

**Introduction of new technology with limited resources: the case of  
Thailand**

**by**

**Rossarin Gray  
Social Statistics Division  
National Statistical Office  
Thailand**

**The 18th Population Census Conference  
26-29 August 1998  
East-West Center, Honolulu, Hawaii**

## **Introduction of new technology with limited resources: the case of Thailand**

### **Introduction**

The purpose of this paper is to discuss the operational plans concerning the population and housing census in Thailand, which is expected to be carried out in the year 2000. The paper focuses on the introduction of new technology. It is necessary to state in advance that the economic crisis in Thailand, which started at the end of 1996, will have a considerable impact on census operations and still might affect such plans as exist to introduce new technology.

The introduction of new technology is costly for the National Statistical Office (NSO) and is not regarded as a priority in the climate of scarce resources for government activities. The NSO has had to set up several alternative plans, to be executed using its existing technology. Although the budget was requested for the whole project covering the period 1998-2002, the budget will be allocated on a single-year basis, and it is not possible to be certain about the financial situation of the Thai government during the next few years.

The NSO produced alternative plans for census methodology and data processing so that the census would not be postponed, and the results would be timely and yield good quality data within the financial constraints which will apply. The NSO also takes into account the importance of information technology both from the producers' and users' points of view.

### **The 2000 Population and Housing Census**

The National Statistical Office has been carrying out population censuses every ten years since 1960. While cancellation was considered seriously, a decision has been made that the next Population and Housing Census should be carried out in the year 2000 despite the economic crisis in Thailand. The budget for the census will be less than \$18 million (in August 1998, \$1 was approximately 42 Baht.). Most of the budget

will be spent on the field operation. It is estimated that the population in 2000 will be about 62 million, and the number of households will be about 16 million.

### **Methodology**

Census operations will be expensive, but considerable savings can be made by planning for making results available at different levels of geographic aggregation. Three levels of methodology have been planned, and the main components of these alternatives are set out in this section.

The administrative units of Thailand are divided into region, province, district, sub-district, commune and village. According to Ministry of Interior, the latest figures in December 1997 showed that there were 4 regions, 76 provinces (including Bangkok), 844 districts, 81 sub-districts, 7,255 communes, and 67,844 villages.

In the *first alternative*, a sample census enumeration technique similar to that which was used for the 1970, 1980 and 1990 censuses will be adopted. For the three censuses, in Bangkok and non-municipal areas, all persons and households were listed and simultaneously enumerated with the short form questionnaire except for the sample households (20 %) which were enumerated with the long form questionnaire. In municipal areas outside Bangkok all persons and households were listed and enumerated using the long form questionnaire. For the 2000 census, in Bangkok, municipal and non-municipal areas, all persons and households will be listed and simultaneously enumerated with the short form questionnaire except for the sample households (20 % for Bangkok and non-municipal areas and 50 % for municipal areas) which will be enumerated with the long form questionnaire.

Appendix A presents the topics to be included in the 2000 Population and Housing Census.

In the *second alternative*, a two-stage sample design will be used to select households and produce information at no level lower than the district level. In the first stage, 50 % of blocks in Bangkok and municipal areas and 50 % of villages in non-municipal

areas will be selected from a complete list of blocks and villages. In the second stage, 20 % of households will be selected from sample blocks and villages. Only the long form questionnaire will be used for the sample households selected from a complete list of households in sample blocks and villages. No information will be collected from non-sample households. The budget will be reduced by 47 per cent compared with the first alternative sample census enumeration technique.

In the *third alternative*, a two-stage sample design will be used to select households and produce information at no level lower than the province level. In the first stage, one-seventh of blocks in Bangkok and municipal areas and one-seventh of villages in non-municipal areas will be selected from a complete list of blocks and villages. In the second stage, 20 % of households will be selected from sample blocks and villages. Only the long form questionnaire will be used for the sample households selected from a complete list of households in sample blocks and villages. No information will be collected from non-sample households. The budget will be reduced by 73 per cent compared with the first alternative sample census enumeration technique.

It is likely that the second alternative will be selected if the first alternative cannot be applied.

