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Popstan

A CASE STUDY FOR THE 1980 CENSUSES OF POPULATION AND HOUSING

PART E.

Intercensal Household Survey Program for Popstan

Prepared under a Resources Support Services Agreement with the U.S. Agency for International Development

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PREFACE

Popstan: A Case Study for the 1980 Censuses of Population and Housing was developed by the International Statistical Programs Center of the U.S. Bureau of the Census. The publication covers all aspects of planning and implementing population and housing censuses—from determining the topics to be investigated and the method for collecting the information to the tabulation and evaluation of the results. It was prompted by the increasing importance of censuses in developing countries and the need for a set of materials on the interrelated complex of concepts, enumeration and processing procedures, controls, and analyses that are inherent in a census undertaking.

To provide a practical setting for the presentation of the instructional materials, the case study approach was used. A mythical country, Popstan, was created, with administrative subdivisions, social and economic characteristics of the population, housing characteristics, and a national statistical organization which was in the process of planning a decennial census of population and housing. Conceptual and procedural guidelines were developed for this undertaking, utilizing the recommendations of regional and international agencies and commissions and the experiences of various countries in similar programs. The materials are directed primarily to census technicians in developing countries; nevertheless, it is intended that countries adapt the case study to their particular needs. The titles of the seven parts of the case study and the chapters in each part are listed on the previous page.

Part A presents considerations and guidelines for planning and conducting censuses and is directed to census planners; it presents various alternatives and discusses their advantages and disadvantages. Part B introduces the mythical country and describes Popstan's decisions and preparations for its census; in giving the rationale for the decisions, reference is made to the considerations described in Part A. The complete enumeration, Phase I, is discussed in Part C; Phase II, which combines coverage evaluation with detailed characteristics for a sample of areas in Popstan, is the subject of Part D. Part E deals with Popstan's intercensal household survey program to provide current and continuing statistical data. Part F describes adaptations that may be more suitable for some countries. The final document, Part G, contains study exercises, a glossary of terms, and technical notes.

Other case studies prepared by the International Statistical Programs Center include *New Florencia* for the 1970 round of population and housing censuses, *Agrostan* for agricultural censuses, *Providencia* for economic censuses, and *Atlantida* for household sample surveys. Additionally, course materials in mapping for censuses and surveys, basic applied sampling, principles of demography, agricultural economics, and similar topics have been developed.

ACKNOWLEDGMENTS

The Popstan Case Study was developed in the International Statistical Programs Center under the general direction of **Beulah Washabaugh**, Chief of the World Census Staff, assisted by **Nina J. Pane Pinto**, Chief of the Census and Survey Methods Branch. Other members of the staff who were responsible for the technical review of the case study and for developing exhibits and supplemental materials include: **William E. O'Leary**, Demographic Statistician; **Janelle Fowler**, Survey Statistician; and **Leo B. Dougherty**, Survey Statistician. **Linda A. Schlueter**, Survey Statistician, assisted with chapters on field operations. **Frederick A. Leedy**, Assistant Chief, Training and Information Services, reviewed a number of chapters for technical consistency, particularly those related to the training and control of the field staff.

Chapters on various topics were prepared by former employees of the U.S. Bureau of the Census, as follows: census objectives, organization, operational control, and budgeting by **Robert B. Voight**, former Chief of the Field Division, Chief of Operations in the Population and Housing Division, and Chief of the Data User Services Division; legislation and publicity by **Lawrence A. Marzetti**, former Chief of the Overseas Consultation and Research Office and Assistant Chief of the International Statistical Programs Center; mapping by **Robert C. Klove**, former Census Geographic Adviser; census content, publication, and uses of census data by **Elisabeth S. Nagy**, former Demographer, Population Division; quality control by **George Minton**, former Principal Researcher in Quality Control and Operations Research, Statistical Research Division; pretesting and coverage evaluation by **Herman H. Fasteau**, former Assistant Chief, Statistical Methods Division; data processing by **Dorothy P. Armstrong**, former Assistant Chief, Systems Division, and **Morton A. Meyer**, former Chief of the Demographic Operations Division and Chief of the Geography Division; and table preparation and local adaptations of census guidelines by **Edward P. Swan**, former Foreign Census Adviser. **Robert B. Pearl**, former Chief, Demographic Surveys Division, developed all of Part E, on Popstan's intercensal household survey program. **Howard G. Brunsman**, former Chief, Population Division, reviewed table formats and developed computer specifications for editing and tabulating. **Sigmund Schor**, former Chief, Statistical Procedures Branch, Population and Housing Division, reviewed the chapters on census organization and operational controls. **Charles W. Baker**, former Chief of Training, Field Division, prepared materials on enumerator training. Chapters on sampling were prepared by **Earl E. Houseman**, Sampling Consultant and former Sampling Specialist, U.S. Department of Agriculture.

Important contributions to the case study were made by a number of other persons in the U.S. Bureau of the Census. **Eli S. Marks**, Chief Census Research and Technical Adviser, reviewed and developed portions of the chapters on coverage evaluation; **Edgar H. Elam, Jr.**, Supervisory Statistician in the Decennial Census Division and former Foreign Statistical Adviser, and **Richard R. Storm**, Survey Statistician, assisted in the early developments of the case study. **Barbara A. Garner**, Survey Statistician, assisted with data processing specifications; **Maxwell D. Jeane**, Principal Researcher in Operations and Quality Control Research Staff, and **John F. Powell**, Contributing Researcher, Statistical Research Division, reviewed the materials on quality control; **Anthony G. Turner**, Chief, International Programs Staff, Statistical Methods Division, reviewed the chapters on sampling and evaluation; and **J. Gary Van Nest**, Survey Statistician, assisted with the mapping exhibits and the content of the census inquiry. Many other persons in the Bureau of the Census and in outside organizations assisted in the technical review of the materials, including **Samuel Baum**, Assistant Chief for International Demographic Statistics, Population Division; **Mary K. Friday**, Computer Systems Analyst, International Statistical Programs Center; **David V. Bateman**, Assistant Chief for Methods and Development, Statistical Methods Division; and **Maurice Kniceley**, Mathematical Statistician, Statistical Methods Division.

Members of the World Census Staff prepared the publication for printing. **Sandra G. Chapman** edited the text and prepared questionnaires and control forms; **Gladys Rea** designed flow charts, prepared computer printouts of table formats, and typed statistical portions of the text; **Joan A. Godwin**, assisted by **Rhonda L. Muncey** and **Deborah A. Serfass**, laid out and typed the text; **Stella L. Sutton** read the manuscript copy; and **John R. Gibson** drafted table formats. **Dolores E. Adams**, assisted by **Ellen Shifflett**, coordinated operational aspects of preparing the case study.

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Chapter E-1. OBJECTIVES OF PROGRAM

1. *INTRODUCTION*

No matter how successfully a population and housing census is carried out, it cannot meet all of the statistical needs of the country for data in subsequent years. Many changes occur over time so that census information steadily becomes outdated. Many topics are too complicated for inclusion in a census even if conducted as a two-stage operation. New issues arise that require information not anticipated at the time the census was taken.

There is a definite need, therefore, for some kind of statistical gathering system between census dates. Because of cost and timing considerations, it is almost inevitable that such intercensal statistics be collected by means of sampling. Although other alternatives may exist, such as social insurance records, data from business and industrial establishments, and the like--and these sources should be explored where feasible--sample surveys of the population present the most flexible and manageable means of gathering intercensal statistics, especially where comparability with the census is important. The Popstan plan, therefore, envisions a series of intercensal population surveys linked to the census program.

2. *RELATIONSHIP BETWEEN THE CENSUS AND INTERCENSAL PROGRAMS*

Chapter 1 of Part A of the case study discussed the objectives of an integrated statistical system. Essentially, such a system should provide data on the basic social and economic needs of the population and present a framework for developing, implementing, and monitoring government policies and programs aimed at advancing those aspirations. Population censuses and intercensal statistical endeavors both can play an important part in meeting these objectives. A census will, of necessity, explore these matters in only a relatively brief fashion. However, because it covers the entire population, the census can provide otherwise unavailable geographic and demographic detail. Intercensal sample surveys are ordinarily the better vehicle for a detailed examination of population needs at the national level or for broad geographic areas. At the same time, if a census reveals the likely concentration of certain conditions or problems in specific areas or among particular population groups, it is possible to design sample surveys to obtain the necessary detail for those sectors as well.

The relationship between the census and the intercensal program can also be depicted as the difference between a still picture and a moving image. A census provides an inventory of the human resources; essentially, it is a still picture of the population at a given point in time. The intercensal survey program mirrors the dynamic changes in the population as a result of altered social and economic events and the impact of government policies. Changes may be observed by comparing the findings in successive censuses, but the interval between censuses is a long time to wait for readings of that kind. The information from an intercensal survey program will pinpoint significant developments as they occur and enable adjustments in government policies to meet changing conditions.

The census and the intercensal programs complement each other in terms of the range of subjects to be covered. Even with a two-stage design, a census cannot possibly include all of the subjects about which information is needed

for planning purposes. Priority must be given to crucial matters for which information is needed in great geographic or demographic detail. The intercensal program, on the other hand, is much less restricted in this respect. Since there would be a succession of surveys, various subjects could be alternated from survey to survey, so that many more topics could be explored over time without over-burdening the enumeration at any one point.

The intercensal program can also complement the census in terms of the kinds of information to be collected. Certain subjects such as health, nutrition, recreational activities, etc., are usually too complex to be covered in a census, where large numbers of enumerators must be recruited and trained and where the enumeration must be completed in a relatively brief period of time. The intercensal program, in contrast, provides a much more viable means of exploring subjects of this kind. The use of a much smaller and relatively permanent field staff makes it more feasible to invest the necessary training and supervision essential in gathering complex information. Moreover, the existence of a succession of surveys, where complex subject matter can be developed gradually through testing and experimentation, can contribute greatly to the success of a total statistical program.

3. *IMPORTANT FEATURES OF INTERCENSAL SAMPLE SURVEYS*

Perhaps the most important single feature of sample surveys of the population lies in the flexibility of this approach. Other sources, such as administrative records, surveys of business establishments, and the like, may be less costly and will often provide more accurate data; but they are generally restricted in coverage and content by legal and administrative considerations. Household surveys, on the other hand, are less limited in both the kinds of information that may be obtained and in the amount of detail that may be developed on a particular topic. Also, whereas other sources usually provide information only about individuals, it is possible to develop data from household surveys both for each individual and for the household or family as a group.

It is important, however, not to stretch household surveys beyond the point where reliable information can be developed. For example, in constructing price indexes, it would be theoretically possible to use household surveys as a means for asking consumers about the prices they paid. However, since a price index depends on obtaining data for a highly standardized set of products from each reporter and from one period to the next, not much confidence could be placed on the kind of information that a household could provide. Similarly, although some valuable information on health can be obtained from household surveys, it is unreasonable to expect the respondents to provide detailed diagnoses of their ailments.

In some cases, household surveys may not be the best approach for obtaining certain information, but they may offer the only option available at the time. For example, data on births, deaths, and other vital events are probably best obtained from government registration systems. In some countries, however, such systems either do not exist or are known to be inadequate and incomplete. Although household surveys are not ideal for this purpose, necessity has led to the development of techniques in a number of countries which can provide reasonably adequate data. The survey approach, in this situation, can represent a stop-gap for obtaining these essential statistics until an adequate registration system can be installed.

Even if adequate alternative data sources exist, there may be reasons for collecting

certain information through household surveys. For example, a country may have a social insurance system whereby reliable information on the earnings of individuals can be developed from the reports submitted by employers in making their contributions. In studying the economic well-being of the population, however, information on the income of the household or family may be much more meaningful than data for individuals. Since a household may have more than one earner, and an individual may work for more than one employer, household surveys may be the only practical means of determining family income.

