing of data for individuals away from their usual place of residence on Census Day. Adjustments are made to the data to reflect temporary residents not enumerated at their usual place of residence, persons outside Canada not indicating a usual place of residence, and persons missed due to dwellings incorrectly listed as unoccupied as determined by a post-enumeration check of a sample of such dwellings. These adjustments are made through a process of random additions.

16. All those processing activities have now been completed except for the adjustments. They were completed at a lower cost than anticipated, due mainly to a stable work force, efficient systems and computing facilities and increased productivity over 1981 performance.

17. January 22, 1987 saw the release of the preliminary population counts which are in fact the final counts minus the adjustments yet to be calculated and the population counted "outside Canada". These adjustments and additions account for less than 2% of the total population. The final counts are expected to be published early in April.

Data Quality

18. Three major data quality studies are currently underway: The Reverse Record Check (a measure of the coverage of the population), the Vacancy Check (a verification of the dwellings classified as unoccupied used to make one of the adjustment to the data), and a new post-censal evaluation study of coverage and response errors known as the Overcoverage Check. Further studies are planned, including estimation of response rates, imputation rates and sampling errors. As for the 1981 Census, there will be a formal certification of each universe and variable prior to release.

19. To date, a number of data quality problems have come to light. First, preliminary results from the new aboriginal question (Question 7) indicated implausibly high numbers of Inuit persons. A small scale follow-up of Inuit responses confirmed that many respondents had trouble understanding the aboriginal status question, and incorrectly identified themselves as Inuit. A further pilot follow-up study is underway to assess the magnitude

of the problem for other aboriginal groups, and to determine whether or not an adjustment is necessary or feasible to correct response errors. It is noteworthy that budget constraints did not permit a thorough testing of this question prior its inclusion on the Census.

20. A second problem is a high degree of non-response to the Enumerator completed question on type of dwelling. Not surprisingly, the missing responses are highly clustered, with over one hundred enumeration areas having no type of dwelling data, and over two thousand enumeration areas with more than 10% missing. Further investigation is planned to determine the impact of this problem and to develop solutions. Again, type of dwelling was one of the questions affected by last minute changes to census content and procedures.

21. Finally, a comparison of interim population counts with demographic estimates suggests that undercoverage may be higher than in previous censuses. At this stage, however, results from the Reverse Record Check are not available, and it will be several months before we will be able to assess accurately the degree of underenumeration. The undercoverage rate in 1981 was estimated at 2.01%.

Plans

22. The coming year will see the completion of a large number of activities related to the 1986 Census, starting with the release of the final counts at all standard geographical levels in April.

23. Meanwhile, the data are being processed through an automated edit and imputation system: a system designed to impute non-response data and detect and correct inconsistent data.

24. The processing of the 100% data through this system has already started and should be completed by June so that the release of the basic set of characteristics can take place in July. The systems in place to process and retrieve the data are such that the information becomes available for all geographical areas at the same time.

25. The processing of the sample data through the edit and imputation phase will start early summer and will proceed at a steady pace to allow the release of the sample data by April 1988.

26. Of course, work on the data quality studies will be completed to provide an overall assessment of the quality of the 1986 Census.

Conclusion

27. As seen in this brief report, Statistics Canada has met its objectives in collecting and processing the 1986 Census.

However, the next two years still represent a major challenge as Census staff complete the processing and produce the output from the 1986 program and deal with the necessity of devoting more and more scarce resources to the planning and design of the next census planned for 1991.

6. 1990年代 各國의 人口센서스計劃

Post 1980 Census Activities and Planning
for the 1990 Census in Malaysia

Department of Statistics,
Malaysia,
Kuala Lumpur.

January, 1987.

Post 1980 Census Activities and Planning
for the 1990 Census in Malaysia

Summary

1980 Census data:

1. The 1980 Census data have been widely disseminated. In addition, analysis of some of the data has been undertaken to provide further insights into the weaknesses in the data and ways of further improving their better collection. It was found that users mostly requested simple cross-tabulations and frequency counts of key variables. The greatest demand was for data at sub-national level.

2. The programme of analysis of the 1980 Census data is drawing to a close with the completion of six major projects: (a) the revision of the intercensal population estimates from 1970-80, (b) the estimation of district fertility rates using the 1970 and 1980 Census data which forms part of a regional study initiated by ESCAP, (c) the development of life cycle profiles which forms part of an international project organized by the Development Centre of the OECD and the Institute of Development Studies at the University of Sussex, (d) preparation of new life tables for 1970 and 1980, (e) development of consistent estimates of levels and trends of fertility and mortality in Sabah and Sarawak, and (f) the preparation of population and housing projections as major inputs to the formulation of the Fifth Malaysia Plan 1986-90.

Towards the 1990 Census - Planning and Strategy

3. Three major themes frequently recur in our discussions of the 1990 Census programme. These are: (a) improvement in the coverage, (b) reduction in cost, and (c) more timely release of data.
4. To assist in the further improvement of the coverage, small-scale field tests are currently being undertaken to establish more clearly the observed relationships among the various stages of the census results. New formats of questionnaires are also being experimented.
5. The main approach being considered to further reduce cost of the census is the wider application of sampling methods, both at the collecting and processing stages.
6. Towards more timely release of census data, besides the proposed adoption of wider sampling applications, decentralized processing is being planned for the first time. It is envisaged that the ready access to micro-computers and electronic scanning devices would greatly facilitate the achievement of decentralized processing.

Post 1980 Census activities and planning
for the 1990 Census in Malaysia

Introduction

1. Malaysia has a fairly long history of census taking, the earliest census being held in 1750 in one of the states. The first census covering the whole of Peninsular Malaysia was, however, conducted in 1911, while the states of Sabah and Sarawak had their first census in 1901 and 1939 respectively. The 1980 Census is the second Malaysian-wide census, the first being held in 1970.
2. The details of the 1970 and 1980 Censuses are published in Cho and Hearn (1984)¹ and it is sufficient to mention that in many respects the two censuses are very similar. For example, both used a de facto approach and the census questions were all canvassed and processed on a 100 percent basis. Even the same computer editing and tabulating software was used.

Analysis of the 1980 Census data

3. While dissemination of the census data to users in both public and private sectors formed a large part of our programme after the completion of the main census work, we are also very conscious of the need for our statisticians to use and to analyse the census data themselves. It is only in this way that weaknesses in the data can be revealed and insights into ways of collecting better data can be developed. For example, analysis of the types of data required by users after the

¹ Cho, Lee-Jay and R.L. Hearn, 1984 Censuses of Asia and the Pacific, 1980 Round, East-West Population Institute, East-West Center, Honolulu.

1980 Census revealed that simple cross-tabulations and frequency counts of key variables were mostly required. In addition, the greatest demand was for data at the sub-national level, including special regions earmarked for various government projects. This points to the possibility of reducing the number of complex tabulations as well as the number of census topics but more sub-national level tabulations will need to be prepared in the next census.

4. The programme of analysis of the 1980 Census data is coming to a close with the completion of 6 major projects. These include: (a) the revision of the intercensal population estimates from 1970-80, (b) the estimation of district fertility rates using the 1970 and 1980 Census data which forms part of a regional study initiated by ESCAP, (c) the development of life cycle profiles which forms part of an international project organised by the Development Centre of the OECD and the Institute of Development Studies at the University of Sussex, (d) preparation of new life tables for 1970 and 1980, (e) development of consistent estimates of levels and trends of fertility and mortality in Sabah and Sarawak where such information from the vital registration system is of poor quality and, lastly, (f) the preparation of population and housing projections which have been of considerable importance in the formulation of the Fifth Malaysia Plan, 1986-90.

Towards the 1990 Census - Planning and Strategy.

5. Like many other census organisations around the world, discussion and work within the Department of Statistics in Malaysia have increasingly been focussed on the planning of the 1990 Census. It was therefore very timely that ESCAP organised a regional group meeting of 25 member and associate countries of the Asian region at the end of 1986 to discuss key issues pertaining to the conduct of the next round of censuses. A second meeting to be organised for the countries of the Pacific region is scheduled for mid-1987.

6. Three main themes recur frequently in our discussions of the 1990 Census programme. These are: (a) improvement in the coverage of the next census, (b) reduction in the cost of holding the census and (c) a more timely release of the data collected.

(a) Improvement in coverage

7. Our experience with the 1970 and 1980 Censuses and other on-going sample surveys indicate that lessening the workload of the enumerator could improve census coverage. Table 1 shows the number of persons enumerated in the first and second stage of the 1970 and 1980 Censuses and the final results after adjustment for census under-enumeration obtained from the Post Enumeration Surveys (PES) of 1970 and 1980. In both the 1970 and 1980 Censuses, the listing and housing census schedules, which were much shorter than the full population census schedule, were completed in the first stage while the population census was conducted in the second stage.

Table 1: Population by region, Malaysia, 1970 and 1980

	<u>First Stage</u>		<u>Second Stage</u>		<u>Post-Enumeration Surve</u>	
	<u>1970</u>	<u>1980</u>	<u>1970</u>	<u>1980</u>	<u>1970</u>	<u>1980</u>
	(in thousands)					
Peninsular Malaysia	8929	11223	8810	10945	9182	11427
Sabah	N.A.	1007	654	956	N.A.	1011
Sarawak	N.A.	1295	976	1236	N.A.	1308
Malaysia	N.A.	13525	10439	13136	N.A.	13745

Note: N.A. denotes available.

8. From Table 1, it can be seen that the size of the enumerated population in the second stage is smaller than that in the first stage for both the 1970 and 1980 Censuses and that those in the first stage are nearer to the figures provided by the Post Enumeration Surveys. For example, for Malaysia as a whole, the second stage figure is only 96 per cent of the PES figure while the first stage figure is 98 per cent for 1980.
9. While the above results are consistent with general expectations, they, however, need to be used with some caution since they are not completely comparable. The reference periods for the two stages are different. The number of household members in the first stage was based on the number who stayed in the household the previous night while that for the second stage was based on the number who stayed in the household on census night, that is, the night of 10/11th June, 1980, which can be as far back as two weeks from the time of interview at the end of the second stage enumeration. These figures may have been affected by response errors arising from memory lapse. Moreover, the results of the second stage were obtained after the completion of the first stage

which may also be affected by the loss of interest of some of the enumerators. The lower figures obtained in the second stage could therefore be partly due to these factors in addition to the effect of a heavier workload.

10. Small-scale field tests on coverage are being done now to establish more clearly these relationships. In these studies, we have also experimented with new formats of questionnaires which provide due attention to groups such as babies, young adults and the very old which are known to have high under-enumeration rates.

(b) Reduction in cost

11. The current economic recession and the expected slow recovery will require a drastic reduction in the costs of holding the next census in Malaysia. There is therefore the need to collect some of the 1990 Census data on a sample basis. The major topics would be included in a short questionnaire which would be canvassed on a 100 per cent basis while the other census topics would be canvassed from a sample of the population. The use of sampling in the enumeration phase of a census can enlarge the scope of a census by canvassing most of the topics on a sample. In Malaysia, this is seen to be a means of maintaining the large number of topics covered in the census and also a means of reducing the workload of the census enumerator so that information of better quality and coverage can be collected. This approach would, of course, help to reduce the 1990 Census costs as well and lead to a more timely release of the 1990 Census information because of the expected sharp reduction in the volume of data that has to be processed.

Several points, however, will have to be considered when sampling is to be incorporated in the census undertaking. Firstly, the data collected on a sample basis may not be sufficiently precise to provide small area statistics. This is important because users rightly take the census as the main source of small area statistics. The final decision is likely to be based on a balance of the following considerations: (a) what data are needed at sub-national levels which cannot be provided with enough precision even from a fairly large sample, (b) what size of sample is feasible, (c) what types of data are required at higher levels and thus can be based on a sample and (d) the reduction in the cost of holding the census. In this context, the analysis of the types of census data required by users, as mentioned earlier, provides useful information for decision making in planning for the 1990 Census.

12. Another important consideration is the control of the selection of the sample to ensure that biases are not introduced. The approach of requiring census enumerators to pick a sample of households or living quarters within their enumeration blocks often suffers from selection biases. An alternative procedure would be to select whole enumeration blocks in the main office and arrange for these to be completely enumerated to avoid selection by enumerators. The disadvantage of this design is that it is less efficient than one involving a sample of living quarters or households since, with a given sample size, more enumeration blocks can be included in the first type. A third possibility is to have an independent sample selected in the main office which will be enumerated by

experienced staff of the Department after the main census, based on a short form, has been completed. However, the required sample size will necessitate the use of additional inexperienced staff.

13. From the experience of the last two censuses, it is apparent that the main component of the census cost is wages and salaries for field and office workers. For example, this cost amounted to 72 per cent of the total cost of the 1980 Census and wages paid to field enumerators were 50 per cent of the total cost. Based on results from preliminary studies, we find that if the approach of the 1980 Census based on 100 per cent enumeration were to be adopted, the 1990 Census could cost as much as M\$70 million which is M\$20 million more than the 1980 Census. Further, if a long and short form approach is adopted, a cost reduction in salaries and wages of M\$13.5 million or 27 per cent of this cost item could be achieved.

(c) Timely release of data

14. The timely release of data collected is also an important consideration in the planning of the next census. The use of a short and long form should, of course, contribute to more timely releases of data as processing time would be reduced because of the smaller volume. A sample tabulation based on the short forms could also be made to provide advanced information before the processing of all the short forms is completed.

15. The speeding up of the occupation and industry coding would also contribute greatly towards more timely releases of census data. We hope to achieve this by using pre-coded descriptions of industrial and occupation groups in the short form which will be canvassed on a 100 per cent basis. In addition, if this information is found to be consistent, they would provide good controls for the development of ratio estimates, particularly at the sub-national level, of detailed occupation and industry classifications obtained through office coding of detailed descriptions of occupations and information of establishments at which respondents are employed.
16. A particularly important issue on which the success of this approach depends is whether field enumerators can select the correct codes at the time of interview. Preliminary results from a 2 percent sample tape of the 1980 Census in which these two approaches were used indicate that the abbreviated approach does not produce information consistent with those obtained from the more elaborate approach. While the two types of data are not strictly comparable, one being for a long reference period of one year and the other is based on a short reference period of one week, this was found to be not the main factor. It is clear that further field tests are essential before a method of pre-coding of occupations and industrial sectors can be used in the next census.
17. Finally, as part of the plan to speed up data processing, particularly that of preliminary census counts, data processing of the 1990 Census is expected to be decentralised. This is a new direction for us since both the 1970 and 1980 Censuses data were centrally processed.

18. It is envisaged that part of the data processing for the 1990 Census will be done in the Department's regional centres in Peninsular Malaysia and in the two branch offices in the states of Sabah and Sarawak. While the types and extent of activities in data processing to be decentralised have yet to be decided, it is clear that data capture and tabulation of the preliminary census counts can usefully be done at the regional centres, especially if cheap micro-computers are capable of handling the expected workloads. A further step would include the validation and imputation of the data so that a clean tape or diskette from each regional centre can be sent to headquarters for further aggregation and tabulation.

19. Several advantages are likely to result from decentralising the data processing for the next census. More timely results, particularly preliminary census counts, can be expected to be released to users. In addition, transport, storage and office space rental problems arising from a centralised approach would be greatly reduced. We expect that decentralised processing and tabulation of census preliminary results at regional centres can improve overall census coverage if such tabulations at the enumeration block level could highlight blocks with unusually low population counts and lead to immediate rechecking on the ground. However, we realise that these benefits are likely to bring about an increase in processing costs and stretch the capabilities of our small group of experienced supervisory staff.

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PLANNING CONSIDERATIONS FOR THE NEXT POPULATION
AND HOUSING CENSUS OF PAKISTAN

By

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PLANNING CONSIDERATIONS FOR THE NEXT POPULATION AND
HOUSING CENSUS OF PAKISTAN

The objective of a population & housing census is generally stated to be to provide the required population & housing data with reasonable accuracy within the provided funds and available time. It thus requires ascertaining data requirement of all types of users whether in government or the public. The scope of data in terms of topics and their details is increasing day by day. A sincere effort is made to meet the data requirement of all types of users. But it is usually a trade-off between what the users want and what a population census office can provide with its resources and to the extent and reliability the required data is made available by the respondents. Therefore, unless sufficient funds, required expertise, technology & material resources are available, the needs of all administrators, planners, evaluation experts and researchers cannot be met. Another most important factor is the type and quality of enumerators if interview method is adopted.

Planning for the next population and housing censuses in Pakistan has been started with the review of the census legislation. It is thus quite pre-mature to give an outline of the whole census plan and innovations proposed to be carried out in the next censuses. It is likely to be on the pattern of 1990-91 Housing and Population Censuses with necessary improvements to overcome the shortfalls observed in these censuses and lessons learnt from the census experiences of other countries. The UN and ESCAP recommendation for the 1990 round of population and housing censuses and the recommendations emerging from this conference will be given due consideration keeping in view the Pakistan's own requirements and resources to be made available for these censuses.

Separate or Combined Housing & Population Censuses

The first issue which is likely to enage the attention of the census planners will be concerned with conduct of separate population and housing censuses or their combination and dates of their enumeration periods. In the last census the housing census was carried out in the first fortnight of December, 1980 which was followed by the population census in the first fortnight of March, 1981.

The population censuses before the 1981 Population Census had been preceded by an exercise of household listing primarily because of the inadequacy of proper maps and absence of control lists of living quarters for census enumeration purpose. Subsequently the scope of indepent household listing was extended to that of a housing census, which was conducted separately before the population census.

It was initially planned to conduct the housing census at least six months in advance of the population census, so that its household listing could be used as sampling frame for the sample count of the subsequent population census and for necessary revision of the housing census delineation work for the purpose of the population census. But unfortunately the housing census was delayed and was conducted only three months in advance of the population census, which did not permit revision of the housing census delineation work though found necessary but the list of census enumeration blocks was used as sampling frame for the population census.

Conducting of the housing census and population census separately was found to be not only expensive but difficult to

manage within a period of three months and further to elicit the same response and cooperation from respondents and work zeal and enthusiasm from enumerators. In the next census, therefore, the possibility of a combined housing & population census will necessarily be examined. But it pre-supposes availability of well delineated census areas with their adequate description to assist the enumerators in locating and identifying each and every living quarter. The assistance of the local administration authorities will be sought in this regard. A lot of efforts will, however, be required for preparing the maps of delineated enumeration areas with adequate details. In case this exercise does not mature, the housing census may have to be conducted separately but quite well in advance of the population census, so as also to provide the necessary sampling frame for the agriculture census of Pakistan which is conducted on sample basis.

Census Enumeration Period

While considering the question of separate or combined population and housing censuses, the choice of enumeration period in both the cases will eventually be considered. The choice of the enumeration period is determined primarily keeping in view movement of population, availability of enumerators and their supervisory staff, weather conditions, etc. at the time of census enumeration, beside absence of any nation-wide activity such as elections, etc., normalcy of period, administrative convenience, etc. at that time. In Pakistan the censuses have been conducted during some fortnight in the first quarter of the year primarily with the consideration that this period is dry and rather slack from economic activity viewpoint in rural area and the rural population, which constitute 70% of total population is available

at their homes for census enumeration. But it has always presented the problem of coverage of snow-bound and extremely cold areas at that time. In the last census, mostly school teachers were used. Their availability during this period poses some problems since it coincides with the period of annual examinations. Thus if the present practice of utilising school teachers is to be followed or the proposal of using high school students is considered, the period of any fortnight during the first quarter of the year may not suit them. Better period under this situation could be the short spell of winter-vacation during the second fortnight of December except for snow-bound and extremely cold areas. Keeping in view the other considerations of the least movement of population and moderate weather conditions, the month of April or September may also be considered. The disadvantage of the present period of enumeration also relates to the question of measurement of economic activity, since this is a slack period of employment so far as the rural population is concerned.

In case it is decided to conduct separate housing and population censuses, it would be desirable to conduct the housing census sufficiently in advance of the population census in order to utilise their results as sampling frame for the population census and the agricultural census and to review the housing census delineation work, if need be. If due consideration is given to selection of proper period for enumeration in case of population census, the housing census may be conducted exactly one year in advance, alternately in the first week of September, if the earlier enumeration period of the population census is followed.

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Use of Sampling in Enumeration

The next issue which may be considered in planning the next census is expected to be the use of sampling for enumeration purposes. In the 1981 Population Census use of sampling for enumeration was made and two census questionnaires were introduced for this purpose. A large questionnaire was canvassed in respect of sample population comprising ten per cent of the total population and a short one for the remaining population. The short questionnaire included the topics of sex, age, marital status, religion & educational attainment and the long questionnaire all topics of the short questionnaire plus topics of field of education, place of previous residence and duration of residence at the present place, employment & its status, occupation and economic activity, children born alive, surviving and born during the past year & disability. This procedure was adopted to increase the reliability of the additional topics in the long questionnaire which were considered comparatively difficult-to-enumerate and also to reduce the burden of questions on ninety per cent of the population. It was provided that for canvassing the long questionnaire better qualified enumerators will be used who would be given exhaustive and intensive training for this purpose and would also be closely supervised, but in practice it could not be implemented completely and the desired results remained elusive. The issue of use of sampling for enumeration may have to be re-examined and complete enumeration of all topics may have to be resorted to particularly because of the need of small area statistics for local planning & administrative purposes. Alternately, the topics of the complete and sample count questionnaires may have to be reviewed for necessary changes.

In case of separate housing census use of sampling in enumeration is likely to be considered for rural areas and a few urban localities where there is not expected to be much variability in housing characteristics.

Enumeration Staff

The quality of enumeration, among other things, is dependent upon the type of staff used for enumeration, their training and supervision, though the ability and willingness of the respondents to provide the requested information is of equal importance. In Pakistan, teachers and local government officials of the concerned area are used as enumerators. It was found difficult to create sufficient interest and devotion in enumerators for carrying out the census work because of various reasons. First, they are required to carry out the census work in addition to their own job which carries some prestige at the local level as compared to the enumeration work where they are required to solicit information by visiting households. Secondly, the honoraria they get for census work is hardly enough to provide the required incentive to them. Thirdly, the census job is required to be done in addition to their own duties though for census work they are relieved of their normal duties except of urgent nature, but it requires extra hours of work and sometimes personal inconvenience. This is the gravest problem of the census which has to be resolved but there is not an easy solution to it. There is no other field force than the teachers and local government official except the students who could be utilised for census enumeration work. Employment of high school students for this work has also some problems particularly when annual examinations mostly take place around the census enumeration period. Under the circumstances the only choice is

to pay the enumerators quite handsomely, for which a huge amount will have to be requested.

Various manuals for supervisory staff, trainers and enumerators were prepared in the last census Use of college lecturers and high school teachers for training paid some dividend but the situation demands more effort in this regard. Training material of self-study type may be proposed to be prepared to improve the situation but preparation of such material would not be an easy task.

Census Questions

The quality of data emerging from the last census was found to be lacking particularly on age, economic activity, children born alive and surviving.

Since the quality of data on ages is very important for both administrative purposes and demographic research, the question on age will require thorough review to provide the required quality data. Particular attention will be given to proper reporting of ages of infants, children below 5 years and avoidance of reporting of ages around 0 & 5 and even numbers. The month and year of birth alongwith age on last birthday and asking of age in months in case of infants will be considered for inclusion beside provision of probing and verification for this purpose.

In the last census the usual activity status approach was used because of the seasonality aspect in employment. But unfortunately this approach failed to capture the economic activity of females and to some extent of rural population meaningfully.

There were only four questions for measurement of economic activity population, namely,

- i) what does he/she do,
- ii) what is his/her main job, profession, trade or what kind/type of work does he/she usually do,
- iii) what is the activity of organization or business in which he/she works, and
- iv) what is his/her working status or capacity in which working?

Though the census questionnaire does not permit including many questions because of the cost, limitation of questionnaire space and heavy burden of coding and processing yet it is possible that more questions may have to be asked to improve the quality of the economic activity data irrespective of the fact whether current or usual activity status approach is used. The concept of earner is likely to be introduced in this regard.

The quality of data on migration which was canvassed on sample basis was considered to be on sufficiently reasonable quality, though it lacked in comparison with data available from other sources. There were only two questions on migration, namely,

- i) for how many years is he/she living continuously in this district and
- ii) in case of migrants, the district in Pakistan with urban or rural indication or country where he/she was last living before migrating.

There were no questions on place of birth and place of residence at a fixed date in the past. Though it is argued that place of residence at a fixed date in the past is less complicated for obtaining time-oriented migration data yet it will have to be examined before inclusion. However, the data on place of birth is likely to be considered for inclusion, irrespective of the custom of mothers going

to their parents' place for birth particularly of the first child and occurrence of births in hospitals in places other than the usual place of residence of the mother. In such cases the possibility of rephrasing the birth place question will be considered.

No question on nationality was asked in the last census because of the insignificant number of foreigners in the country. But it created the problem of comparability of census tabulation with the previous censuses. In the previous censuses all tabulations were made in respect of Pakistanis only and there were only one or two tables for foreigners. It is thus possible that the question on nationality may be included again.

The quality of data on disability was far from satisfactory because of the well known problems of collection of this data through censuses. It is, therefore, likely to be dropped in the next census unless the pressure for its inclusion mounts high.

The quality of data on children born alive and surviving was not satisfactory because of the problem of recall lapse and likely omission of children dying during their infancy. The quality of data on children born alive during the last one year was all the more poor. However, because of the importance of these data in demographic analysis, these questions will be introduced again but with the required modifications.

Census Tabulation & Publications

For expediting the tabulation of census results the possibility of using optical mark reader (OMR) type of census questionnaire was examined but it was dropped primarily because of their printing problems within the country and the anticipated apprehension of damaging of census questionnaires by dust and dampness and their

crumpling while handling and transmitting these. Though the system of decentralized data entry through micro-computers will also be considered the possibility of introduction of OMR questionnaires will also be taken into account.

It has been felt that the census data needs to be disseminated extensively. Unless it is done so, the required feed-back in the form of criticism & other requirement of data may not be forthcoming, without which no meaningful improvement in the census can be effected. The statistical tables produced during the last census were quite adequate but not quite suited to the direct requirements of data analysis for demographic and economic research. The work on analysis of census data has recently been started by the population census office, as it also leads to knowing the limitations of data in terms of its quality & quantity, which help in improving the future censuses. The scope of census tabulations & consequently of the census publications is, therefore, expected to be enlarged in the next census.

Planning for the 1991 Census of Population in Nepal:
Some Reflections

1. Conducting a census of population successfully is always a difficult proposition even in best of circumstances. This is more so in Nepal, where its unique geographic, socio-economic and political conditions have largely defined the nature and scope of any large-scale statistical undertaking including the census.
2. Most of the difficulties in a census of population in Nepal, stem from the principles of "universality" and "simultaneity" of a census. These principles make it absolutely necessary to employ a large number of people to carry out the operation simultaneously through out the length and breadth of the country most of which is not easily accessible. This simple need of the census organization to employ unusually large number of people once every ten years, leads to several problems of varying complexities.
3. Though planning for the 1991 census of population has not yet started, certain ideas for its improvements have been discussed with the principle users of census data. I wish to present in this report one very important aspect of those reflections about the upcoming census in Nepal.
4. Traditionally censuses in Nepal had relied upon an existing pool of land revenue agents variously known as

the "Zamindars", the "Patwaries", the "Tharies" and the "Mukhiyas", spread all over the country for obtaining the requisite number of skilled enumerators for the census task. These agents formed a very important link between the census organization and the village people, and to a certain extent, were made responsible for the accuracy and timeliness of the census counts in their respective areas. Through their cooperation and hard work, census field work used to be completed on time and reasonably accurately at least in terms of the total number and the sex composition of the population. But the abolishment of the "Zamindari System", as a measure of Land Reform, has since created a situation which from the standpoint of the census, has not been congenial. The lack of a well defined group of local functionaries as the revenue agents of the past, has really affected the quality of the field work of subsequent censuses.

