

**PLANNING FOR THE 2000 POPULATION CENSUS
OF INDONESIA**

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I. Introduction

- 1.1. After the proclamation of independent in 1945, Indonesia has conducted four censuses in 1961,1971,1980, and 1990. According to the Census Law No.6, 1960, which was replaced by the Statistical Law No 16, 1997, the data on population should be collected through direct enumeration to all population residing in the territory of Indonesia, except for the member of diplomatic corps and their family. The Law also states that the population census should be carried out in all parts of Indonesia simultaneously every ten years, in the year ending with zero or around it. The next census will be carried out in the year 2000.
- 1.2. The evaluation of the past censuses by the *Badan Pusat Statistik* (BPS) - Indonesia reveals that a great progress that has been achieved in various stages of census activities, such as, planning, execution, and processing. However, there are still many problems of census taking that have to be solved by BPS, and due to the increasing demand by the data users for a better data quality, timeliness, and small area statistics, the 2000 Population Census has become more complex compared to the previous population censuses
- 1.3. In the case of Indonesia, there are several factors that may affect the quality of census data, among them are the followings: firstly, the total number of population to be enumerated in a census is very large (179.4 million in 1990 and estimated more than 210 millions in 2000), residing in thousands of islands and scattered in very wide area. Lack of good transportation to remote islands is one of the reasons of under-enumeration in those places. Secondly, the population of Indonesia consists of more than 200 ethnic groups with varying degree of development. Each has its own local language that cause problem during the enumeration, since the questionnaires and manual are written in *bahasa* Indonesia (national language). Thirdly, in many parts of Indonesia, the local statistical offices have difficulties in recruiting and training the field workers.
- 1.4. Comparing to the 1990 Population Census, the 2000 Population Census is slightly ahead in almost all stages of census activities. The following sections

of the paper will present the improvement of the 1990 Population Census, that will be applied in the 2000 Population Census, including the methodology, concept and definitions, mapping, household listing, enumeration, processing and dissemination of the census results.

II. Methodology

- 2.1. The 1990 Population Census consisted of two phases: the complete count was done from 15 September to 31 October 1990, and the sample count was carried out from 12 to 31 October 1990. The main purpose of the complete count was to get the total population by sex and administrative areas : province, district (*kabupaten*), sub-district (*kecamatan*) and village (*desa/kelurahan*). In addition to the sex, the complete count form (L-Form) also contained other topics, namely, age, relation to the head of household and marital status, which were used by the enumerators and the supervisor to check the completeness of the enumeration. The L-Forms was processed manually by the enumerators and the results were forwarded to the BPS Jakarta through the Regional Statistical Offices at each level of administrative unit. The complete count of the 1990 Population Census was the only source of statistical tables classified by small areas, but it was limited to the above items.
- 2.2. The characteristics of the population were collected through the enumeration of household selected as sample (approximately 5 percent), using the S-Forms, which contained 48 questions. The sample of households were selected in two stages: firstly, the selection of enumeration areas proportional to size, and secondly, the selection of households within the selected enumeration areas.
- 2.3. The total population by its characteristics obtained from the complete count were not the same as those estimated from the sample count. The sampling error as well as the non-sampling error may have contributed of these differences. To avoid the confusion among the data users, the BPS has decided not to publish the characteristics of population that were obtained from the complete count, except the total population by administrative areas.
- 2.4. A closer look at the tables estimated from the sample count indicated that the characteristics of population had very skewed distributions were not reliable. For example, a table on population by nationality classified by sex and province is in accurate since more than 90 percent on the population are Indonesian and the rest are foreigner. Hence, the estimated number of the

Dutch, for example, living in Indonesia was not accurate. The same problems were indicated in the tables on religion, education, migrant etc. Actually, these types of tables can be obtained by tabulating the resident registration records, but the registration system in Indonesia is not running well and does not cover the whole country.

2.5. The demand of small area statistics from the data users in recent years is increasing for regional planning as well as for micro type analysis. To meet those demands, the BPS has modified the methodology of the 2000 Population Census as the followings:

a). There will be no sample count, but it will be only complete count to enumerate all population in all parts of Indonesia simultaneously, using the P-Form which contains only some basic topics that are frequently requested by the government for regional planning and other data users as well. Province, kabupaten (district), kecamatan (sub-district) and desa/kelurahan (village) as the smallest administrative unit will tabulate the P-Form.

b). Other topics of the Long Form of the 1990 Population Census will be included in the National Socio-Economics Survey (known as **Susenas**) that will be conducted two months after the enumeration of the 2000 Population Census.

c). Approximately one year before the enumeration of the population, BPS will conduct household listing within the census blocks. In addition to the household topics, the housing topics will be collected during the household listing that makes it possible to tabulate the housing information by administrative unit down to village level.