Still another feature of household surveys, not ordinarily provided by other data sources, is the ability to link together information on a variety of subjects for the same individuals or households. Most administrative record systems and similar sources relate to a particular subject. Since household surveys, on the other hand, can cover a reasonable number of different subjects in the same interview, it would be possible to cross-classify various kinds of information (for example, income and occupation as related to education). Understandably, there is a practical limitation on the number of subjects and the kinds of information that can be covered at any one time. In an intercensal system, however, it is likely that the same households would be included in a succession of surveys, with different subjects included at different times. In this way, the information on a variety of topics could eventually be combined for the same persons.

4. *DATA OBJECTIVES FOR POPSTAN*

As stated in chapter B-2 of the case study, the Popstan NSO plans to initiate a Household Survey Program to begin early in 1982. This decision influenced the objectives of both the census and the intercensal program. It also affected the kinds of topics that were included in the 1980 Census, particularly in Phase II. (Phase I was the 100-percent enumeration of characteristics to be published at all administrative levels. Phase II combined a sample survey for detailed demographic, social, and economic characteristics with a coverage evaluation survey to measure the completeness of the Phase I enumeration. Phase II was carried out in January 1981.)

4.1 *General objectives and topics*

The data objectives of the intercensal program depend on the policy needs of Popstan. Although conditions and emphasis will vary from time to time, there are some general objectives that will influence the shape and control of the intercensal program. The following are some of the important objectives:

(1) Provide adequate employment opportunities for all persons who want and need work. Among the kinds of information needed to further this objective will be data on whether persons are employed or unemployed; number of hours of work; length of time unemployed persons have been out of work; occupation and industry of present or previous job; wage rates for different kinds of work; date last employed (for persons not in the labor force); etc.

(2) Appraise the impact of population growth and mobility of the population. Information for this purpose is needed on births and deaths; immigration into and emigration out of the country; internal migration with special attention to movement from rural areas into the cities; and reasons for population mobility.

(3) Promote improved health and nutrition. In these complex fields, the program will measure at least certain basic parameters such as immunization of children and young people against communicable diseases; extent of use of doctors, dentists, and hospitals; existence of serious health conditions; consumption of high-protein foods; etc.

(4) Provide decent housing for the population. This requires information on current housing conditions; size of living quarters in relation to number of occupants (extent of crowding and privacy); availability of basic sanitary facilities; rent and other housing costs; etc.

(5) Provide educational, training, and recreational opportunities. Information will be obtained on extent of illiteracy; current school enrollment; educational attainment of adults and school dropouts; other kinds of training received; and availability of basic kinds of recreational and cultural opportunities.

4.2 *Census topics*

In order to provide the greatest linkage between the census and the intercensal program, all of the subjects covered in the census will be included from time to time in the household surveys. However, more detail on these subjects will be obtainable in the intercensal setting. Categories will be selected in such a way that singly or grouped they will be comparable with the broader categories used in the 1980 Census.

4.3 *Additional topics of current interest*

More complex subjects, not included in the 1980 Census, will be introduced gradually in the intercensal program. In this regard, the NSO considered it advisable to start with relatively simple formulations of these subjects. More detailed versions will be introduced in subsequent surveys as more experience is gained. As previously noted, the availability of a succession of surveys also provides an opportunity to experiment with different approaches to complex subjects until a satisfactory method is developed.

A further element of flexibility in an intercensal survey system is the ability to satisfy new and evolving data needs. For example, Popstan was confronted with a smallpox epidemic several years ago. At that time, little or no information was available on the number and ages of persons who had not been vaccinated. A household survey system could have provided, in a relatively short time, information on how many and what ages of people might be in danger of contracting the disease.

5. *GEOGRAPHIC OBJECTIVES*

The type and size of sample that can be supported in an intercensal survey program will be primarily oriented to providing statistics for the country as a whole. However, because social and economic patterns vary considerably from one part of the country to another--and especially among the metropolitan, urban, and rural portions--an effort will be made to provide at least some geographic detail. The objective will be to obtain a limited range of statistics in each survey for each of the two major metropolitan areas of the country and, separately, for the urban and rural parts of each of four major regions (exclusive of the metropolitan areas). More detail will be obtainable for these broad geographic areas by combining and averaging the results of successive surveys.

6. *INTERIM PROGRAM FOR POPSTAN*

The establishment of a sound intercensal program is a difficult undertaking and will require much time and effort. Content must be planned, a sample must be selected and updated from time to time, and a field staff must be organized. The NSO reasoned that there could be a gap of several years between the conclusion of the 1980 Census and the start of a continuing intercensal survey program, since the staff will want to use the 1980 Census data for some population characteristics to plan a sample that will meet specific objectives.

The NSO decided that the absence of current statistics for so long a period on various matters of prime interest will seriously handicap program planning. Several options were carefully considered and the decision was made to continue essentially the Phase II sample design and the Phase II questionnaire (exclusive of the coverage portion).

6.1 *Content*

The interim program will cover precisely the same subject matter and will use the same Phase II questions for demographic, social, and economic characteristics (see Part D of the case study). This will be the simplest solution and will expedite enumerator training, data collection, and data processing. At the same time, the census data will be kept up to date, at least for Popstan (urban and rural) and the total for each region. If there is specific interest in one or two of the topics cited in chapter E-2 as supplementary inquiries for the intercensal program, the NSO will consider including supplementary topics provided they do not detract from developing the full intercensal program. In fact, it will be desirable to include some of the supplementary topics for a small subsample to test the new questions and procedures.

6.2 *Duration and timing*

A reasonable approach will be to plan the interim program for up to 2 years following the Phase II enumeration; that is, carry out the interim program in 1982 and 1983, preferably in January so that it can be compared with the Phase II results. About 3 to 4 weeks will be allowed each year to complete the data collection.

6.3 *Sample*

The sample design for Phase II (described in chapter 2 of Part D of the case study) will be the basis for the interim program. However, the available program resources can support a sample of only half that size. Two approaches were considered: (a) select every second unit or (b) select every alternate EA.[1] The first approach will reduce the "cluster" size and will produce a more reliable sample than the second approach, which will retain the size of the original cluster but will reduce the total sample size. The NSO decided on the first alternative (that is, using every second housing unit to achieve greater reliability). The sample size will be smaller than the Phase II sample so that less detail will be published by urban-rural residence for each region.

6.4 *Estimation procedure*

The estimation procedure for the interim surveys will be similar to that described for Phase II but the basic sample weights will be twice as large. The survey data will still be adjusted to the Phase I population counts, as described in chapter 9 of Part D of the case study.[2]

6.5 *Enumeration and other operational procedures*

The administrative structure, data collection methods, and data processing procedures will be much the same as described in Part D for Phase II of the 1980 Census. However, the staffing and related requirements will be modified for the intercensal survey program to take account of the reduced sample size.

6.6 *Analysis and publication*

Full advantage will be taken of the data processing procedures and the software packages that were used in the editing and tabulation program for Phase II. Also, the review procedures for the Phase II publication tables will be adapted and used in the interim survey program. The software will facilitate producing tabulations for research as well as publication.

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[1] *In Phase II, one sector (or area subdivision of an EA) was selected from each sample EA. The same sector will be selected for the interim surveys.*

[2] *If the interim program continues for more than 2 years, however, projections of the census population counts will be used for this purpose.*

6.7 *Caution regarding the interim program*

In spite of the possible benefits of an interim program, Popstan will be careful not to invest so much effort and resources in carrying it out that the Household Survey Program will be inordinately delayed or be put aside entirely. An interim program will not, by any means, meet the full objectives of the intercensal plan; it will be regarded as a stop-gap measure rather than a substitute.

7. *CONTINUING HOUSEHOLD SURVEY PROGRAM*

As indicated, Popstan plans to establish a continuing Household Survey Program as soon as it can be developed. The discussion in the remainder of Part E relates to the development of the full-scale intercensal program and its operational aspects, once it is installed. Aside from the date of initiating the program, these steps will be much the same whether or not an interim program is implemented.

Chapter E-2. PROGRAM CONTENT AND SCHEDULING

1. GENERAL CONSIDERATIONS

The program content for the Household Survey Program will largely reflect the various objectives detailed in the previous chapter. All of the subjects covered in the census will be repeated from time to time in the survey program in order to keep the information up to date at least for the country as a whole, the four regions, and the two metropolitan areas. Another important feature will be the use of the survey mechanism to collect information on births and deaths. With the possible exception of the captial city of St. Regis and perhaps one or two of the other large urban centers, the birth and death registration system is known to be incomplete. The survey will provide at least some interim data on this crucial subject until the registration system can be sufficiently improved. In fact, matching the births and deaths reported in the survey against the records in the registration system should help identify the kinds of deficiencies in the latter for which particular attention is needed.

The survey content can be divided into three general categories:

(1) Basic subjects. These are subjects which should be covered in every successive survey. They include fundamental population characteristics (age, sex, etc.) that are invariably needed to cross-tabulate with other subjects. Also included are important topics which are subject to relatively rapid changes.

(2) Supplementary subjects. These are subjects which will be alternated from survey to survey, either (a) because they do not change rapidly or (b) because they are regarded as too complex for continuous use.

(3) Specialized subjects. These include highly complex subjects that will require essentially separate surveys. An example is consumer expenditure data needed to provide the weights and other ingredients for price indexes. Although some limited information on health and nutrition will be included in the set of supplementary subjects for the intercensal surveys, detailed treatment of these topics would also necessitate specialized surveys.

The design and conduct of specialized surveys will not be covered in the case study. It should be mentioned, however, that concepts and definitions in specialized surveys (especially for population characteristics and other items used as cross-classifiers) should be made as comparable as possible to those used in the regular intercensal surveys, in order to increase the usefulness of the results in an integrated data system.

A discussion and tentative scheduling of the basic and supplementary subjects is presented in the remainder of this chapter, together with illustrations of the questionnaires that will be tested. As previously noted, the intercensal survey system will also allow for the inclusion of new and emerging subjects, the need for which cannot be anticipated at the time the program is being developed. To the extent that the new inquiries are brief, they will probably be added to the scheduled content at any one time. In other cases, it may be necessary to cancel or postpone supplementary subjects in order to include some urgent new items.

2. FREQUENCY OF SURVEYS

A full-scale review of the data needs of Popstan, in relation to the available resources for statistical purposes, indicates that four quarterly surveys during each year of the intercensal period would represent the optimum choice. This scheduling would produce the basic statistics with sufficient frequency and

provide ample opportunities for the inclusion of supplementary and even ad hoc inquiries.

Because of the complexity of an intercensal operation of the type being planned and the need to develop adequate staff at all levels, a gradual build-up to a quarterly basis appears advisable. The approach adopted will be to conduct only two surveys in each of the first 2 years--one in the first half of the year and the other in the second half. The regular cycle of four quarterly surveys will not start until the third year. Most of the basic subjects will be covered in the first year. Supplementary subjects, however, will be attempted on only a limited and experimental basis in the first 2 years. Regular scheduling of supplements will begin in the third year of the continuing Household Survey Program.

3. PATTERN AND METHOD OF INTERVIEWING

For each survey, whether semi-annual or quarterly, the enumeration will be spread over virtually the entire survey period. This will be done by randomizing the sample into an appropriate number of subsamples, one of which would be enumerated in each successive period. Thus, in the first 2 years, when the survey will be on a semi-annual basis, the sample will be subdivided into 12 subsamples. Each one, in turn, will be enumerated in every second week of the semi-annual period, except for the final 2 weeks. Once the operation is on a quarterly basis, the sample will also be divided into 12 subsamples, but one of these would be assigned to each week of the quarter, except the last week. The reason for omitting the last week (last two weeks in the first 2 years) is to set aside some time for scheduling training sessions and similar activities.

3.1 Reason for spreading sample

There are several reasons for spreading the sample throughout the survey period. First, all of the weeks of the year (once the operation is on a quarterly basis) will be represented in the statistics, thus reducing the variability that might result from the selection of only certain weeks. This is especially important in a country with a large agricultural sector, like Popstan, where seasonal economic activity, changing weather conditions, and similar factors can result in substantial week-to-week variations.