The introduction of the Panchayat System of Government in 1961 has created a network of Village Panchayats and various class-organizations the membership which reaches the very grass root levels. The main objective of the several thousand members of these organizations is to provide leadership at the local levels for various development activities and social change. This pool of dedicated representatives of the local people can provide tremendous resource in terms of energetic manpower for

undertaking any kind of community development work. The recently promulgated Decentralization Act 2039 (1983 A.D.), has given new dimensions to local development problems. The village and district panchayats are now made responsible for formulating, implementing and evaluating village and district development plans in synchronization with the national periodic plans. This has created and is likely to create unprecedented demands for more and more up-to-date informations on various aspects of the socio-economic conditions of the people not only at the national level but also at small area levels.

6. It is in this changed context of greater demand for specialized and up-to-date informations at local levels, pertinent questions are now being raised whether any statistical organization, howsoever equipped it might be, would be able to cater to these increasing demands effectively ? Whether statistical organizations like it or not, most of the statistics, in future, particularly those that are most relevant to local area development planning, are going to be collected, processed and analysed not at one central statistical organization but at several small centres where such statistics can be meaningfully collected and utilized for the purpose for which they are collected. Statistical organizations must be able to realize these changed contexts in which they have to operate and must adapt their roles accordingly. Hence, it is asked whether

would it not be advisable and efficient to entrust the responsibility for carrying out the field work of the upcoming census of 1991 to the Village and Town Panchayats by providing them with all other necessary support and guidance from the statistical office ? By doing so, it is argued, that census could solve a chronic problem of having to use barely literate and adhoc personnel for completing the most crucial of all census activities, i.e. the actual enumeration.

7. Beside the obvious problem of asking elected and honorary representatives of the people to perform essentially an executive function like the census taking, what are other objections that could possibly be raised against this proposition ? It is, after all, for the use of these very people that census data is collected in the first place.
8. While such a policy decision as fundamental as taking away the responsibility for field work of the census from a technical and bureaucratic organization like the statistical office and entrusting this to an organization like the Panchayat, which is basically a political and administrative unit, might entail several unenvisaged difficulties. It could safely be argued, however, that lowered quality of the collected data would not be one those unenvisaged problems. On the contrary, such arrangement would at least ensure a permanent institutional framework for one of the most important of all statistical activities that a nation undertakes every ten years.

EAST-WEST POPULATION

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ELEVENTH POPULATION CENSUS

CONFERENCE

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MID-DECADE CENSUS

IN NEW ZEALAND

Population Census Division
Department of Statistics
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NEW ZEALAND

January 1987

A number of significant operational changes were introduced for the 1986 Census of Population and Dwellings in New Zealand. This country report reviews these changes which include the full management and conduct of the field data collection process by the Department of Statistics (formerly undertaken by the New Zealand Post Office), the enhancement of the questionnaire development process and the utilisation of recent advancements in computer technology to process the Census.

A brief summary of the Quality Control procedures developed for the field and subsequent processing operations is also provided, together with information on the Post-Census Evaluation programme. This series of checks has been undertaken in order to assess data consistency and coverage as a formal post-enumeration survey was not undertaken.

An outline of the problems faced and methods used in the enumeration of minority groups in new Zealand, emphasises the importance of good publicity and liaison with such groups.

The report concludes with a short review of the plans for 1991 Census in New Zealand which include enhancements to the computer-assisted coding and editing system (direct file matching, automatic editing), a review of the Statistics Act, revision of the Industrial and Occupational classifications, a study of data capture options and a review of technology and software available for the design of questionnaires.

1. INTRODUCTION

The 28th New Zealand Census of Population and Dwellings was taken on 4 March 1986. A total of 3,307,084 population and 1,095,748 occupied dwellings were enumerated, an increase of 131,347 (4.1 percent) persons and 83,866 (8.4 percent) dwellings over the previous five-year period.

A decision by government that departmental expenditure - including the Population Census - must be reduced in real terms, resulted in an extensive review of census procedures and methods being undertaken during 1982.

A number of project teams were set up to review current working methods, including aspects such as resources and timeliness and to research alternative methods of performing the relevant operations.

Topics covered included Questionnaire Design, Pilot Testing, Data Capture, Coding, Editing and Imputation, Sampling, Table Specification and Production, Output Dissemination, Mapping, Enumeration, Post Enumeration Surveys and Quality Control. The recommendations of these reports were used in the preparation of the "Plan for the 1986 Census of Population and Dwellings".

A number of significant operational changes were introduced for the 1986 Census including:

- the full management and conduct by the department of the field data collection process,
- a major enhancement of the questionnaire development process,
- the utilisation of recent advancements in computer technology, in the processing of the Census.

This report now reviews each of these aspects in more detail.

2. FIELD DATA COLLECTION

The management of the field enumeration process by staff of the Department of Statistics was a major operational change after many decades of assistance from the New Zealand Post Office.

From 1916 to 1981 the field enumeration was conducted by the Post Office. In recent censuses, however, staff delegated to these duties were also required to undertake their normal Post Office duties. This resulted in much of the census work being undertaken outside of normal working hours. Access to the field staff for management and training was also difficult.

The decision by the Department of Statistics to undertake the field data collection exercise required the setting up of a temporary management structure.

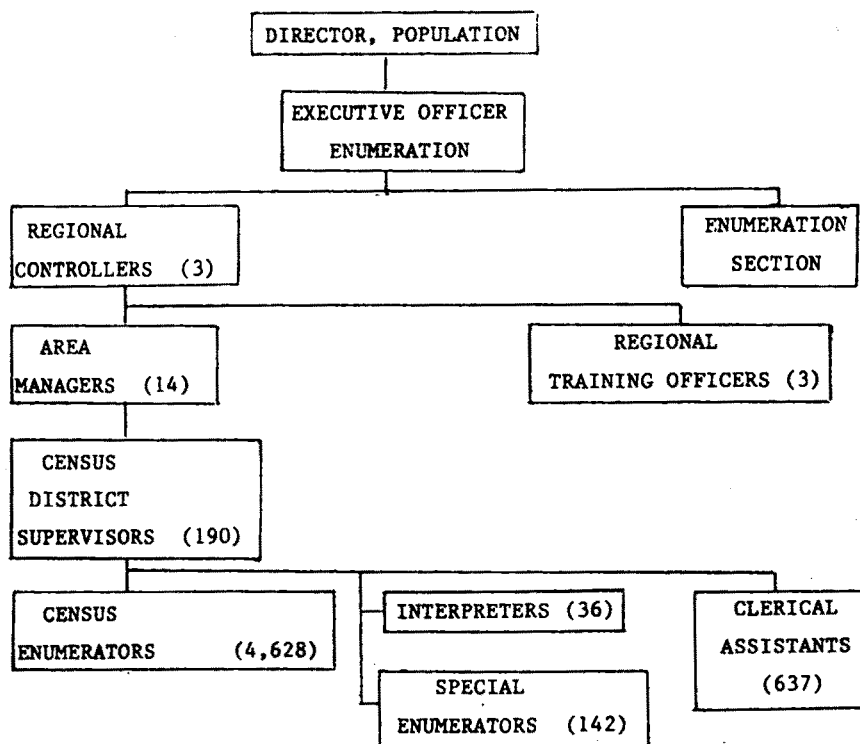
Seven additional positions were created in this temporary organisation, including 3 Regional Controllers reporting to the Executive Officer (a permanent officer of the department). The function of Regional Controllers was to oversee and control the census in their region. They were each responsible for 3 or 4 Area Managers.

The role of the Area Manager was also changed. It was no longer simply one of liaison with Post Office staff - rather it was one of actual management. One additional Area Manager position was created, taking the number of positions to 14.

The change in the management of the census also enabled a reduction in the number of District Supervisors. Whilst 276 such positions were required in 1981, the employment of full-time staff resulted in the need for only 190 positions at 1986.

The success of the field work of the Census was vitally dependent on the effective training of these staff. Three Regional Training Officers who would conduct courses for District Supervisors, and who would provide training packages and describe techniques by which District Supervisors could train their Enumerators, were also employed. The special training packages included the use of videos and covered all aspects of the Census. Detailed instructional manuals were also prepared for all levels of field staff.

The resulting field organisation is as shown in the following chart:



3. QUESTIONNAIRE DEVELOPMENT

A number of general policy decisions affected the content of the 1986 Census of Population and Dwelling questionnaires, including:

- (i) the continuation of the policy adopted in previous censuses of restricting the size of each questionnaire to a large folded page;
- (ii) simplify the form of the questions and the questionnaire and to improve their readability by the public;
- (iii) reduce the total cost of the 1986 Census;
- (iv) use the questionnaire as a data capture document, to reduce the census processing costs, resulting in "pre-coded" boxes being used wherever possible;
- (v) pretest new questions or those existing questions that were amended substantially;
- (vi) review critically those questions which generated adverse public reaction in previous censuses;
- (vii) make the Census labour force questions as consistent as possible with the concepts used in the new Labour Force Survey and other key employment statistics.

Submission Evaluation Process

An invitation was sent to all known users of census statistics during 1983, to make submissions on the content of the 1986 Census. The general public was also invited to participate, with advertisements being placed in daily newspapers.

Questionnaire submission forms were made available to ensure that all submissions included the information needed to evaluate their merits.

A total of 257 submissions were received from 125 individuals and organisations.

The general areas of interest of the user submissions and their numbers were:

Employment	73	Demographic Characteristics	41
Dwelling Characteristics	39	Health	17
Education	10	Income	7

Some of the particular matters addressed in submissions included:

- (i) the retention of the 1981 education questions;
- (ii) the replacement of the Smoking question with another health question, preferably related to disability, or alternatively for the retention of the Smoking question;

- (iii) the changing of the ancestry basis of ethnic origin to one of self identification;
- (iv) the recognition of the numbers who were adopting more informal living arrangements in the marital status question;
- (v) both the deletion and retention of the children born topic;
- (vi) the need for additional detail on unemployed persons;
- (vii) the inclusion of voluntary and unpaid work in hours of work answers;
- (viii) the recognition of full-time homemaker/housekeeper and voluntary work as an occupation;
- (ix) the measurement of voluntary and unpaid work;
- (x) a change in the income question to obtain total income:
- (xi) an increase in the range of amenities data obtained from dwellings.

A topic report evaluating the submissions of users was prepared and those topics which were accepted, underwent a programme of field testing.

The Questionnaire Testing Programme

A new feature of questionnaire development for the 1986 Census of Population and Dwellings was the comprehensive testing programme. Although there was a pilot test before the 1976 and 1981 Censuses, this was the first occasion when a series of tests have been undertaken.

- (i) Eight question content tests were conducted during the period August 1983 and November 1984.
- (ii) There were two pilot tests which contained the full range of census questions. These were large scale exercises involving approximately 1500 households in several centres. The second pilot test in November 1984 was the final in the series and was regarded as a 'dress rehearsal' for the Census questionnaires, with enumeration and processing procedures being tested. Only minor changes were considered after this test.
- (iii) There were four pre-tests focusing on a limited number of question topics (usually less than five). These were small-scale exercises, involving approximately 200-300 households, and were generally conducted in one centre to ensure consistency of interviewer training. They usually involved the testing of alternative formats of the questions under study, and three of the tests included a follow-up interview with selected respondents. The follow-up interviews sought information on the respondents' understanding of the terms used, general impressions and difficulties, as well as checking their answers and explaining reasons for inconsistencies.
- (iv) There were also two small scale skirmish tests which attempted to develop the best wording and layout for a single question. This

involved experimenting with alternative versions of a question in the field, until arriving at a format that was easy for most respondents to understand and answer.

- (v) In addition to the eight tests above, a small-scale preliminary exercise was conducted in September 1982, to test the feasibility of using an Optical Mark Reader (OMR) for data capture. This involved designing a special questionnaire on which respondents choose answers to questions from a list of pre-coded options, by colouring in circles. An Optical Mark Reader was used to capture the data thus eliminating the need to transcribe data on to coding sheets. Useful feedback on questionnaire design was also obtained.

A report outlining the questionnaire development process adopted at the 1986 Census, including the criteria used to evaluate each submission, was published in November 1985. This report entitled "Questionnaire Content and Submissions Report" summarises the respective merits of each of the submissions made for the 1986 Census.

4. COMPUTER PROCESSING

(i) Questionnaire Processing

At the two previous censuses, labour intensive methods were used in the processing of questionnaires. Clerical staff were required to code the responses onto specially designed coding sheets which were read by an Optical Character Recognition (OCR) machine. The data was then subject to computer editing. Many problems arose with this process including the quality of coding, misreads by the OCR equipment, poor handprint standards and variations in the quality (paper and printing standards) of the coding sheet.

A three stage approach was adopted in processing the 1986 Census including data preparation, data capture and computerised coding and editing. The questionnaire was designed to enable respondent-coded boxes to be used as the capture document whilst descriptive answers were coded using the interactive computer system.

The development of the computer software is a major technical advancement and enabled a more efficient processing system to be used. Staff resources were able to be reduced by up to 50 percent when compared with the 1981 Census.

(a) Data Preparation

Some 200 staff were employed for up to 5 months to check and balance the questionnaires received from the field. Manual coding was undertaken for three questions, including Dwelling type, Absentees and Relationship/Family code. The final operation of this phase was to "groom" the questionnaires to ensure they were clear and unambiguous and in the correct form for data capture.

(b) Data Capture

The data capture pool comprised some 48 Inforex stations. Temporary staff were hired for a period of up to 8 months, including a period of up to 2 months for training.

All pre-coded responses were captured on Inforex key-to-disk equipment and the data entered into the computer records.

Range checks were performed on 2 dwelling fields and 4 personal fields only - this being a limitation of the Inforex system.

Initially, all questionnaires were fully verified; as operators reached the required punching standards, partial and nil verification was introduced.

Details on the number of records punched per week and data quality are shown on Attachment 1.

(c) Computer Assisted Coding and Editing

Some 85 staff have been employed for a period of 14 months to undertake this phase of the work. Two shifts, each of 40 staff operate 30 Visual Display Units (VDU's), which are linked to a dedicated in-house IBM 4361/4 computer.

Computer Assisted Coding (CAC) is the automation of the process of matching a question response with a reference file of descriptions and codes. The CAC operator enters a respondents answer into the computer, through a VDU, in an interactive mode. The appropriate file of descriptions is searched and those descriptions which match most closely are displayed on screen along with their applicable codes.

The CAC operator may be presented with more than one description on screen and has to select the most appropriate. If no descriptions are matched, a modified or alternative description can be input or alternatively the question can be bypassed for later manual referencing.

The CAC System essentially leads the operator through each questionnaire by displaying on screen those actions which are required. When all the data for a record has been input, it is edited for interfield errors. Corrections are entered in an interactive mode using the CAC files. Finally inter-record errors are actioned in batch mode.

The main fields coded using CAC include:

- | | |
|----------------------------|----------------------------|
| * Usual Residence+ | * Residence 5 Years Ago+ |
| * Birthplace+ | * Ethnic Origin+ |
| * Occupation | * Industry |
| * Sector | * Place of Work |
| * Religion+ | * Social Welfare Payments+ |
| * Tertiary Qualifications+ | |

+ These questions on the personal questionnaire were designed to enable the majority of respondents to tick a box. For example, the Birthplace question listed the seven main countries, which enabled 95% of the questionnaire responses to be captured at data capture (i.e. only 5% of questionnaires required processing at CAC).

(ii) Output Processing

Whilst improvements in the timeliness of release of statistics from the 1981 Census were achieved, further improvements were required for the 1986 Census.

The software package (CENTSAID II) utilised at the previous census had limitations in its report formats, requiring a significant level of manual input in order to obtain publication quality copy. (This software was found to be very good for adhoc type work).

The acquisition of TPL with a suitable "user interface" has enabled non-EDP staff to undertake the programming of 1986 Census publications. The format of this output, together with the use of new technology, has enabled the production of publication quality copy directly from the computer files with minimum manual intervention.

The required improvements in timeliness are being achieved through the use of the above systems, an earlier start in determining the statistical content of each publication and the use of non-EDP or user section staff to undertake the programming of the census reports.

In addition to the range of census publications, statistical information from the 1986 Census, will also be available from a number of additional sources -

- * Counts File - Population and Dwelling Counts will be available for the periods 1976-1986 at any geographic level required.
- * SIR/CENSYS DATABASE - Users will be able to directly access a range of 1986 Census data at the small area level through the INFOS network.
- * Summary Files - Data from the 1981 and 1986 Censuses can be obtained by users from a series of geographic and national files.
- * Sample Files - A range of unit-record files will be available for users to process their statistical requirements, using SAS or TPL from either 1981 or 1986 Censuses.
- * Ad Hoc Files

(5) OTHER DEVELOPMENTS AT 1986 CENSUS

(i) Quality Control

The importance of monitoring both the quantity and quality of work undertaken by a large number of temporary staff was recognised during the planning stage of the census, as being of major importance.

A pre-requisite for all projects undertaken at the 1986 Census was for adequate control checks to be incorporated.

In the field collection work, District Supervisors were required to carry out field checks on the work of Enumerators during the delivery and collection phase, to examine their records and observe their techniques during contact with household occupants.

In the questionnaire processing phase, a quality control team was set up to check the work at the data preparation and computer assisted coding and editing operations.

Quality control procedures for the pre-capture processing operation were where possible, independent of the clerical process itself. Where this was not possible the clerical processing instructions were modified so that the limited quality control resources were targetted to potential problem areas.

Quality control procedures in the CAC work area were totally independent of the initial coding. Generally the coding process was emulated without recourse to the original coding decisions and, subsequently, a printout was generated which indicated all discrepancies between the coder's work and that of the quality control clerk.

Computer-generated reports were produced for each phase of the work, and for each section and each individual clerk. These provided management with information relating to the quality and throughput of the work of clerks engaged in both processing and quality control.

In the data capture pool, batches of work were re-punched and cases of disagreement checked out, in order to ascertain the cause of the error. These checks were undertaken for each operator on a regular basis, the frequency being dependent on the quality of each operators work. The statistics generated were utilised to determine the level of verification for each operator and the overall quality of the punching being undertaken.

(ii) Post Census Evaluation Programme

A Post Enumeration Survey has never been undertaken in New Zealand. Instead a series of checks are undertaken in order to assess data consistency and coverage.

Four subjects in this programme were concerned with data consistency for selected topics between the 1981 and 1986 Censuses:

- a general consistency study involving comparison of responses to selected questions from a representative sample of 1986 Census questionnaires (both dwelling and personal) with responses on the 1981 Census 10% sample files;
- a labour force statistics consistency study involving the matching of a sample of 1986 Census individual records with corresponding records from the Household Labour Force Survey and the analysis of aggregated labour force data from the Census and the Department of Labour's Quarterly Employment Survey;
- an unemployment statistics consistency study involving similar data sources to the above;
- an analysis of errors in age reporting at past Censuses (1976, 1981 and 1986).

Research into different aspects of coverage of statistics obtained from the 1986 Census of Population and Dwellings were the aims of another four specific projects:

- an evaluation of Census coverage of private dwellings involving checks of Census address lists in sample areas adopted for Household Labour Force Survey and Household Expenditure Survey;
- estimation of the Census night underenumeration of occupied private dwellings based on a post-census sample survey of unoccupied dwellings by type to check for misclassification;
- a general study involving analysis of the incidence of non-response and inconsistent answers to selected questions from the Census;
- an 'error-of-closure' estimation involving comparison of the "expected" usually resident New Zealand population by age and sex (based on intercensal estimates) with the corresponding enumeration populations at the 1986 Census.

The benefits of these evaluation and research programmes will be:

- further improvements in questionnaire contents and format for the 1991 Census;
- a more efficient and complete 1991 Census enumeration of New Zealand's population and dwellings;
- a faster and more accurate data processing phase leading to a further improvement in the timeliness of the release of Census statistics.

(6) ENUMERATION OF MINORITY GROUPS

Minority ethnic groups make up less than 20 percent of New Zealand's population, with the predominant group being the New Zealand Maori who total over 403,000 or 12.5 percent of the resident population.

The remaining groups comprise mainly Pacific island Polynesians (approx. 95,000), Chinese (approx. 20,000), and Indians (approx. 12,000). There are however increasing numbers of Fijians, Vietnamese, Kampucheans and Japanese, although the latter are predominantly in New Zealand as tourists.

The ethnic classification in New Zealand treats persons born in Greece, Poland, Hungary and Yugoslavia as European and are not included in the above figures on minority groups. It is estimated that such persons would total less than 10,000.

Traditionally, the major problem encountered in the enumeration of minority ethnic groups has been one of language and their ability to understand their obligations to the census. In recent times, however, the attitude of several such groups has required a much greater understanding of their culture and customs in order to obtain the desired level of co-operation.

Concerns about supplying personal information have also increased resulting in the need to stress the confidentiality provisions of the Statistics Act and to promote the benefits of the census in relation to such minority groups.

Social policy in New Zealand endeavours to adequately house the population with the result that few - if any - live in sub-standard conditions. The migration of the New Zealand Maori population from rural to urban areas and the large number of immigrants from the Pacific Islands in the last two decades has resulted in a very high demand for housing, part of which has been provided by the State as rental accommodation. The growth has been predominantly in the northern part of New Zealand in cities such as Manukau, which has grown by 27.5 percent between the 1976 and 1986 Censuses.

The result of this is that much of the publicity and liaison work must be focused on this part of the country.

The following actions were taken by the department to ensure the minority ethnic groups participated fully in the Census:

- (i) Appointment of field staff from the minority ethnic groups.
Whilst enumerators were appointed to such positions on merit, greater numbers of Maori and/or Pacific Island enumerators and assistant enumerators were appointed in areas where there was dominance of such groups. Field staff were also trained (where appropriate) in customs - e.g. on entering a Maori Marae, protocol at Maori tangis, hui etc.
- (ii) Use of interpreters.
Interpreters were provided for persons who were unable to obtain assistance from their own ethnic community, or organisations who provide assistance to such groups (e.g. to recent immigrants from S.E. Asia).

Interpreters were also utilised in the enumeration of crew on vessels fishing New Zealand waters. Whilst only those vessels in port were enumerated, a wide range of nationalities had to be catered for.

- (iii) Assistance from the Department of Maori Affairs.
Staff from Maori Affairs were made available to assist Maori people in the completion of their Census questionnaires and to provide assistance and advice on Census matters.
- (iv) Appointment of a Maori Liaison Officer.
A Maori elder who had the 'respect' of the Maori population was recruited for some 5 months. His role was to assist in the recruitment of suitable field staff, advise on publicity requirements, and liaise closely with Maori groups/meetings throughout the country promoting the importance and benefits of the Census to their community.

The Liaison Officer also provided assistance to Pacific Island groups when the opportunity arose.

The appointment of the Liaison Officer was also a major advantage in dealing with radio and TV, and the access this officer had in obtaining persons able to translate the census message in NZ Maori and 6 Pacific Island languages.

- (v) Liaison with Churches and Resource Centres.
A large proportion of the Pacific island population are involved in Church organisations. These were contacted and information provided on the Census, including where and how to obtain assistance. Liaison with the Pacific Islanders Educational Resource Centre and the Pacific Island Affairs Advisory Council was also undertaken in order to promote the Census and to receive advice from such groups on enumeration and publicity matters.
- (vi) Publicity.
A multi-Language Leaflet covering New Zealand Maori and 6 Pacific Island languages was prepared and was distributed by enumerators as required.

Radio and TV programmes were utilised while commercials in the various languages were broadcast shortly before questionnaire delivery commenced.

An education teaching kit on the Census was prepared for use in primary and intermediate schools. This was of considerable benefit in promoting through children, an awareness of the Census in households where parents were poor speakers of english.

Other Minority Groups which will require special consideration at the 1991 Census (as a result of discussions following the 1986 Census) include the Blind, Disabled and Intellectually Handicapped not residing in institutions. Aids in the form of video for the deaf and braille for the blind will be considered for the next enumeration.

(7) PLANS FOR 1991 CENSUS

(i) Enhancements to CAC

Several minor enhancements to the processing system are planned during the intercensal period.

Whilst the final evaluation of Automatic Editing and Direct File matching projects have still to be completed, it is likely that the CAC system will be enhanced to incorporate these methods.

Automation of family coding involving questions on Absentees and Relationship to Occupier, will also be evaluated.

The reference files of descriptions used in CAC will continue to be updated during the intercensal period. Also, during this timeframe, a revision of the Occupational classification will be undertaken (and will make use of the recommendations in the latest release of ISCO and the ASCO classification).

(ii) Review of Statistics Act

Whilst several minor amendments were made to the Statistics Act during 1985 mainly as a result of the Department of Statistics taking over the management of the field data collection process, a number of aspects need to be modified and updated in order that several changes to enumeration procedures can be implemented.

(iii) Questionnaire Development

It is intended to again consult a wide range of users of census statistics on the content of the 1991 Census. A comprehensive field testing programme including pre-tests and pilot tests is scheduled between June 1987 and December 1989. The department is also reviewing technology and software currently available for the design of questionnaires.

(iv) Data Capture

The Inforex equipment utilised at the 1986 Census has been retired and a study of the data capture options (including OMR and Key Entry) for 1991 Census will be undertaken during 1987/89.

(v) Sub-district Summary File

The feasibility of creating a file of historic data at the sub-district (or collection) level for use by enumeration staff is being evaluated.

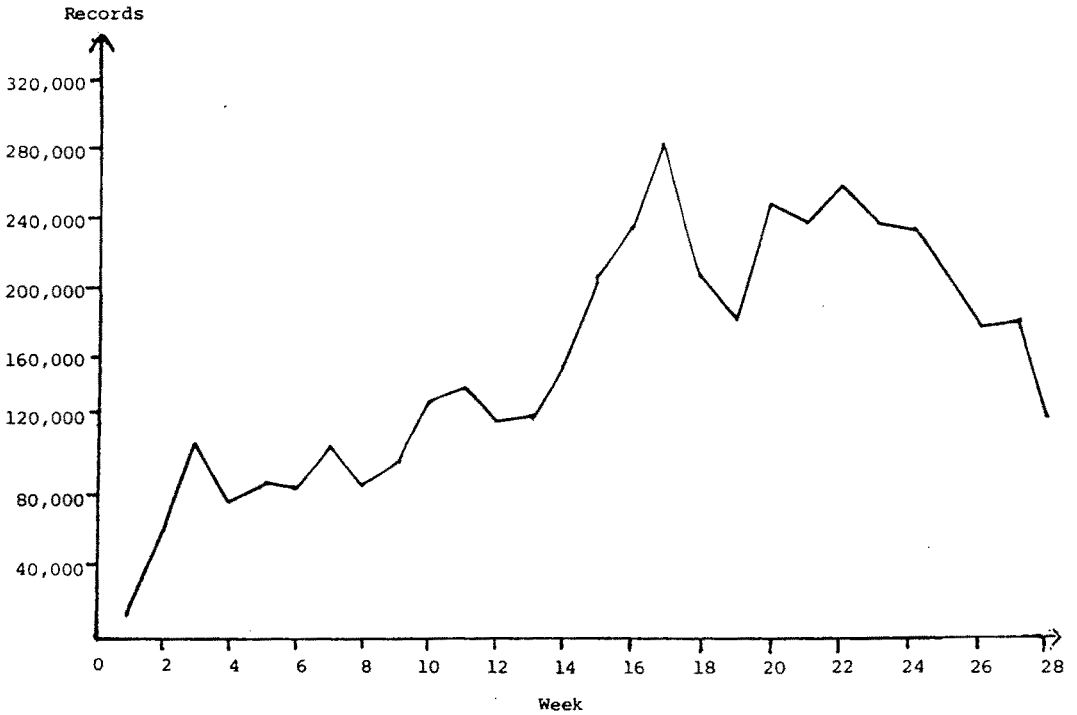
The data would include counts of population and dwellings, building permits, population and dwelling projections, non-private dwellings, type of sub-district (e.g. urban, rural, hilly etc.), characteristics of occupants etc.