### **Data capture and data processing**

One of the major concerns with the statistics produced by the NSO is their timeliness. Timeliness has been improved significantly during the last few years due to the policy of decentralization of the NSO adopted since 1993. Nowadays, manual editing and keyboard data entry is carried out at statistical provincial offices in all provinces of Thailand before sending the data in the form of computer media (diskettes) to the central office in Bangkok for aggregation to national level, and other aspects of data processing, using mainframe computers.

Appendix B outlines the existing computing facilities of the NSO. It has been proposed to obtain a new mainframe to cope with uncorrected software problems in the year

2000 and to upgrade computing capacity. It is not yet certain when it will be possible due to the budget constraint in Thailand.

Local area networking (LAN) linked to the internet has been available at the central office of the NSO and three provinces adjacent to Bangkok since the end of 1997. Statistical processes do not yet necessarily utilize the intranet facilities. A wide area network (WAN) has also been planned so that provincial statistical offices will be able to connect to the host computer at the central office of the NSO by a dial-up process and internet service provider (ISP). It is expected to be available in every province by September 1998. This allows transfer of data by FTP (File Transfer Protocol) from provinces to the main station in Bangkok. These innovations are being introduced more slowly than would have been the case if budgetary restrictions had not been in force.

The NSO has also planned to introduce an Intelligent Character Recognition (ICR) solution for data capture. It is currently in a testing process, in which the NSO plans to carry out a pilot test with a survey using ICR for data capture, subject to availability of funds. This is to help make a decision whether the ICR technology should be adopted for the 2000 Census. The possibility of the utilization of ICR for the census is still unclear due to the budgetary constraints in Thailand.

### **Data dissemination**

The data will be available as printed publications, and on traditional computer media such as diskettes and CD-ROM. There will also be on-line data dissemination.

At present, summary statistical information from the NSO is made available on the World Wide Web. Internet infrastructure and the SAS package will be available by the year 2000. It depends on the subject matter area to design the census data dissemination via the Internet which will require innovative approaches to meet needs of sophisticated users taking into consideration the issues of user-authentication and security.

**Conclusion**

The introduction of new technology on the 2000 Population and Housing Census in Thailand will depend very much on the financial situation of the country. However, the policy of decentralization, the introduction of internet infrastructure that links provincial statistical offices to the central office which is underway, and the plan to adopt ICR for data capture promise improvement of the 2000 census to meet users' requirement.

## **Appendix A**

### **Topics to be included**

#### *Identification of household:*

- \* type of area (municipal, inside sanitary district, outside sanitary district and non-municipal)
- \* census block
- \* village number
- \* household type (private/collective)
- \* household number
- \* number of persons in household
- \* males/females
- \* language spoken at home
- \* short form or long form

#### *Short form (all respondents):*

- \* relationship to head of household
- \* month and year of birth, and age
- \* sex
- \* educational attainment
- \* marital status
- \* occupation during last year
- \* industry during last year
- \* work status during last year
- \* whether work at establishment or outside (home workers)

#### *Long form (sample respondents):*

(short form and in addition)

- \* children ever born alive
- \* children died
- \* place of birth
- \* length of residence
- \* place of previous residence (province, rural/urban)
- \* level of school attending
- \* religion

#### *Long form (housing):*

- \* type of living quarter
- \* characteristic of living quarter
- \* tenure of living quarter
- \* tenure of land
- \* number of bed rooms
- \* fuel used for cooking

- \* source of drinking water
- \* source of supply water
- \* household possessions

## **Appendix B**

### **Computing facilities of the NSO**

The computer system consists of

1. Mainframe computer system 4381 with CPU IBM 4381/R92E 18 channels 32 MB memory. This system is used mainly for batch processing of census and survey data.
2. Mainframe computer system 3090 with CPU IBM 3090/110J 16 channels 32 MB memory. This system is used mainly for data base and on line processing.
3. Desktop microcomputers are available throughout the central office, connected to a local area network. Provincial offices also use microcomputers.

A Geographical Information System (GIS) is used for mapping and geographical data presentation.