Spreading the sample will also permit the use of a much smaller and primarily full-time staff of enumerators, thus reducing training and supervisory costs. By providing full-time work in most instances, it should also be possible to recruit more qualified personnel and to decrease turnover. The fact that enumerators will be working more-or-less continuously should avoid the losses in skill and experience that sometimes occur among those employed only intermittently, such as once a month or once a quarter.

As will be described in detail in chapter E-3, the sample for the Household Survey Program will be located in the two major metropolitan areas and in a selection of about 200 urban and rural areas throughout Popstan. Enumeration assignments in the metropolitan areas will be made each week (each second week in the first 2 years), with the work handled by resident enumerators. However, in order to avoid excessive travel and cost, other areas will be enumerated on a rotating basis, probably with each one included in the sample only once in a quarter (once the operation is on a quarterly basis). In the latter situation, there would be a staff of travelling enumerators who would move from area to area in accordance with the scheduling.

Even though only a subsample of selected areas will be enumerated in a given week, the overall sample for each week would nevertheless represent a probability sample for Popstan as

a whole. Although any given weekly sample would be much too small (and too concentrated geographically) to provide useful statistics, this type of design adds a good deal of flexibility to the program. In addition to annual or quarterly statistics, tabulations can be made for any reasonable combination of weeks that will be significant from an analytical standpoint and for which a sufficient number of observations are available. For example, if an analysis of employment data is wanted for the dry period just preceding the monsoon season, the survey results for those weeks can be combined to provide the desired statistics.

3.2 *Method of interview*

Survey data will be collected by personal visit to the housing units in the sample. In most instances, a responsible adult household member present at the time of interview will be asked to report for the entire household. There will be inquiries, however, where each individual should report for himself/herself. This will also be the case where the household respondent cannot supply the necessary information for a particular individual.

3.3 *Survey instrument*

At the start, Popstan will use single-sheet or booklet questionnaires similar to the forms used in the 1980 Census. The NSO will test forms that can be read by optical scanners.[1] Tests will be conducted in a small subsample of households, and the results will be compared with the cases using the conventional format.

4. *ROTATION OF SAMPLE*

In the continuing program, the design calls for enumerating the same sample units during the first 2 years; they would be enumerated twice in each of those years, once in the first half and once in the second half. Starting in the third year, when the operation is on a quarterly basis, provision will be made for changing the sample from time to time, in order to minimize non-cooperation and to reduce response biases that sometimes occur when the same households are interviewed repeatedly.

This changing or rotation of the sample will be done gradually in order to avoid serious discontinuities in the statistics, particularly in the estimates of changes from one period to the next. The final design calls for interviewing a particular group of sample units for four consecutive quarters, replacing a systematic one-fourth of the sample each quarter. On this basis, three-fourths of the units will overlap from quarter to quarter, providing sampling stability for the estimates of changes.

It should be noted, in this respect, that this is a sample of housing units and collective quarters and not of particular households or individuals. If occupants move out between one quarterly visit and the next and are replaced by a new household, the new household would be interviewed at that time. A sample unit may be occupied at one visit and vacant at the next, or vice versa. Whatever the case, the occupants present at any given visit, if any, will be enumerated.

5. *BASIC PROGRAM ITEMS*

The basic intercensal program items for Popstan--those to be covered in every successive survey--will comprise the following subjects:

(1) Basic population characteristics
(2) Economic activity
(3) Births and deaths

5.1 *Basic population characteristics*

Certain basic population characteristics are important not only in their own right but

[1] *Refer to chapter 7 in Part B of the case study for full discussion of questionnaire design. Refer also to alternative questionnaire designs in Part F of the case study.*

are essential for cross-tabulation with almost every other subject. Persons will be included in the intercensal surveys on the same basis as in the census; that is, on a de jure basis. Thus, the surveys will cover all persons who usually live in a sample unit, including those who are temporarily absent. Also included will be those temporarily staying in the unit who have no usual residence elsewhere.

5.11 List of population characteristics.--Only a few characteristics are included on the basic list--relationship to the household head, age, sex, and marital status. The concepts and definitions to be used for these items will be the same as specified for the census.

5.12 Household Record Card.--The procedure for recording the basic characteristics will be somewhat different from that used in the census, mainly because the same sample unit will be interviewed in several successive surveys. At the first interview, a Household Record Card (exhibit E-2-1) will be filled, listing the persons in the HU or CQ and recording their basic characteristics. All persons who usually live in the unit, including those temporarily absent, and anyone who is temporarily staying there will be listed. The relationship of each person to the household head will be recorded as he/she is listed. After the listing is complete, a determination will be made as to whether each person is a household member (item 13); that is, whether he/she usually lives in the unit or has no usual residence elsewhere. Only household members (under the de jure approach) would be asked the survey questions.

For household members, sex, date of birth, and marital status will be reported. Date of birth is included because a person's age could change during the time the unit is included in the survey. That is the reason two columns (16a and 16b) are provided for recording age, which is determined by the enumerator from the date of birth.

During the second or later interview of the household, the Household Record Card will be brought up to date by adding or deleting persons, if appropriate. The date and reason for household change will be recorded in item 18 (for example, May 1984--moved to another city). If an entire household moves out and is replaced by another, a new Household Record Card will be prepared.

5.2 *Economic activity*

Continuing information on the economic activity of the population is essential in determining how well the country is succeeding in its objective of providing useful employment opportunities to those who want and need work. Employment in Popstan is subject to considerable fluctuation, not only because of seasonal factors but also because of variations in economic conditions. The country's prosperity is largely dependent on exports of raw materials and certain light manufactured goods, the demand for which is subject to sudden changes. This is the reason it has been decided to obtain information on employment status in each survey. Once the program is in full operation, such statistics will be available quarterly.

5.21 Difference from census concepts.--Because the intercensal program is devoted to current statistics, it was decided to use a short reference period. Instead of determining employment status in the previous month, as in the census, the survey questions will relate to activity in the calendar week preceding the interview. Because the activities of unemployed persons are more irregular, however, the questions on looking for work will relate to the previous 4 weeks. In addition to this basic change, the survey will obtain more information on certain items. For example, persons looking for work will be asked how long they have been looking, persons who are not looking for work will be asked if they intend to look for work in the next year, etc.

5.22 Economic Activity Questionnaire.--An illustrative economic activity questionnaire is shown as exhibit E-2-2. A separate questionnaire will be filled for each household member 12 years or older. For convenience, the questionnaires will be bound together in booklets of four for a household.

5.23 Concept of employment.--Under the concept that Popstan will use, which is broadly comparable with the international standard, employed persons will consist of the following:

(1) Persons who worked during reference week. The person must have worked for 1 hour or more for pay or profit; that is, as an employee for wages, salary, commission, or pay in kind; as an employer; or as a self-employed or own-account worker in own business or farm. Included are persons reported as "Working" in item 1 or "Yes" in item 2 of the Economic Activity Questionnaire. An exception will be persons who worked without pay in a family farm or business (code 5 in item 19); such persons are not considered employed unless they worked at least 15 hours during reference week. Own housework and volunteer work are not considered "work."

(2) Persons who did not work but had a job or business. The person had a job or business but was absent during reference week for non-economic reasons--short-term illness, vacation, labor dispute, bad weather, or personal reasons. Included are persons with "Yes" in item 3 and any of codes 1 to 5 in item 4.

5.24 Concept of unemployment.--The unemployed will consist of persons who were not employed but who had looked for work during the previous 4 weeks and were available for work; that is, persons with "Yes" in item 5 and "No" in item 7. Also included as unemployed will be persons absent from work the previous week because they were waiting to start new jobs or were on layoff (code 6, 8, or 9 in item 4).

5.25 Labor force concept.--The civilian labor force consists of the employed and the unemployed. The total labor force will also include the Armed Forces, about whom information will be obtained from official records rather than from the survey. All other persons 12 years old or older are considered as not in the labor force (this includes seasonal workers out of jobs but not looking for other work). Information on previous job experience and future job-seeking intentions is obtained for persons who are not currently employed in order to appraise the potential labor reserves of the country. Their current major activity is also reported (that is, whether keeping house, going to school, or some other activity).[2]

5.26 Underemployment.--Persons who normally work fewer than 35 hours (item 12) will be asked the reason why they work fewer than 35 hours (item 16) and whether they want and can accept additional work (items 14 and 15). Those who worked fewer than 35 hours because of economic conditions or who want and could accept additional work will be considered as underemployed. Persons who earn subnormal wages (item 20) even though working full time will also be regarded as underemployed.

5.3 *Vital statistics--births and deaths*

As previously indicated, the survey procedure will be used, at least temporarily, in an effort to improve the statistics on births and deaths. These topics will be covered in each of the successive surveys in order to obtain continuous data. Births and deaths will be detected by comparing current with previous household composition. Consequently, information on births and deaths will not be obtained until the second or later survey.

5.31 Use of population change data.--The Household Record Card (exhibit E-2-1) will provide information on changes in the household

[2] *In the 1980 Census, the combined group of employed and unemployed persons made up the "economically active" population. The term "labor force" refers to the same group except that the term is generally used when the concept relates to the activity of a person during a brief recent period such as a calendar week.*

from one interview to the next. Where persons previously listed are no longer members of the household, an inquiry will be made as to whether the person has died. Infants added to the household whose birth dates are after the date of the previous interview are obvious indications of new births. Since newly born infants who died shortly after birth are one of the prime reasons for failure to register a birth (or death), a special inquiry will also be made on this matter.

5.32 Vital statistics questionnaires.-- The questionnaire shown as exhibit E-2-3 indicates how population change data will be used to explore the possibility of deaths and births. In each instance, the questionnaire uses information from the Household Record Card to detect a birth or death since the previous interview. Where a birth is discovered, a separate questionnaire (exhibit E-2-4) will be filled to provide detailed information. A similar procedure will be followed for deaths (exhibit E-2-5).

6. SUPPLEMENTARY SUBJECTS

Although certain types of inquiries for the Popstan intercensal program are designated as "supplementary," this does not necessarily mean that they are less important than the basic items. The main distinction is in the frequency with which they will be included in the survey. Whereas the basic items are covered on a continuous basis, the frequency of inclusion of a given supplementary subject will depend, in large measure, on how changeable the information may be. The complexity of the subject will also dictate how frequently it will be feasible to cover it in the survey. Policy priorities will affect the scheduling of supplements as well.

6.1 *List of supplementary subjects*

Although it is desirable to allow some flexibility in the program, it is necessary for planning purposes to set forth the subject content and scheduling for at least the first few years of operation. On this basis, the following supplementary topics have been selected for inclusion in the first full survey cycle:

(1) Annual income and work experience
(2) Internal migration
(3) School enrollment and educational attainment
(4) Natality
(5) Immunization against communicable diseases
(6) Use of medical facilities
(7) Consumption of high-protein foods
(8) Housing characteristics
(9) Recreational and cultural opportunities

6.2 *Scheduling of supplements*

In the first year of operation, when two semi-annual surveys will be taken, none of the supplementary subjects are regularly scheduled. In fact, the NSO feels it is advisable to cover nothing besides the basic items in the first semi-annual survey in order to permit enumerators and processing personnel to concentrate on these matters. During the second survey, in the final 6 months of the year, several of the supplementary subjects will be tested for no longer than a 1-month period each and in only a few areas. The results will be evaluated and the questions tested again. This approach will not result in usable statistics but will provide an opportunity to improve the questions and procedures for purposes of actual inclusion in the later surveys.

In the second year, it is proposed to include two supplementary subjects, each for a 6-month period. The plan at this time calls for covering internal migration in the first 6 months and natality in the second 6 months. These represent two important supplements; however, they are not quite as complex as some of the others.