The file would be utilised in reviewing sub-district boundaries, assessing the workload, for each enumerator, the contract price to enumerate the sub-district and the required forms for each sub-district.

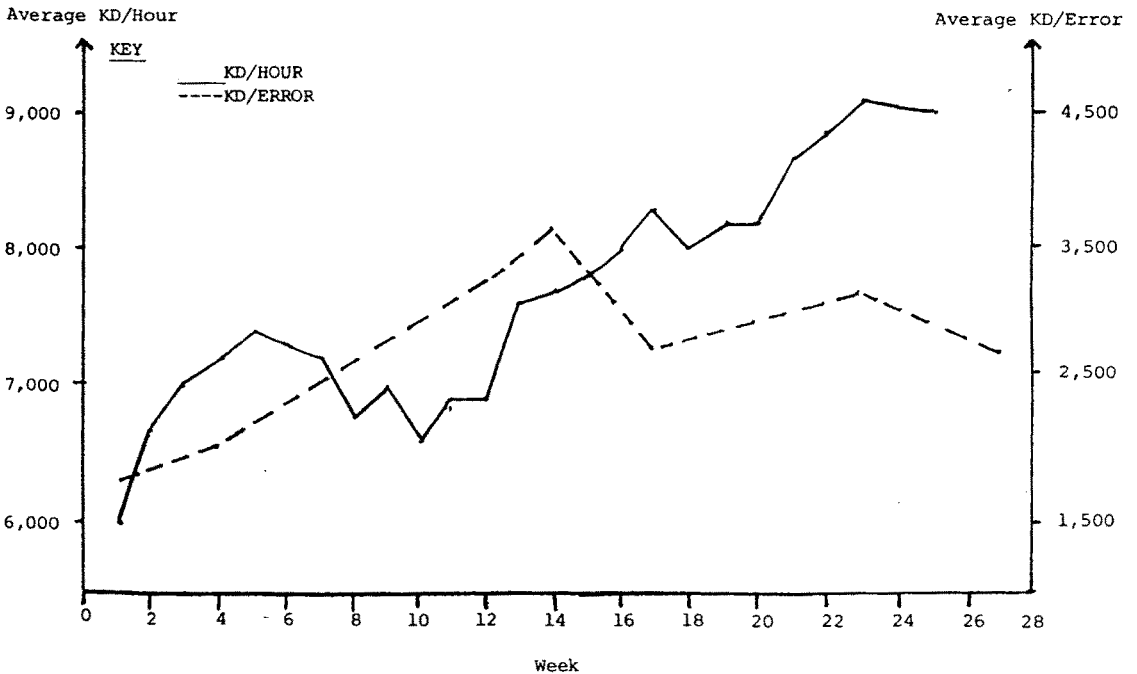
(8) CONTACT WITH NEW ZEALAND

New Zealand is keen to correspond with countries on census matters, including the sharing of experiences, recent developments and plans. The contact point is:

The Director
Population Census Division
Department of Statistics
Private Bag
Christchurch, New Zealand



Quantity and Quality of Punching



APPROACHING THE 1991 CENSUS OF CANADA

Edward T. Pryor
Statistics Canada

Paper presented at the Second Annual Research Conference (U.S. Bureau of the Census),
Reston, Virginia, 23-26 March 1986.

Edward T. Pryor, Statistics Canada

ABSTRACT

With the 1991 Census only some five years away, there is a need to develop a strategy resulting in an integrated consultation and testing plan. A five year census cycle adds both advantages and disadvantages to the census planning process. (There is a comprehensive census in June 1986.) Census planning, including research and testing, and census execution "leap frog", providing both additional opportunities and risks. The basic, current working assumption is that the 1991 Census will bring changes requiring testing and research of content modifications, additional automation of geography; field methods and operations; and product delivery alternatives. The paper outlines the issues, concerns and current strategy for the 1991 Census of Population within the Canadian environment.

KEYWORDS

census, planning, data needs

INTRODUCTION

Planning a country's census is, in a sense, one massive research and development project. As such an undertaking, a pending census must be launched within a number of parameters, often ambiguous or ill-defined, that are not exactly textbook conditions for survey design. Among these parameters are: (1) a forecast of priority data needs for both the public and private sectors some five to ten years in advance of data availability; (2) the public mood toward government data collection and its effects on data quality, again some five or more years in advance; and (3) the availability of adequate funding to meet a wide range of expectations for the next census including research on each phase of a census, development and testing, consultation with users, measurement of quality from various angles and product development. An additional issue for Canada, which is simultaneously an asset and a handicap, is that with a five-year census cycle, each census is a test environment for the next census. However, results and conclusions of one census are not always available in time for incorporation in the next round. This issue is fundamental for this paper outlining an "approach to the 1991 Census of Canada". The yet to be taken 1986 Census (June 1986) will no doubt provide experience and new information, often unanticipated, that will affect the direction and planning priorities for 1991 Census strategy.

Within this briefly stated back-drop and although a 1991 Census of Population is over five years away, there is a need to start soon to develop a strategy for such an activity and to put in place an appropriate management structure to commence planning that activity.

CURRENT OPERATIONAL ASSUMPTIONS

Any working assumptions at this point as presented here must be anticipatory and will imply policies not recognized nor yet formulated elsewhere. (In fact, given necessary planning lead times, the census must anticipate policies and programmes.) These key assumptions are:

- (1) Using the 1981 Census as a benchmark^{1/}, the 1986 Census project will be a success, i.e., public reaction will be positive; response rates will be high; the timing of data outputs will be acceptable; coverage will be within acceptable limits and the cost structure of products and services will gain user acceptance.
- (2) There will be a census of population for Canada in 1991.

1/ For a review of the 1981 Census and current 1986 Census issues, see Smith and Pryor, Forthcoming, 1986.

- (3) A census of agriculture will continue to be done in conjunction with the census of population in 1991.
- (4) The 1991 Census will be a "comprehensive" census, i.e., roughly comparable in size to those in 1981 and 1986.
- (5) Some previous segments of questions will be dropped and some as yet unknown question components will be added.
- (6) In contrast to the carry-over from the 1981 to the 1986 Census, practically every sector of questions will be reexamined with the potential for considerable change in the formulation of specific questions. These question sectors include:

(a) demographic questions:

- relationships to reference person
- marital status
- derived family definitions
- migration
- immigration

(b) language questions

(c) ethnicity/visible minority/cultural group question(s)

(d) education/specialization/training questions

(e) place of birth and citizenship questions

(f) fertility measurement questions

(g) labour force/occupation/industry questions

(h) income questions

(i) housing questions

(j) health question(s)

with 1986 Census results being pending input to the process.

- (7) Issues of equity (labour force participation; occupational access; income distribution) and discrimination (minorities; immigrants; disabled; elderly; etc.) will continue as priority data collection issues.
- (8) Support of the elderly; work participation of the elderly; youth participation in society; decreasing social mobility and crime victimization will become more prominent and will add pressures for (new) census type information.
- (9) There will be increased public concerns for privacy, perceptions of linkage of government data files and for the census and other government data collection vehicles to ask fewer and less sensitive questions.
- (10) There will be pressures from users to improve the quality of the data, e.g., response rates, coverage or sampling fraction.
- (11) Technological change will bring the obsolescence of some current census data processing systems.
- (12) Increased public awareness and additional sensitive (e.g., language loss or retention) data applications will bring pressures for more publicly understandable, and communicable, data editing and imputing systems.
- (13) 1986 Census field experience will generate pressures to reexamine various field methods and to test changes to these; awareness and success of U.S.B.C. field approaches for the 1990 U.S. Census will assist these pressures.

- (14) Following the 1981 and 1986 Census trends, the government of the day will urge Statistics Canada to seek means to reduce the unit costs of taking a 1991 Census (see Figure 1 which shows the considerable drop in unit costs between 1971 and 1986).
- (15) There will be pressures to examine contracting to the private sector components of 1991 Census data collection and processing which, if brought about, would necessitate research and testing in relation to public acceptance, data security and conformity to legal imperatives of such new arrangements.
- (16) Regional data processing, access and/or output will be a reality.
- (17) The Bureau will wish, regardless of the short time frame, to initiate a project examining alternatives to the 1991 Census and to demonstrate the strengths and weaknesses of these alternatives, especially various administrative files.
- (18) The combination of new content considerations, field collection technology changes and unknown public attitudes will require reinstituting a pre-census testing program replicating a collection environment.

CURRENT ORGANIZATIONAL ASSUMPTIONS

A census takes place within a corporate environment of other important complementary and competitive programmes. No census planning strategy can be effectively developed without consideration of the involvement of the total statistical system and organization. The following are key assumptions in this regard:

- (1) The current advisory committee system within the Bureau composed of external experts will be expanded, become more established and play an important role in 1991 Census substantive recommendations and in the public interface.
- (2) The direction of the Bureau organizational involvement will increase the corporate nature of the census both in sector participation and responsibility.
- (3) There will be increased flexibility in management and control of census development and implementation.
- (4) Census management will thereby be more complex with an even greater emphasis (in skill needs and activity) on internal negotiation, coordination, mediation and conflict resolution.
- (5) Staff continuity will be an issue given trends to more frequent job changes, shorter work assignments plus encouraged earlier retirements causing loss of experience and knowledge. Counter balancing those trends, the recent abolition of compulsory retirement in the public service at age 65 could work to the advantage of the census operation.

In the light of the above operational and organizational assumptions (which are recognized as challengeable and changeable), an initial course of action can be formulated, with related interim conclusions.

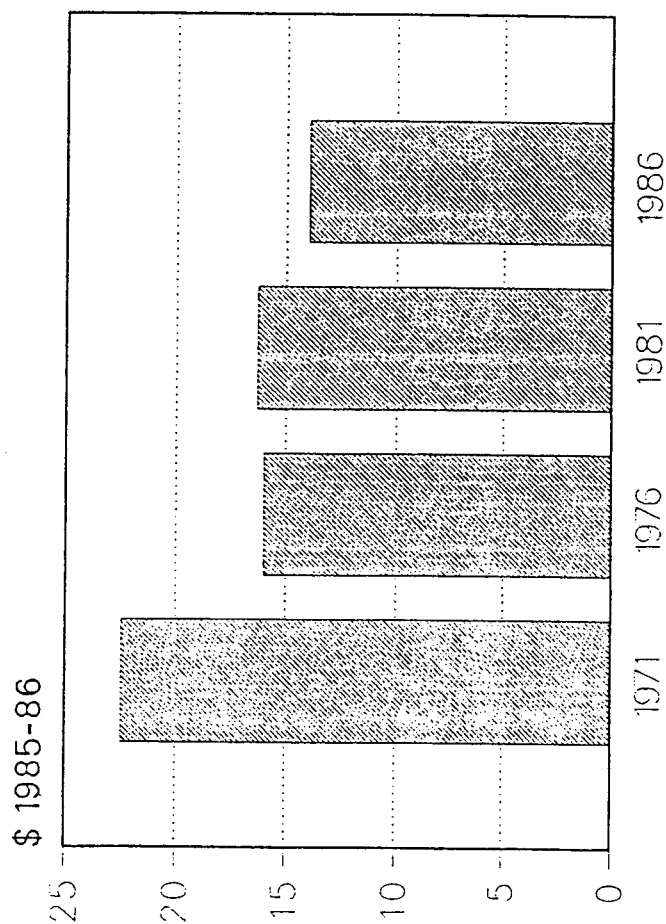
CURRENT DEVELOPMENTS

Statistics Canada has already commenced 1991 Census planning with the Fall 1985 International Conference on the 1991 Census (Ottawa, Canada). The general plan for this conference was a product of earlier management discussions as to the important issues to be covered for the conference. Content, field collection, methodology, agriculture census, geography and processing were the general subjects of priority.

This conference was viewed as the initial launching point both for giving the 1991 Census some visibility, in the midst of 1986 Census preoccupations, and to encourage thinking corporately as to the priority issues for successfully planning a 1991 Census. Representatives from Australia, Sweden, the United Kingdom and the United States assisted Statistics Canada in firming up the issues requiring thorough review and research in relation to the subjects mentioned above.

Figure 1

- Cost per Household of the Census of Population for 1971, 1976, 1981 and 1986 Censuses (Four Peak Years *)



* 1970--1974; 1975--1979; 1980--1984; and 1985--1989 respectively

A natural extension of the Fall 85 Conference was the establishment of a 1991 Census Planning Group with the mandate to thoroughly examine the emerging 1991 issues, organize these and develop an action plan to address them. Essential to such an approach is some image of what the 1991 Census environment will be and what will be the effective strategy to address the problems involved.

1991 CENSUS SCENARIO

Conjecture is both interesting and necessary in order to develop an image of the census environment for 1991. The 1991 Census will be a "new ball game" in several ways. Content, collection methods, processing technology and output forms/product mix, all have the potential for relatively less continuity than existed for the progression from 1971 to 1986. Looking back a bit, the 1961 Census was often characterized, rightly or wrongly, as the real beginning of automation, 1971 Census for the initiation of self-enumeration, 1976 Census for break-throughs in automated editing and output production, and the 1981 Census for more timely and user oriented products. And the 1991 Census? The four broad areas mentioned above (content, collection, processing and output) are the components which have the potential for considerable innovation and change (both voluntary and forced):

- (1) Content. There is practically no area among those listed above (see Current Operational Assumption 6.) that is not a content component susceptible to reexamination. There will be the problem of trade-offs between historical comparability and change to reflect current conditions. The perceived leanings are to change given the transitions taking place in Canadian society and institutions and in data demands. Many of our current concepts of measuring are viewed by some experts and/or users as outmoded, too conservative, too complex, irrelevant, biased, over-simplistic or some combination thereof. Our census instruments for measuring residency, the household, the family, marital status, fertility, migration, language identification and capacity, ethnicity, minorities, cultural groups, educational and training attainment, labour force participation, occupations and income have all been subject in recent (and not so recent) times to criticism under some combination of the above described deficiencies. Of course, such accusations have an element of exaggeration and narrowness but also contain some well substantiated validity. Perhaps unfortunately, there are conflicting views among various experts and constituencies which makes resolution of the differences and trade-offs a distinct challenge for the agency.

Conclusion. The Bureau needs to initiate early (1986) in the 1991 Census plan, a research and consultation process involving experts and users of census data regarding their views and recommendations for the formulation of the content, questions and resulting data base in the 1991 Census including possible regional content on supplementary questionnaires. The process should not only be "wide-open" but be viewed (and promulgated) as such to the public.

By "wide-open" is meant the solicitation of briefs, city/regional/national user meetings (even in languages beyond English or French), active participation of Bureau Advisory Committees, presentations at expert conferences and symposia and other means that would publicly instill the idea and reality that Statistics Canada is receptive to all groups concerned. Such an approach will hopefully bring forward proposals for innovations improving the utility of census data. Northern and Aboriginal groups might seek more "relevant" questionnaires for their constituencies. Ethnic groups have already indicated their desire to consult on question formulations for the 1991 Census. A very plausible offshoot of such approaches could well be open and direct exchanges on issues of privacy and confidentiality that are inseparable from the inquiries in the census itself. Such a thorough public airing brings its risks and acknowledgements of departures from the past but also entails a requisite for successful acceptance and approval by Cabinet of a 1991 Census body of questions.

- (2) Collection methods. There is a wide variety of issues leading to the 1991 Census that deserves examination. Generally, these can be categorized as related to utilization of new collection technology, privacy protection, coverage (and its measurement), additional data collection methodologies and field staff selection.

Technology of an operational type may exist to assist in some automation at the field capture stage. The U.S. Bureau of the Census is working in that direction with early indications of a pay-off for the 1990 U.S. Census. Such developments deserve monitoring and on-going review for potential application to Canada. The increased uses of automated field operations control and management information systems are areas where research and testing are necessary and could produce significant pay-offs.

Innovative training techniques incorporates an area worthy of close examination. Training costs are a considerable expenditure and therefore could lead to significant efficiencies. Field staff will not be motivated to learn if our training methods and technology are perceived as, and in fact are, dated or obsolete.

Although related to other issues, new approaches need to be considered in terms of the local, "neighbor" enumerator which means looking at the feasibility of centralized editing, further or complete extension of mail-back, perhaps selective mail-out and other means of enhancing privacy and the public's perception and acceptance of our efforts to protect privacy. In this scenario, people are viewed as increasing concerned about privacy and possible mis-uses of personal information.

Centralized editing has the potential to reduce costs and improve quality but, in the Canadian context, could add a level of job segmentation lowering enumerator satisfaction in completing the task.

Sampling

Sampling methodology is included as a collection item in that response burden is tied to sampling along with actual effects on quality, costs and response burden perceptions. Sampling can be viewed as a national ratio, differential regional ratios, interlocking samples, a "two stage" census and other sampling methods used in census taking. And, of course, there are local and provincial/territorial sensitivities related to whatever sampling approaches we envisage. In addition, sampling may have other uses, e.g., follow-up.

Coverage

Coverage is a fundamental aspect both in terms of the important financial implications of our results but also in terms of some of our assumptions of how we assure high levels of population coverage. Some issues, with important operational ramifications, are already apparent that deserve examination. Is early (March-April of census year) enumeration of designated Northern populations still effective and/or necessary? Or should it be extended? Is our limited coverage (no long form, sample questions) of the institutional or collective dwelling population, especially considering its projected growth, going to be an acceptable, defensible approach in 1991? Related is the need to address the difficulties of collecting accurate data from the elderly, especially the "old" elderly (85+). There are other examples.

Given competing priorities, there will be limits of investment to be made for improved coverage. For that reason, improved measures to estimate coverage error (and possibly "adjust") will be considerations.

Regional data

What preparations must be made to deal with potential new complexities of data collection in 1991? Here is meant pressures, with possible encouragement by users for various reasons, for collecting regionally specific (metropolitan area, province or territory) or sub-population specific (e.g., Aboriginal People) data sets? Aside from revenue generation or regional data needs, Statistics Canada may be forced in that direction to address potentially strong pressures to reduce considerably respondent burden across the country. Such directions would/could force difficult compromises for national data coverage and comparability. This scenario assumes that such pressures must be carefully weighed and options formulated.

Post-censal surveys

Greater use of post-censal or piggyback surveys may also become established as an alternative to collect more detailed and/or regionally specific information on selected sub-populations. As of this date, Statistics Canada may gain experience in this regard from the 1986 Census if a proposed post-censal disability survey is approved in the near future.

The current assumption has been that such a 1986 Census post-enumeration activity, as currently designed, would indicate a great deal about field operational issues, enumerator skills required, public reactions and quality of data obtained. In summary, active soliciting of 1991 post-censal surveys and no 1986 experience (if so) would make relevant testing and research prior to a 1991 Census imperative.

Conclusion: The number, importance and wide variety of collection related issues for a 1991 Census necessitates the early formation of a research and testing plan essential in order to assemble, assess and prioritize for action the spectrum of such issues.

- (3) Coverage evaluation. The Reverse Record Check remains the centre piece for assessing coverage of the Canadian census. For 1991, there will be a need also to study the feasibility of producing measures of overcoverage along with traditional estimates of undercoverage. The size of the R.R.C. may need to be increased depending on the increased emphasis on the R.R.C. to produce more detailed coverage estimates of specific sub-populations, regions or the Territories. If demand for increased specificity for assessments of particular groups emerges as, for example, the aboriginal population counts, perhaps by region; then, the potential capacity and adaptation of the R.R.C. will require early examination.

Other post-censal checks may also need to be considered. At this juncture, a plausible assumption is that by 1991, certain specific data sets (aboriginal population, the disabled, the occupationally deprived, those discriminated against in terms of certain characteristics, or other sensitive or policy-related categories) will require special post-censal evaluation or scrutiny in order to measure various types of error, including coverage, with unprecedented precision.

Conclusion: A review of coverage and evaluation of sources of error methods be undertaken leading to a plan for development of possibly new, required 1991 Census approaches.

- (4) Data Processing: The objective for the 1986 Census has been to basically keep systems in place from 1981 wherever possible. The incentive in 1986 to reduce costs to a minimum has increased the adherence to a "change only when necessary" policy. The price paid for this necessary restraint has been to reduce investment in new efficiencies.

Systems for data capture entry bear re-examination. (Again, U.S.B.C. review of FOSDIC vs. other technologies will be of great use.) Key entry as used in 1981 and 1986, OCR or other approaches deserve close attention. The initiative must come from the 1991 Census project operation, as the systems users, to set systems objectives and to secure long term commitments for highly skilled systems development personnel.

Most probable, it is likely that systems development will be required in automated coding, retrieval systems (Statpak) and edit and imputation (CANEDIT, SPIDER and RAPID). Further, possible automation for collection systems (for example, centralized edits and follow-up) may also require expert systems development resources.

Conclusion: The range of systems issues should be discussed and categorized (1987/88) with a major review and required systems development activities to take place in the 1988/90 period in order to be in a position to take full advantage of technology, to meet expectations for further compressed time schedules for data delivery and to reduce person-year consumption.

- (5) Output forms/product: For 1991, the assumption is that the retrieval system will be increasingly driven by the data forms that technically will be feasible. For the 1986 Census, there is a need to further integrate retrieval systems with the trend to more custom and ad hoc production vs. "preplanned" products. Obviously, for 1991, the experience yet to be gained from 1986 will be important.

On the other hand, there is a risk in assuming that data release forms for 1991 will simply evolve or be a direct extension from 1986.

User capacity and needs will no doubt change rapidly given the technological acceleration to transfer larger and larger data files, via compact disks (present state-of-the-art) to mini and micro-computers. That trend is assumed to accelerate into the early 1990's. The acquisition of expertise to anticipate and formulate the potential configuration of census type data for 1991 will be a priority.

Conclusion: As a first step to developing a vision of 1991 Census products, a "futuristic" paper should be commissioned that lays out some hypotheses of what will be the data transmission forms and capacity in 1993 for Statistics Canada, libraries, commerce, governments, and other user sectors.

One guess is that we could be heading for a polarization in data users, i.e., the technologically sophisticated wanting the most advanced data output forms vs. those, for various reasons, confined to more traditional means of data use. The sensitivities of that situation, if it were to materialize, could be, at the least, challenging.

DEVELOPING THE INITIAL 1991 CENSUS PLAN

Since late 1985, the established 1991 Census Planning Group has commenced the development of a planning strategy attempting to take into account the totality of the considerable accumulated knowledge. The Fall 1985 Conference, earlier management discussions, considerable exchanges with our colleagues in other countries and the reservoir of staff experience provided a sound base for assessing the situation looking toward 1991. As inferred earlier in this paper, one important body of essential information is not yet in place, viz., the results of the yet to be taken 1986 Census. Here, the operational assumptions outlined previously in this report come into play. Such assumptions were essential in order to determine possible 1991 Census developmental projects and to give these some preliminary ranking by priority.

The principal objective for 1991 is clear, i.e., the development of an integrated set of questions meeting priority user requirements using a specified sampling plan with each of these aspects necessarily specified for a submission to Cabinet. The schema presented in Figure 2 portrays the elements to this process. Building on the experience of previous five year censuses, the Planning Group identified the key planning elements that would determine the final recommendations to Cabinet. User requirements for data; governmental priorities for financial restraints and other policy objectives; and the general environment in terms of social attitudes, prevailing values and technological restraints and opportunities would be the major components shaping the 1991 Census.

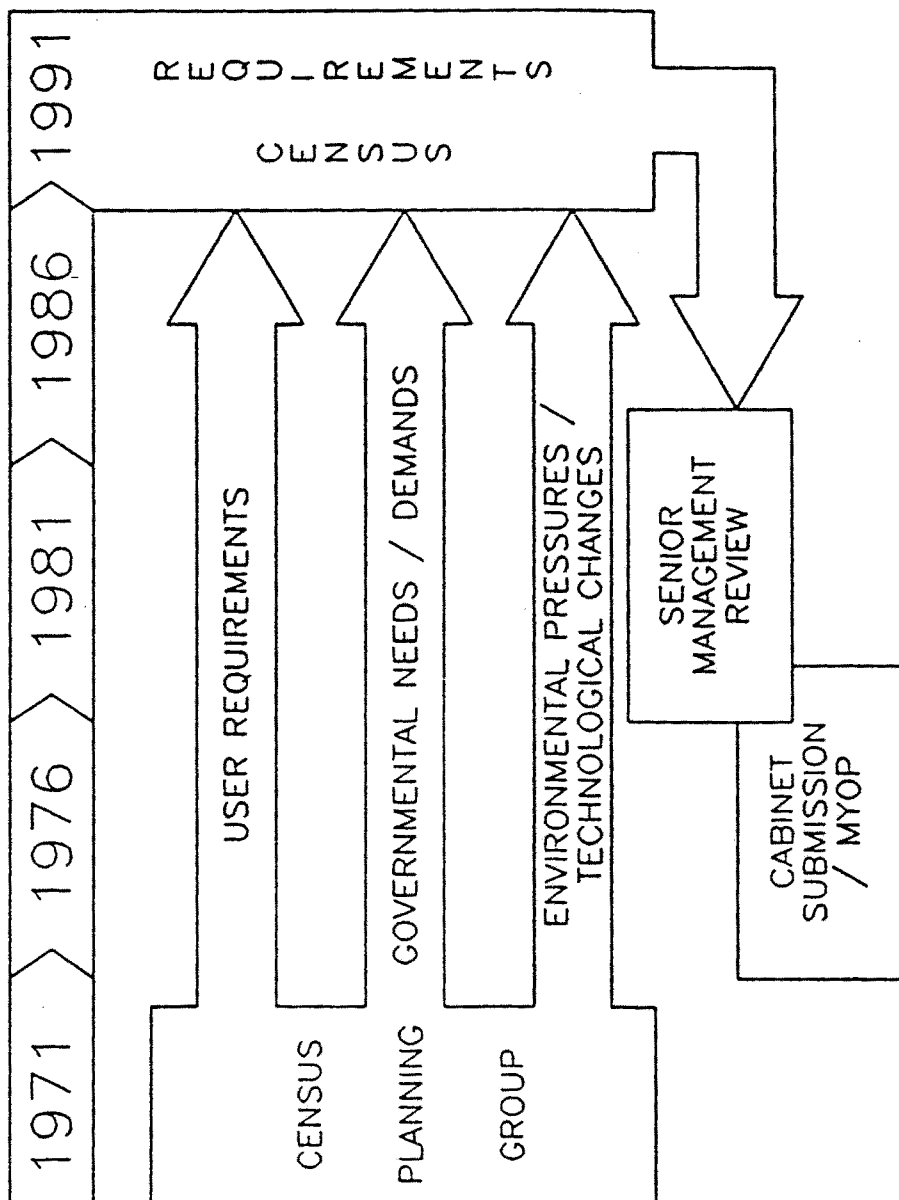
1986 Census

The unfolding of the 1986 Census was recognized as a essential element. In fact, 1986 Census evaluation studies were designed to a large extent as input to the planning of the next census. In this situation Canada has the opportunity, and necessity, to use the current census as a testing ground for the next, especially in terms of public acceptability^{2/}. The total list of 1986 Census evaluations planned as input to the 1991 Census process cannot be spelled out here; however, the following

^{2/} In commenting on the planning cycle for the 1990 U.S. Census, the Panel on Decennial Census Methodology observed: "... evaluation of the likely impact of important changes is hampered by the fact that pretests cannot adequately assess the effects of alternative procedures on public cooperation with the census -- only tests conducted under census conditions, that is, experiments incorporated into an actual census as distinct from pretests, can fully address this important question." (p. 4) In that sense, Canada has an advantage.