2.6. Three important field activities of the 1990 Population Census, namely, the village mapping and demarcation of the census blocks, household listing and the enumeration of the population, will remain unchanged in the 2000 Population Census, except some modification that will be discussed in the following parts of the paper.

III. Mapping and demarcation of the census block

3.1 Mapping of the country territory by its sub-division is one of the basic and most important of the census operation. The maps are usually used by the enumerators to locate the housing units and the households within the enumeration area and prevent omission and duplication during the enumeration. In addition, the maps will be also used at the planning stage of

the census to estimate travel time and cost, to recruit field offices and assign geographical codes.

- 3.2. The first step of drawing village map is to copy the existing village map into a village map form (70 x 50 cm) and draw all the legends on the map and after that the enumerator goes to the field, to revise the map according to the latest situation. The enumeration area (EA) demarcation were made on the basis of the legends recorded on the village map and the estimated number of households and population, obtained through quick household listing. An EA is defined as part of a village which has a clear cut natural as well as man-made boundaries, with a total number of households between 200 and 300. . In fact, in many places outside Java the number of households within an EA were less than 100. On the other hand, in high densely populated areas in Java, the size of an EA was between 500 and 1000 households.
- 3.3. A great variation in the size of the enumeration area mentioned above create problem if it is used as the sampling unit for the selection of the households to be enumerated in the sample count. In practice, the large enumeration areas were divided into several segments, each having around 100 households. It is not easy to do this without direct checking to the field. In most cases, the enumerators during the population enumeration do not easily recognize the boundaries of segments in urban areas. This could be one of the reasons that the under-enumeration in crowded urban areas is larger than that in rural areas.
- 3.4. A great variation in the size of the household, the population, as well as the area of the EA causes some difficulties during the planning stage of the census, especially in estimating the average cost and the workload per enumerator. As a general guidance to the regional statistical offices, one enumerator was assigned to enumerate the population within one EA. Later it was found that to enumerate 300 households within a period of one week was not an easy task. In many cases the enumerators needed to visit the households more than once and sometimes they were helped by the head of the village and the field supervisors to accomplish the enumeration.
- 3.5. The BPS has made some modifications on the procedure of village mapping and the demarcation of the enumeration area for the 2000 Population Census. Basically, the overall procedure of mapping is more or less similar to that of the 1990 Population Census, except that the term "Enumeration Area" (EA) will be replaced by the term "Census Block" (CB) which is defined as a sub-division of a village having approximately 100 households. This seems to be an appropriate size of CB that an enumerator can accomplish his job within

the period of one week. Another difference is that the demarcation of the CB will be based on the Local Neighborhood Units (LNU), which are specially formed by the head of the village for administrative purposes and most of the population living within the LNU are supposed to know where they belong. If the household size of a LNU is very large, say 400 households; it will be divided further into smaller unit so that each CB will have on the average 100 households. It is interesting to note here that different parts of Indonesia has different term for LNU, for example, in Jakarta known as *Rukun Tetangga* , in Bali known as *Banjar*, in Yogyakarta known as *Dukuh* etc.

- 3.6. The main field works of the 1990 Population Census, namely, the mapping, household listing and the population enumeration, were carried out from 7 September to 31 October 1990, consecutively. In many parts of Indonesia, due to lack of enumerator, each stage of field works were carried out by the same person, hence a cross check evaluation of the results of enumeration could be done efficiently by the supervisors. The execution of the field works of the 2000 Population Census will be carried out successively at the following periods of time. The mapping and demarcation of the census block will be carried out in October 1998, the household listing will be conducted in October 1999, and the enumeration of population will be carried out in 2000. By this arrangement, the field staffs of BPS at regional offices will have enough time to make preparation of each stage of the field works, including recruitment and training of the enumerators.
- 3.7. The village map showing the sub-division by census blocks will be made in two copies: a copy will be sent to the Cartographic Division at the BPS Jakarta to be processed using computer and the other will be kept by the enumerators for enumeration purposes. Using aerial photos, the Cartographic Division will plot the village census maps with census block boundaries on scale based maps, resulting in more precise and reliable maps. These maps will be valuable not only for the presentation of statistical data on maps, but also for planning of future censuses and surveys, particularly for sample selection.