Figure E-2a. SCHEDULE OF SUPPLEMENTARY TOPICS FOR QUARTERLY SURVEYS

Year*	1st quarter (January - March)	2nd quarter (April - June)	3rd quarter (July - September)	4th quarter (October - December)
3rd year.....	Annual income and work experience	Housing characteristics	Immunization against communicable diseases	School enrollment and educational attainment
4th year.....	Annual income and work experience	Internal migration**	Natality**	(1) Use of medical facilities (2) Consumption of high-protein foods
5th year.....	Annual income and work experience	Recreational and cultural opportunities	Immunization against communicable diseases	School enrollment and educational attainment

**First two surveys (excluding interim surveys) are conducted semi-annually in 1984 and 1985.*
***Previously covered in the second survey.*

The NSO set up a proposed cycle of supplements for the 3rd to the 5th years; that is, the first 3-year period of operation on a quarterly basis. The topics and time schedule are given in figure E-2a.

6.3 *Content and objectives of supplements*

The general content and objectives of the various supplemental inquiries are discussed below. Illustrative questionnaires for each subject are shown in exhibits E-2-6 to E-2-14. These exhibits are intended primarily to illustrate subject content and not necessarily the final formats.

6.31 Annual income and work experience.--This supplement is intended to provide a broad picture of the economic well-being of the family, as evidenced by the amount of money income and the receipt of certain non-cash income (pay in kind). All sources of income are covered as are the contributions of all household members 12 years old or older. Statistics on both the incomes of individuals and households or family groups can be developed from this information.

The relationship between annual income and work experience is an especially useful indicator. It is possible to determine from this relationship, for example, whether inadequate income is due to low earning rates or to lack of sufficient working time. The analysts will examine the earnings of persons who work full time and those who work part time. By comparing the incomes of persons working equivalent amounts of time, it will be possible to judge the relative earning rates of different occupational and demographic groups.

The annual work experience data provide a somewhat different picture of the job market from that obtained from the current employment status data. The expansibility of the labor force is illustrated by comparing the number and kinds of persons who work at any time during the year with the total in the job market at any one point. The effect of seasonal slumps in curtailing annual working time may also be observed--an important indicator in Popstan with its large agricultural sector.

Because income and work experience are both relatively changeable, it is proposed to include this supplement once each year in the survey. The first quarter of the year appears to be an opportune time to cover this subject, since the questions relate to the previous calendar year.

6.32 Internal migration.--Many of the social and economic problems of the country are caused by the heavy migration of the population from one part of the country to another, especially from depressed rural areas to the overcrowded metropolitan areas. Migration information will provide the necessary data to analyze these population flows, at least in a broad sense. In addition to the amount of movement, it will be possible to observe the special employment, housing, educational, and other problems of recent migrants to the cities.

Aside from the usefulness of this information in its own right, the data on internal migration may be helpful, together with statistics on births and deaths, in developing intercensal population estimates for several broad geographic areas. Because of sampling error, internal migration estimates from the survey may be too unreliable to be used directly for this purpose, but may be combined with other evidences of population shifts (such as changing school enrollments).

This subject has major policy implications in Popstan. Therefore, these questions will be included every second year of the survey. They are to be initiated in the second year and scheduled for repetition in the fourth year. The time of year is not too crucial, but the 2nd quarter was selected because the first inquiry on this subject (in the second year of operation) was made in the first half of the year. It is usually advisable to schedule successive supplements on the same subject at about the same time of year, to avoid possible seasonal influences.

6.33 School enrollment and educational attainment.--The future hopes of Popstan depend, in large measure, on its ability to advance the education and training of the population. This supplement will reveal the extent to which children of different age groups, and adults, are taking advantage of the schooling opportunities offered by the Popstan Government. At the same time, information on the educational attainment (number of school years completed) of the adult population provides a measure of the skill potential and training needs of different groups in an increasingly technical world. At the most elemental level, the degree of literacy of the population will be measured periodically.

Because of the importance of schooling for the next generation, and the concerted government effort to promote this cause, this supplement will be included every other year. The final quarter of the year appears to be the best choice for scheduling the supplement, because school attendance is at a peak at that time. The questions on educational attainment and literacy of adults will be asked in the same supplemental inquiry.

6.34 Natality.--Since the rate of growth of the population has a major bearing on social and economic development, periodic measures of the number of children born to women of different ages and socio-economic groups and information on the spacing of births are highly important. The availability of these statistics permits considerable refinements in the preparation of population projections and forecasts. The data will also reveal the effectiveness of the population policies pursued by the government. Although this is usually not a rapidly changing subject, policy considerations call for reasonably frequent measurements--about every other year. (Like the migration supplement, natality was first included in the second year and will be repeated in the fourth year.) The time of year is not especially important and will be varied, if necessary.

6.35 Immunization against communicable diseases.--Despite the existence of effective vaccines and the efforts of the government to promote innoculation, large numbers of children continue to be unprotected against communicable

diseases. The problem is especially acute among children in lower socio-economic groups, where crowded and insanitary living conditions increase the likelihood of infection. This supplement will provide an indication of the degree of protection among children and young people (under 25 years old) and the effectiveness of government efforts to promote universal innoculation. Inclusion of this supplement is proposed every other year as a monitoring device.

6.36 Use of medical facilities.--Detailed inquiries on health problems usually require separate, specialized surveys. Some useful indicators are obtainable, however, from information on the frequency with which different population groups avail themselves of medical practitioners and facilities--doctors, dentists, hospitals, etc. Where such facilities are used, it is often possible, in addition, to obtain from the patients some reasonably reliable information on the health conditions which were treated. A supplement on this relatively slow-changing subject is proposed about once every 3 years. The final quarter of the year should be suitable for this inquiry, as it represents about an average period for illness in Popstan.

6.37 Consumption of high-protein foods.--Detailed studies of nutrition require highly specialized surveys and techniques. Some useful indicators will be obtainable from this supplement on frequency of consumption of high-protein foods by different socio-economic and demographic groups in the population. This supplement will be tied in with that on the use of medical facilities; thus, it will be included about once every 3 years.

6.38 Housing characteristics.--One of the most important, and most difficult, goals of the government is to promote adequate housing for everyone in the population. The current picture on housing adequacy among different population groups and the responsiveness of this problem to government efforts will be revealed by this periodic supplement. Since housing changes fairly slowly, present plans are to cover this subject about once every 3 years. The time of year is not crucial.

6.39 Recreational and cultural opportunities.--The quality of life can be judged not only by the volume of goods provided by the economy and the adequacy of health care and education, but by the availability and use of recreational and cultural opportunities. This supplement, which will be included only once in the 3-year cycle, is primarily an experimental effort to explore this field.

Chapter E-3. SAMPLING FOR INTERCENSAL SURVEYS

1. *INTRODUCTION*

The Household Survey Program calls for interviewing only a sample of the population and it is important that the design selected for this purpose be as efficient as possible in meeting the objectives of the program. The sample will be designed to provide data for Popstan and the four regions, by urban-rural residence, and the two metropolitan areas.

Many factors will be taken into account in deciding on a sample design, including the available budgetary resources, the required level of reliability in the statistics, the geography and topography of the country, transportation and communication facilities, etc. It is impossible in this document to cover every situation in Popstan. Instead, a rather common situation will be assumed in describing the basic procedure, with some variations given later to cover different circumstances.

In approaching this matter, the Popstan NSO had given first consideration to the possibility of using or adapting the Phase II sample, but the desirability of using the design beyond an interim period appeared questionable (see chapter E-1). The framework and objectives of the Household Survey Program are sufficiently different from those of the 1980 Census that a rather different approach is indicated. Phase II had to be completed rapidly and required a simplified sample design, using relatively large clusters spread widely throughout Popstan. A more efficient procedure for intercensal surveys will be to use smaller (and more) clusters of units with less scatter. Such a system will make it more feasible to spread the enumeration over longer periods of time, with the consequent advantages that were discussed in chapter E-2. Also, a key objective of the Household Survey Program will be to measure changes in the statistics from one survey to the next, with emphasis on different subjects at different times. As a consequence, the NSO will develop a new sample that is specifically oriented to the needs of intercensal surveys and is largely independent of the one used in Phase II of the 1980 Census.[1]

2. *SAMPLE SIZE*

Two general approaches will be considered for determining the size of the sample for the household surveys:

(1) Assuming there is a fixed available budget in terms of both money and potential staff resources, determine the most efficient sample size and design.

(2) Assuming there is a needed minimum level of reliability in the statistics, determine the least expensive sample size and design that will meet the criterion.

Generally speaking, it is better to start with the second approach. However, if the computations result in a sample size that cannot be supported by the statistical budget, compromises in the reliability standards or in other aspects of the program will need to be made. Since the program will produce a wide variety of statistics, there will be differing levels of reliability, depending on the frequency with which a particular characteristic is found. For example, a characteristic found relatively infrequently (such as deaths) will have a much lower statistical reliability than one which is

[1] *As stated in chapter E-1, the Phase II sample will be used in the interim program.*

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rather common (such as employment). In deciding on sample size, therefore, the most critical statistics will be the main basis for judgment. Most particularly, subjects covered in successive surveys and for which estimates of changes are needed will be crucial.

2.1 *Sample size for metropolitan areas*

For the St. Regis and Tanga Metropolitan Areas, for which separate statistics are needed, the most critical data are considered to be the rates of change in unemployment over time. Unemployment is a particularly serious problem in these areas because of the large, continuing influx of migrants from depressed rural areas.

The unemployment percentage (that is, the proportion of the working age population which is unemployed) is estimated to be around 10 percent in these areas. The principal survey objective will be to measure, with reasonable confidence, a change of 1 percentage point or more from one survey to the next.[2] This means that the sampling error should be no larger than 1 percentage point in the survey estimates of changes in the statistics.[3] A criterion often used in these circumstances is to determine what sample size will be needed in order that the survey estimates will be within the allowable range of error (1 percentage point) in about 9 cases out of 10. This margin of error is equal to about 1.6 standard errors in the sample estimates of change in the unemployment percentage. The margin of error that is acceptable is a matter of judgment.

A more rigid rule would be to require that the specified margin of error be satisfied in 95 cases out of 100 (at two standard errors). That criterion, however, would require about a 50-percent larger sample and is regarded as unnecessarily restrictive for Popstan's needs at this time.

The calculations needed to determine the sample size are shown in figure E-3a. The calculations assume a criterion of 1 percentage point change at about 1.6 standard errors in the estimate of change in the unemployment percentage.

In figure E-3a, note that there is an allowance for clustering. The usual variance formula assumes a random sample of the population. Because of cost and operational considerations, it will not be possible to use a random sample in Popstan. Instead, clusters of units will be selected, which will result in an increase in sampling variance. The factor 1.4 used in the equation in step 2 is a reasonable allowance for a relatively infrequent characteristic such as unemployment in a moderately clustered sample. The factor will be higher or lower, depending on the subject and the degree of clustering. More precise calculations will be made of the factors after some survey data have been accumulated.