Figure 2

Schematic Summary of 1991
Census Content Development



is a selection of important evaluations pertinent to 1991 field collection operations:

- (1) student/youth recruitment programme: numbers, performance, turnover and its impact, etc.;
- (2) special aboriginal enumeration programme: coverage and data quality;
- (3) Northern early enumeration: costs, problems and recommended 1991 Census approach;
- (4) field training: evaluate 1986 approach including successful and unsuccessful methods;
- (5) drop-off procedures: evaluate costs and effectiveness of 1986 procedures especially new bilingual 2A (100%) questionnaire drop-off;
- (6) local enumerator/direct response: problems, if any, and assess alternatives;
- (7) refusal process: procedures used and possible improvements;
- (8) telephone answering service: utilization, categorization of questions and complaints, duration of operation, etc.;
- (9) problem area profiles: direct input for identification of possible difficult to enumerate areas for 1991;
- (10) MIS system: assess automation of system and recommend improvements for next census in terms of management's need-to-know.

This is a partial list of 1986 Census field evaluations that are planned for FYs 1986/87 and 1987/88. In addition, methodology staff are conducting: an edit sample study to evaluate the effect of follow-up on response rates; an evaluation of the use of telephone follow-up for complete non-response; and a test of the use of telephone company lists for follow-up of non-response (similar to a 1980 U.S.B.C. experiment). Of course, other evaluations of data quality by variable, coverage, processing systems and costs will influence 1991 planning. Some 1986 Census approaches have had no immediate precedent. The assessment of the 1986 publicity programme for collection without paid advertising and the greater decentralization of public communication activities to Regional Offices will be crucial input to the strategy for 1991. These are departures for the 1986 Census that will heavily influence 1991 thinking.

Developmental Projects for 1991

Within the prevailing environment of financial restraint, the emerging approach to the 1991 Census is to identify specific developmental initiatives incrementally improving a basically sound census methodology. Not surprisingly, the list of suggested enhancements is far beyond the capacity of Statistics Canada to implement. However, for the 1986/89 period, a list of high priority projects has been identified. These projects are viewed as having the highest potential to improve data quality and/or produce new efficiencies:

- (1) research on automated coding: building on research in other national statistical agencies, to assess automated coding of write-in responses;
- (2) extension of mail-back: earlier tests (1977) indicate feasible with current research focus on effects to Census of Agriculture which has been carried out jointly with Census of Population;
- (3) content consultation: as described previously in this paper, the early initiation of broad consultation based on critical review of 1986 and past practice;
- (4) adjustment for coverage error: potential 1991 Census issue building on 1986 Census overcoverage study and hopefully exploiting extensive U.S.B.C. programme in this area;
- (5) field pay structure: assess 1986 pay system, examination of regional piece-rates, etc. in light of regional labour supply, possible piggy-back surveys and effects on staff morale;

- (6) integrated text production: present system is obsolete, objective would be to integrate keying, proofreading, editing and translation with thorough assessment of cost effectiveness;
- (7) review of head office processing: various steps in head office processing require referral back to questionnaire, 1986 Census of Agriculture test to store questionnaire images on optical disks and retrieve from this mode will be useful for review;
- (8) modes of product dissemination: commence in 1988/89 to review 1986 dissemination system, current market trends, role of Regional Offices and use of new electronic media.

A second tier of desirable 1991 development projects was also identified with funding more problematic especially for 1986/87. These included research on an address register, centralized edit/follow-up, administrative data development, MIS automation, telephone follow-up experiment, piggy-back or post-censal survey alternatives and use of postal codes in migration and place of work inquiries.

As they should, these sets of projects express the particular Canadian situation for census taking. Still, within these lists (plus others not specifically pointed out here) are some projects expressing similar issues in other countries. For examples, finding and motivating good field staff, public perceptions of privacy vis-à-vis the census enumerator especially, administrative record potential, coverage and adjustment, automated coding and data products and technology, if not universal issues, are at least among those research items in common with several countries including the United States. Although specific countries will arrive at different decisions for solution, the results of research under varying country conditions will influence the direction Canada takes for 1991.

CENSUS COSTS

In the current financial environment facing many countries and the counter tendency of increased pressures for investments in new technology for massive data collection, storage and dissemination, the costs of census taking is without doubt a problem shared by most national statistical agencies. Although Statistics Canada has had considerable success in reducing the unit (household) costs of the census (see Figure 1), further economies will be difficult to attain especially if expectations for data quality, coverage and availability levels are constant or even rising. Certain costs, especially labour intensive field collection expenditures, are sensitive to the number of units to be enumerated. For example, the following illustrates specific expenditures for the 1981 and 1986 Censuses:

Census Year (85/86 Ss CA)

1981 = 86.7 M	{ +5%
1986 = 91.1 M (est.)	

All Years Prior to Census Year (85/86 Ss CA)

1981 = 43.3 M	{ -24%
1986 = 34.9 M (est.)	

The increase in census year costs basically expresses the collection costs for increased number of households. On the other hand, census development costs were reduced considerably for 1986 with, among other economies, reduced expenditures for research and testing work. Figure 3 presents comparative peak year actual costs for the 1971, 1976 and 1981 Censuses and estimated costs for 1986. As Figure 3 indicates, despite increases in number of households (see Table 1), total peak year costs (1970-1974, etc.) have been roughly constant, taking into account the smaller number of questions in 1976. The projected continuing growth of households to 1991 (9-13% from 1986 to 1991) infers that relatively fixed field costs will continue to increase unless new cost efficiencies can be found. Cost reduction may well evolve as the major focus of census research for the 1990 round of censuses.

CONCLUSION

This status report on early developments for the 1991 Census of Canada illustrates some of the complexities and opportunities of a five-year census cycle. Under such a regime, planning lead times are compressed with the census at hand indispensable

Figure 3

Total Census Costs (Four Peak Years) for 1971 to 1986

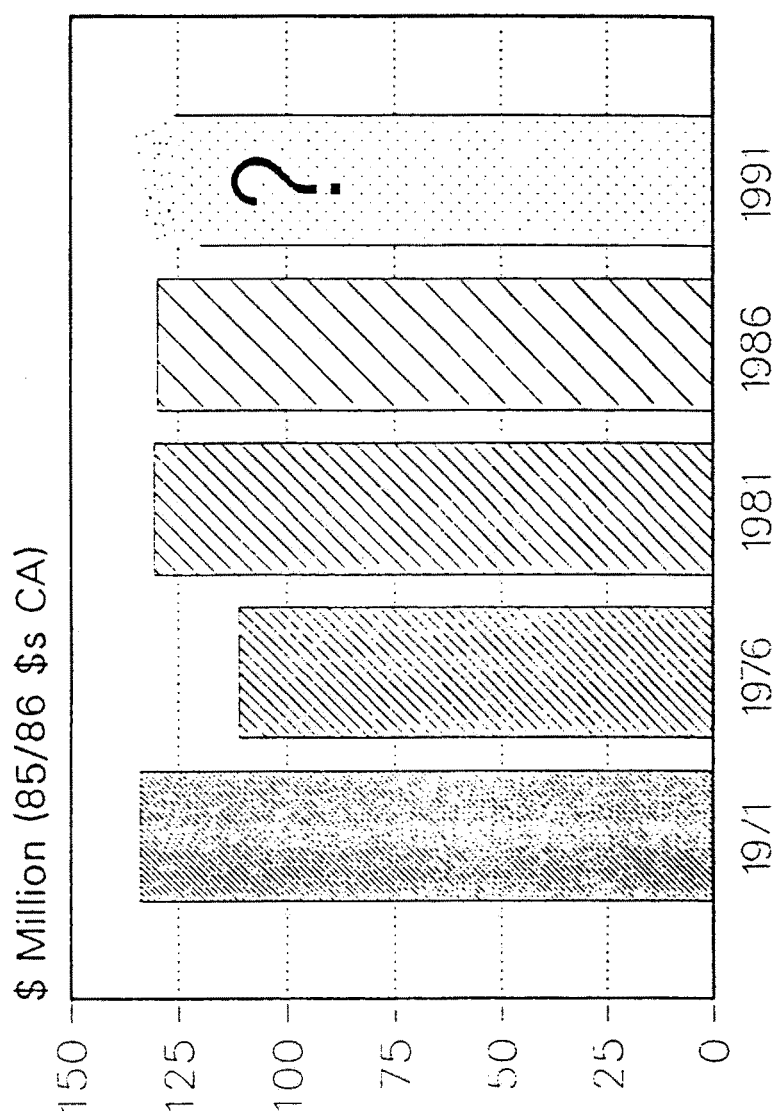


Table 1
Total Population and Private Households, Canada
Actual 1971, 1976, 1981 and Projected 1986, 1991
(Number in thousands)

	Population			Households		
<u>Actual</u>	<u>Series 1</u>	<u>Series 2</u>	<u>Series 3</u>	<u>Series 1</u>	<u>Series 2</u>	<u>Series 3</u>
1971		21,568.3			6,041.3	
1976		22,992.6			7,166.1	
1981		24,343.2			8,281.5	
<u>Projected</u>						
1986	25,503.0	25,606.8	25,622.3	9,293.0	9,440.4	9,442.1
1991	26,613.0	26,781.1	26,903.9	10,105.9	10,460.2	10,460.2

for anticipating the subsequent census requirements. Beyond the peculiarities of any one country's census, certain large research issues face census takers in North America (and elsewhere). Some of these emerge from the discussion herein:

- (1) how to improve the collection of data from a growing and aging population in most countries, especially the institutional population;
- (2) assuring access to respondents with concerns for security and privacy increasing;
- (3) providing data product lines that meet the demands and needs of users in an environment where information answers are increasingly expected to be immediate.

The international atmosphere of this second Annual Research Conference is indicative of important new efforts to share knowledge and collectively seek solutions to societal challenges for better information.

ACKNOWLEDGEMENTS

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APPENDIX A

Early Chronology: 1991 Census Milestones

October 1985	1991 Census Planning Conference
October-November 1985	Formation of 1991 Census Planning Group
May 1986	Report of 1991 Census Planning Group on priorities and strategy
June 1986	Management review and establishment of priorities and direction of 1991 Census work
September-October 1986	Initiation of 1991 Census content consultations
September-October 1986	Specialists review with recommendations on collection methods and needed development and testing begins
February 1987	Report to management on collection recommendations
March 1987	First report on content consultation results
Fall 1987	Specialists assembled for assessment of quality review approaches
June 1987	Final report on content review and recommendations for content testing
June-August 1987	Specialists confer on design and implementation of joint consideration of content and collection testing program
September 1987	Content/collection testing begins
September 1987	Review of systems development needs for 1991 commences
December 1987	Report on systems development priorities for action
June 1988	Content testing results report
September 1988	Systems development projects started

The 1990 U.S. Census of Population and Housing: Test Census Results and 1990 Plans

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**Eleventh Population
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The 1990 U.S. Census of Population and Housing: Test Census Results and 1990 Plans

Introduction

The next U.S. Census of Population and Housing will be conducted as of April 1, 1990 and will mark the 200th anniversary of census-taking in the United States. Planning for the 1990 census started in earnest in 1982 shortly after the 1980 census began to wind down. With the number of decisions to be made and the long lead times required, early planning was necessary. While we still have not completed our planning cycle, we have made some key decisions about how we are going to conduct the 1990 census.

The process by which we gathered the information and advice needed to make good decisions included internal review, consultation with data users, and formal tests of procedures. We consulted with a broad array of data users in planning the 1990 census: the Congress, state and local officials, other Federal agencies, planners/academics, business leaders and private organizations, minority group representatives, and the general population.

We have also conducted a number of test censuses and plan to conduct additional tests. The importance of the test censuses cannot be overstated. We cannot make major changes in procedures for the 1990 census based on speculation or hypothesis that they may work. We must test them in controlled field experiments. We want our plans to be as final as possible for the 1988 dress rehearsal censuses so that they will be actual run-throughs of 1990 census procedures. Any changes made as a result of the dress rehearsals would amount to minor finetuning. (See figure 1 for a chronology of our 1990 test censuses.)

In this paper, I will discuss three topics that we have been addressing in our planning and for which we have reached some decisions. These topics are (1) the basic procedures we will use to take the census, (2) efforts to encourage a high mail-return rate, (3) and, content and sample design. I discuss a fourth topic--automation--in a separate paper. Since many of our decisions reflect changes or variations in 1980 procedures, I will briefly describe how we took the 1980 census.

1980 Census Procedures

In 1980, we took the census by mail in areas of the country containing 95 percent of the population. We first developed an address list and then mailed questionnaires to each housing unit on the list. A complete and accurate address list is essential in taking a census by mail. We use an address list to control the enumeration by monitoring the mail returns to determine whether a questionnaire has been returned for a particular unit. Once a housing unit is included in our address list, we stand an excellent chance of completing the enumeration of that unit and its inhabitants. Our experience has shown us that no single source of addresses is complete enough to meet our stringent requirements. Also, an address list becomes out-dated quickly. Therefore, we perform several updates to

Figure 1. Test Censuses for the 1990 Census

<u>YEAR</u>	<u>SITE OR NAME</u>	<u>OBJECTIVE</u>
1984	Hartford and Bridgeport, Connecticut; rural counties in Georgia and Texas	Alternative approaches for compiling address list.
1985	Jersey City, New Jersey, and Tampa, Florida	Two-stage census procedure and new automation features.
1986	Several communities in central portion of Los Angeles County, California, and eight counties in east central Mississippi	Automation, including self-contained office; new field procedures, including enumerator delivery of questionnaires; and efforts to increase mail-return rate.
1986	National Content Test	Potential new questionnaire items and new wording and format for 1980 census questions.
1987	Ten counties in North Central North Dakota	Door-to-door enumeration procedures, special plans for American Indian reservations, and census processing.
1987	National Survey	Further refinement and analysis of population questions and housing quality questions.
1988	Dress Rehearsal:	
	St. Louis, Missouri	Urban procedures.
	Fourteen counties in central Missouri	Mixed small city, suburban and rural procedures.
	Eight counties in eastern Washington State	Procedures for sparsely populated areas, including American Indian reservations.

verify the accuracy and completeness of the census mailing list. In planning for the 1990 census, we have conducted several tests to improve our procedures for compiling an address list. Since most countries at this conference do not use the mail, I will not describe these tests. But I just want to emphasize that having an address list that can be subjected to updates and improvements is one of the things that makes a census by mail an improvement over traditional door-to-door techniques, at least in the United States.¹ The mail census requires fewer enumerators and improves data quality (because of the updated address list and reduced potential for bias introduced by the enumerators). The mail census does not necessarily lead to substantial cost savings compared to the door-to-door census, in part because of the cost of compiling and updating the address list.

In 1980, the U.S. Postal Service (USPS) delivered questionnaires to each housing unit on the list on March 28 and householders were asked to fill them out and mail them back to one of 409 temporary census district offices on April 1. (Thus, we usually refer to our mail-census procedures as mail-out/mail-back.) The aim of this approach was to complete as much of the census as possible by the less expensive mail method and then to do the costly and time-consuming followup of those housing units for which no questionnaire was returned. A large work force (270,000 at peak) personally visited nonresponding housing units and vacant units. While this number of temporary workers may seem high considering the fact that we took most of the census by mail, we would have required many more than this number to take the census door-to-door everywhere--far more than it would have been possible to recruit.

In sparsely populated parts of the country where the distance between homes reduces the cost-effectiveness of creating a precensus mailing list, census enumerators went door-to-door to take the census. (While door-to-door areas contained only about 5 percent of the population, they were about 50 percent of the U.S. land area.)

Since we do not create a precensus mailing list in door-to-door areas, we have devised other coverage improvement techniques to take the place of the address list updates we perform in mail-census areas. One of these is an advance listing. Crew leaders list a specified number of addresses (24 in 1980) in each enumeration district in advance of the census. After the enumeration is completed, the advance listings are matched to the listing of housing units the enumerator makes during his/her rounds to determine if the enumerator missed any addresses. Enumeration areas are recanvassed and poor enumerators are released if warranted by the results of this quality control operation. Another coverage improvement operation is the postenumeration post office check. Enumerators fill out an address card for each housing unit they list while canvassing. The cards are delivered to post offices where mail carriers review them and tell us the addresses not on our list to which they deliver mail.

Basic Census Procedures

We plan to use the mail-out/mail-back census method for most of the country again in 1990. Most of the new collection procedures we have

tested have been variations on the mail-census method, and I will describe some of those variations in this section.

Two-Stage Census

In 1970 and 1980 we collected both short- and long-form questionnaires at the same time. Short forms contain those questions asked of every person (7) and housing unit (10); long forms contain the same basic questions plus some additional inquiries asked of only a sample of persons and housing units.

We have tested collecting basic and sample information in separate stages as a potential improvement in difficult-to-enumerate areas such as parts of large cities where mail-return rates were low in the 1980 census. In big cities in 1980, the mail-return rate for short forms was 2.5 percent higher than that for long forms.

It was believed that the two-stage approach might allow a quick count of people and their essential characteristics, such as age, race, and sex. Important data needs could be quickly satisfied. If the mail-response rate were increased by a shorter form, answers to the basic questions might be more accurate as well. On the other hand, it was believed that public cooperation and coverage of individuals in the second stage might decrease. Accuracy and comparability with basic population data obtained in the first stage might be lessened, and the cost of two questionnaire mailings and two follow-up operations could be prohibitive.

In our 1985 test census in Jersey City, New Jersey, we tested a two-stage census approach and compared it to the 1980 approach to find out if it would improve the census in a hard-to-enumerate urban area. For the two-stage test panel we mailed and collected short-form questionnaires first; 2 months later we mailed and collected long forms. For the other panel, we collected both types of information at the same time, as in 1980.

The two-stage method did not produce an improvement over the 1980 system. The test results indicated that the differences in the mail-return rates for short forms in the one-stage (37.2%) and two-stage (39.5%) panels were not significantly different. However, the mail-response rate for the long form in the two-stage panel was less than half that for the long form in the one-stage panel (about 15 percent vs about 31 percent). This rate was so low that we cancelled followup activities for the second-stage.² There also did not appear to be any improvement in short-form data quality as a result of using the two-stage procedure.³ We believe that the lesson here can be summed up in the adage, "Strike while the iron is hot." In this case, that means collect all the required data in the first contact with a household, because when you go back a second time, the respondents will probably be less willing to cooperate.

Questionnaire Delivery

In areas that do not have house number/street name addresses (i.e., 875 Main St.) our listers sometimes have difficulty obtaining mailing addresses that are recognizable by the postal carriers, and, thus, the USPS cannot deliver questionnaires to these addresses. In our 1986 test census in

East Central Mississippi, we tested a procedure--called "update/leave"--in which census enumerators (rather than postal carriers) delivered the questionnaires to housing units in these problem areas. The operation was so-called because enumerators canvassed an assigned area, updated the address list, and left a questionnaire for the householders to fill out and return on Census Day. The operation was conducted about 2 weeks prior to the census.

It was thought that this procedure could reduce problems with the mailing list and thereby improve the accuracy of initial and follow-up enumeration. We designed evaluations as part of the 1986 test to examine the effects of update/leave on coverage and costs. These studies have not yet been completed.

We were also concerned about the timing and feasibility of this operation. In order for it to work, we would have to update our master address control file to reflect changes as a result of update/leave, e.g., added addresses, corrections, deletions, and so on. And this would have to be done in a very tight time frame (about 4 weeks) so that address lists generated for nonresponse followup would reflect the changes. As a result of our experiences in the 1986 test census where we had difficulty incorporating the addresses, we have determined that this cannot be accomplished in the allotted time. Since our schedule will not allow enough flexibility to conduct update/leave earlier, we have decided not to use this procedure for the 1990 census. However, the coverage and cost evaluations, when completed, will be useful for planning future censuses.

This decision required us to search for an alternative approach to solve the questionnaire delivery problem in rural areas. We have decided to use an update/enumerate procedure.⁴ In the "problem" areas, we will implement a door-to-door procedure similar to what we used in 1980 and will use again for very sparsely populated areas in 1990. In both update/enumerate and door-to-door areas, the USPS will deliver unaddressed short-form questionnaires a few days prior to Census Day. Enumerators will canvass their assigned areas, collect or fill short forms, and administer long-form questionnaires to a sample of housing units.

The difference between update/enumerate and door-to-door enumeration is that in the update/enumerate areas, enumerators will update an existing address list (the one compiled in prelist) while conducting the enumeration. This should lead to slightly better coverage than a purely door-to-door procedure, where the enumerators compile an address list from scratch while conducting the enumeration. Update/enumerate areas can be viewed as potential mail-census areas where we later determined the mail-census procedures were really not the best approach.

Mail-Census in Some Door-to-Door Areas

We plan to use mail-census methodology in some 1980 census areas that were door-to-door. Extension of the mail-census methodology should lead to improved data quality and reduce the personal-visit workload. The 1980 census door-to-door areas contained some small to medium-sized towns and cities that had house number/street name address systems and that

would have been conducive to the use of mail-census procedures. Because we wanted to keep census procedures simple and, as much as possible, to not mix procedures within counties, we designated these places for door-to-door enumeration.

For the 1990 census, we plan to use the mail-census procedure in these small towns and cities (those with 500 or more people and city delivery), even if the balance of the county is enumerated by the door-to-door method. We will conduct our first test of this new procedure in the 1987 test census in 10 counties in the north central section of North Dakota.

Efforts to Encourage a High Mail Return

One of our major goals for the 1990 census will be to achieve the highest possible mail-return rate. The higher the mail-return rate, the less personal-visit followup work we will have to conduct. We are estimating that each one-percent increase in the mail-return rate for the 1990 census could save us as much as \$10 million. The mail-return rate for the 1980 census was about 83 percent.

Our efforts to encourage a high mail-return rate and reduce the nonresponse followup workload are multidimensional and I will be discussing only a small part of them here. For example, there is much we try to do to make it easy for people to complete and return the questionnaires. Everything from the length of the questionnaires to the wording and format of the questions can affect a person's ability or willingness to respond. We offer assistance to people who need help in filling the census questionnaire, whether because they do not speak English, have impaired vision, are not sufficiently literate, or just do not understand how to do it. As I described above, we have been examining new procedures for improving questionnaire delivery. Respondents cannot be expected to mail back a questionnaire if they do not receive one. Our test of an update/leave procedure and our decision to implement an update/enumerate procedure are attempts to deal with questionnaire-delivery problems.

To encourage widespread public cooperation with the census we will again mount an extensive promotion campaign. This will involve general advertising through the mass media--television, radio, and newspapers--but we will also tailor our promotion efforts for specific hard-to-enumerate groups and for particular areas and regions of the country. In addition to the basic message that the census is "important, safe, and easy," we will be educating the public on how to look for the questionnaire, how to fill it out, and how to mail it back.

In this section, I will discuss three specific topics we have addressed in our test censuses as possible efforts to increase mail-response in 1990. These are: reminder cards, "motivational" inserts in the census questionnaire package, and different envelope designs.

Reminder Cards

In our 1985 test census in Tampa, Florida, and in our 1986 test census in Central Los Angeles County, California, we tested the effect of sending

out reminder cards targeted to housing units for which questionnaires were not returned. Using an automated address control file and automated checkin of the questionnaires, we could determine those housing units for which a questionnaire had not been returned. In the 1985 test census we mailed one reminder card and in the 1986 test census we conducted two separate mailings of reminder cards.

The results from both the 1985 and 1986 tests indicate that reminder cards can increase mail-return rates. One reminder card increased mail-return rates by about 3-4 percent in both Tampa and Central Los Angeles County, and the second card in the latter site increased mail-return rates by an additional 2-3 percent.⁵ It is uncertain, however, whether these figures would be repeated in the census itself, where, because of a full-scale promotion campaign, initial mail-return rates would be higher. Mail-return rates were generally very low in our test censuses, in part, because we did not receive as much coverage on major media (television, radio, newspapers) as we would if the whole country were being enumerated. Thus, because there were so many persons who did not mail back a questionnaire, there was more potential for a high gain from the reminder card.

Based on our experiences in the 1986 test, we have learned that there are serious logistical, workload, and timing problems involved in doing targeted mailings of reminder cards. To do targeted mailings, we must wait several days for the initial mail returns; then we must create a file of housing units for which questionnaires have not been returned, generate address labels, label the reminder cards, and mail them out early enough to get responses back before the beginning of nonresponse followup. We could avoid this problem if we mailed cards to every unit, rather than targeting them, because we could label the cards in advance of Census Day.

With this in mind, we have decided not to do a targeted mail-out of reminder cards in 1990 (that is, only to nonresponding households). Instead, we will mail a reminder card to every housing unit just before Census Day. While this may not appear as cost effective, we can avoid the timing crunch associated with a targeted mailing.

Motivational Inserts

Research conducted after the 1980 census showed that for some people, the arrival of the census mailing package was the first time they had heard about the census. Thus, the census mailing package itself is a public information vehicle and can be a critical source of information.

In the 1986 test censuses, we evaluated the effects of including a "motivational" insert in some of the questionnaire mailing packages. The test was designed to see whether a brief written appeal for cooperation can improve mail-response rates, lower question nonresponse, and increase cooperation with follow-up enumerators. The insert included red, white, and blue graphics and listed six reasons "to count yourself in on the census."

Results from the 1986 test census show that the motivational insert had a significant positive effect on census mail response. Households that received a questionnaire package that contained an insert mailed back their questionnaires at a rate of 1-3 percentage points higher (depending on the test site) than households that did not receive the insert.⁶ As with the mail reminder cards, we must caution that these figures might not be repeated in the regular census, when initial mail-return rates would be higher. We need to conduct additional research over the next year or two before we decide whether to use a motivational insert in 1990.

Envelope Design

As a basic first step in getting people to respond to the census, it is essential that they recognize the census mailing package is an important piece of mail and that they be interested enough to open it. This is increasingly a challenge in the United States because of a growth in what we call "junk" mail--advertising flyers, solicitations for money, and so on. A study after the 1980 census showed that about 13 percent of the people who did not mail back their questionnaires (2 percent of all households) never opened their census mailing package.⁷

As part of our 1986 National Content Test we conducted a test of two envelope designs to see whether there were different mail-return rates using one rather than the other.

One envelope was designed to be attractive and appealing. The assumption was that an attractive appearance might motivate recipients to open their envelopes and respond to the enclosed questionnaire. The second envelope was designed to capitalize on the official nature of the census and attempted to use the authority and importance of the Federal Government to motivate recipients. The "attractive" envelope had red, white, and blue graphics; the "official" envelope was simply black print on a white background with no graphics.

Preliminary results show that the mail-return rate for the "official" envelope was slightly higher than the rate for the "attractive" envelope--34.6 percent vs 32.4 percent.

Content and Sample Design

Next I will turn to the content of the 1990 census questionnaire and to the way we will collect additional questions from a sample of households. I will discuss questionnaire content only briefly because we are currently in the process of deciding what subject areas we will include in the 1990 census. We must report to Congress by this coming April 1 on the subjects to be included and, by April 1, 1988, we must report to Congress on the actual questions we will ask.

In determining the content for the 1990 census, we have consulted with a broad array of data users in the United States, from both the public and private sectors. In our contacts, we heard many more valid requests for data than we can possibly satisfy. That is because we are committed

to having no growth in the size of the questionnaire. We believe that minimizing the public's work in answering the census is essential if we are going to maintain public support.

We selected some of the suggested new questions for testing in our 1986 National Content Test and we also tested new wording and formats for some of the 1980 questions, such as those on race and ethnicity. We are now completing our evaluations of these tests. Basically, we do not expect any dramatic differences in content between 1980 and 1990, particularly in the case of the short form, which contains the basic questions.