IV. Household Listing

- 4.1. In the 1990 Population Census, the household listing was carried out soon after the mapping of the village, and the demarcation of the enumeration area were completed from 15 to 31 September 1990. In some parts of Indonesia, due to lack of enumerator, both mapping and household listing were conducted simultaneously by the same enumerator. The main objective of the

household listing of the 1990 Census was to get data on the total number of the households and physical structure. All buildings, housing units and other structures, such as, schools, mosques, hospitals etc. were plotted on the maps of the selected enumeration areas. Both the selected enumeration area maps and the results of the household listings were used as the basis for the selection of households to be enumerated in the sample count. Summary report containing the total number of households and the housing unit by village were compiled by the Provincial Statistical Offices, then sent to the BPS in Jakarta.

- 4.2. The list of the selected households within the census block and the map of the enumeration areas showing the location of the housing units were important census documents that were needed by the field workers for the enumeration of the population in the 1990 population census. In addition to the location of the housing units, the maps also show the way to reach each housing unit successively according to housing unit number.
- 4.3. There are some differences of the household listing between the 1990 and the 2000 Population Census:
 - a). The household listing of the 1990 was conducted soon after the village mapping and the demarcation of the enumeration areas. While in the 2000 Population Census, the household listing will be conducted approximately one year after the village mapping. During the household listing the village and the census block maps will be corrected according to the latest information found in the fields.
 - b). The enumerator of the 1990 Population Census, on the average, had more work load as he had to list about 300 households within the enumeration area, compared to only about 100 households in the 2000 Population Census.
 - c). The household listing of the 2000 Population Census will collect more topics regarding the characteristics of housing compared to the 1990 Population Census.
 - d). The household listings of the 1990 Population Census were processed manually to get one way table on the number of households classified by enumeration areas, which were mainly used for sample selection. Using more sophisticated data processing instruments, such as scanning for the data capture, more detailed tables on household and housing will be obtained from the 2000 Population Census
- 4.4. In the 1990 Population Census, the housing topics were asked in the sample count, using the household as the unit of enumeration. Consequently, we could not estimate the total number of **housing units** by its characteristics and

small areas, but the total number of **households** classified by the characteristics of the housing unit. The reason was that in many parts of Indonesia, especially in urban areas, a housing unit could be occupied by more than one household. Hence, if we use the household as the unit of enumeration, the characteristics of the housing unit of each household would have been all similar.

- 4.5. For the first time in the 2000 Population Census, the topics on housing will be included in the household listing forms, that makes possible to present the total number of housing units by each level of administrative unit, from province, kabupaten (district), *kecamatan* (sub-district) down to *desa* or *kelurahan* (village). These tables and the maps of the census blocks will be used as a basis for the construction of Master **Sampling Frame** for the future housing sample surveys. In addition, tables on housing cross-tabulated by its characteristics will be other important results of the household listing of the 2000 Population Census.
- 4.6. Most of the concepts and definitions of the topics of the 2000 Population Census conform with the United Nations recommendations, except that the classification of the selected topics are modified according the situation in Indonesia. As mentioned earlier, there are hundreds of ethnic groups in Indonesia, with varying degree of development, custom, and also having different types of housing units. This situation causes problems in defining and interpreting the concept of the housing topics, since it might be perfectly applicable in certain parts of Indonesia but not in other parts.

V. Data collection

- 5.1. The data collection of the 1990 Population Census was done through direct enumeration by the enumerators to all population living in the territory of the Republic of Indonesia during the period of enumeration. The total number of the field workers were about 400 000 persons, selected among the schoolteachers, students, government officials, and other persons who meet the requirement as the field worker. They should have completed at least primary school, to be adult person with sense of responsibility, and live in the assigned enumeration areas. Each enumerator was in charge of one or two enumeration areas in Java and one enumeration area in other islands.
- 5.2. Before the enumerators did their job to collect data in the field, they were trained for five days regarding the concepts and definitions, methodology of the census and the technique of interviewing. The training consist of several stages: firstly, the training of Master Instructor; secondly, the training of the

National Instructors by the Master Instructors; thirdly, the training of the Regional Instructors by the National Instructor; and fourthly, the training of the enumerators and the field supervisors by the Regional Instructors.