The value of n, as a result of step 3, is 5,164. This figure represents the number of working age persons needed in the sample in order to meet the reliability standard. Since

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[2] *The usual unemployment measure is the unemployment rate; that is, the proportion of the civilian labor force which is unemployed. The unemployment percentage (based on the working age population rather than the labor force) is more convenient for purposes of the present computation. For example, an area with about 4,000,000 persons of working age has 1,950,000 persons employed and 400,000 persons unemployed. The total in the labor force, therefore, is 2,350,000 persons. The unemployment percentage is 10 percent (400,000 out of 4,000,000) and the unemployment rate is 17 percent (400,000 out of 2,350,000). An unemployment percentage of 10 percent in this case implies an unemployment rate of 17 percent, and a change of 1 percentage point in the unemployment percentage implies a change of 1.7 percentage points in the unemployment rate.*

[3] *If the unemployment percentage is larger (for example, 20 percent) a somewhat higher allowable error could be accepted (such as 1.5 percentage points). The net result of the calculations, in that case, would not differ very much from those presented here.*

Figure E-3a. CALCULATION OF SAMPLE SIZE FOR METROPOLITAN AREAS

Step 1

The formula for the standard error of the change from one survey to another is as follows:

$$\sigma_{x_2 - x_1} = \sqrt{\sigma_{x_1}^2 + \sigma_{x_2}^2 - 2\rho\sigma_{x_1}\sigma_{x_2}}$$

where

$\sigma_{x_2 - x_1}$ = standard error of change in the unemployment percentage (or other selected measure)

σ_{x_1} = standard error of unemployment percentage in Survey 1

$\sigma_{x_1}^2$ = variance of unemployment percentage in Survey 1

σ_{x_2} = standard error of unemployment percentage in Survey 2

$\sigma_{x_2}^2$ = variance of unemployment percentage in Survey 2

ρ = correlation in unemployment between Survey 1 and Survey 2. This measure is usually calculated from the estimated number of unemployed persons in the sample from the two surveys.

For practical purposes, σ_{x_1} and σ_{x_2} can be considered as roughly equal. Also, a tentative estimate of .2 can be assumed for ρ, on the basis of past experience for a characteristic such as unemployment and where $\frac{3}{4}$ of the sample segments are common from survey to survey when the sample is rotated.* The formula can be simplified as follows:

$$\sigma_{x_2 - x_1} = \sqrt{\sigma_{x_1}^2 + \sigma_{x_2}^2 - 2(.2)\,\sigma_{x_1}\,\sigma_{x_2}}$$

$$= \sqrt{2\sigma_{x_1}^2 - .4\sigma_{x_1}^2}$$

$$= \sqrt{1.6\,\sigma_{x_1}^2} = \sigma_{x_1}\sqrt{1.6}$$

$$\sigma_{x_1} = \frac{\sigma_{x_2 - x_1}}{\sqrt{1.6}}$$

After the survey program has been in operation for a few periods, more precise calculations can be made of the correlation.

Step 2

The formula for the variance (square of the standard error) of a proportion at a given point in time is the following:

$$\sigma_{x_1}^2 = (1 - f)\ (1.4)\left(\frac{pq}{n}\right)$$

where

p = proportion of the working age population that is unemployed (10 percent or .1 for Popstan)

$q = 1 - p$ (90 percent or .9 for Popstan)

1.4 = allowance for clustering

n = size of sample in terms of number of working age persons

f = sampling fraction

$1 - f$ = finite correction factor, which is disregarded when f is relatively small (10 percent or less). In step 3 below, $1 - f$ is disregarded.

Step 3

From step 1 above,

$$\sigma_{x_1} = \frac{\sigma_{x_2 - x_1}}{\sqrt{1.6}}$$

The criterion is to be able to measure a change of 1 percentage point in the unemployment percentage, with confidence, or in 9 cases out of 10 (1.6 standard errors for Popstan).

$\sigma_{x_2 - x_1}$ = standard error of change in unemployment percentage

$$= \frac{\text{percentage point}}{1.6} = \frac{.01}{1.6} = .00625$$

$$\sigma_{x_1} = \frac{\sigma_{x_2 - x_1}}{\sqrt{1.6}} = \frac{.00625}{\sqrt{1.6}} = .00494$$

$$\sigma_{x_1}^2 = 1.4\left(\frac{(.1)(.9)}{n}\right)$$

$$(.00494)^2 = 1.4\left(\frac{(.1)(.9)}{n}\right)$$

$$n = \frac{(1.4)\ (.1)\ (.9)}{(.00494)^2} = 5{,}164$$

census information indicates there are about 2.5 working age persons per household in the metropolitan areas, the number of sample households needed in each of the two areas will be 5,164 ÷ 2.5 or 2,065 households. This number will be adjusted to 2,280 sample units per area to allow for vacant units, a certain proportion of nonresponses, and other likely losses.

2.2 *Sample size for rural parts of regions*

For the rural parts of each of the four regions, for which separate estimates will be provided, the most critical measure is probably the fluctuations in agricultural employment resulting from seasonal factors or changes in the export demand for raw materials. The requirement will be that the sample is able to measure, with confidence, a change of 4 percentage points or more from survey to survey in the proportion of the working age population engaged in agriculture.

The procedure described above for the two metropolitan areas will be used also for the rural parts of the regions, although the parameters are obviously different. For agricultural employment, the value of ρ (see step 1 in figure E-3a) is more likely to be something like .4 (instead of .2, as for unemployment). The clustering factor (step 2) will be much higher (perhaps as large as 4.0) because of the greater similarity of neighboring units in rural areas and the large cluster size (10 housing units per cluster) that will be used to reduce travel costs. Also, not all rural areas in a region will be included in the sample, so that some additional sampling error will result because of differences between areas. The values of both p and q are likely to be about .5 for agricultural employment. Finally, since a change of 4 percentage points is to be measurable, the value of $\sigma_{x_2 - x_1}$ for the calculations in step 3 would be .025 (which is .04 ÷ 1.6 standard errors).

The calculations indicate a sample of 1,920 working age persons or about 768 rural households will be needed in each region to meet the criterion. This number is increased to 960 sample units to allow for attrition.

2.3 *Sample size for urban parts of regions*

For the urban parts of regions, outside the two metropolitan areas, the main consideration appears to be rate of economic growth, as the government is attempting to broaden economic development beyond the major centers. Changes in non-agricultural employment will represent a good index of growth, and the criterion will be the ability to measure changes of 2.0 percentage points or more between surveys in the percentage of the working age population employed in non-agricultural pursuits. However, the problem of unemployment cannot be disregarded and a second criterion, measurement of changes of 1.5 percentage points in the unemployment percentage, is also stipulated.

For non-agricultural employment, the value of ρ (refer to step 1 in figure E-3a) is likely to be as high as .6. The clustering multiplier in step 2 should fall between those for unemployment and agricultural employment, or about 2.0; p would probably be about .6 and q about .4. In step 3, the value of $\sigma_{x_2 - x_1}$ would be .0125 (2.0 percentage points divided by 1.6). The same unemployment parameters will be used as for the metropolitan areas, except that $\sigma_{x_2 - x_1}$ will equal .009375 (1.5 percentage points divided by 1.6).

The results of the calculations indicate a required sample size of 2,458 working age persons or 983 households to meet the non-agricultural employment criterion. This would be about the same as required by the unemployment criterion. The sample will, therefore, be set at 1,200 units (including the allowance for attrition) for the urban parts of each region (outside of the metropolitan areas).

Figure E-3b. INITIAL ALLOCATION OF SURVEY SAMPLE, BY AREA

Area	1980 housing units	Sample allocation* (HU's)	Sampling ratio	Number of segments*
Total.....	3,101,000	13,200	1 in 235	2,256
Samchok Region.....	867,000	2,160	1 in 401	336
Urban.....	388,000	1,200	1 in 323	240
Rural.....	479,000	960	1 in 499	96
Gold Coast Region.....	1,302,000	6,720	1 in 194	1,248
St. Regis Metropolitan Area.....	380,000	2,280	1 in 167	456
Tanga Metropolitan Area.....	240,000	2,280	1 in 105	456
Urban balance.....	342,000	1,200	1 in 285	240
Rural balance.....	340,000	960	1 in 354	96
Western Region.....	259,000	2,160	1 in 120	336
Urban.....	126,000	1,200	1 in 105	240
Rural.....	133,000	960	1 in 139	96
Atlifica Region.....	673,000	2,160	1 in 312	336
Urban.....	244,000	1,200	1 in 203	240
Rural.....	429,000	960	1 in 447	96

**Urban numbers will be slightly higher in final sample size due to self-representing and non-self-representing (NSR) PSU's; sampling weights for NSR PSU's will be adjusted in final sample.*

2.4 *Summary of sample requirements*

The total sample size in Popstan will be approximately 13,200 units in about 2,300 segments, as shown in figure E-3b. Note that the number of urban or rural sample cases is the same for the different regions, even though some regions have much greater populations than others. This is because of the well-known principle that the reliability of a given type of sample is largely dependent on its absolute size. The proportion of the population which is sampled becomes a factor in reliability only when that proportion is unusually large (15 to 20 percent or more).

When the sampling ratios differ substantially among the various parts of the country, as is the case in Popstan, the effective sample size is not as large as indicated by the overall number of units. In fact, for a sample of 13,200 units distributed in the manner indicated above, the effective sample size for the national estimates would be equivalent to a sample of about 8,000 units selected with uniform sampling ratios in all areas. At this level (8,000 units selected with uniform sampling ratios), it would be possible to measure with confidence (9 out of 10) changes from survey to survey of about 0.6 of a percentage point or more, which is equivalent to 1.0 percent or more in the unemployment rate.

3. *DISTRIBUTION OF SAMPLE*

Once the approximate sample size is determined, the next step is to decide how to distribute this sample throughout Popstan. If someone had a list of every person in the country, it would theoretically be possible to draw the required number of names at random and produce a random sample. However, such a sample would be scattered throughout the country and it would be extremely costly and time consuming to interview the selected persons. For this reason, the NSO will not attempt to use this method. Instead, what is known as a "clustered" sample will be used. The clustering will be done in several stages:

(1) Select a sample of geographic areas known as primary sampling units (PSU's) to represent all areas of the country.

(2) Within each PSU, select smaller areas, sometimes called secondary sampling units (SSU's). In Popstan, these smaller areas will be the 1980 Census EA's.

(3) Divide the selected EA's into subareas called sectors. (In some instances, a whole EA that cannot be easily subdivided is used as one sector.)

(4) Divide the selected sector into segments of about 5 units in urban areas and 10 in rural areas. (In some instances, a whole sector is used as one segment.)

As stated earlier, the approach depends on a number of things--survey objectives, geography, availability of good mapping materials and census statistics, etc. The plan for Popstan is based on the following circumstances:

(1) For the intercensal program, statistics will be developed for Popstan and the four regions, by urban-rural residence, and the two metropolitan areas. Each region contains several provinces, which are divided into districts. There are 15 provinces and 197 districts in Popstan. The two metropolitan areas include three of the districts in the Gold Coast Region.

(2) Each district is divided into barrios or villages, which are further divided into urban places (settlements with 2,000 or more population), hamlets (smaller settlements), or open rural territory. Larger urban places occupy a part or a whole barrio. Smaller urban places represent only part of a barrio.

(3) For purposes of the 1980 Census, the entire country was divided into enumeration areas (EA's) consisting of small areas with well-defined boundaries, containing about 100 to 125 housing units on the average. Population and housing unit counts are available from the 1980 Census for each EA.

(4) Up-to-date mapping materials were developed for the 1980 Census for all parts of the country down to the EA level.

(5) Figure E-3b presents the initial allocation of the household survey sample, by region, in relation to the 1980 Census housing unit counts. The figure also shows the initial sampling rates.

3.1 *Determination of primary sampling units (PSU's)*

Since it is not feasible to interview in every subdivision of the country, the first step will be to select a sample of areas, or primary sampling units (PSU's), to represent the entire country. The entire area of Popstan will be divided into PSU's in the manner described below.

3.11 Metropolitan PSU's.--Each of the two metropolitan areas will represent a separate PSU. The St. Regis PSU consists of St. Regis and Yapei Districts in Tumar Province. The Tanga PSU consists of Rocha District in Dari Province.

3.12 Urban PSU's.--Each urban place (outside the metropolitan PSU's) of a given size will be a separate PSU. The urban PSU's will be determined as follows:

(1) Larger places. Each of the large urban places will consist of a whole barrio or part of a barrio. Each such place will be a separate PSU.

(2) Smaller places. Smaller urban places might represent only part of a barrio. In such cases, the barrio containing one or more urban places will be the PSU.