In order to find a way to ask more of the additional questions that were suggested by our data users without increasing the workload of respondents, we examined several options for collecting the sample questions. In 1980, we asked all the sample questions on one long-form questionnaire, and everyone in the sample was asked the same questions (unless some of the questions did not apply to that person). We had a differential sample size, depending on the size of place: In places with more than 2,500 people we had a 1-in-6 sample; in places with fewer than 2,500 people we had a 1-in-2 sample. The purpose of this differential sampling pattern was to provide more reliable data for small places on the sample questions, particularly income.

One of the alternative sampling approaches we considered for 1990 was a supplemental survey that would have been conducted several months after the main enumeration. We would have used one sample questionnaire during the main enumeration, and, then, later we would have sent a longer sample form to a small sample (1 percent of the housing units) of those who previously had received a short form. The longer sample form would have been about twice the size of the regular sample form and would have included certain new questions we could not fit on the regular sample form. Since the sample size would have been only 1 percent, we would have published data only for very large geographic areas--regions, states, and large metropolitan areas. The sample would not have been targeted to any specific population or housing types on the basis of answers to short-form questions, although that is one way to conduct a supplemental survey.

Another option we considered was "nested" sampling, for which there can be many variations. One way this might have been implemented would have been to have two sample questionnaires during the actual census. Each would have had a set of "core" questions and then a smaller set of additional questions. The additional questions on each form would have been different. Or we could have had two questionnaires, one asked of say 19 percent of the households and one of 1 percent of the households. Both questionnaires would have had a set of core questions that would be tabulated during the census, but the 1-percent sample questionnaire would have contained additional questions that would have been tabulated later, after the regular census.

The third option we considered is "matrix" sampling. As with "nested" sampling, numerous different designs are possible. One of the simplest designs is to have two sample questionnaires during the census (one a large sample, the other a small sample). The small sample would contain different sample questions than those on the regular sample questionnaire.

Only the larger sample would be used for immediate census tabulations. The smaller sample would be independent and tabulated later.

I will just briefly describe one of the more complex matrix designs we considered: We envisioned four sample forms (6%, 6%, 6%, and 2%) and four sets of additional questions (A,B,C, and D). Three of the sample questionnaires would have included core items plus two each of the additional sets (e.g., A+B, A+C, B+C). The fourth sample form would have included core items plus additional set D. Thus, the core items would be on all sample questionnaires, creating a 20-percent sample. Three of the additional sets would be included on 2 forms each creating a 12-percent sample for these questions. To allow cross-classification of variables between sets, three possible pairs of sets are included on one form each (a 6-percent sample). Additional set D questions could only be cross-classified with core items, creating a 2-percent sample.

After an extensive review of these three options, and of various designs within options, we have decided to use the same sampling approach as for 1980: one sample form only.⁸ We may or may not have differential sampling by size of place, that is, 1-in-2 for places over 2,500 people and 1-in-6, elsewhere. This is an issue we are still discussing.

Our decision to use only one sample form basically involves two factors: complexity and cost. All three options would have introduced a great deal of complexity into questionnaire printing and assembly, data collection procedures, automated processing, and data tabulation. This is particularly true of nested and matrix sampling. We believe that given the large number of new procedures we will have for 1990, particularly in the area of automated processing, any of the optional sampling approaches would have introduced too much risk into the census process. The supplemental survey would have added significantly to the cost of the census, as well. We estimated that a supplemental survey would have added \$16,000,000 to census costs.

This decision increases the pressure on us as we decide among competing data needs for limited space on the census questionnaire.

Closing

In summary, we are well on our way to establishing the basic framework for the 1990 census, having reached decisions in several key areas. A considerable amount of work remains as we must complete our testing and conduct our dress rehearsal, determine content, fine-tune procedures (particularly the special, coverage-improvement procedures), establish the field organization and network of offices, and so on.

We chose various approaches for complex reasons, sometimes unique to our country's own special circumstances. Perhaps it is so obvious as to not need repeating, but each country must make its own census-taking decisions based on its own conditions and experiences.

Take the issue of mail-census methodology in the United States. Thirty years ago we began a trend to increasing reliance on the mail-out/mail-back

method of taking the census, and in 1990 we will use this method to enumerate about 95 percent of the population. Our studies have shown that for the most part, taking the census by mail improves data quality by reducing the potential for bias introduced by the enumerators. Compiling an address list and repeatedly updating it improves the overall count by giving us a nearly complete control list against which we can monitor the enumeration.

Though the mail census works very well in the United States, in general, it is not a method we would recommend many other countries consider. Several factors must converge to make a mail-census possible. The population must be literate enough to understand the census questionnaires and provide valid answers with a minimum of aid. Obviously, there must be a widespread, efficient system of mail delivery and an addressing system that lends itself to identification of individual units. Furthermore, a certain density of population is required (we have established 15 per square mile) to make completing an address list cost-effective.

In countries where any of these factors do not exist, then the mail-census methodology may not be possible. Or if sufficient labor is available at a low cost, it might not be preferable to door-to-door techniques. In the 1990 census, we will not use mail-census techniques in sparsely populated areas or areas where we cannot obtain addresses that will make sense to the mail deliverers.

In the area of automation (see my paper on automation), our decisions were also based on a unique set of factors. We have decided to process the census questionnaires (i.e., turn the data into computer-readable format) in eleven locations using the FOSDIC technology. This is somewhat less centralized than in 1980 when we conducted processing in three sites, but considerably more centralized than some of the options we considered for 1990. For example, we considered a totally decentralized scheme, that is, conducting processing in 400-500 "self-contained" district offices. Another option was to conduct processing centrally for most of the country, but to set up several (20-50) self-contained offices. We did test successfully a self-contained office in our 1986 test census of East Central Mississippi. Questionnaire data were key-entered into microcomputers. Decentralization of census processing would have required using key-entry or some other technology (such as the optical mark reader) for data conversion. Keying would have required too great an investment in machinery and too many keyers, which would have greatly increased our personnel needs. The optical mark reader technology was not suitable because it could not accommodate the requirement we have for questionnaire size and we did not have time to conduct further testing.

Thus, because of the immense land area we must cover, our large population, and constraints involving time, money, and personnel, we opted for greater centralization and for using FOSDIC technology. FOSDIC made sense in the more centralized approach because it is a quick, accurate, and tested technology. The use of keying or optical mark recognition may make more sense in countries that do not have the same constraints we have.

The previous paragraphs discussed our reasoning behind making a few key decisions. Each country has different concerns to consider when making

such decisions. What is appropriate in the United States is not necessarily going to work elsewhere. I did, however, examine our test census results and planning process to look for some principles that are appropriate in any country's planning of a census. I hope these thoughts will be helpful to you:

1. Make the census interview easy for the respondent.

Collect all information at the same time, make the questions as easy to understand as possible, and keep the questionnaire as short as possible.

Experience shows that callbacks and multiple visits to collect census information are not effective. A respondent's "attention span" for a census is short. A major exception is post census evaluation surveys; these obviously require a second visit at a later point in time.

Of course, it is not always easy to word questions properly in the space available on a census questionnaire. To help with this problem, we must make sure enumerators are properly trained. In addition, we must consider ways to educate people in advance of the census on how to answer the questions. Instruction sheets are not generally used at the time of the interview.

How long to make the questionnaire (actually, the time it takes to complete it) is a difficult decision. The overhead cost of taking a census is so high that it makes sense to collect as much information as possible at one time since the marginal increased cost for additional questions is so little. There is a point, however, when the questionnaire becomes too burdensome. Each country has to strike its own proper balance.

2. Control is the key to a successful census.

Because of their massive size and infrequent nature, censuses are difficult to monitor and plan. Still, it is imperative that we control them carefully. The bulk of census expenditures are for field collection. During data collection it is easy to spend a lot of money quickly before a problem is recognized. This can be a serious problem because often money originally allotted to tabulation and publication has to be used for data collection. Therefore, the main reason for doing a census--producing data--often suffers. To solve this problem, the United States has invested the funds to prepare a massive computerized Management Information System. We feel this expenditure is well worth the gains that will come from being able to manage the census properly. I would recommend that other countries look at this approach carefully.

3. Be cautious in considering the use of the mail in census taking.

The mail census has been extremely successful in the United States, but not always for the reasons people expect. A mail census can be cheaper, but not by much. That is because the cost savings in

personal visit interviews are somewhat offset by the enormous expense of developing a mailing list and of controlling the mail-out/mail-back operation. In the United States, one significant benefit of the mail census is reducing the number of personal visits to a number we can complete in a reasonable amount of time.

4. Find ways to encourage people to participate in the census.

In the United States, publicity is important in taking a mail census, but it is also clear that publicity is necessary regardless of enumeration techniques. There are many reasons for that: to make people aware, to educate them, and to encourage "unwilling" persons to be included. Basically, there are many benefits to a good publicity campaign that sets the stage for making the interviewer's task easier. (See point #1 above). Since most countries are doing some kind of publicity, there is a good opportunity here for an exchange of knowledge.

5. Microcomputers are extremely powerful and cost efficient. Use them.

The two papers I prepared for this conference have illustrated some of the key uses of small computers in the United States census. Though other countries would not have the same tasks, there are opportunities in any census-taking process to automate. I strongly recommend looking for these opportunities and "forcing" the use of small computers. (Sometimes this is difficult because some people want to do it the "old" way.) The benefits will be significant.

6. Do everything possible to ensure earlier tabulation and publication.

Basically, we are all judged on how well we do in getting out the census results. One universal complaint I hear about census taking is that it takes so long to get out the data. Good planning can help. So can testing tabulation and publication systems in advance of the census. Also, sharing knowledge and equipment among countries can help.

7. Take advantage of opportunities to share knowledge and/or equipment between countries.

Budget problems are something we all face and they could get worse in the future. We can all do some things within our own countries to be efficient in census-taking and save some money. Another way to be efficient, however, is to take advantage of what is being done elsewhere. Some countries, like the United States, have been fortunate enough to get money for some important testing. We hope some of our analysis will be helpful to others. Meetings like this are an excellent way to share that knowledge. The Integrated Microcomputer Processing System (IMPS) is another opportunity for sharing. It is not for everyone, but for a small, less developed country, it can be an excellent way of processing a census with only a minimum of planning and expense. Perhaps there are other opportunities for similar kinds of shared "processes."

Taking a census is an exciting and tremendous challenge, even without having to plan for change and to make needed improvements. I know that I speak for all of our countries when I say that. Enumerating and collecting detailed characteristics for over 226 million people and 88 million housing units, as we did in the United States in 1980, were not simple tasks. This is due in part to the highly mobile nature of people in the United States (about 38 million Americans move each year), and the diverse conditions and situations in which we live. Our task will be more difficult in 1990, when we estimate that there will be about 24 million more people and about 18 million more housing units to count.

Adding to the challenge is the fact that we must count not only the majority of Americans who live in houses, apartments, condominiums, trailers, and so on, but also those who live in what we call group quarters--for example, military barracks, college dormitories, penal institutions, long-term hospitals, and migrant farm camps--and even those without any home. We are also charged with counting those persons in our country illegally, most of whom do not wish to be counted.

Most of these situations are by no means unique to the United States, and other countries face quite different problems. That is why conferences such as this are important as a means of sharing our experiences.

NOTES

1. We also often refer to a door-to-door census as "conventional" and, recently, we have come to refer to the procedure as "list/enumerate." List/enumerate describes the process wherein the enumerator, in the process of going door-to-door to enumerate housing units and their inhabitants, also lists each address in a listing book.
2. 1985 Test Census Decision Memorandum No. 16, July 12, 1985.
3. 1985 Test Census Preliminary Research and Evaluation Memorandum No. 51, April 14, 1986.
4. 1990 Decennial Census Decision Memorandum No. 16, November 28, 1986.
5. 1985 Test Census Preliminary Research and Evaluation Memorandum No. 64, October 22, 1986; 1986 Test Census Preliminary Research and Evaluation Memorandum No. 32, October 7, 1986.
6. 1986 Test Census Preliminary Research and Evaluation Memorandum No. 33, October 7, 1986.
7. 1980 Census Preliminary Evaluation and Research Memorandum No. 61, October 26, 1983.
8. 1990 Decennial Census Decision Memorandum No. 11, July 17, 1986.

**Automation in the
1990 U.S. Census of Population and Housing**

**Paper presented by
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Automation in the 1990 U.S. Census of Population and Housing

Introduction

Our goals for the 1990 census are to produce data products in a more timely manner and to make the whole census process more cost-effective, while at the same time maintaining a high level of accuracy. We hope to achieve this, in part, by automating outmoded clerical operations and by entirely rethinking the relationship between the data collection and data processing phases of the census.

While we do not know at this time whether a specific automation decision will, in itself, necessarily save money, we believe that our automation decisions will lead to a more efficient and accurate census. We will only invest in automation that could potentially reduce costs or that is necessary for maintaining or improving the quality of the census. Automating census operations will allow us to replace labor intensive and error-prone clerical operations with automated techniques that are quicker, more accurate, and more controllable.

Traditionally, census data collection and much of the census data processing have been paper- and people-intensive tasks. The use of automated equipment can help us reduce the mountains of paper and the thousands of clerical tasks and to deal with the whole census process in a much more efficient and controlled way.

As we examined our 1980 census experience, we found that while the census was generally a success there was a great deal of room for improvement. We determined that much of the improvement in timeliness, accuracy, and cost-efficiency could come from taking a fresh look at automation and increasing automation in the census.

While the automation advances we plan for the 1990 census will not involve the development of new technologies, they will be based on innovative applications and refinements of existing technologies. The Census Bureau has embarked on a vigorous program to examine alternative automation possibilities in test censuses before making choices for the 1990 census. We have already identified a number of areas that are candidates for automation, and have already tested most of them.

Geography

One of these areas is geography. Geographic materials are essential to a successful census for two reasons: First, having correct and legible maps helps our enumerators find every housing unit so that we have a complete count; and second, having correct boundaries and geographic information helps us assign each housing unit and the people who live there to the appropriate land area. One of our problems in the 1980 census was that our

geographic materials, including the maps, were produced in separate operations involving a great deal of clerical work. This process was slow and error-prone, leading to delays in production and errors and inconsistencies in some of the products.

Three major tools provide the geographic support for the census: maps, address reference files, and geographic reference files. Maps guide data collection, depict the geographic areas for which the Census Bureau tabulates data, and, in some cases, present data. An address reference file associates addresses with their geographic location. For example, it references 801 Main Street to block 101 because it knows that all the addresses in the street segment 801-899 Main Street are in that block. Even-numbered addresses 800-898 on Main Street would be assigned to another block. This task of assigning geographic codes is essential when taking a census by mail. Geographic reference files catalog the various geographic areas for which data are tabulated in the census and define their relationships to one another so as to allow the presentation of data by geographic area in an orderly, understandable fashion.

For 1990 we are automating our geographic support system, which we are calling TIGER (Topologically Integrated Geographic Encoding and Referencing system). TIGER will integrate into one file all the geographic information that was produced in separate operations in 1980. The key word in the TIGER acronym is "integrated." TIGER will integrate into one file all the geographic information that was produced in separate operations in 1980. This will allow us to produce the geographic products and services for 1990 from one consistent data base, and will help us avoid some of the 1980 census delays and inaccuracies. Having the computer generate maps that match the geographic areas in our tabulations will be a big improvement over the clerical operations of the 1980 and earlier censuses.

The TIGER file is really many files linked together. This structure relates all mappable features, address range information, and geographic codes, and reflects any change to one item in all other files simultaneously. It ensures that the same information appears in a geocoded address list as on a map or in a printed report.

Each record in the TIGER file will be for a geographic feature (i.e., a road, street, waterway, railroad, political boundary, etc.). The record will include the following information: the name and type of the feature; the coordinate values for each intersection point along the feature (e.g., the latitude and longitude for the point where Main Street intersects First Street); the ranges of addresses located between intersection points for streets and roads, in addition to the post office and ZIP code associated with the address range; and, for each feature segment, the codes for all geographic areas in which the segment is located.

As a start to creating the TIGER file, the Bureau of the Census and the U.S. Geological Survey (USGS) entered into an interagency cooperative agreement for the creation of the initial cartographic data base for the contiguous 48 states and the District of Columbia. For Alaska, Hawaii, Puerto Rico and the Outlying Areas, the Census Bureau is "digitizing", or capturing in computer-readable form, on a point-by-point basis, information from printed maps. (The Outlying Areas include the U.S. Virgin Islands, Guam, American Samoa, and the Northern Mariana Islands). We could have

created the entire automated digital map data base, but the Census Bureau and the USGS, by working cooperatively, can achieve their mutual goals without duplicating cost and effort.

For those areas where the initial map base is complete, we have already begun work on the second phase of TIGER file building: we are updating the digital map data base with other information that makes maps useful for Census Bureau activities. This includes adding new streets where subdivisions have been built; entering the names of all streets, rivers, and railroads so that Census Bureau field staff and data users can orient themselves; inserting the address ranges that go with each section of a street in the major urban areas; and adding the boundaries and names of all political and statistical areas for which the Census Bureau tabulates the data.

As we begin to use the TIGER file to support 1990 census operations, we will enhance the file further based on the results of these operations. Our goal is to have the TIGER system operational for use in our dress rehearsal censuses in 1988.

Address Control File

Another improvement planned for the 1990 census is the development of an automated address control file. Since we will again use the mail-out/mail-back census methodology, an accurate and up-to-date address control file is essential. In 1980, although the initial control list of addresses was computerized, changes to the address file during the census were made manually. For 1990, we will have continuous access to the automated address control file so that we can keep the list current.

With an automated address file, it will be much easier to determine whether or not we included a specific address in the file. It also will be possible to update the file where we missed an address in earlier operations. We can imprint bar codes (like those on supermarket items) on the questionnaires and use electronic equipment to read the information in the bar codes. Thus, we can use the computer for checking in and keeping track of census questionnaires instead of doing check-in manually as we did in 1980. As a result, it will be easier for our enumeration staff to identify the addresses for which questionnaires have not been returned.

Finally, with an automated address list, we can update the list and use it in our current survey programs and in future Census Bureau operations, such as the 2000 census. In our 1985 and 1986 test censuses, we successfully implemented an automated address control file and automated check-in.

Earlier Data Conversion

One of the most promising ways to take advantage of automation in the census, and our biggest challenge, is to convert the data on the questionnaires into a computer-readable format earlier in the census process than in past censuses. This approach is essential if we are going to take full advantage of automation and release data products quicker.

In 1980, the conversion of data to machine-readable form did not begin until after the district offices completed all enumeration, edits, and followups and shipped all questionnaires to one of the three automated processing centers. This was a sequential process. This meant that many completed questionnaires that could have been automatically processed early in the census, lay around for several months until the district offices closed. Also, because we did not have an automated address control file, we had to process all the questionnaires for an enumeration district together in one batch.

The automated address control file for the 1990 census will allow us to conduct flow processing, and to do it concurrently with data collection. An earlier start in 1990 (5-7 months ahead of the 1980 schedule--April instead of September-November) will allow more time for review and correction and will enable the computer to assist in certain census operations. It will contribute to the early identification of enumeration problems. Also, by converting questionnaire data to machine-readable form sooner, we can minimize the potential for losing data when original questionnaires are accidentally damaged or destroyed. Finally, and perhaps most importantly, it will help us meet our goal of disseminating data products in a more timely fashion.

Planning for concurrent processing in the 1990 census has centered around two major questions: Where and how would it be done? The "where" issue involves the number of processing offices and the degree of centralization or decentralization. In 1980, when we processed the census questionnaires sequentially, we had three processing centers. With concurrent processing, having so few centers probably would not be feasible, primarily because of the need to move materials quickly between processing and collection offices. Greater centralization of processing activities also places greater staffing burdens on us, i.e., the need to hire more employees in one employment area.

We weighed these concerns against problems related to decentralization--the need for more hardware to service a greater number of locations and the difficulties of controlling and supporting many processing offices.

The "how" issue involves the technology we will use to convert questionnaire data into a computer-readable format. In the 1980 census, we employed the FACT-80 system (with FOSDIC technology as the base) to convert microfilm directly to computer tape. FOSDIC stands for Film Optical Sensing Device for Input to Computer. FACT stands for FOSDIC and Automated Camera Technology. The complete data-conversion system consists of high-speed cameras that film the questionnaires, film developers to process the raw film into rolls of microfilm, and the FOSDIC machines that read the data from microfilm onto computer tape.

We also looked at key-entry as a possible primary data conversion methodology. Both FOSDIC and keying are tested methodologies that have proven workable over the years. Because there are technical limitations to how many FOSDIC systems we can build and maintain for 1990, we had considered data keying to give us maximum flexibility in decentralization. Keying was not considered as a viable option as the sole data conversion technology for the entire census because of the large numbers of keyers and key stations that would be required.

Earlier in our planning we had also considered a third technology--optical mark recognition (OMR). OMR provides direct input of data into computer, whereas with FOSDIC the questionnaires must be filmed first. As with keying, we considered OMR to allow us more flexibility in decentralizing our processing. We tested OMR in our 1985 census in Tampa, Florida. Based on some of the problems experienced with OMR in this test, and on other concerns about cost, timing, environmental controls, and so on, we decided not to pursue further testing of OMR technology for use in 1990. We will, however, consider testing OMR and other technologies in 1990 for possible use in the 2000 census.

A decision about which kind of data conversion technique to use is a very individual one. What is best for one country might not be best for another. In appendix 1, I have listed some of the "pros and cons" for each of the three data conversion techniques we considered.

After reviewing these two main issues--where and how--at planning conferences and in internal working groups, we have reached some decisions. We have decided to set up eleven processing centers for the 1990 census where we will use FACT 90 (an update of the 1980 system, still with FOSDIC as the base) to convert the data to machine-readable format.

We determined that having two primary data conversion technologies (FOSDIC and keying) would have excessively complicated our processing system for 1990. We will use keying only as a supplement to FOSDIC for entering some of the handwritten data on the questionnaires into computer-readable form.

We will have two types of district offices for which the questionnaire flows will be different. For district offices in certain high population density areas the processing centers will receive the questionnaires, perform automated check-in using laser sorters, immediately convert the questionnaires to computer-readable form, and thereby perform an automated review of the questionnaires (edit). The district offices covered by these processing offices will likely correspond to some of our "centralized" offices in 1980--the more hard-to-enumerate urban cores where recruiting enough temporary census workers can be difficult. These district offices will not need to hire many office clerical workers and can concentrate on field follow-up activities for households that did not mail back their questionnaires or that mailed back incomplete questionnaires.

District offices in the rest of the country will receive the returned questionnaires; use pencil-shaped, electronic "wands" attached to micro computers to read the bar codes on the questionnaires and, thus, perform automated check-in; and conduct clerical edits for completeness. Once

questionnaires pass the edit, they will be sent on a flow basis to a processing center for data conversion (using FACT-90).

This decision represents a careful balance of staffing, equipment, and workload considerations as they relate to the processing and collection offices. We will have an automated address control file and automated check-in for the entire area covered by the mail-out/mail-back census, and we will achieve our goal of concurrent processing by converting questionnaire data to computer-readable format on a flow basis, several months earlier than for the 1980 census.

Computer Edits

Another area where we will increase automation is questionnaire edit. Edit is a repetitive and monotonous job better suited to computers than people. Entering data from the questionnaires into the computer earlier in the census process will allow computer editing of the questionnaire data earlier than ever before. These edits will check the completeness and consistency of the data. In 1980, the questionnaires were manually edited in the district offices, basically to check that they had been answered completely; then, once the questionnaires went through the FOSDIC machines, the computer edited them for completeness and consistency. For 1990, manual editing would be eliminated in some district offices and replaced by computer edits.

Automated Coding

Another promising automation technique relates to the coding of handwritten entries on the questionnaire. In 1980, manually coding the handwritten entries on questionnaires involved a large, time-consuming, and costly clerical operation. For 1990, we might be able to key handwritten responses into the computer and specially developed software would assign the appropriate computer-readable codes. We cannot eliminate all clerical involvement in coding, because some handwritten responses will be incomplete or uncodable and will have to be handled by our referral units. We will, however, be able to significantly reduce the amount of manual work and, thus, save time and improve the quality of the data. Instead of a clerk having to look up the occupation "statistician" in a reference manual, find the numerical code, and fill the appropriate coding box on the questionnaire, the clerk can type in the word "statistician" and the computer will automatically assign a code and enter that onto a computer record. Thus, the time-consuming lookup and circle-filling are eliminated.

At this time, we do not know precisely the extent to which the computer will be able to assign codes as opposed to clerical intervention. The extent of computer-coding will vary by the three types of coding--(1) general (e.g., race, ancestry, language, income), (2) industry and occupation, and (3) place-of-work/residence 5 years previously--with the highest level of automation likely achieved for general coding. For all types of coding, the initial key-entry of write-in answers will occur in the eleven processing centers. We have not

yet determined the sites for clerical referral coding, except that each type of coding would be done in one location. We may do clerical coding for all three types in one location.

Management and Administration

We will also use automation to help us plan and monitor the census. The Census Bureau is developing an automated management information data base to see that we meet key dates in making decisions for the 1990 census. The management information system was in place to help us keep track of operations for our 1985 and 1986 test censuses. In addition to serving as an aid in planning the 1990 census, the management information system will give us up-to-the-minute cost and progress data so that we can monitor actual 1990 census operations. In 1980, cost and progress reports were not integrated with other management reports, and some of the cost and progress information was several days old by the time managers received it.

Automation will help us control and monitor many other administrative functions. We will have an automated payroll system, as in 1980. And for 1990, we will also have, on a microcomputer, a new automated employee file that will help us organize needed information about our large temporary work force. (We did this in our 1985 test census.) For instance, we will know whether we are meeting our hiring goals in each enumeration area and we can use the file to help us make enumerator assignments. We will also have a new automated inventory control system to manage the procurement and distribution of the large volume of specialized supplies needed to take the census.

Standardized Processing System

The Census Bureau has also developed an off-the-shelf Integrated Microcomputer Processing System. This system, which we refer to by the acronym IMPS, was developed by our International Statistical Programs Center (ISPC) as an attractive (i.e., low cost and decentralized) alternative for developing countries, where mainframe computing has often been problematic. We are also examining the potential for using IMPS to process the census in our Outlying Areas for the 1990 census. The Outlying Areas include the U.S. Virgin Islands, Guam, American Samoa, and the Northern Mariana Islands.

As it now stands, the IMPS system encompasses data entry, editing, and tabulation; it eventually may also be expanded to include data analysis capabilities. A standardized set of software, called ENTRY POINT, is used for data entry. ISPC has developed microcomputer versions of its CONCOR software program for editing and its CENTS 4 program for data tabulation.

Last summer, ISPC staff helped set up a microcomputer system to process the census of Ponape, part of the Federated States of Micronesia. The Federated States of Micronesia were included in the 1980 Census of the United States as part of the Trust Territory of the Pacific Islands, but have since

entered into a compact of free association with the United States, so they will not be enumerated as part of the 1990 U.S. Census. Ponope had about 22,000 people in 1980 and did not have access to a mainframe computer.

The ISPC trained two persons working on the Ponope census, who despite having no previous experience with computers, learned the user-friendly system very quickly. ISPC provided 3 IBM PC/AT's and associated equipment and the CONCOR and CENTS 4 software. In general, the IMPS system worked very well. Ponope census processing is already completed and the equipment will be used in the next year or two to process censuses of the other three states of the Federated States of Micronesia.

Closing

The unique nature of the census has made planning for increased automation very complicated and challenging. The census occurs infrequently--only once every 10 years and it is a massive undertaking.

We get only one opportunity to take the census correctly, so there is little margin for failure. That is why one of our major concerns has been to minimize risk. We must use automated equipment that is tested and proven and for which we will have adequate backups. Because we will require thousands of temporary census workers, any equipment that we widely distribute must be relatively simple to operate. One of the reasons we have had to make major automation decisions early is to allow time for procurement of equipment for use in our 1988 dress rehearsal census. We cannot risk using any automated systems in 1990 that have not been thoroughly tested.