- 5.3. There will be no significant change regarding the method of data collection of the 2000 Population Census compared to the 1990 Population Census, except probably the application of self-enumeration of a certain strata of population in urban areas. This method of enumeration is being studied and soon BPS will conduct pilot-study in several parts of urban areas. The estimated number of field workers will be around 500 000 persons, who will be trained according to the method adopted in the 1990 Population Census, but the phases of training will be reduced from five to three phases. Hence, the cumulative errors at each stage of training can be reduced to a certain extent. Moreover, the method of training will be improved, using modern means of training such as video, television set, sound system etc.
- 5.4. As mentioned earlier, two type of questionnaires were used for the collection of data on population in the 1990 Population Census, namely, the complete count form (L-Form) and the sample count form (S-Form). To complete the S-Form, an enumerator needed on the average 45 minutes for each household, consisting of 4 persons and to enumerate illiterate persons in rural areas even needed more time. This did not include the travelling time from one household to another, which sometimes needed several hours. This matter has been discussed during the planning of the 2000 Population Census which mainly focused how to reduce the enumeration time, since it will indirectly affect the quality of data collected by the enumerator.
- 5.5. To improve the quality of the data as results of the 2000 Population Census, the BPS will take some essential steps, which related to the data, collection in the field as the followings:
 - a). To improve the methods of selecting and training of the enumerators, including the supervisors.
 - b). To modify the questionnaires and the manuals, so that it will be easily understood by field workers.
 - c). To improve the method of the quality control check at the stage of enumeration by the field supervisors through direct check on the spot. This will include checking of the content of the questionnaires as well as the coverage of the enumeration.
 - d). In order to get the overall picture about the quality of data and the coverage of the enumeration, BPS will conduct the Post Enumeration Survey soon after the enumeration is completed.

VI. Data Processing

- 6.1. Unlike the previous censuses of Indonesia, the processing of the 1990 Population Census of large provinces, namely, West Java, Central Java, East Java, South Sulawesi, and North Sumatra, were handed over to the Statistical Offices of those provinces, and the data of the rest of the country were processed in the BPS in Jakarta. Through this arrangement some of the past data processing problems, such as, a lack of storage of census documents at BPS and long delay of receiving census documents from remote places to a certain extent were solved. The clean data resulting from processing at the regional statistical offices were sent to BPS in Jakarta for further processing to get the final tables on population.
- 6.2. As mentioned earlier, the processing of the complete count (the L Form) was done manually by the enumerators and field supervisors to get the number of population by sex for each administrative unit : village, *kecamatan* (sub-district), *kabupaten/kotamadya* (district), province and the national figures. The processing was completed within the period of two months and the results were announced to the public as preliminary figure of the population.
- 6.3. To meet the urgent demand of the data users, the BPS processed ten percent of the sample count forms (approximately 200 000 households), to get basic tables on population . The processing was completed within the period of six months and the results were published as advanced tabulation. In the meantime, the processing of the rest of the sample count forms were run separately and completed within the period of one and half years as the final tabulation of the 1990 Population Census. Some differences between the data on the characteristics of population published in the advanced tabulation and the final one cannot be avoided, since they are both affected by sampling error with different magnitude. The BPS recommends the data users not to use the advanced tabulation, when the final publications are already available.
- 6.4. Centralization of data processing at one place in Jakarta, as it was applied to the earlier census of Indonesia caused storage problems and the delay of the in-flow of the census documents from remote parts of Indonesia, which in turn affect each stage of the data processing and the delay of the whole processing plan. . Moreover, handling a large amount of census documents (about 10 million forms) at one place requires a good data management. Otherwise, the flow of census documents from one processing unit to another cannot be controlled effectively. For that reasons, the documents of the 2000

Census will be processed at provincial statistical offices and at selected *kabupaten/kotamadya* (district) statistical offices in Java. It will be limited to the checking of the census forms, data entry, and cleaning of the data. Later, the clean data will be sent to BPS in Jakarta for further processing.