(3) Barrios/villages under 5,000 population. To reduce the concentration of the sample in very confined geographic areas, no barrio (with an urban place) which had less than 5,000 population in 1980 would be designated as a separate PSU. Instead, such barrios would be combined with one or more adjacent barrios in order to achieve a population total of at least 5,000. Where a barrio containing another urban place is adjacent to the small barrio, it would be preferable to make that combination rather than to combine with a purely rural PSU.

(4) Effect of procedure. It is evident from the foregoing that some so-called urban PSU's will contain some rural population (as defined for the census). The urban-rural concept is difficult to apply in a continuing program, especially where the population continues to migrate to the vicinity of urban places and to settle in what was formerly rural territory. Often, the population adjacent to urban places is more urban than rural in character. Thus, barrios containing urban places may be a better basis for designating urban population in this kind of program than using the urban places themselves.

3.13 Rural PSU's.--The rural territory in each district outside of urban PSU's (as defined above) will be divided into roughly two halves (observing barrio/village lines). Each half will represent a separate rural PSU. The reason for this choice is that it would be feasible for one enumerator to cover a normal workload (40 to 50 housing units) in a single week if

it was spread over not much more than half of the rural territory of a district.

3.2 *Selection of PSU's for the sample*

The two metropolitan PSU's will be automatically selected for the sample. They will represent only themselves for purposes of the statistics. PSU's of this type will be called "self-representing" (SR).

Five other urban PSU's will be designated as self-representing. These are Loma (Copal Province) in Samchok Region, Cendari (Artesia Province) also in Samchok Region, Bara (Tumar Province) in the Gold Coast Region, Port Moro (Lira Province) in Atlifica Region, and Kingston (Lacuna Province) in the Samchok Region. These five PSU's are made self-representing because of their size and importance. It will be desirable to spread their workload over a period of weeks.

Only a sample of the remaining PSU's will be chosen. These PSU's will be called "non-self-representing" (NSR), since they represent not only themselves in the survey but all of the other PSU's as well. Non-self-representing PSU's will be selected separately for the urban and rural parts. For the non-self-representing PSU's, the entire workload (40 to 50 units) will be enumerated in a single week.

3.3 *Selection of non-metropolitan urban PSU's*

The urban sample (outside of the metropolitan areas) needed in each region will be about 1,200 cases. In accordance with the plan described in chapter E-2, the sample will be spread over 12 weeks of the survey quarter (every other week in the first 2 years), thus requiring about 100 cases per week. It is estimated that one enumerator--in travel status--can complete up to 50 cases in a week in the smaller urban areas. Consequently, there will be two workloads per week for the urban non-metropolitan part of each region.

A workload of 50 cases will be selected in a separate PSU in order to avoid undue clustering. This will necessitate selecting 24 urban PSU's per region for a sample of 1,200 units.

Some modification in this design would be required because of the designation of the five additional self-representing areas cited in section 3.2. Any sample allocated to those areas would be deducted from the urban total for the remainder of the region. In the Gold Coast Region, for example, the city of Bara with some 240,000 population or 48,000 housing units will be self-representing. Using the urban sampling ratio of 1 in 285 for this region (see figure E-3b), the sample allocation to Bara would be about 170 units. The plan will still be to select 24 other urban PSU's in the Gold Coast Region but to reduce the workload in each from 50 to 45 units. Similarly, the workload per urban PSU will be reduced to 45 in Atlifica Region to accommodate the self-representing PSU, Port Moro, and to 35 units in Samchok Region to accommodate Loma, Cendari, and Kingston.[4]

3.31 Division of PSU's into strata.--In selecting the 24 urban PSU's in each region, the procedure will be first to divide all of the urban PSU's into strata (groups of similar areas), then select two for the sample from each stratum. The reason for selecting two per stratum is that this provides a simple basis for calculating sampling variances directly from the sample results. The two PSU's from a given stratum will be enumerated in the same week.

In allocating the urban PSU's to strata, one consideration will be to confine any one

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[4] *Even with the indicated workload reductions in the non-self-representing urban PSU's, the overall urban sample will be somewhat larger than 1,200 per region. However, because some of the urban PSU's will contain rural territory, some fraction of the resultant sample will not be urban, as defined for the 1980 Census.*

stratum to PSU's in the same province. In this way, it will be more feasible to obtain a few overall statistics for a given province by combining the results of successive surveys. The assignment of PSU's to strata within provinces will depend on such characteristics as whether the PSU's are primarily manufacturing, primarily commercial or shipping centers, or mainly marketing centers serving rural areas. Another important criterion is to create strata of approximately equal size (in terms of population). When that is done, the sampling ratios will be about the same among strata and the sampling errors will tend to be smaller. In any case, stratification is often a matter of trial and error until the best possible result is obtained. In the case of the Gold Coast Region, five strata are formed in Dari Province, four in Eris, and three in Tumar, which is roughly proportionate to the urban populations in these three provinces outside of the metropolitan and other self-representing areas.

3.32 Illustration of selection of PSU's.-- Figure E-3c illustrates the selection of the two sample urban PSU's from one of the strata in Dari Province. The selection will be made with probability proportionate to size, which means that the probability that a given PSU will be chosen is proportionate to its population or number of housing units. This approach provides a more efficient sample and one from which it is easier to compute estimates. The procedure is as follows:

(1) In making the selection, it is convenient to convert the housing unit counts into "measures of size," that is, multiples of the number of units to be sampled in a given PSU. In the Gold Coast Region, as indicated earlier, there will be 45 units per PSU (after allowing for the sample to be assigned to the self-representing city of Bara). The measures of size will be determined by dividing the housing unit count for a PSU by 45 and rounding (for convenience) to the nearest whole number.

Figure E-3c. SELECTION OF URBAN PSU'S IN ONE STRATUM IN DARI PROVINCE IN THE GOLD COAST REGION

PSU	1980 housing units	Measure of size*	Cumulative measure	Sample PSU**
Total...	21,200	471	-	
Lopi.....	7,600	169	169	X (152)
Matera.....	4,200	93	262	
Ampara.....	3,800	84	346	
Tokyo.....	2,800	62	408	X (388)
Olympia.....	1,600	36	444	
Credo.....	1,200	27	471	

**Housing units ÷ 45, which is the desired number of units per PSU.*
***Random start is 152 and the sampling interval is 236.*

(2) The procedure will be simplified if a cumulative measure of size is computed for each PSU. For the first PSU, the cumulative measure of size is the same as the original measure of size. For every other PSU, the cumulative measure of size is the measure of size of the PSU plus the cumulative measure of size of the preceding PSU. Thus, for Matari, 93 (its measure of size) is added to 169 (the cumulative measure of size of Lopi) to obtain 262. The cumulative measure of size indicates the range of measures of size included in that PSU. Thus, Lopi contains measures of size of 1 to 169, Matera contains 170 to 262, Ampara contains 263 to 346, etc.

(3) Since two PSU's are to be selected, and there are 471 measures of size, each 236th (471 ÷ 2) measure is selected. To accomplish this, select a random number (from a random number table) between 1 and 236. Assume that the random number 152 was selected; that would be the first sample measure. Adding the skip interval (236) to this first measure results in 388 for the second sample measure. Thus, the two PSU's to be selected will be those containing the 152nd and the 388th cumulative measures of size. As is evident, the two PSU's are Lopi and Tokyo.

3.4 *Selection of rural PSU's*

The procedure will be similar for the selection of rural PSU's. Again, 24 such PSU's are needed in each region, with two selected

from each of 12 strata. The stratification of rural PSU's will also be done within each province. The main criteria will be whether the PSU's are agricultural or whether there is predominantly mining, quarrying, or fishing. The type of farming (whether large holdings, small subsistence holdings, or livestock and grazing operations) will also be considered. A key factor will be to obtain strata of approximately equal size. The two halves of each district designated as rural PSU's will always be assigned to the same stratum.

The actual selection process will be done by means of a table similar to figure E-3c. The two halves of a district designated as rural PSU's will always be listed in consecutive order in the table, so that it will not be possible to choose both for the sample. The measures of size will be determined by dividing the number of housing units in a PSU by 40, since 40 is the desired workload in each rural PSU.

3.5 *Selection of EA's within PSU's*

Once the PSU's are selected, the next step is to determine the distribution of the sample units within PSU's. Since it would not be feasible from the standpoint of either cost or time to interview in every single part of a PSU, the approach will be first to select a sample of secondary sample units (SSU's) within each sample PSU. The 1980 Census EA's, which contain around 100 to 125 housing units, will be used as the SSU's. Good maps and population and housing unit counts are available from the 1980 Census for each EA.

The procedure will be similar for all the sample PSU's, whether metropolitan, other self-representing cities, or non-self-representing urban or rural PSU's. The main difference will be in the rate of sampling. Some 2,280 units, in clusters of 5, will be chosen in each metropolitan area. The number of units will vary among the five other self-representing cities depending on their populations and the sampling rates for urban areas in their respective regions as specified in figure E-3b. In rounded terms, the numbers will be 170 units in Bara (Gold Coast Region); 245 in Loma, 120 in Cendari, and 70 in Kingston (Samchok Region); and 165 in Port Moro (Atlifica Region). All of these will be selected in clusters of 5 units.

For non-self-representing urban PSU's, the sample numbers will vary slightly by region, depending on whether or not there were also self-representing urban PSU's. The numbers per PSU will be 45 in the Gold Coast Region, 35 in Samchok, 45 in Atlifica, and 50 in the Western Region, all selected in clusters of 5 units.

The sample units for all rural PSU's will number 40. They will be selected in clusters of 10, because of the greater distances to be traveled.

Each sample cluster, whether consisting of 5 or 10 units, will be chosen from a different EA. The selection will also be made with probability proportionate to size. Figure E-3d illustrates the selection process for one of the non-self-representing urban PSU's chosen from the Gold Coast Region. The procedure is as follows:

(1) List in geographic order the EA's in the PSU. A serpentine order is often convenient and efficient (that is, listing the first row of EA's from west to east, continuing with the second row from east to west, the third from west to east, etc.).

(2) Convert the housing unit counts to measures of size by dividing by the number of units to be taken from one EA. For the illustration, the divisor will be 5. (For rural PSU's, it will be 10.)

(3) Determine the cumulative number of measures of size for each PSU, in the manner previously described.

(4) Select 9 EA's (45 total units divided by 5 per EA). Since there are 1,530 total measures of size, select each 170th (1,530 ÷ 9) measure in the sample (see figure E-3d).

Figure E-3d. SELECTION OF SECOND-STAGE UNITS IN LOPI PSU IN THE GOLD COAST REGION

EA No.	Number of HU's	Measure of size*	Cumulative measure	Sample EA**	EA No.	Number of HU's	Measure of size*	Cumulative measure	Sample EA**
1	118	24	24		34	142	28	785	
2	132	26	50		35	117	23	808	
3	94	19	69		36	127	25	833	X (817)
4	141	28	97		37	119	24	857	
5	126	25	122		38	110	22	879	
6	112	22	144	X (137)	39	158	32	911	
7	118	24	168		40	93	19	930	
8	143	29	197		41	133	27	957	
9	87	17	214		42	110	22	979	
10	84	17	231		43	141	28	1,007	X (987)
11	152	30	261		44	133	27	1,034	
12	78	16	277		45	93	19	1,053	
13	121	24	301		46	116	23	1,076	
14	142	28	329	X (307)	47	134	27	1,103	
15	131	26	355		48	123	25	1,128	
16	83	17	372		49	136	27	1,155	
17	116	23	395		50	107	21	1,176	X (1157)
18	127	25	420		51	103	21	1,197	
19	114	23	443		52	98	20	1,217	
20	108	22	465		53	83	17	1,234	
21	137	27	492	X (477)	54	92	18	1,252	
22	84	17	509		55	77	15	1,267	
23	111	22	531		56	123	25	1,292	
24	79	16	547		57	131	26	1,318	
25	118	24	571		58	111	22	1,340	X (1327)
26	94	19	590		59	103	21	1,361	
27	140	28	618		60	142	28	1,389	
28	117	23	641		61	126	25	1,414	
29	136	27	668	X (647)	62	133	27	1,441	
30	168	34	702		63	121	24	1,465	
31	96	19	721		64	117	23	1,488	
32	93	19	740		65	119	24	1,512	X (1497)
33	84	17	757		66	90	18	1,530	

**Housing units ÷ 5, which is the desired number of units in a segment in an urban PSU.*

***Random start is 137 and the sampling interval is 170.*

(5) Select a random number between 1 and 170. Assume that 137 is chosen, which becomes the first selected measure of size. Adding successive intervals of 170 to the first measure, the additional selected measures will be 307, 477, 647, 817, 987, 1157, 1327, and 1497. The EA's that correspond to these numbers are 6, 14, 21, 29, 36, 43, 50, 58, and 65.