Cost and usefulness after 1990 have also been primary concerns in our automation planning. Any automated equipment we use must be reasonably priced and have utility after 1990--either for use in other Census Bureau programs or for sale to other agencies or the private sector. We do not want warehouses full of unused equipment after the census.

We considered all these factors in reaching our automation decisions for 1990. We believe we struck the appropriate balance by automating wherever we could without posing undo risks for the census.

While we have not gone as far as some would have liked, we will have an automated geographic support system, an automated address control file, automated questionnaire check-in, automated questionnaire edit, automated coding, automated management information and administrative systems, and we will employ new office and equipment configurations that will allow us to begin the data conversion much earlier than for the 1980 census. Our district offices will look quite different. Instead of just paper and cardboard (there was virtually no equipment in 1980, except for facsimile copying machines in some offices), each office will have a number of microcomputers to handle check-in, address control file updates, cost and progress reporting, keying of data, and so on.

The 1990 census will mark the 200th anniversary of census-taking in the United States. The Bicentennial Census will be the biggest ever, as the number of people and housing units will have increased since 1980. We are striving to make it the best ever, as well. Many of the automation decisions discussed here should help by making the census operations more cost-effective and leading to the collection of more accurate data. Increased automation will also permit us to process the data more accurately and faster, allowing us to release data products in a more timely manner.

Appendix 1. Some Major Pros and Cons
of Three Data Conversion Techniques

KEYING

Pros

1. Most flexibility in questionnaire design and paper specifications.
2. Relatively easy to maintain and to provide backups.
3. Makes coding write-ins easier.
4. Questionnaire editing can be done at the point of entry.
5. Vast experience of many countries that have used key-entry.
6. Fewest environmental controls.
7. Even if optical mark capture is used, a sizeable number of questionnaires will need correction by key entry anyway. Since you have to manually intervene, it might be more efficient to key the whole questionnaire at once.

Cons

1. Subject to keying error.
2. Requires largest staff of three options.
3. Relatively slow and expensive, especially if you need to verify for accuracy.
4. Appears "old-fashioned."

OPTICAL MARK READER

Pros

1. Automatic entry of precoded responses in one step.
2. Allows automatic questionnaire edit at point of entry.
3. Faster and more accurate than keying.
4. Minimal workflow problems, since it is a self-contained system.
5. Appears to be an advance.

Cons

1. Would require many machines with limited use after
2. Relatively expensive.
3. Write-in entries would still need to be coded.
4. Relatively untried; little census experience with this system.
5. There are some questionnaire design and paper quality restrictions.
6. Machines are sensitive to temperature and humidity; therefore, difficult to decentralize.
7. Would not provide an archival copy.
8. There are difficulties in handling a multi-page questionnaire.

FILM-TO-TAPE (FOSDIC--Film Optical Scanning Device for Input to Computer)

Pros

1. Automatic entry from precoded responses.
2. Fast, accurate, and least expensive of three options.
3. Proven system; the United States has much experience with it.
4. Few procurement problems for the United States and can be used after census. (This advantage might not hold true for other countries.)
5. Immediate archival copy.

Cons

1. Requires microfilming; a two-step process means more workflow problems.
2. Questionnaire editing cannot be done at point of entry.
3. Significant restrictions on questionnaire design and paper quality.
4. Cannot be widely decentralized because of limited number of machines and engineers available.
5. Write-in answers have to be coded separately.

6. Appears to be "same old thing."
7. Questionnaires may need to be "cleaned up" before filming.

Eleventh Population Census Conference

East-West Population Institute

Sydney and Canberra, Australia, February 9-13, 1987

RECOMMENDATIONS OF THE ESCAP REGIONAL WORKING GROUP ON
THE 1990 WORLD POPULATION AND HOUSING CENSUS PROGRAMME

by

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WORLD POPULATION AND HOUSING CENSUS PROGRAMME

I. Introduction

The universality of census-taking in the Asia-Pacific region, as indeed throughout the world, establishes population data in a central role in national statistical and information systems. Few national development plans fail to draw extensively on the data generated from the regular cycle of housing and population censuses. Information on levels and trends in movement of the most important demographic and related variables provide key inputs into the planning process. These in turn give rise to the need for more detailed and regular demographic statistics to assist in monitoring the progress of development programmes and in evaluating their impact and success.

Reflecting this position, the United Nations has maintained an active programme of encouragement and technical assistance to countries wishing to conduct censuses. At the global level the United Nations, through its Statistical Office, (UNSO), has produced a regular series of principles and recommendations^{1/} to guide countries in housing and population censuses. The regional commissions, in close consultation with national statistical offices and other experts, have produced recommendations felt to have higher relevance to the regions. To further focus attention on censuses and related activities, the United Nations has declared each decade of population and housing censuses as a world programme.

The current programme decade differs in many respects to the previous ones. Much attention was focussed after World War II in encouraging countries who had not done so far many years, to conduct a population census. There was also a strongly felt need to develop international standards in the design of censuses and in the conceptualisation, definition and measurement of units and variates that would provide the bases for statistical tabulations. This attention culminated in the 1980 recommendations.

In May 1985 the United Nations Economic and Social Council adopted a resolution requesting the Secretary-General to develop the 1990 World Population and Housing Census Programme, covering the decade 1985-1994. Under the direction of the United Nations Statistical Commission, the UNSO convened an Expert Group meeting in late 1985 to prepare for the World Programme.

In its deliberations on the future direction of the recommendations the Expert Group acknowledged their widespread use and the important part they had played in the development of census methodologies through the standardisation of census practices and more generally in providing a medium for the international exchange of information and experience. Most of the principles and recommendation remained valid for the new census decade and thus it was agreed that no major revision to the 1980 recommendations was required. To take account of new developments, for example in the revision of classifications of economic activities, it was agreed that supplementary recommendations would be produced at the global level.

1/ Principles and Recommendations for Population and Housing Censuses, United Nations publications, Sales No. E80.XVII.8

To further consider work undertaken in preparation for the next census round, and to determine a course of action appropriate to its member countries, ESCAP scheduled two Working Groups, one for Asian countries and one for Pacific countries, on the regional approach to the World Programme. The Asian Working Group was convened in November 1986 while the Pacific Working Group is planned, in co-operation with the South Pacific Commission, to be held in June 1987.

The Asian Working Group, financed by the United Nations Fund for Population Activities (UNFPA), was attended by 36 participants from the following 25 members and associate members of ESCAP: Afghanistan, Australia, Bangladesh, Bhutan, Brunei Darussalam, China, France, India, Indonesia, Islamic Republic of Iran, Japan, Lao People's Democratic Republic, Malaysia, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, United States of America, Vanuatu, Viet Nam and Hong Kong. Representatives of the United Nations Centre for Human Settlements (UNCHS), UNFPA, and United Nations Educational, Scientific and Cultural Organization (UNESCO) also participated. Observers were present from the UNDP/UNCHS Regional Cities Development Project Phase II, Bangkok. The agenda included a review of the Asia Pacific recommendations (APR) on demographic, economic and housing topics, an examination of the recent population and housing census experience in the Asian subregion, and, in keeping with the UNSO position, a consideration of supplementary recommendations, for the 1990 census decade, the problems and needs in data processing, the uses of sampling in population censuses, and technical co-operation and financial support required during the decade. A similar agenda has been proposed for the Pacific subregion.

This paper summarizes the discussions of the Working Group and presents a summary of the recommendations emerging under various agenda items particularly "Regional approach to the 1985-1994 decade of population and housing censuses".

II. Recent Census Experience

The Working Group felt that a recent survey by the Statistics Division on the 1980 round of population and housing censuses provided valuable insights into census experience in the region. It illustrated the important role played by population and housing censuses in the development of national statistical capabilities. Many of the advances in computerization, especially in the fields of software development and data capture, and in the integration of operations such as data processing and printing, resulted directly from national census programmes. Far greater use had been made of sampling, both in census field work and tabulation, and in imputation to speed up data collection and processing.

Significant improvements on various aspects of population and housing censuses had been achieved during the past decade. Many countries reported progress in areas such as mapping, questionnaire design, pilot testing, enumeration, data capture, coding, editing and imputation, sampling, dissemination of data, and evaluation which had led to improvements in the efficiency of census operations and in the quality and utility of data. More elaborate census control systems had been adopted, for example, some countries reported efforts to computerize the control operations utilizing bar codes. Other significant developments included the establishment of data bases utilizing census records, increased emphasis on the collection of data on households and families, and the growing importance of

dissemination of data at local levels.

One common theme that emerged was the need for active and extensive publicity, utilizing every possible venue. Training was considered crucial and most countries reported marked improvements in training of field staff, including a greater use of audio-visual equipment.

It was recognized that there were still many common problems that needed to be addressed. For example, personnel recruitment and quality of staff remained as major concerns, especially in the larger developing countries. In some cases, the problem of recruitment of a large temporary field force of desirable skill was insurmountable. Another major problem of personnel management was high turnover among staff, especially computer personnel. It was felt that the national statistical offices should make a positive commitment to develop greater skills and capacities in some key areas such as cartography and printing. On this same theme, countries recognized that the Statisticians had an expanding role to play in further analysis and data utilization, and many felt a compelling need to develop the appropriate analytic skills which were generally lacking in the national statistical offices.

Despite the availability of external assistance in the procurement of computer equipment for their censuses, some developing countries experienced difficulties in the effective utilization of their facilities, mainly due to delays in installation. Other problems reported were various kinds of resistance towards census data collection and attempts to influence census results by certain groups. Such attempts were usually politically or economically motivated. Some countries reported budgetary constraints among the reasons forcing change to census operations.

III. Recommendations for the 1990 Population and Housing Census Programme

The Working Group agreed that the Asian and Pacific Recommendations² generally remained valid for the 1990 census decade (1985-1994). That did not, however, preclude the need for supplementary recommendations and changed emphases in the light of new developments and needs. It suggested that mechanisms would need to be set up to review the changing needs of countries and that to make full use of the Working Group, its report and recommendations should be presented to the next ESCAP Committee on Statistics for its views.

Topics to be investigated

The Working Group reviewed recommendations on topics and tabulations for the 1980 population and housing census programme in three specific areas:

- (a) demographic topics
- (b) economic topics
- (c) housing and other topics

2/ Asian and Pacific Recommendations for the 1980 Population and Housing Censuses (ST/ESCAP/52)

(a) Demographic topics

The Working Group reaffirmed that the demographic topics recommended for investigation in the 1980 census round would essentially remain valid for the 1990 round. However, it stressed that in the selection of topics priority should always be given to meeting the needs of development planners and other important national users.

The Working Group recommended that, where civil registration was poor and no alternative sources for reliable demographic estimates were available, fertility and mortality topics should be included in the census. Where complete census enumeration was likely to produce results of insufficient reliability, consideration should be given to including fertility and mortality topics on a sample basis. That approach could increase control, reduce costs and result in considerably better estimates. A far greater emphasis on sound design, training and field-work was recommended.

For the measurement of fertility and mortality, in countries where the census was the main source of demographic data, It was recommended that questions on age and duration of marriage, on births during the last 12 months and on whether the last live-born child was surviving should be included under "recommended topics" rather than "other useful topics".

While there would be no change to the list of topics recommended for the 1980 census round for the measurement of migration, the Working Group reaffirmed that the inclusion of topics covering place of residence "n" years ago or duration of residence and place of previous residence provided useful data for measuring internal migration flows. Place of birth was considered to be an important migration topic and the need for its inclusion in the census was reaffirmed. The importance of measuring migration to the urban areas was stressed.

(b) Economic topics

In view of the revised ILO standards, to obtain comparable economic data for the 1990 round of population censuses, much greater effort than in past censuses would be needed. A large number of probing questions, for example, would have to be asked regarding the precise status of economic activity.

Even though the use of either "usual" or "current" activity concepts had advantages, the Working Group felt that it would be difficult or expensive to collect data in a census using both the approaches simultaneously. To assist in making a choice, it suggested that it might be useful to study their interrelationship through carefully designed employment-unemployment surveys. The choice of approach should also take into account seasonality in economic activity, existence of a current post-censal survey programme and comparability with data from other censuses and surveys.

A number of additional items such as "duration of unemployment" which were useful to some countries, might be canvassed in the census programme on a sample basis. They might form part of a detailed or long questionnaire, restricting the universal questionnaire to only a limited number of basic questions.

The Working Group recommended that attempts should be made to collect at least sample data on both the new and old ILO standards. Where the new standards were introduced, therefore, more detailed probing would be

necessary on such topics as the nature and hours of work by unpaid family workers, and persons without work, to enable a limited comparison to be made.

Revision and development of classifications

The Working Group recommended that ILO and the United Nations Statistical Office should make every effort to release the new versions of ISCO and ISIC by early 1989. Great concern was expressed as to the comparability of time series with the adoption of revised classifications. It noted that assistance from ESCAP and ILO could play an important role in assisting countries in adopting the new classifications.

(c) Housing topics

The Working Group recommended that greater attention be paid to providing information of use in tackling problems of sub-standard shelter and the homeless and in meeting data needs arising from the International Year of Shelter for the Homeless. The 1990 census round should provide measures of the housing stock and characteristics and relate those to living quarters and households. The Working Group stressed the importance of providing housing data for small geographic areas and, as far as possible, of cross-tabulating data on structures with the socio-economic characteristics of occupants, with appropriate attention to marginal housing units and the homeless.

Cartography

Several countries identified mapping and graphics as among major areas where improvements were most needed. Inadequacy of maps and dependence on other agencies had led to poor coverage and maintenance, inefficiency in fieldwork, and increased cost. The Working Group accorded high priority to the development of maps for censuses and to the establishment of permanent capability in cartography, where possible within the census or statistics organization. It recommended that efforts should be made to develop and improve capability in the use of automated cartography and other graphics in data presentation and analysis. It emphasized that cartographic information and material produced for censuses would be valuable for other government and private users.

Effective review procedures

The Working Group noted that the United Nations recommendations had emphasized the importance of systematic recording and dissemination of the census experience. Considerable progress had been made by some of the countries of the region in evolving comprehensive census review procedures with the aim of introducing improvements to the next census. The Working Group recommended that countries should continue to develop effective review mechanisms. Post-enumeration surveys could play an important role and thus their scope should be broadened to encourage greater use in future censuses. It was noted that some countries of the region had procedures whereby review reports on various aspects of the design, data processing and dissemination of the census were prepared through post-enumeration surveys and post-censal research programmes. It was recommended that ESCAP should collect and disseminate the experiences of those countries.

Data processing

Based on the experience in the 1980 census round, strategies for effective data processing for the 1990 round were elaborated. Those strategies included early planning, placing the highest priority on timeliness (and, where appropriate, producing an advance range of tabulations), streamlining coding through testing and proper design of the questionnaire, carefully evaluating the various options in data entry and processing, and determining strategies for tabulation and printing. There was also a need for close co-operation between data processing staff and subject-matter specialists at all stages, while for some processes, such as in the editing of data, it was absolutely essential.

Bearing in mind the rapid development of computer technology, the future implications for census data processing was discussed. The potential uses of microcomputers were highlighted. Among the advantages of microcomputers was that they could be used for many purposes such as data entry, editing, and control and analysis of data. It was felt that despite the rapid growth in the use of microcomputers, especially amongst subject-matter statisticians, mainframe computers would remain important in many countries.

Experience with optical readers (OMR/OCR) for data entry was highlighted by countries which had used those devices. The special attention of countries which planned to use an OMR system was drawn to problems in the selection and quality of the paper, choice of the ink and the printing of the census document, and appropriate procedures for ensuring that the OMR machine was reading consistently while in operation. It was suggested that a more sophisticated OMR system was needed for census work which would accept larger sheets of paper and read a wider range of marks.

The need to consult closely with users on tabulation programmes was emphasized by the Working Group. It noted that there were instances of unnecessary tabulations being produced, the result of inadequate consultation with users. But the Working Group stressed the importance of providing facilities for meeting ad hoc statistical needs. Options included the production of a range of summary files, public use sample files or the provision of facilities for processing unit record data files. Such approaches might also provide additional revenue to the statistical organization if users of the facilities could be charged. The Working Group recommended that for the effective utilization of modern computer technology, careful assessment of options should be made in meeting needs, with due regard to the advantages and limitations of each. In discussing the merits of generalized software packages, the Working Group felt that while they had some obvious advantages over tailor-made programmes, they too often had limitations. Usually, generalized software was not as efficient as the tailor-made software. The Working Group recognized that there was a need to assess both the strengths and limitations of generalized software packages carefully before they were utilized for census data processing and tabulation.

Census organization

The Working Group recommended that greater recognition should be given to the role that the census organization could and should play in the statistical system of a country. Efforts should be made to maintain some core census organization on a permanent basis, which would help to improve future censuses through adequate preparatory work and research.

Timeliness of dissemination

It was noted that the quick release of relevant and accurate data was important and, if achieved, could raise the standing of the census organization. The Working Group recommended, therefore, that every effort be made by countries to improve the timely release of data. The use of the census to establish a sampling frame should also be fully exploited to gain the support of the users and producers of statistics.

Small-area statistics

In view of the increase in the demand for information at the local level, and because the census was often the only source of data at that level, the Working Group recommended that the census organizers should give greater emphasis to meeting demands for small-area statistics.

Sampling in census data collection

The Working Group suggested that it was important to weigh the advantages and disadvantages carefully before deciding to use sampling in a census. Other options for collecting additional data in a cost-effective manner should also be considered before undertaking sampling in a census programme. Moreover, various factors such as the availability of a suitable sampling frame, the sample size required to provide the desired level of data disaggregation, the proposed contents of the sample questionnaire vis-a-vis the main census schedule, the timing and conduct of the sample enumeration, the issues in processing, analysing and disseminating data collected through sampling, and the evaluation of the precision of the sample results had to be carefully considered.

The Working Group stressed that the size of a sample should be determined largely by the levels of disaggregation of data that were desired by users. The inefficiency of sampling in providing small-area data had to be recognized as a necessary cost or constraint to sampling. Inordinately large samples would make the control of non-sampling errors difficult, would delay the processing of the main census, and in addition would not be cost-effective. The final choice of topics to be canvassed through sampling and through the main census had to be considered carefully in the light of user priorities.

The uses of sampling, either simultaneously with the main census operation or as a follow-up operation after the completion of the main census field-work, were both reported by countries of the region. Simultaneous execution of sampling along with the main census operation had the advantage of reducing cost as well as training requirements; however, the Working Group noted that the approach could detract attention from the main census operation, raise problems associated with respondent burden, and introduce household selection bias if special precautions in control and supervision were not taken. Sampling after completion of the main census was felt to be better in these respects since the census sampling frame could be used and the selection of sample households could be made at census headquarters, thereby avoiding the bias toward selection of small-sized households; however, that could involve an additional training burden on the part of the sample organizers.

Generally, the Working Group felt that sampling offered a cost-effective option for most countries in the region in augmenting the main field data collection in their censuses.

Sampling in data processing

Several countries in the region, particularly those with large populations, had utilized sampling at the data processing and tabulation stage to release census results quickly. The Working Group acknowledged the value of sample processing and emphasized that the sample plan, including sampling design and selection, should be developed in advance. Estimation procedures also had to be clearly set out and followed. Nonetheless, the Working Group reiterated that certain items, such as literacy, education and employment, which were essentially required at the local level for action-oriented programmes, could not be reliably derived at those levels from sample tabulations; for such detailed information there was no alternative to processing census data on a 100 per cent basis.

Intercensal demographic surveys

The Working Group felt that the conduct of intercensal demographic surveys was necessary to provide current data on fertility, mortality and migration for policy and planning purposes. Such surveys provided an effective user service, particularly in countries where the civil registration system was deficient. Intercensal demographic surveys utilizing the census frame provided an important link in the overall census-based data delivery system.

It was noted that interest in the dual-data type of demographic survey was reviving among countries of the region. Apart from intercensal surveys, the dual-record approach was used extensively in census evaluation through the post-enumeration survey.

Technical co-operation

Although the technical capabilities of Asian countries might collectively be more advanced than those in other developing regions, there was still a wide variation within the region. Moreover, the number and quality of available staff and high turnover still posed major problems, particularly in countries with inadequate statistical infrastructure. Accordingly, training needs varied widely. While the Working Group recognized that emphasis should be placed on training in specialized areas, the training needs of statistically least developed countries in general census topics, including planning and organizational aspects of census-taking, should not be neglected. The Working Group noted that some developing countries now possessed sufficient census expertise to require only short-term advisory assistance and then most often only in specialized areas of census-taking. For the statistically least developed countries, while short-term assistance was also useful, there remained a greater need for long-term resident advisers. The Working Group recognized, however, that the success of resident advisers depended on how easily they could assimilate and on the capacity of the recipient country to provide suitable counterpart census staff. In providing technical assistance national capability-building remained the prime long-term consideration. It was noted that ESCAP regional advisory services on the organization and conduct of censuses and on data processing had been extremely useful and successful. While those services were still very much required, there was a strongly felt need for additional advisers on demographic statistics to assist with the 1990 census programme with emphasis on special areas such as migration and cartography.

Technical Co-operation among Developing Countries (TCDC) as a means to transfer technical information and skills was stressed by the Working Group. Sharing experiences and expertise, particularly on innovative methods and materials developed, would result in better quality data, and in the longer run could lead to substantial savings in time and money.

Note: This paper has been produced without formal editing. The presentation of material therefore, does not necessarily imply endorsement by the United Nations.

NEW DIRECTIONS IN CENSUS - TAKING

INTRODUCTION

We know from archaeological findings that the ancient Babylonians conducted censuses as far back as 3800 B.C.. Almost 2000 years ago, in the year 5 B.C., Caesar Augustus ordered the census of the Roman Empire extended to include all its regions and lands. In China, at the same time, the Early Han Dynasty was at its zenith and censuses had already had a long history there. Each of these civilizations did its best to enumerate the world of its day.

I am pleased to state that as of this decade the known world, the entire planet Earth, has at last been enumerated. Most of you were involved. Today we end a week of discussions and cooperation leading to the round of 1990 Censuses. Have our jobs changed that much from the times of Roman Caesars and Chinese Emperors? No, in the sense that we will do our best to count all the inhabitants of our respective nations. Also, no in the sense that censuses are important. But yes in two very important ways.

First, unlike our predecessors who enumerated primarily to assess taxes, conscript armies, and register selective citizenship our data will be used for government representation, social services planning, and economic development and planning.

Secondly, the way we take our censuses has not only changed and improved our work, but changed the world as well. We often overlook this aspect of census-taking in our day to day hectic schedules and it is a theme I want to illustrate in addition to profiling new directions in census-taking.

I will briefly review some past new directions in census-taking to support my theme followed by a profile of new directions already incorporated into the 1990 Census of the United States - our Bicentennial Census. I am including both innovations originally developed at the Census Bureau and those we adopted and adapted from elsewhere. Then, I will present some more speculative ideas of how we might be taking censuses in the next century.

PAST CENSUS-TAKING INNOVATIONS WITH WORLD-WIDE EFFECTS

Automated Data Processing

Undoubtedly the most important census-taking innovation to affect the world was the development of automated data processing. The Hollerith punch card technology used in the 1890 Decennial Census of the United States was the predecessor of the modern computer. The first general-use computer, UNIVAC I, was used for a part of the 1950 Decennial Census. Now, mini- and personal computers are becoming the norm throughout the world. There were an estimated 22.6 million personal computers installed in the United States as of 1985, almost one for every ten people.[1] Computer technology has certainly changed modern civilization.

Census Tests and Dress Rehearsal(s)

The Census Bureau's highly visible and successful census-testing program probably influenced other government and business community research and development practices. The concept of an ongoing series of tests leading to a dress rehearsal prior to the real event is widely used in various forms and under different names. Program evaluation, demonstration projects, product research and development, and test marketing are examples.

Since 1939 we have tested parts of, or entire census-taking systems in preparation for decennial censuses. This permanent testing program includes nationwide content surveys, publicity campaigns, small focused censuses, and dress rehearsals of entire cities and counties. Because of this program we are able to evaluate technological, management, and content alternatives and incorporate new census-taking directions into final plans and procedures.

High-Speed Document Processing and Storage

FOSDIC, Film Optical Sensing Device for Input to Computer, was developed in the United States for the 1960 Census. That technology directly led to the development of high-speed Optical Mark Reading technology that also creates a microfilm archive, an improvement on previous OMR technology. Many of you have or are planning to use this technology.

The development of the bar-code system to rapidly check-in census documents in the mid-1960's led directly to the point of sale scanners you find in some grocery stores here in Canberra. The small lasers read the universal product bar code on the package, look up the correct current price in the store's computer, and update the store's inventory. In 1990 we will add automated envelope sorting and opening machinery to the check-in system. We estimate over 10,000 census forms will be checked-in hourly per machine as a result.

Our Census Bureau tape library at one time held over 300 thousand tapes and we developed a high-speed tape retrieval system now used by hospitals and other large record keeping businesses.

These three census-related technologies are and will have larger impacts on many societies in the decades ahead. For example, imagine being able to submit a tax form to a high-speed Optical Mark Reader directly linked to a computer that edits your entries and checks your math. You would know immediately about any problems. Or, in a educational setting, a student would know his test results immediately after taking an exam.

Sampling Theory and Methodology

Sampling theory development at the Census Bureau in the 1930's has had an indirect effect on almost everyone who watches television, buys a consumer product, or votes in an election. Television programs in the United States come and go based on the viewing habits of a sample of the public. Marketing research and public political opinion polling are essentially based on sampling methodologies. It is hard to imagine a world without cancelled TV shows, advertising that cites survey results, or election projections. Just 40 years ago that was the case. The ability to determine overnight the behavior or opinions of a nation is an awesome impact of census-taking research.

NEW DIRECTIONS FOR THE 1990 BICENTENNIAL CENSUS OF THE UNITED STATES

These past examples are convincing evidence that some census-taking innovations have a world-wide impact. My colleague, Assistant Director Peter Bounpane, will be detailing test census results and our 1990 Census plans later today and he already discussed automation on Tuesday. I want just profile the new census-taking directions we are going to use in 1990. Please keep in mind my theme: how some of these new directions might impact the world at large.

Minority Behavioral Research

Sophisticated behavioral research of traditionally under counted and new populations like the Cambodians and Vietnamese will improve our 1990 Census. But just as important, the understanding and relationships between populations within America and even the world at large will benefit.

We have found as a result of studying recent Asian immigrants that their concept of a household - an extended family with diversified living arrangements - may help us enumerate Americans who do not fit into our traditional idea of a household - a two-generation family in a structure at a fixed location. Also, several of your nations are multilingual. How you measure and tabulate language data will help us, and the world as a whole, to

better communicate. Some of the behavioral findings may spill over into economic areas as well and help in foreign trade statistical programs.

Automated Census Mapping System

Our 1990 Census maps will be stored and printed by computers. This automation is integrated with other mapping functions of the United States Government and has several spin-off uses. The On-Board Navigation System, a computer mounted in an automobile that shows the driver the best route to the next destination, is a product already available in some automobiles that will probably use a version of our 1990 automated map files. No more driving and reading a map at the same time!

Government agencies are looking at our map data base for natural and industrial disaster planning and response since the road network and population data will be integrated into one data base. Our transportation agencies are interested. They could finally build one national up-to-date data base of roads and bridges for inventory and research purposes.

Automated Coding and Editing

The medical industry is already using some of the automated coding software to develop computer aided diagnosis of a patient's symptoms and vital signs. Advanced 5th generation computer and sophisticated artificial intelligence research will be aided by decision and mathematical theory being developed for the automated coding and editing of the 1990 questionnaire.