- 6.5. One of the advantage of the de-centralization of data processing at regional statistical offices, is that, the distance between the fields and the processing center is much shorter, hence the traveling time of the census documents from the fields to the processing center is less than that to Jakarta, and the local cost will be much lower. Another advantage is that any errors found during the processing can be corrected without many problems, by checking back to the field directly by the field supervisors. In the earlier censuses, most of the uncorrected errors were classified as the unknown cases.
- 6.6. The preparation for the decentralization of data processing at regional statistical offices was started in 1997. Personal computers and instruments for the installation of the Local Area Network (LAN)/ Wide Area Network (WAN) has been purchased by BPS. Scanning machines will be made available next year. In the meantime, training of the data processing staffs of the local offices has been carried out regularly at the BPS in Jakarta. The data processing plan for the future is aimed at a decentralized data processing in a broader sense which means that all statistical data will be processed at the province as well as the *kabupaten/kotamadya* (district) statistical offices. The BPS Jakarta will only receive the clean data, processing and disseminating it. The central office is also responsible in making of overall plan.
- 6.7. The data capture of the earlier population census in Indonesia used keyboard as a mean of transferring the information from the census documents to a format that can be read by computer. The evaluation study conducted by the BPS indicates that many mistakes occurred during the data entry, which are rather hard to correct them without matching to the original census documents. It usually takes times and cause delay of the other processing activities. Many efforts have been made by the BPS to improve this situation, for example, through tight recruitment and regular training of the data entry staffs, and the improvement of the organization of data processing both at central as well as at regional statistical offices. However, no significant improvement on this matter has been achieved as indicated by the results of several tests and the indicators on the quality of the population statistics.
- 6.8. To solve the data entry problems mentioned above, BPS has decided to use the Optical Character Recognition (OCR) or Intelligence Character

Recognition (ICR) for the data capture of the 2000 Population Census and the funding for the purchase of these machines is being sought from external sources. These machines and computers will be allocated to the data processing center at province Statistical Offices and selected kabupaten/kotamadya (district) in Java. To change the technique of data capture from traditional keyboard, which has been used by the BPS for many years in the past; to OCR need some preparations as the followings

- a). To reform the organization of data processing unit both at central office and regional statistical offices, including the recruitment and training of new data processing staffs.
- b). The questionnaires should be re-designed in such way that all information recorded in the questionnaires, both numerals and characters can be read and recognized by the OCR equipment's. This will include the selection of the quality of the paper, the size of the questionnaire, color and type of character to be used etc.
- c). The draft of the questionnaires should be tested several times at different places. The main purpose is to test the suitability of the questions, concepts and definitions, as well as the questionnaire design. The test is also used for estimating the time requirement for the enumeration. Last but not least, the test provides the acceptance rate of the writing style of the enumerators by the OCR equipment.
- d). The methods and the topics of training of the field workers should be modified emphasizing more on how to handle the census questionnaires carefully and to write the information on the questionnaires clearly.

VII. Dissemination

- 7.1. Results of earlier censuses were disseminated in several types of official publications. The format and the content of publications were designed for different purposes and adopted to different background of the users. The national publication contains tables showing the characteristics of population of Indonesia, and province publications (27 provinces) containing tables related to the characteristics of the population of each province. In addition, BPS also published the executive summary, containing summary tables, graphs and population maps, aiming at the need of the executives who usually do not have enough time to digest thick publications mentioned above.
- 7.2. Printed publications will be remain important means of disseminating results of the 2000 Population Census, but the number of publications as well as the number of tables included in each publication will be reduced significantly.

The publication will contain selected tables, attractive graphs and geographical population maps of small areas. These publications are easily distributed to a large number of the users, since they do not require any particular equipment, software or technical skills.

- 7.3. Under an agreement between the BPS and the data user, the BPS will provide the raw data (individual information) to the user by deleting a certain information, so that the users cannot trace the individual concern in the field. It is stated in the agreement that the user may not release the data to the third person without the knowledge of the BPS.
- 7.4. BPS is planning a new method of disseminating the results of the 2000 Census through on line access media, namely, the Internet, which has been used by the BPS to disseminate other statistics. Using the Internet, the data can be accessed through the BPS homepage, but it contains very limited data. For those who want to explore further, they may obtain either the census publication or the raw data as mentioned earlier.

VIII. Closing Remark

- 8.1. To improve the quality and the timeliness of the results of the population census, the BPS has made very important steps to revise the 2000 Population Census planning and to change the technique of data capture from traditional keyboard to OCR. This decision affects almost all census activities, such as, questionnaire designing, training of the field workers, the organization of data processing both at central offices and regional statistical offices etc. It is expected that the data processing of the 2000 Population Census will be completed within the period of less than 7 months and soon after that the results of the 2000 Population Census will be disseminated to the users.
- 8.2. Regarding the issue of small area statistics, the BPS has decided to simplify the methodology of the 2000 Population Census of not taking sample count like in the earlier censuses, but it will be only one phase of enumeration, that is, the complete count that will be carried out simultaneously in all parts of Indonesia. More information on population will be collected in the National Socio Economic Survey, which will be conducted three months after the enumeration of the 2000 Population Census.

Jakarta , August 1998