3.6 *Selection of housing units within EA's*

The final stage of sampling is to select clusters of housing units in each selected EA. Various procedures may be used for this purpose.

3.61 Sample from EA listing.--One approach will be to make a listing of all housing units in the EA. Units will be listed systematically, following the map for the EA.

The sampling rate within the EA depends on the Phase I Census count. Assume that the count is 141 HU's in a selected EA. Since 5 units are to be selected for the sample (urban), the sampling rate would be 1 in 28. Assume the random start number is 11; the 11th, 39th, 67th, 95th, and 123rd units will be selected.

It is probable, even likely, however, that the current count will differ from that of the 1980 Census. For example, assume that 160 units are actually listed. The sampling rate should still be the one determined from the census count; that is, 1 in 28. In this case, the 151st listed unit would also be chosen, resulting in a cluster of 6. (The number of listed units could also be lower than the census count.) This procedure allows the sample to reflect changes since the census data.

3.62 Quick count, listing, and selection of sample.--Since the EA's are relatively large (100 to 125 units on the average), another procedure is to subdivide them first into smaller areas called sectors and then select one of the sectors for listing the actual addresses. In the cities, for example, the EA's might be subdivided into blocks. The rural EA's are more difficult to subdivide but this can usually be done using linear features or landmarks as boundaries.

Under this procedure, it will usually be necessary to have interviewers divide the EA into sectors and make a "quick count" of the number of units in each sector.[5] Using these numbers, one sector will be selected with probability proportionate to size (or at random, if the counts are very close). The selected sector will then be listed and the sample cluster (or segment) will be selected from the listing in the manner described above.

3.7 *Listing*

Housing units will be listed for the selected sector or the entire EA if it is considered more economical to list the entire EA than to make the separate trip to divide the EA into sectors before listing. Figure E-3e illustrates the type of listing sheet that will be used in preparing the listings. The listing will usually start in a designated part of the area, such as the northwest corner, and proceed in a systematic manner, such as clockwise. Care must be taken to cover all internal streets or alleys. Although some of the listing may be done by observation, all structures that appear as though they could have more than one housing unit will be visited to determine the situation.

4. *ASSIGNMENT OF SAMPLE CLUSTERS TO INTERVIEWING WEEKS*

The next step after selecting the sample clusters in each PSU will be to assign them to interviewing weeks. As previously indicated, interviewing assignments will be made in the first 12 weeks of each quarter, once the survey is on a quarterly basis. (In the first 2 years of the continuing survey, 1984 and 1985, there will be 12 periods of interviewing semi-annually, occurring every other week.)

For reasons of cost and operational convenience, the assignment to weeks will be made in terms of whole clusters; that is, all of the households in the cluster chosen from a given EA will be assigned to the same week. In the subsequent discussion, these clusters will be called segments.

The assignment of segments to the interviewing weeks will depend on whether they are in the two metropolitan areas, the five other self-representing PSU's, or the non-self-representing PSU's.

4.1 *Metropolitan (self-representing) PSU's*

In the two metropolitan PSU's, the segments will be assigned systematically to the 12 interviewing weeks, as described below:

Step 1. Starting with the St. Regis Metropolitan Area, list the segments in the geographic order in which they were selected. Continue with the segments, in geographic order, in the Tanga area.

[5] *The quick count procedure is described in chapters 2 and 5 in Part D of the case study.*

Figure E-3e. HOUSEHOLD SURVEY LISTING SHEET

Line No. (1)	Street name, road name or No. (2)	Side of road (street) and house No. (3)	HOUSEHOLD SURVEY LISTING SHEET — Description or location of housing unit (4)		FOR OFFICE USE ONLY — Sample set/ rotation (5)	Serial No. (6)	Reason and date added or deleted (7)
1	Hokum Road	L or R 401	Corner house - 1st floor Name: Rosado, L. and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)			
2	Hokum Road	L or R 401	Corner house - 2nd floor Name: Rosado, G. and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)	A1	01	
3	Hokum Road	L or R —	Unpainted house behind 401 Hokum Road Name: Andino, J. and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)			
4	Hokum Road	L or R 415	Green frame house. House number painted on steps Name: Torres, R. and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)			
5	Hokum Road	L or R 419	Name: Hernandez, P. and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)			
6	Mik Lane	L or R 27	Name: Barreto, S. and:	☐ Farm buildings ☐ Garage ☐ Store ☒ Other (Specify) chicken house	A1	02	
7	Mik Lane	L or R 35	Red roof Name: Karri, Aran and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)			
8	Mik Lane	L or R 39	Apartment above store Name: Smythe, B. and:	☐ Farm buildings ☐ Garage ☒ Store ☐ Other (Specify)			
9	Mik Lane	L or R 41	Name: Silva, K. and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)			
10	Mik Lane	L or R 50	First and second floors Name: Yolanda, M. and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)	A1	03	
11	Mik Lane	L or R 50	Basement apartment Name: Papik, R. and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)			
12	Route 3	L or R —	Corner of Route 3 and Mik Lane. White house with black shutters. Name: Porro, L. and:	☐ Farm buildings ☒ Garage ☐ Store ☐ Other (Specify)			
13	Route 3	L or R —	Farmhouse. Split rail fence. "Raco Acres" Name: Raco, Fernandez and:	☒ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)			
14	Route 3	L or R —	Wooden cabin. One story. Stone chimney. Name: Sutton, Maria and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)	A1	04	
15	Route 3	L or R	Yellow house, green shutters Name: Frea, Robin and:	☐ Farm buildings ☐ Garage ☐ Store ☐ Other (Specify)			

Step 2. Select a random number between 1 and 12; assign this number to the first listed segment and continue assigning consecutive numbers sequentially until all 12 numbers are used. Two examples of how week numbers will be assigned for the first 12 listed segments are shown in figure E-3f.

Figure E-3f. ASSIGNMENT OF WEEKS TO METROPOLITAN PSU'S

Segment No.	If random number is 8	If random number is 3
1	8	3
2	9	4
3	10	5
4	11	6
5	12	7
6	1	8
7	2	9
8	3	10
9	4	11
10	5	12
11	6	1
12	7	2

Step 3. Continue the same cycle of 12 numbers, in the same sequence, for each successive group of 12 segments, until all segments have been assigned a number. If the last group contains fewer than 12 segments, assign as many numbers as needed to cover them (for example, if the random number is 8, and only 4 segments remained at the end of the listing, they will be assigned numbers 8, 9, 10, and 11). The assigned numbers represent the calendar weeks in the quarter in which each segment is to be interviewed. (In the first 2 years, the numbers refer to every second week in the semi-annual period.) These numbers are extremely important and will be part of the identification code or number for the segment.

4.2 *Other self-representing PSU's*

In the other self-representing PSU's, the overall workloads are too small to be spread over the entire survey period. The distribution is a matter of judgment. The intent is to spread the workload so that the weekly assignments are approximately the same size. For the five areas in Popstan, the workloads will be divided as shown in figure E-3g.

Figure E-3g. ASSIGNMENT OF WEEKS TO OTHER SELF-REPRESENTING PSU'S

Area	Number of HU's	Number of weekly samples	Designated week for interview
Loma.....	245	5	2, 4, 7, 10, 12
Bara.....	170	4	2, 5, 8, 11
Port Moro..	165	4	3, 6, 9, 12
Cendari....	120	3	1, 6, 11
Kingston...	70	2	4, 9

4.3 *Non-self-representing PSU's*

There are 24 non-self-representing urban PSU's and 24 rural PSU's in each region. Since the workload in each represents about 1 week's work for one enumerator, the entire PSU will be assigned to a given interviewing week. In all cases, the pair of PSU's selected from a given stratum will be assigned to the same week. The steps will be as follows:

(1) Arrange the pairs of urban PSU's in the Gold Coast Region in some logical geographic order. Select from a random number table a sequence of random numbers between 1 and 12. Assume that the sequence is 7, 12, 9, 3, 1, 5, 6, 2, 8, 10, 4, and 11. (In this step, a given number should be used only once; skip any numbers in the random number table that are repeated.) Assign these random numbers to the pair of PSU's in the order in which they are listed. These numbers, then, indicate the interviewing weeks to which each pair of PSU's is assigned.

(2) Repeat the procedure for the rural PSU's in the Gold Coast Region. Continue in the same manner in the remaining three regions. Select a new set of random numbers each time.

5. *ROTATION OF THE SAMPLE*

The survey design calls for interviewing the same sample units for four successive quarters before replacement. The NSO believes that respondents will not be too cooperative after about four interviews. Since one of the

survey objectives is to measure change from one period to the next, it is important that the transition from one sample to the next be done in a gradual way, rather than changing the entire sample abruptly at one time. If an abrupt sample change is made, the sampling error might be so large at that point as to obscure the real change in the statistics from the previous quarter. A gradual transition will be achieved as follows:

Step 1. Arrange all the sample segments in one geographic sequence. First, list all segments in the St. Regis Metropolitan Area, followed by those in the Tanga Metropolitan Area, then the five other self-representing PSU's. Continue with listing all of the urban segments in the non-self-representing PSU's in each region, in order. Complete by listing the rural segments in each PSU in each region, in order.

Step 2. Select random numbers between 1 and 4; these will be called "rotation" numbers. Assume for this illustration that the rotation number is 2. Assign 2 to the first listed segment, 3 to the second segment, 4 to the third segment, 1 to the fourth segment, 2 to the fifth segment, etc. This same sequence of numbers 2, 3, 4, and 1 would be assigned in the same order to each successive group of 4 segments. The final group of segments (if less than 4), would be assigned as many numbers as needed.

Step 3. The rotation numbers determine when each group of segments will leave the sample. For example, all segments with rotation 1 will leave the sample at the same time and be replaced by another group of segments, which will also be assigned rotation number 1. When the rotation is fully operable, each rotation group will be interviewed in four successive quarters before replacement.

The entire sample will be interviewed, without rotation, in the semi-annual surveys in the first 2 years. The rotation will start in the third year, when the operation is on a quarterly basis. Figure E-3h illustrates the interviewing patterns for the first 12 quarters of the survey, starting in the 3rd year.

Step 4. In replacing the households in a segment leaving the sample, the replacements will be drawn from the same sector or EA, but using the next sequence of households. For example, in figure E-3e, a sampling rate of 1 in 4, starting with random number 2, resulted in selecting the 2nd, 6th, 10th, 14th, and 18th listed units for the assigned sample. The replacements, in this case, will be the next sequence, the 3rd, 7th, 11th, 15th, and 19th listed units in the same segment or EA. For control purposes, the initial sample set is designated A, the first replacement is B, etc. (see figure E-3h). If the last sequence of units is selected, the next replacement will be selected from the next sector or EA (in geographic sequence) using the same sampling methods as in the original sector or EA (but adjusting the sampling ratios according to the size of the new sector or EA).