Concurrent Processing

An estimated 110 million questionnaires will be collected, edited, and basic data captured and tabulated within six months of Census Day, 1990. Each form will be processed individually on a flow basis instead of waiting for completion of whole census enumeration districts as we did in 1980. This process has already been tested successfully in 1986. Does this high-speed high-volume processing ability, concurrent with field collection activities, suggest regional, hemispheric, or even global statistical programs and cooperation? I am sure at least our Indian and Chinese colleagues with their very large populations will be interested in our results.

FUTURE PROSPECTS IN CENSUS-TAKING

Next, I turn to the more speculative ideas and new directions that we are exploring for censuses in the next century. I know you have ideas because I have heard some of them this week. We all need to keep in mind just how important our ideas are outside

of our profession as I have demonstrated. Now, to turn to the turn of the century!

Census Cost Minimization

The usual way of taking a census is like growing a crop on a field. You plow the whole field, spread the seed, harvest the crop, wait several months, and then start all over again next season. Sometimes the crop is improved with fertilizer or better weather. During the off season the expensive tractor and plow sit and rust. Is there a better way altogether that would minimize the cost of a census?

We have discussed the idea of a permanent or rolling census that covers different areas of the nation each year and covers the entire nation over a five to ten year cycle.

Another way of minimizing costs is to share the computers and staff with other nations, or with other governments, institutions, and businesses within the same country, between the censuses. Either approach would share the cost and maintain the state-of-the-art of the technological and human investments.

We all know that a census is necessary to update or create the sampling frame for other surveys and updates of census information. Or is it? Is sampling theory fully developed? Our researchers are continuing to explore new statistical and mathematical theory looking for possible alternatives and improvements to the current state-of-the-art of sampling.

Encouraging Participation in a Census

The many efforts to encourage individuals and institutions to participate in our census are exhaustive and well documented. Any new or improved successful means of motivating large numbers of people to take specific actions will be closely watched; by everyone from advertisers to politicians to advocates of causes like arms control and environmental protection.

Small Area Estimation and Adjustment

The Australians have been successful in adjusting final results of their 1981 and 1986 censuses. But more work is needed to be able to make small area estimations and adjustments without a large-scale post-enumeration survey. We are looking into this area.

Satellite Geocoding and Imagery and Aerial Photography

The technology exists to stand in front of a housing unit with a small device, press a button, and an overhead satellite returns

the exact longitude and latitude within a few feet. Aerial photography has also become very sophisticated and exact. It could be used to locate housing in rural areas and, perhaps, even satisfactorily estimate population counts between censuses. Satellite imagery that detects the body heat of people is another potential. We haven't had great success with aerial photography and satellite systems are expensive but maybe these technologies could be improved and/or shared.

Direct Response Entry

There is already the capability of an interviewer, either in person or via telephone, to enter responses directly into a minicomputer. Why couldn't the respondent enter responses directly via a touch-tone telephone? Could a non-touchtone telephone be used? Could portable telephones be used in areas without phone service?

In some remote areas or islands, the enumerator could have a satellite uplink with him or her. This portable transmission device could pinpoint the location of the remote housing unit and transmit the entries of the enumerator to a ground computer hundreds of kilometers away.

Voice recognition is another developing promising technology. A computer could call and conduct an entire intelligent interview. With the continuing reduction in the cost of electronics plus their greater capabilities and reliability the idea merits serious consideration in some nations.

A Different Census Philosophy

We periodically question the very philosophical underpinnings of the modern census. Is it best to continue with the household as the basic census unit of measure, or usual residence as the geographic rule? Should we use census questionnaires designed more for the respondents than for the technology we use to process the forms? What cognitive process does a respondent use when answering the questions and how many are really giving fully informed responses?

We must continue to balance the need of society for necessary information with the privacy of the individual. Our governments make the major privacy related policies and decisions, but we are charged with actually carrying out the censuses and surveys. The trust between ourselves and our respondents is a very basic philosophy that must be nurtured.

WHY ARE NEW-DIRECTIONS IN CENSUS TAKING SO IMPORTANT?

We are increasingly living in an information-based world of linked economies heavily influenced by government fiscal, social, and defense programs and policies. How data are collected and measured affects their reliability, interpretation, perception, and use.. plus, of course, their cost. How and what data are collected is partly a function of the census-taking directions I have mentioned.

For example, how poverty is operationally defined is partly based on what data we are able to collect at an acceptable cost. That definition is based mostly on income but is there a better definition, perhaps based on happiness of the individual? How could we measure happiness? The data collected and resultant conclusions affect society's judgements and decisions. A new census methodology that collects better poverty data would probably alter those conclusions, judgements, and decisions.

New directions and technology must undergo rigorous development and testing before being used in a nationwide census. The private sector usually does not have the means or setting to test innovations on such a large scale. What passes muster with the census bureaus of the world is usually a worthwhile product or methodology suitable to many other settings.

Finally, a census naturally is a highly visible national effort undertaken by your respective agencies. What you do in your respective nations is seen by your government and business community peers, both within your nation and around the world. That visibility and endorsement have helped launch several innovations that went on to alter our world. It is a process that continues and needs to continue.

CLOSING

In closing, do not underestimate the importance of new-directions in census-taking. Now more than ever it is important to look and plan beyond the next census. Beyond the promise these new directions hold in improving censuses in our respective nations, they have, are, and will go on to change our modern world itself...and for the better, I hope. We here today represent over 57 percent of the world's population and some of the most dynamic and expanding economies of today and tomorrow. Ours is an exciting profession. In that vein I salute new directions in census-taking and especially you, the census takers!

7. 캐나다의 人口動態申告法

VITAL STATISTICS ACT

CHAPTER 425

(Consolidated May 26, 1986 to include Vital Statistics Amendment Act, 1986 (Bill 2-1986) amendments; these amendments not in force.)

(Act administered by the Ministry of Health)

Interpretation

1. In this Act

"birth" means the complete expulsion or extraction from its mother, irrespective of the duration of the pregnancy, of a product of conception in which, after the expulsion or extraction, there is

(a) breathing;

(b) beating of the heart;

(c) pulsation of the umbilical cord; or

(d) unmistakable movement of voluntary muscle,

whether or not the umbilical cord has been cut or the placenta attached;

"burial permit" means a permit to bury, cremate, remove or otherwise dispose of a dead human body;

"cemetery" includes land set apart or used as a place for the interment or other disposal of dead bodies, and includes a vault, columbarium, mausoleum and crematorium;

"cemetery owner" includes the manager, superintendent, caretaker or other person in charge of a cemetery;

"certificate" means a certified extract of the prescribed particulars of a registration filed in the office of the director;

"columbarium" means a structure designed for the purpose of storing the ashes of human remains which have been cremated;

"cremation" means incineration of a dead body in a crematorium as provided by the Cemetery Act;

"crematorium" means a building fitted with appliances for the purpose of burning human remains, and includes everything incidental or ancillary to it;

"director" means the Director of Vital Statistics;

"district registrar" means a district registrar holding office under this Act;

"funeral director" means a person who has possession of a dead human body for the purpose of burial, cremation or other disposition;

"given name" includes a Christian name and a baptismal name;

"incapable" means unable because of death, illness, absence from the Province or otherwise;

"inspector" means an Inspector of Vital Statistics;

"international classification" means the International Statistical Classification of Diseases, Injuries and Causes of Death as last revised by the International Conference assembled for that purpose and published by the World Health Organization;

"married woman" means a woman

(a) lawfully married to a living husband; or

(b) who, within the period of gestation prior to the birth of the child in respect of whose birth an application for registration is made under this Act, was lawfully married to a living husband;

"occupier" includes the person having the management or charge of any public or private institution where persons are cared for or confined, and the proprietor, manager, keeper

or other person in charge of an hotel, inn, apartment,
lodging house or other dwelling or accommodation;

"registration district" means a registration district established under this Act;

"state" means any state or territory of the United States of America and includes the District of Columbia;

"stillbirth" means the complete expulsion or extraction from its mother after at least 20 weeks' pregnancy, or after attaining a weight of at least 500g, of a product of conception in which, after the expulsion or extraction, there is no breathing, beating of the heart, pulsation of the umbilical cord or unmistakable movement of voluntary muscle.

1962-66-2; 1974-106-Sch.; 1977-75-8; 1985-86-1,
effective January 2, 1986 (B.C. Reg.
417/85); 1986, Bill 2.

Duty to give notices of births

2. (1) Every medical practitioner who attends at a birth shall give notice of the birth.

(2) If there is no medical practitioner in attendance at a birth, the nurse or other person in attendance shall give notice of the birth.

(3) The notice shall be in the form required by the director, and shall be given by mailing it within 48 hours after the day of the birth, addressed to the district registrar of the district within which the birth occurred.

1962-66-3; 1985-86 Sch., effective January 2, 1986
(B.C. Reg. 417/85).

Registration of births

3. (1) Every birth in the Province shall be registered.

(2) Within 30 days after the day of a birth,

(a) the mother of the child;

(b) if the mother is incapable, the father of the child;

(c) if the mother and the father are incapable, the person standing in the place of the parents of the child;

(d) if there is no person to whom paragraph (a), (b) or (c) applies, the person required to give notice of the birth under section 2; or

(e) if there is no person to whom paragraph (a), (b), (c) or (d) applies, the occupier of the premises in which the child is born, if he has knowledge of the birth,

shall complete and deliver a statement in the form required by the director respecting the birth to the district registrar of the registration district in which the birth occurs.

(3) The district registrar may accept a statement completed in accordance with subsection (2) by the father of the child although the mother is not incapable, and his acceptance absolves the mother of her duty under subsection (2).

(4) The father of a child born outside marriage is not required to comply with subsection (2).

(5) If more than one child is born during a confinement, a separate statement for each child shall be completed and delivered as provided in subsection (2), and in each statement

(a) the number of children born during the confinement;
and

(b) the number of the child in the order of birth shall be given.

(6) Except as provided in subsections (7) to (7.2), the surname of a child of a married woman shall be registered as follows:

- (a) if, according to the statement in subsection (2), the husband and mother use the same surname, showing that surname, or
- (b) if, according to the statement in subsection (2), the husband and mother use different surnames
 - (i) showing the surnames of the husband and the mother hyphenated in alphabetical order, or
 - (ii) if the husband and mother jointly so request, showing
 - (A) one of their surnames, or
 - (B) the husband's surname hyphenated or combined with the mother's surname,

and the particulars of the husband shall be given as those of the father of the child.

(7) Subject to subsection (7.2), where a child was born to a married woman who files with the director a statutory declaration in the form required by the director declaring that

- (a) at the time the child was conceived, she was living separate and apart from her husband, and
- (b) her husband is not the child's father,

no particulars of the husband shall be given in the statement required under subsection (2) and where requested in the statutory declaration the birth shall be registered showing the surname of the mother as the surname of the child.

(7.1) Subject to subsection (7.2), where a statutory

declaration described in subsection (7) is filed after the registration of the birth, the birth registration shall be altered

- (a) by deleting all particulars of the mother's husband, and
- (b) where requested in the statutory declaration, by showing the surname of the mother as the surname of the child.

(7.2) Where a statutory declaration has been or is being filed under subsection (7) or (7.1) and the mother and a person acknowledging himself to be the father jointly request in writing in the form required by the director that

- (a) the particulars of the person so acknowledging be given as the particulars of the father,
- (b) the child's surname be shown on the birth registration as the surname of the person so acknowledging, or a surname of the person so acknowledging hyphenated or combined with the mother's surname, or
- (c) both the particulars under paragraph (a) be given and the surname under paragraph (b) be shown,

the birth shall be registered or the birth registration shall be altered in accordance with the request.

(8) Except as provided in subsection (9), the registration of the birth of a child of an unmarried woman shall show

- (a) the surname of the mother as the surname of the child; and
- (b) no particulars as to the father.

(9) Where an unmarried woman who is the mother of a child and a person acknowledging himself to be the father jointly request in writing in the form required by the director that

- (a) the particulars of the person so acknowledging be

given as the particulars of the father,

- (b) the child's surname be shown on the birth registration as the surname of the person so acknowledging, or a surname of the person so acknowledging hyphenated or combined with the mother's surname, or

- (c) both the particulars under paragraph (a) be given and the surname under paragraph (b) be shown,

the birth shall be registered or the birth registration shall be altered in accordance with the request.

(9.1) Notwithstanding subsections (6), (7.2) and (9), no surname shall contain more than 2 surnames hyphenated or combined, and if the husband or person acknowledging, as the case may be, or the mother or both have a hyphenated surname, only one of the names in that surname shall be used.

(9.2) For the purposes of subsection (6) (b) (i), if subsection (9.1) applies, the one name to be used is the name that alphabetically precedes the other.

(10) If the director or district registrar is not satisfied as to the truth and sufficiency of the statement referred to in subsection (2), he may

- (a) require the production of further evidence of the facts to his satisfaction, and
- (b) require the person who signed the statement or another person
 - (i) to attend at his office, and
 - (ii) to be examined under oath respecting any matter pertaining to the registration of the birth.

(11) If the statement referred to in subsection (2) is not completed and delivered in the manner and within the time provided, every person on whom the duty of completing and delivering

the statement is imposed

- (a) remains liable to perform that duty notwithstanding the expiration of the time provided; and
- (b) commits an offence in respect of each successive period of 30 days thereafter during which he neglects or fails to complete and deliver or mail the statement.

(12) Where the director receives a statement referred to in subsection (2) within one year after the day of the birth, he shall, if satisfied as to the truth and sufficiency of it, register the birth.

1962-66-4; 1985-68-114, effective April 17, 1985 (B.C. Reg. 392/85); 1985-86-2, Sch., effective January 2, 1986 (B.C. Reg. 417/85); 1986, Bill 2.

Registration by director

4. When a birth is not registered under section 3 within one year from the day of the birth and application for the registration of it is made by any person to the director by statutory declaration, accompanied by the prescribed fee and by a statement in the form required by the director respecting the birth and other evidence as may be prescribed, the director, if he is satisfied as to the truth and sufficiency of the matters stated in the application and that the application is made in good faith, shall register the birth.

1962-66-5; 1985-86-3, Sch., effective January 2, 1986 (B.C. Reg. 417/85).

Registration where parents marry after child is born

5. (1) Where the parents of a child marry each other after

the child is born, then on the parents

(a) completing the statement required under section 3

(2) as if the parents had been married to each other at the time of the birth;

(b) causing the statement, together with the evidence required by regulation, to be delivered to the director; and

(c) paying the prescribed fee,

the director shall register the birth.

(2) On proof that one of the parents is dead or incapable of fulfilling any requirement of subsection (1), the application may be made by the other parent.

(3) Where an acknowledgment of paternity has been filed under section 3(7), (7.2) or (9), the application may be made by the child.

(4) On registration of a birth under this section, where the birth has been registered before marriage, the original registration shall be withdrawn from the registration files and shall be kept in a separate file and sealed.

1962-66-6; 1985-68-115, effective April 17, 1985
(B.C. Reg. 392/85); 1985-86-4, effective
January 2, 1986 (B.C. Reg. 417/85); 1986,
Bill 2.

Foundlings

6. (1) Where a newborn child is found deserted, the person who finds the child, and any person in whose charge the child may be, shall give to the district registrar of the registration district in which the child is found, within 7 days after the finding or taking charge of the child, the information that he has regarding the particulars required to be registered

concerning the birth of the child.

(2) The district registrar, on receipt of the information regarding the birth of the child, and on being satisfied that every reasonable effort has been made to identify the child without success shall

- (a) require the person who found or has charge of the child to complete a statutory declaration concerning the facts of the finding of the child and to complete, so far as the person is able, a statement in the form required under section 3 (2);
- (b) cause the child to be examined by the local medical health officer or other medical practitioner with a view to determining as nearly as possible the date of the birth of the child, and require the examiner to make a statutory declaration setting forth the facts as determined by the examination; and
- (c) make a detailed report of the case and transmit to the director the evidence regarding the birth of the child.

(3) The fee for an examination made by a medical practitioner under subsection (2) shall be prescribed by the Lieutenant Governor in Council.

(4) The director, on receipt of the report and the evidence mentioned in subsection (2), shall

- (a) review the case; and
- (b) if he is satisfied as to the correctness and sufficiency of the matters stated, register the birth; and the registration shall, subject to subsections (6) and (7), establish for the child a date of birth, a place of birth and a surname and given name.

(5) The director, on registering a birth under this section, shall transmit to the Superintendent of Family and Child Service designated under the Family and Child Service Act a copy of all documents filed under this section respecting the child.

(6) If, subsequent to the registration of a birth under this section, the identity of the child is established to the satisfaction of the director or further information with respect to it is received by him, he shall

- (a) add to or correct the registration of the birth made under this section; or
- (b) cancel the registration of birth made under this section and cause a new registration in accordance with the actual facts of the birth to be made and filed in substitution for the registration first made under this section.

(7) Where a new registration of the birth of a child is made under subsection (6),

- (a) the date of registration shall be as shown on the registration first made; and
- (b) no certificate in respect of the first registration shall be issued after that.

(8) The director shall promptly notify the Superintendent of Family and Child Service designated under the Family and Child Service Act of any action taken under subsection (6).

(9) Where a person has received a certificate issued in respect of the registration of the birth of a child made under subsection (4), if the registration is cancelled under subsection (6), he shall deliver the certificate to the director for cancellation if the director so requires.

1962-66-7; 1981-15-171, proclaimed effective November 26, 1981; 1985-86-5, Sch., effective January 2, 1986 (B.C. Reg. 417/85); 1986, Bill 2.

Registration of given names

6.1 (1) Notwithstanding sections 3 and 4, where the director considers that a given name that a person applying for registration of a birth or an amendment to a registration of birth seeks to give to a child

(a) might reasonably be expected to cause

(i) mistake or confusion, or

(ii) embarrassment to the child or another person,

(b) is sought for an improper purpose, or

(c) is, on any other ground, objectionable,

he shall

(d) register the birth without the given name applied for or refuse to amend the existing given name on a birth registration, as the case may be, and

(e) notify the applicant forthwith of his decision.

(2) Where, under subsection (1), the director registers the birth without the given name applied for or refuses to amend the existing given name on a birth registration, the applicant may, within 30 days after receipt of notification of the refusal, appeal the refusal to the minister.

(3) The minister may, in the best interests of the child, the applicant and the public, order the director to alter the birth registration to include the given name that the applicant applied for or may confirm the director's decision.

(4) The minister shall forthwith notify the applicant of his decision.

(5) Where an appeal is made to the minister under subsection (2) and the minister confirms the director's decision, the applicant may, within 30 days after receipt of notification of the minister's decision, appeal to the Supreme Court.

(6) On an appeal to the Supreme Court under this section, the court may consider the evidence that in the opinion of the court is relevant and may make an order it considers just.

1985-86-6, effective January 2, 1986 (B.C. Reg. 417/85); 1986, Bill 2.

Alteration or addition of given names by director

7. (1) Subject to section 6.1 and except in a case to which section 20 applies, where the birth of a child has been registered, and

- (a) the given name of the child is desired to be changed; or
- (b) the birth of the child was registered without a given name,

both parents, the surviving parent, the guardian of the child or the child after he has attained the age of 19 years may deliver or cause to be delivered to the director a statutory declaration in the form required by the director setting forth the particulars of the change or of the name given, and

- (c) a baptismal certificate showing the given name under which the child was baptized; or
- (d) if a baptismal certificate is not procurable, other documentary evidence satisfactory to the director;

and the director, on being satisfied that the application is made in good faith and on payment of the prescribed fee, shall record the alteration or addition.

(2) No alteration or addition shall be made under this section unless the name of the child was changed or the name was given to the child within 12 years next after the day of

the birth.

(3) No alteration or addition shall be made to a given name in a registration of a birth, except as provided in this Act.

(4) Any birth certificate issued after the making of an alteration or addition under this section shall be prepared as if the registration had been made containing the changed or added given name at the time of registration.

(5) Where any person whose signature is required pursuant to this section cannot be located after adequate search, the applicant and the director may proceed without the certificate of that person. The director shall be the judge of the sufficiency of the evidence that the person cannot be located.

1962-66-8; 1985-86-7, Sch., effective January 2, 1986
(B.C. Reg. 417/85); 1986, Bill 2.

Stillbirths

8. (1) Every stillbirth in the Province shall be registered as provided in this Act.

(2) Where a stillbirth occurs, the person who would have been responsible for the registration of it under section 3, if it had been a birth, shall prepare and deliver to the funeral director a statement in the form required by the director respecting the stillbirth.

(3) Every medical practitioner in attendance at a stillbirth, or, where there is no medical practitioner in attendance, a medical practitioner or a coroner, shall complete the medical certificate included in the form required by the director showing the cause of the stillbirth and shall deliver it to the funeral director.

(4) On receipt of the statement, the funeral director shall

(a) complete the statement, setting forth the proposed

date and place of burial, cremation or other disposition of the body; and

- (b) deliver or cause to be delivered the statement to the district registrar of the registration district in which the stillbirth occurred.

(5) On receipt of the statement, the district registrar, if he is satisfied as to the truth and sufficiency of it, shall register the stillbirth.

(6) On the registration of a stillbirth, the direct registrar shall promptly prepare and deliver to the person requiring them for the purpose of the burial, cremation or other disposition of the body of the stillborn child

- (a) an acknowledgment that the stillbirth is registered; and

- (b) a burial permit.

(7) Subject to this section, sections 2, 3 and 4 and sections 13 to 18 apply to stillbirths.

1962-66-9; 1985-86-Sch., effective January 2, 1986
(B.C. Reg. 417/85); 1986, Bill 2.

Registration of adoption

9. (1) On receipt of a copy of an order of adoption transmitted under the Adoption Act, the director shall register the adoption.

(2) If, at the time of the registration of the adoption, or at any time afterward, there is in the office of the director a registration of the birth of the person adopted, the director, on production of evidence satisfactory to him of the identity of the person, shall delete the original birth registration from the registration files and substitute a birth registration in

accordance with the facts contained in the order of adoption.

(3) Where a person is adopted pursuant to an order, judgment or decree of adoption made by a court of competent jurisdiction in another province, state or country, the director.

(a) on receipt of a certified copy of the order, judgment or decree, and

(b) on production of evidence satisfactory to him of the identity of the person,

shall, if there is in his office a registration of the birth of that person, register the adoption in the manner referred to in subsection (1) and substitute the birth registration in the manner referred to in subsection (2).

(4) Where a person born outside the Province is adopted pursuant to the Adoption Act, the director may, notwithstanding section 15(3) of that Act, transmit a certified copy of the order of adoption to the person having charge of the registration of births in the province, state or country in which the person was born.

1986, Bill 2.

Special register of adoptions

9.1 The director shall maintain a special register in which he shall keep

(a) the original birth registrations withdrawn from the registration files pursuant to section 9, and

(b) the copies of all orders, judgments and decrees received by him for the purposes of section 9, other than the copy required for the purposes of section 9(4).

1986, Bill 2.

Birth certificate after adoption

9.2 If a child born in the Province is adopted pursuant to the laws of the Province or of another jurisdiction and a registration of adoption has been made pursuant to section 9, any certificate of birth of that child subsequently issued by the director

(a) shall be in accordance with the new birth registration, and

(b) in any case where parentage is shown, shall indicate the adopting parents in accordance with the Adoption Act,

and nothing shall appear on any certificate issued by the director that would disclose that the child is an adopted child.

1986, Bill 2.

Registration of marriages

10. (1) Every marriage solemnized in the Province shall be registered as provided in this Act.

(2) Every person authorized by law to solemnize marriage in the Province shall, immediately after he solemnizes a marriage, which statement shall be signed by

(a) each of the parties to the marriage;

(b) at least 2 witnesses to the marriage; and

(c) the person by whom the marriage was solemnized.

(3) The person by whom the marriage was solemnized shall, within 2 days after the day of the marriage, deliver the completed statement to the district registrar of the registration district in which the marriage was solemnized.

(4) On the receipt within one year from the day of a marriage of a completed statement respecting the marriage, the

director, if he is satisfied as to the truth and sufficiency of it, shall register the marriage.

1962-66-11; 1985-86-9, Sch., effective January 2, 1986
(B.C. Reg. 417/85); 1986, Bill 2.

Late registration of marriage

11. When a marriage is not registered within one year from the day of the marriage, if application for registration of it is made by any person to the director by statutory declaration accompanied by

(a) a statement in the form required by the director respecting the marriage; and

(b) other evidence as may be prescribed,
the director, if he is satisfied as to the truth and sufficiency of the matters stated in the application and that the application is made in good faith, shall register the marriage.

1962-66-12; 1985-86-Sch., effective January 2, 1986
(B.C. Reg. 417/85); 1986, Bill 2.

12. (Repealed 1985-86-10, effective January 2, 1986 (B.C. Reg. 417/85).)

Particulars of death

13. (1) The death of every person who dies in the Province shall be registered as provided in this Act..

(2) The personal particulars of the deceased person shall, on the request of the funeral director, be set forth in a statement in the form required by the director and delivered to the funeral director

(a) by the nearest relative of the deceased present at

the death or in attendance at the last illness of the deceased;

- (b) if no such relative is available, by any relative of the deceased residing or being in the registration district;
- (c) if no relative is available, by any adult person present at the death;
- (d) by any other adult person having knowledge of the facts;
- (e) by the occupier of the premises in which the death occurred; or
- (f) by the coroner who has been notified of the death and has made an inquiry or held an inquest regarding the death.

(3) to (5) (Repealed 1986, Bill 2.)

1962-66-14; 1985-86-Sch., effective January 2, 1986
(B.C. Reg. 417/85); 1986, Bill 2.

Medical certificate

13.1 (1) Where

- (a) a medical practitioner
 - (i) attended the deceased during his last illness,
 - (ii) is able to certify the medical cause of death with reasonable accuracy, and
 - (iii) has no reason to believe that the deceased died under circumstances which require an inquiry or inquest under the Coroners Act,
- (b) the death was natural and a medical practitioner
 - (i) is able to certify the medical cause of death with reasonable accuracy, and

- (ii) has received the consent of a coroner to complete and sign the medical certificate, or
- (c) a coroner conducts an inquiry or inquest into the death under the Coroners Act,

the medical practitioner or the coroner, as the case may be, shall within 48 hours after the death

- (d) complete and sign a medical certificate in the form required by the director stating in it the cause of death according to the international classification, and
- (e) make the certificate available to the funeral director.

(2) Where

- (a) a death occurred without the attendance of a medical practitioner during the last illness of the deceased, or
- (b) the medical practitioner who attended the deceased is for any reason unable to complete the medical certificate within 48 hours after the death,

the funeral director or the medical practitioner, as the case may be, shall forthwith notify the coroner.

(3) Where a cause of death cannot be determined within 48 hours after the death and

- (a) an autopsy is performed, or
- (b) an inquiry or inquest is commenced under the Coroners Act,

and the medical practitioner who performs the autopsy or the coroner who commences an inquiry or inquest under the Coroners Act, as the case may be, considers that the body is no longer required for the purposes of the autopsy, inquiry or inquest, the medical practitioner or the coroner, as the case may be,

may, notwithstanding subsection (1), issue and shall make available to the funeral director an interim medical certificate in the form required by the director.

(4) After the conclusion of the autopsy, inquiry or inquest referred to in subsection (3), the medical practitioner or coroner, as the case may be, shall complete and sign the medical certificate required under subsection (1) and deliver it to the director.

1986, Bill 2.

Statement and certificate to district registrar

13.2 (1) On receipt of the statement referred to in section 13(2) and of the medical certificate or the interim medical certificate, the funeral director shall forthwith deliver the statement and certificate to the district registrar of the registration district in which the death occurred or, if the place of death is not known, to the district registrar of the registration district in which the body was found.

(2) Where it is impracticable to deliver the statement and certificate to the proper district registrar, they may be delivered to the nearest district registrar.

1986, Bill 2.

Registration of death by district registrar

14. On receipt, within one year from the day of a death, of the statement and certificate under section 13.2, the district registrar, if he is satisfied as to the truth and sufficiency of the statement, shall register the death.

1986, Bill 2.

Registration of death by director

15. When a death is not registered within one year from the day of the death, or where the district registrar refuses to register a death, if application for registration of it is made by any person to the director, accompanied by

(a) the statement and certificate under section 13.2,
and

(b) other evidence as may be prescribed,
the director, if he is satisfied as to the truth and sufficiency of the matters stated in the application and that the application is made in good faith, shall register the death.

1962-66-16; 1985-86-Sch., effective January 2, 1986
(B.C. Reg. 417/85); 1986, Bill 2.

Burial permit

16. (1) On receipt of the statement and certificate under section 13.2(1), the district registrar shall prepare and issue to the funeral director a burial permit.

(2) On receipt of the statement and certificate under section 13.2(2), the district registrar shall prepare and issue to the funeral director a burial permit and forward the statement and certificate to the proper district registrar.

(3) No person shall

(a) bury, cremate or otherwise dispose of the body of a person who dies in the Province unless a burial permit in respect of the deceased has been obtained from a district registrar, or

(b) remove the body from the registration district in which the death occurred or the body was found, except temporarily for the purpose of preparing it

for burial.

(4) Where the body of any person is to be removed by a common carrier to the place of burial or other disposition, the removal shall not take place unless the appropriate copies of the burial permit have been affixed to the outside of the casket.

(5) The funeral director shall,

- (a) at the place of burial or other disposition, remove any copies of the burial permit affixed to the outside of the casket;
- (b) deliver the appropriate copy of the burial permit to the person conducting the funeral or religious service; and
- (c) deliver the appropriate copy of the burial permit to the cemetery owners, or where no person is in charge of the cemetery at the time of the burial or other disposition of the body, write across the face of the burial permit the words "No person in charge", append his signature to the permit, and mail it to the director.

(6) Where a death occurs outside the Province and the burial or other disposition of the body is to take place in the Province, a burial permit or other document authorized under the law of the province or country in which the death occurs, signed by the district registrar or other proper officer, is sufficient authority for the burial or other disposition of the body.

1962-66-17; 1985-86-Sch., effective January 2, 1986
(B.C. Reg. 417/85); 1986, Bill 2.

Cemetery owners' duties

17. (1) No cemetery owner shall permit the burial or cremation of a dead body in the cemetery unless the funeral director or the person officiating at the burial has delivered to him the appropriate copy of the burial permit.

(2) (Repealed 1985-86-11, effective January 2, 1986 (B.C. Reg. 417/85).)

1962-66-18; 1985-86-11, Sch., effective January 2, 1986
(B.C. Reg. 417/85).

Birth or death on aircraft or ship

18. Where the birth or death of a person occurs on an aircraft or ship whose first stop after the birth or death is in the Province, the director may register the birth or death.

1985-86-12, effective January 2, 1986 (B.C. Reg. 417/85).

Filing of church records

19. Where registers or records of baptisms, marriages or burials kept by any church or religious body in the Province or certified true copies or extracts from those records are on file or are, with the approval of the director, placed on file in the office of the director, the registers, records, certified true copies or extracts shall be preserved and shall remain in the custody of the director as part of the records of his office.

1962-66-20.

Change of name

20. (1) Where the name of a person is changed under the Name Act or under a statute of another province, the director,

on production to him of proof of the change and evidence satisfactory to him as to the identity of the person.

- (a) if the birth or marriage of the person is registered in the Province, shall record the change, and
- (b) if the change was made under the Name Act and the person was born or married in Canada but outside the Province, shall transmit to the officer in charge of the registration of births and marriages in the jurisdiction in which the person was born or married a copy of the proof of the change of name produced to the director.

(2) Every birth or marriage certificate, issued after the recording of a change under this section, shall be issued as if the original registration had been made in the name of the person as changed under the Name Act.

1962-66-21; 1972-11-9; 1985-86-13, effective January 2, 1986
(B.C. Reg. 417/85); 1986, Bill 2.

Change of sex designation

21. (1) Where a person in respect of whom trans-sexual surgery has been performed is unmarried on the date he applies under this section, the director shall, on application made to him in accordance with subsection (2), change the sex designation on the registration of birth of the person in such a manner that the sex designation is consistent with the intended results of the trans-sexual surgery.

(2) An application under subsection (1) shall be made in the form required by the director and shall be accompanied by,

- (a) where the trans-sexual surgery was performed in a province of Canada, the certificate of a medical

- practitioner, qualified and licensed to practise medicine in that province, explaining the surgical procedures carried out and certifying that he performed the trans-sexual surgery on the applicant;
- (b) where the trans-sexual surgery was performed in a jurisdiction outside Canada,
- (i) evidence satisfactory to the director that the person who performed the surgery was, at the time of the surgery, qualified and licensed to practise medicine in that jurisdiction; and
 - (ii) the certificate referred to in paragraph (a) certified by the person who performed the surgery; and
- (c) the certificate of a medical practitioner who did not perform the trans-sexual surgery, but who is qualified and licensed to practise medicine in the jurisdiction where the applicant resides, certifying that
- (i) he examined the applicant,
 - (ii) the results of his examination substantiate the certificate of the practitioner who performed the trans-sexual surgery, and
 - (iii) the trans-sexual surgery is complete by accepted medical standards.

(3) Every birth certificate issued after the registration of birth is changed under this section shall be issued as if the original registration had been made showing the sex designation as changed under this section.

1973-160-3; 1974-106-Sch.; 1985-86-14, Sch., effective January 2, 1986 (B.C. Reg. 417/85).

Registrations fraudulently or improperly obtained

22. (1) If, after the notice to and hearing of those interested parties as he considers proper, the director is satisfied that a registration under this Act was fraudulently or improperly obtained, he may order that it be cancelled, and after that no certificate shall be issued in respect of the registration.

(2) On the making of an order under subsection (1), the director may order the delivery to him of every certificate previously issued in respect of the registration.

(3) If the director has reason to believe that a certificate in respect of a registration is being had or used for fraudulent or improper purposes, he may, after whatever notice to and hearing of interested parties he considers proper, make an order requiring the delivery of the certificate to him for cancellation.

(4) Any person who has in his possession or under his control a certificate in respect of which an order has been made under subsection (2) or (3) shall promptly deliver the certificate to the director.

1962-66-22; 1986, Bill 2.

Corrections of errors and omissions

23. (1) Before a district registrar has forwarded

(a) a statement referred to in section 3(2) or 10(3),

or

(b) a registration referred to in section 8(5) or 14

(1),

he may alter the statement or registration in order to correct an error or omission in the statement or registration.

(2) If the person who furnished the information contained

in the statement or registration to be corrected appears in person, the district registrar may permit the correction by having the person amend and initial the original entry.

(3) If on receipt and examination of a registration it appears to the director that an error or omission exists in the registration, he shall inquire into the matter and, on production of evidence of the error or omission satisfactory to him, may correct the error or omission.

(4) If, after a registration has been filed by the director, it is reported to him that an error or omission exists in the registration, the director shall inquire into the matter, and on production of evidence of the error or omission satisfactory to him verified by statutory declaration, and on payment of the prescribed fee, he may correct the error or omission.

(5) If, after the correction of an error or omission, application is made for a certificate, the certificate shall be prepared as if the registration had been made containing correct particulars at the time of registration, except that a photostatic copy or photographic print of the registration shall include both the original information and all amendments made under subsections (1), (2), (3) and (4).

1962-66-23; 1985-86-15, effective January 2, 1986 (B.C. Reg. 417/85); 1986, Bill 2.

Division of Vital Statistics

24. (1) For the purpose of administering and carrying out this Act there shall be in the Ministry of Health a Division of Vital Statistics.

(2) The Division of Vital Statistics shall be under the direct supervision of a Director of Vital Statistics.

(3) The Director of Vital Statistics shall be appointed pursuant to the Public Service Act, and is directly responsible in all matters to the Minister of Health.

(4) The Lieutenant Governor in Council may appoint one or more acting Directors of Vital Statistics who shall, in the absence of the director at any time, exercise the powers and perform the duties of the director in the order of precedence set forth in the appointment, but not more than one person may simultaneously exercise the powers and perform the duties of the director under this subsection.

(5) An Inspector or Inspectors of Vital Statistics may, for the purposes of this Act, be appointed pursuant to the Public Service Act.

1962-66-24; 1974-106-Sch.; 1977-75-1.

Registration districts

25. (1) The Province shall for the purposes of this Act be divided into registration districts.

(2) The Lieutenant Governor in Council may establish the boundaries of the registration districts and may extend, reduce, subdivide or abolish any registration district or merge it in whole or in part with one or more registration districts.

(3) Every order made under subsection (2) shall be published in the Gazette and shall take effect on and from a day to be fixed by the order.

1962-66-25.

Appointments by minister

26. (1) The minister may appoint district registrars and deputy district registrars necessary for carrying out this Act.

(2) A district registrar or a deputy district registrar holding office under section 26 of this Act, as it was before this subsection came into force, continues to be a district registrar or deputy district registrar until his appointment is terminated by the minister.

1985-86-16, effective January 2, 1986 (B.C. Reg. 417/85).

Enforcement of Act by district registrar

27. Every district registrar shall, under the supervision and direction of the director and in accordance with the regulations, enforce this Act in his registration district and shall make an immediate report to the director concerning any violation of this Act of which he has knowledge.

1962-66-27.

Remuneration of district registrars

28. The remuneration of district registrars and deputy district registrars shall be as prescribed by regulation.

1962-66-28.

Searches of registrations and church records

29. (1) Any person, on applying in the form required by the director, and paying the prescribed fee, may, if the director is satisfied that the information is not to be used for an unlawful or improper purpose, have a search made by the director

(a) for the registration in his office of any birth, stillbirth, marriage, death, change of name or adoption; or

(b) for the record of any baptism, marriage or burial

filed in the office of the director under section 19.

(2) The director shall make a report on the search, which report shall state whether or not the birth, stillbirth, marriage, death, change of name, adoption, baptism or burial is registered or recorded and shall contain no further information.

1962-66-29; 1985-86-17, Sch., effective January 2, 1986
(B.C. Reg. 417/85).

Issuance of certificates and copies

30. (1) A certificate of birth or marriage may be issued by the director, on application in the form required by the director and on payment of the prescribed fee, only to

- (a) a person named in the certificate;
- (b) a parent whose name appears on the registration from which the certificate is to be issued;
- (c) a spouse of a person whose name appears on the registration from which the certificate is to be issued;
- (d) a person on the authorization in writing of the person named in the certificate or of the parents or spouse of the person named in the certificate;
- (e) an agent of the person named in the certificate or of the parents or spouse of the person named in the certificate;
- (f) a person on the order of a court;
- (g) an officer of the Crown in right of the Province who requires it for use in the discharge of his official duties; or
- (h) any other person who satisfies the deputy minister

concerning the good faith of his cause for requiring the certificate.

(2) A birth certificate shall contain

- (a) the name of the person,
- (b) the date of birth,
- (c) the place of birth,
- (d) the sex of the person,
- (e) the date of registration, and
- (f) the serial number of the registration,

and may contain the names and places of birth of the parents.

(3) A certified copy, photostatic copy or photographic print of the registration of a birth, or of a portion of it, may be issued, on application in the form required by the director and on payment of the prescribed fee, by the director only to

- (a) a person who requires it to comply with section 5 of the Adoption Act;
- (b) an officer of the Crown in right of the Province who requires it for use in the discharge of his official duties;
- (c) a person on the authority in writing of the deputy minister or on the order of a court; or
- (d) a medical health officer who requires it for use in the discharge of his official duties.

(4) A certified copy, photostatic copy or photographic print of the registration of a marriage may be issued by the director, on application in the form required by the director and on payment of the prescribed fee, only to

- (a) a party to the marriage;
- (b) a person on the authority in writing of a party to the marriage;

(c) a person on the authority in writing of the deputy minister; or

(d) a person on the order of a court.

(5) Subject to subsection (6), any person, on application in the form required by the director, the furnishing of information satisfactory to the director, and the payment of the prescribed fee, may obtain from the director a certificate of death.

(6) No certificate issued in respect of the registration of a death shall be issued in a manner as to disclose the cause of death as certified on the medical certificate, except

(a) on the authority in writing of the deputy minister;
or

(b) on the order of a court.

(7) On application in the form required by the director and on payment of the prescribed fee, a certified copy, photostatic copy or photographic print of the registration of a death or stillbirth may be issued by the director only to

(a) a person on the authority in writing of the deputy minister; or

(b) a person on the order of a court.

(8) Any person, on application in the form required by the director and payment of the prescribed fee, may, prior to the inclusion of the registration in any return to the director, obtain from a district registrar a certificate in the form required by the director of a death of which there is a registration in his office.

(9) Except under subsection (8), no certificate and no certified copy, photostatic copy or photographic print shall be issued by a district registrar.

(10) Any person, on application in the form required by the

director and payment of the prescribed fee, may, with the approval of the director and subject to the same limitations as those set out in subsections (1),(3),(4) and (7), obtain a certificate in the form required by the director in respect of the record of a baptism, marriage or burial filed under section 19.

(11) The director may refuse to issue a certificate, certified copy, photostatic copy or photographic print if he has reason to believe that the document is to be used for an unlawful or improper purpose. A district registrar may refuse to issue a certificate of death if he has reason to believe that the document is to be used for an unlawful or improper purpose.

(12) The deputy minister may, by his written order signed by him and directed to the director, require the director, when issuing a certificate, certified copy, photostatic copy or photographic print under this section,

(a) to dispense with the production of the authority in writing of the deputy minister required under subsections (3),(4),(6),(7) and (10), or under any of those subsections; or

(b) to dispense with the production of that written authority in the cases, or in the circumstances, as the deputy minister may set forth in the order; and the director shall comply with the order.

(13) Where the deputy minister has issued an order under subsection (12), he may at any time amend or revoke it or issue a further order under it.

1962-66-30, 1984-19-18; 1985-86-18, Sch., effective January 2, 1986 (B.C. Reg. 417/85).

Certificates to be issued only by director or district registrars

31. (1) Except as provided in section 30(8), every

certificate, certified copy, photostatic copy or photographic print issued under section 30 shall be issued by the director, and no person other than a person herein authorized to do so shall issue any document that purports to be issued under this Act.

(2) Where the signature of

(a) the director or acting director is required for any purposes of this Act; or

(b) a district registrar specifically designated in writing by the director is required on any certificate issued under this Act,

the signature may be written, engraved, lithographed or reproduced by any other mode of reproducing words in visible form.

(3) Every document issued under this Act under the signature of the director or of any person described in subsection (2) is and remains valid, notwithstanding that the director or the person so appointed has ceased to hold office before the issue of the certificate.

1962-66-31.

Certificate as evidence

32. (1) Every certificate purporting to be issued under section 30 is admissible in any court in the Province as evidence of the facts certified to be recorded, and every certified copy, photostatic copy or photographic print purporting to be issued under section 30 is admissible as evidence of the facts recorded in it. It is not necessary to prove the signature or official position of the person by whom the certificate, certified copy, photostatic copy or photographic copy purports to be signed.

(2) and (3) (Repealed 1985-68-116, effective April 17, 1985 (B.C. Reg. 392/85).)

1962-66-32; 1970-44-22; 1985-68-116, effective April 17, 1985 (B.C. Reg. 392/85).

Appeal from decision of director

33. (1) Where an application for the registration of a birth, stillbirth, marriage or death is refused by the director, if, within one year of the refusal, an application is made to the Supreme Court or to any County Court, the court, on being satisfied that the application is made in good faith and as to the truth and sufficiency of the evidence adduced on the application, and having regard to the standards respecting delayed registration set forth in the regulations for the guidance of the director, may make an order requiring the director to accept the application and register the birth, stillbirth, marriage or death.

(2) The clerk of the court shall promptly send a copy of the order to the director, who shall comply with the order and attach the copy to the registration.

(3) Where an application for a certificate or a search in respect of the registration of a birth, stillbirth, marriage or death is refused by the director, if, within one year of the refusal, application is made to the Supreme Court or to any County Court, the court, on being satisfied that the application is made in good faith and that the applicant has good reason for requiring the certificate or search, may make an order requiring the director to issue the certificate or make the search. The clerk of the court shall promptly forward a copy of the order to the director, who shall comply with it.

(4) Where the director has made an order under section 22, any person interested may, at any time after the order is made, appeal from it to the Supreme Court or to any County Court. The court may make an order confirming or setting aside the order of the director, and the order of the court is final and is binding on the director.

(5) No application or appeal shall be made under this section unless at least 30 days' notice of the hearing of the application has been served on the director, accompanied by a statement of the particulars of the application and by a copy of each paper intended to be produced to the court on the hearing of the application.

1962-66-33.

Power to take affidavits

34. The director, acting director, inspector and every district registrar and deputy district registrar has, for the purposes of this Act only, the powers of a commissioner for taking affidavits for British Columbia.

1962-66-34.

Publication of statistical information

35. The director may compile, publish and distribute statistical information respecting the births, stillbirths, marriages, deaths, adoptions, changes of name and dissolutions and annulments of marriage registered during any period he may deem necessary and in the public interest.

1962-66-35.

Annual report

36. As soon as convenient after January 1 in each year, the director shall make, for the use of the Legislative Assembly and for public information, a statistical report of the births, stillbirths, marriages, deaths, adoptions, changes of name and dissolutions and annulments of marriage registered during the preceding calendar year.

1962-66-36.

Records property of Crown

37. (1) All records, books and other documents pertaining to any office under this Act are the property of the Crown.

(2) Where a vacancy occurs in any office under this Act, the person having the possession, custody or control of any books, records or other documents pertaining to the office shall give up possession of and deliver them to the successor in office or to any person appointed by the director to demand and receive them, and any person who fails to comply with this subsection commits an offence.

1962-66-37.

Secrecy

38. (1) No district registrar or deputy district registrar and no person employed in the service of Her Majesty shall communicate or allow to be communicated to any person not entitled to it any information obtained under this Act, or allow such person to inspect or have access to any records containing information obtained under this Act.

(2) Nothing in subsection (1) prohibits the completion,

furnishing or publication of statistical data that does not disclose specific information with respect to any particular person.

1962-66-38.

39. (Repealed 1986, Bill 2.)

Application of Act

40. This Act applies in respect of any birth, stillbirth, marriage, death, dissolution or annulment of marriage, adoption or change of name that occurred prior to the passing of this Act, as well as to any birth, stillbirth, marriage, adoption or change of name that may occur subsequent to the passing of this Act.

1962-66-40.

Establish forms

41. The director may establish the forms to be used for the purposes of this Act and, except where specified by this Act, the particulars to be included in a certificate issued under this Act.

1985-86-20, effective January 2, 1986 (B.C. Reg. 417/85).

Failure to carry out duties

42. (1) Every person who fails to give any notice or to furnish any statement, certificate or particulars required under or pursuant to this Act, within the time limited by this Act, commits an offence.

(2) Where more than one person is required to give any

notice or to register or to furnish any statement, certificate or particulars required under or pursuant to this Act and the duty is carried out by any of those persons, the other or others are absolved from the performance of the duty.

1962-66-42.

Interference with public notice

43. Every person who wilfully removes, defaces or destroys a public notice relating to the registration of births, stillbirths, marriages or deaths commits an offence.

1962-66-43.

Failure to obtain permit for transportation of body

44. (1) Subject to subsection (2) and any other Act, a common carrier transporting or carrying, or accepting through its agents or employees for transportation or carriage, the body of a deceased person without the burial permit issued under this Act commits an offence.

(2) If the death occurred outside the Province and the body is accompanied by a burial permit issued in accordance with the law in force where the death occurred, the burial permit is sufficient to authorize the transportation or carriage of the body into or through the Province.

1962-66-44; 1986, Bill 2.

Prohibition

45. No system of registration of births, deaths or marriages shall be maintained or continued in the Province other than as authorized by this Act.

1962-66-45.

Prosecutions

46. (1) No prosecution shall be commenced under this Act without the consent of the deputy minister.

(2) Every prosecution under this Act shall be commenced within 10 years after the offence.

1962-66-46.

Regulations

47. The Lieutenant Governor in Council may make regulations including, without limiting the generality of the foregoing,

- (a) prescribing the duties of and records to be kept by the district registrars;
- (b) and (c) (Repealed 1985-86-21, effective January 2, 1986 (B.C. Reg. 417/85).)
- (c) designating the persons who may have access to or may be given copies of or information from the records in the office of the director or of a district registrar and prescribing an oath of secrecy to be taken by those persons;
- (d) providing for the registration of births, still-births, marriages, deaths, adoptions or changes of name in cases not otherwise provided for in this Act;
- (e) prescribing the fees to be paid for searches, certificates and anything done or permitted to be done under this Act and providing for the waiver of payment of those fees in favour of any person or class of persons;
- (f) designating the persons who may sign registrations;
- (g) prescribing the evidence on which the director may

register a birth, stillbirth, marriage or death after one year from the date of it;

- (h) prescribing the evidence on which the director may make a registration of birth under section 5(1);
- (i) requiring persons in charge of hospitals to prepare and deliver to the director returns respecting births and stillbirths of all children born in the hospitals; and
- (j) requiring persons in charge of schools in designated areas of the Province to prepare and deliver to the director returns respecting the names, dates and places of birth of children enrolled in such schools.

1962-66-47; 1985-68-117, effective April 17, 1985 (B.C. Reg. 392/85); 1985-86-21, effective January 2, 1986 (B.C. Reg. 417/85).

(Note: see also draft uniform Vital Statistics Act to be found as stated in the Users Guide to Statutes in the beginning of this volume.)

Queen's Printer for British Columbia O
Victoria, 1986

8. 蒐集資料目錄

8 . 수집자료목록

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1. Australian Bureau of Statistics. 1986. Australian Demographic Statistics. Part 1 : An Outline of Major Administrative by-Product data. Australia
2. Australian Bureau of Statistics. 1984, 1985, 1986, 1987. Australian Bureau of Statistics Series(1984-'87), Austrlia
3. Australian Bureau of Statistics. 1986
 - 1) Census 86 - How Australia Takes a Census
 - 2) Census 86 - Video giving an Overview of the 1986 Census
 - 3) 1986 Census of Population and Housing --Content and Procedure
 - 4) Census Forms and Explanatory Booklet
 - 5) Collector's Manual
 - 6) Guide for Training Collectors
 - 7) Video used in Training Field Staff
 - 8) Media Kit
 - 9) Information Services Kit
 - 10) Education Kit designed for Schools in Areas with a Concentration of Ethnic groups
 - 11) Data Release Plans
 - 12) 1986 Census Dictionary

Canada 편

1. Statistics Canada. 1986. 1986 Census of Canada

- 1) Procedure Manual Self-enumeration Areas
- 2) Procedures Manual Canvasser Areas
- 3) Edit Processing Manual
- 4) Supervisor's Manual
- 5) Drop-off Training Guide
- 6) Edit and Follow-up Training Guide
- 7) CAM'S Book of Answer Keys
- 8) Regional Office Processing Operation 2, Document Preparation
- 9) Regional Office Processing Operation 2, Document Preparation Quality Control
- 10) Regional Office Processing Operation 2, Document Preparation Supervisor
- 11) Regional Office Processing Operation 2, Document Preparation Relationship to Person 1, Referral Coding
- 12) Regional Office Processing Operation 2, Document Preparation Control Clerk
- 13) Regional Office Processing Operation 4, Economic Coding
- 14) Regional Office Processing Operation 4, Economic Coding Quality Control
- 15) Regional Office Processing Operation 4, Economic Coding Supervisor
- 16) Regional Office Processing Operation 4, Economic Coding Control Clerk
- 17) Aboriginal Peoples Procedures Manual for Canvasser Reserve Areas and Indian Settlements

- 18) Census Commissioner's Manual Self-enumeration Areas
- 19) Quality Control Technician's Manual
- 20) Edit and Follow-up Home Study Program for Mail-back Census Representatives
- 21) Population Pick-up Home Study Program for Census Representatives
- 22) Drop-off Home Study Program for Pick-up Census Representatives
- 23) Drop-off Home Study Program for Mail-back Census Representatives
- 24) Census Commissioner's Training Work Book
- 25) Population Training Work Book
- 26) Visitation Record
- 27) Census Commissioner's Manual Canvasser Areas
- 28) Special Processing Manual
- 29) Quality Control Training Guide
- 30) Census Commissioner Training Guide Stage I (Mail-back, Pick-up area)
- 31) Census Commissioner Training Guide Stage II (Mail-back, Pick-up area)
- 32) Census Commissioner Training Guide Stage III (Mail-back, Pick-up area)
- 33) Census Commissioner Training Guide Stage I (Canvasser area)
- 34) Census Commissioner Training Guide Stage II (Canvasser area)
- 35) Drop-off Training Guide (Pick-up area)
- 36) Guide de Formation-Populaiton
- 37) Population Pick-up Trainin Guide

Republic of China 편

1. The Bureau of Statistics. 1986. Republic of China

- 1) Statistical Yearbook of the R.O.C
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- 3) Statistical Handbook of the R.O.C
- 4) National Income in Taiwan Area
- 5) Report on the Survey of Personal Income Distribution in Taiwan Area
- 6) Report of Forecasting for Aggregate Demand and Supply
- 7) Social Indicators of the R.O.C
- 8) Statistics on Children and Youth
- 9) National Conditions
- 10) Quarterly National Economic Trends Taiwan Area, R.O.C
- 11) Monthly Statistics of the R.O.C
- 12) Monthly Bulletin of Statistics
- 13) Monthly Key Social Indicators of Taiwan Area
- 14) Monthly Key Economic Indicators of Taiwan Area
- 15) Commodity - Price Statistics Monthly, Taiwan Area
- 16) Commodity - Price Monthly, Taiwan Area
- 17) Express Report of Price Statistics in Taiwan Area
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- 19) Standard Classification of Educational Attainment and Field of Study of the R.O.C
- 20) Standard Classification of Industries and Occupation
- 21) Standard Classification of Commodities of the R.O.C
- 22) Standard Classification of Statistical District of the R.O.C

2. Council for Economic planning and Development, 1986, Taiwan
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1. Department of Statistics. 1986 New Zealand Census of Population and Dwelling - Sample Questionnaires for use in Demonstration of Computer assisted coding. New Zealand.
2. Norman. Y. Luther, Lee - Jay Cho. Reconstruction of Birth histories from Census and Household Survey data. Washington State University & East-West Center Population Institute, U.S.A
3. East - West Center Population Institute, 1986. EASWESPOP - Fertility (Fertility Estimate Programs), Honolulu, U.S.A.
4. Statistics Bureau, Management and Coordination Agency. 1986. Population of Japan. Japan
5. Andrew Mason. 1986. Demographic Prospects in the Republic of Korea - Population, Households and Education to the Year 2000 East-West Population Institute. Honolulu. U.S.A.

〔附 錄〕

第3次韓・中統計協力會議 概要

第3次 韓·中 統計協力會議 概要

1. 會議概要

1) 日次：1987. 2.16-2.19 (4日間)

2) 場所：自由中國 타이페이

2. 目的

韓國과 自由中國의 統計局間 相互 統計技術 協力增進 및 情報交換을 通한 統計發展의 寄與가 目的임.

3. 會議 開催 經緯

- 第1次會議：1984. 4. 9-4.13 (서울)
- 第2次會議：1984. 9.19-9.23 (타이페이)
- 第3次會議：1987. 2.16-2.19 (타이페이)

4. 訪問機關

- 行政院 主計處 主計長 Mr. Shin-Yi Chung (鍾時益)
- 行政院 主計處 第3局長 Dr. Duan Wei (韋端)
- 行政院 主計處 第4局長 Mr. Chung-Li Chang (張宗利)
- 經濟部 統計長 Mr. Ching-Tseng Song (宋欽增)

5. 蒐集資料

- 第Ⅱ編의 蒐集資料目錄 參照