Figure E-3h. ROTATION GROUPS

Survey quarter	Rotation numbers			
	Initial sample (A)	First replacement (B)	Second replacement (C)	Third replacement (D)
THIRD YEAR				
1st quarter...	1,2,3,4			
2nd quarter...	2,3,4	1		
3rd quarter...	3,4	1,2		
4th quarter...	4	1,2,3		
FOURTH YEAR				
1st quarter...		1,2,3,4		
2nd quarter...		2,3,4	1	
3rd quarter...		3,4	1,2	
4th quarter...		4	1,2,3	
FIFTH YEAR				
1st quarter...			1,2,3,4	
2nd quarter...			2,3,4	1
3rd quarter...			3,4	1,2
4th quarter...			4	1,2,3

6. SPECIAL DWELLING PLACES

The discussion up to this point assumes that all persons live in housing units. But some persons live in collective quarters such as rooms in rooming houses, dormitories in schools or in working camps, quarters in institutions, etc. Since these people differ in many respects from the population as a whole, it is important that they be represented in the sample. The quarters occupied by such persons are called "special dwelling places."

Note that the basic interviewing rules discussed earlier will apply here; that is, inmates of institutions and members of the Armed Forces living on military posts will be omitted, and other persons found in special dwelling places who have residences elsewhere will not be interviewed for purposes of the survey. Also, the small nomadic population in the Western Region will not be covered.

6.1 *Listing procedure*

The procedure is to (a) select a sample of special dwelling places then (b) select a sample of persons within the special dwelling place. A list will be made of special dwelling places within the sample PSU's. Since most places such as institutions, hotels, rooming houses, etc., require a special license from the Popstan Government to operate, information will often be available from the proper authorities. Addresses and identification of such places may also be obtainable from the 1980 Census records.

Once such a list has been prepared, an inquiry will be made to determine the number of persons residing in each place. Only persons within the coverage of the survey will be counted. For example, in institutions, only the number of staff members residing there and not the number of inmates will be counted. In large transient hotels, the procedure will be to count only the number of "permanent" guests (who will be defined as those renting quarters for 30 days or more).

6.2 *Sampling procedure*

After such counts are obtained (or are estimated if not directly obtainable), the procedure will be similar to that for housing units. Assuming clusters of 5, the "measure of size" (in terms of the number of clusters of 5 persons) will be computed for each place and cumulative totals will be determined for each (as if each place were an EA). Then, using a random starting point and the same sampling ratio as for the PSU in general, a sample of places will be selected. Finally, a listing will be made of all persons in the selected places and a sample of 5 will be designated. Interviewing weeks and rotation numbers will be assigned to these special dwelling place clusters also, in the same manner as for housing unit clusters.[6]

As described above, the sample of persons from special dwelling places is an addition to the sample of housing units. For Popstan as a whole, the number of persons living in special dwelling places is less than 1.5 percent of the total population. A sample will not add greatly to the workload but will require additional effort to include in the survey.

7. *UPDATING THE LISTING*

It is important that the sample be updated from time to time to reflect changes, especially newly constructed housing. The listing of units for the initial Household Survey sample will be up to date at that time but the procedure must not end there.

7.1 *Scheduling the updating*

A useful approach, after the initial listing, is to update the listing at the time a segment is about to leave the sample and before the replacement households are selected. After interviewing the households in a segment for the last time, for example, the interviewer will canvass the segment (or the EA if the entire EA is in the sample) and add all newly formed and newly constructed housing units at the end of

[6] *If special dwelling places are encountered in the course of the listing of housing units, these will be noted. If they are not on the list of special dwelling places, they will be added and given the usual chance of selection for the sample.*

the listing. When the replacement units are selected in the manner described in section 5 above, the newly listed units will have the same chance of selection as the original ones.

7.2 *Subsampling new construction*

Sometimes, in updating a listing, a large group of new units will be found, as where a new apartment building has been constructed in the segment (or EA). In that case, the usual sampling procedures might result in the addition of a large number of sample units. One way of avoiding this will be to subsample the new units and interview only the subsample. For example, if 180 new units are found and the sampling ratio for the segment is 1 in 12, this will add 15 new sample units. Instead, a subsample of 1 in 3 of these will be chosen, which will add only 5 new units. In such instances, each subsampled unit will be counted as if it represented 3 units (that is, it will be given a weight of 3 times the basic weight).

7.3 *New construction universe*

When there is much new construction in an area, the procedure described above (whether or not subsampling is used) will substantially increase the sampling variances. As soon as it can be worked out, Popstan will develop what is called a "new construction" universe. In places where building permits are needed to construct new houses or apartments, information on the location of new construction can usually be obtained from authorities. Otherwise, it will be obtained from on-the-spot field checks in areas where it is known there is a large amount of new construction.

The procedure involves making a list of new housing projects in the sample PSU where much new building occurs and drawing a cluster of units for the survey from this list, using the sampling ratio for the PSU. When updating the segment (or EA) listing, the units on the "new construction" listing will be excluded.

The same procedure for assigning segments to interviewing weeks and rotation groups, as described for the original sample, will be applicable to clusters drawn from the new construction universe.

The addition of new construction over time will tend to increase the sample size gradually. At various intervals (perhaps every 2 or 3 years), this tendency will be offset by reducing the overall sampling ratios and, thereby, increasing the basic weight per unit.

8. *ESTIMATION PROCEDURES*

Simple, unbiased estimates can be obtained by assigning to each sample case the reciprocal of the sampling ratio used in selecting the case and then summing up the results. Thus, persons in each sample unit in the St. Regis Metropolitan Area can be assigned a weight of 167 and each one in the Tanga Metropolitan Area can have a weight of 105 (see figure E-3b). Those in the five other self-representing PSU's could be assigned the weights indicated for urban PSU's in their respective regions.

The weights for the non-self-representing PSU's would not be precisely those in figure E-3b. Instead, the weights for each pair of PSU's from a given stratum would be determined by dividing the total sample assigned to those PSU's (for example, 90 for each urban stratum in the Gold Coast Region) into the 1980 housing unit total for the stratum. The weights would not be exactly the same for each stratum in a region, but should be close since an effort was made to create strata of approximately equal size.[7]

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[7] *An alternative would have been to use the same sampling ratios (those in figure E-3b) in all strata within the region, which would have resulted in slightly different workloads in each stratum but equal basic weights. With strata of approximately equal size, the difference between the two procedures is minimal.*

This simple procedure, however, fails to recognize one almost inevitable survey problem--that of nonresponse in the survey. Some selected addresses will be found to be vacant or occupied by persons not to be enumerated (that is, those with a residence elsewhere); these present no problem since they reflect the actual situation in the population. No allowance needs to be made for such cases in the estimation procedure.

There are other cases, however, where no interview is obtained at an address occupied by persons who are eligible for enumeration. This occurs for a variety of reasons, the most common of which are absence of the entire family from home during the period of enumeration, inability to find the occupants at home in spite of repeated attempts, and refusal to cooperate. An adjustment in the sample weights is needed to account for these cases, which will henceforth be called "non-interviews" in this discussion.

8.1 *Non-interview adjustment*

Since people who live in the same neighborhood tend to have similar characteristics, it is preferable to make adjustments for non-interviews in the same cluster or segment. For example, if 1 of the 5 households in a given urban segment is non-interview, the NSO will select one of the 4 interviewed households at random and duplicate that case; that is, count it twice in the estimation. The assumption is that the non-interview household is similar to a nearby interviewed case.

This procedure can be refined if computers are available for tabulation. In the above example, the non-interviewed household represented one-fifth or 20 percent of the segment total. An adjustment for non-interviews could be made by multiplying the weight for each interviewed household in the segment by 1.25 (5 divided by 4). If the weight for the PSU was 400, the adjusted weight for the interviewed households would be 400 times 1.25 or 500.

If the number of non-interviews in a segment is large, it would be preferable to spread the adjustment over a larger group of households. This can be done by computing the non-interview factors for a group of neighboring segments or even for the PSU as a whole. Where there is some information about the non-interviewed households (for example, whether they are homeowners or renters), an even more refined procedure is to make the non-interview adjustment among neighboring segments of a similar kind. The mechanics for carrying out the non-interview adjustment are given in chapter E-6 on data processing.

8.2 *Population adjustment*

Somewhat improved sample estimates will be made by summing up the household weights after the non-interview adjustment. However, since the number of persons in the sample can vary by chance from time to time, especially as the sample rotates, considerable sampling variance can result from this factor alone.

One way of controlling this population variability, which particularly affects large sample estimates, such as the number employed or the number of illiterate persons, is by adjusting the sample totals to independent estimates of the population. Current estimates of the population will be prepared by projecting the latest census total to reflect births, deaths, and population migration since that date. It is important to have reliable and consistent independent estimates for a date close to the survey period.

The general procedure will be similar regardless of the level at which population adjustments are made. After the interim survey program, which will adjust by several age-sex groups (see chapter 9 in Part D of the case study), Popstan will prepare an independent

estimate for the country as a whole. Assume that the independent estimate at approximately the survey date is 18,800,000. After the non-interview adjustment, the adjusted weights for all persons in the sample total is 17,300,000. The adjustment ratio is determined by dividing the independent estimate by the weighted sample total; that is, 18,800,000 divided by 17,300,000 or 1.087. The weight for each person in the sample is then multiplied by 1.087 to determine the final weight. For example, if the weight for a person after non-interview adjustment was 480, the final weight will be 522. The final sample weights for all persons combined will equal the independent population estimate.

If independent estimates are available by age and sex, the adjustment will be done separately for each group. In that case, there will be a different adjustment factor for each group. The same will be true if independent estimates are available for geographic areas, such as regions. Note that, in a continuing survey of this kind, new independent population estimates will need to be available for each survey period, updating the estimates from the previous survey period.

This population adjustment procedure is a form of ratio estimation. In most cases it will result in a lower sampling variance for sample totals and estimates of change, as will be seen in the next section. The mechanics for carrying out the population adjustment are described in chapter E-6 on data processing.[8]

9. CALCULATION OF SAMPLING VARIANCES

One of the principal advantages of a probability sample is that it is possible to calculate sampling variances and thus provide some measures of the statistical reliability of the survey data. The standard formula for calculating variances in most statistical textbooks assumes that certain information is known about variability in the population. However, if such information is not known--as is usually the case--it is possible to compute useful sampling variances from the survey data alone. The presentation here will be confined to a relatively simple means of calculating variances from the sample itself.

It is necessary to calculate the variances separately for each area in which a different sampling ratio was used. The overall variance will then consist of a summation of these separate variances. The sampling ratios are different for most of the areas and regions for which separate survey estimates are wanted (see figure E-3b). The procedure will be to calculate separate variances for each of the two metropolitan areas and for the urban and rural parts of each region, since data will be published for these areas and the users will want to know something about the reliability of the statistics for each area. In the calculations, the main difference will be in the procedure used for self-representing as compared to non-self-representing PSU's.

9.1 *Self-representing PSU's*

This section deals with both the two metropolitan areas and the five other self-representing PSU's. A relatively simple way of computing variances for this type of area would be to divide the sample cases into a number of random groups of equal size and calculate the differences in the estimates among the groups. The 4 rotation groups described earlier essentially represent random groups. However, the NSO will form a larger number of groups to obtain a better measure of variance.

For the two metropolitan areas and the two or three larger of the other self-representing PSU's, the NSO will divide each rotation group

[8] *More complex ratio estimation procedures are discussed for Phase II of the 1980 Census; refer to chapter 9 in Part D of the case study.*

systematically into two subgroups for purposes of variance computations, by assigning every other segment in the group to a subgroup. (This subgroup assignment should be made part of the segment code.) This process will result in 8 random groups, usually sufficient for reasonably reliable computations. For the smaller of the self-representing PSU's, however, it will be better to remain with the 4 rotation groups for variance purposes.

The formula for estimating the variance[9] of a weighted total based on random groups is as follows:

$$s^2_{\hat{x}} = \frac{k^2 \sum_{i=1}^{k} (x_i - \hat{\bar{x}})^2}{k\ (k-1)}$$

$$= \frac{k \sum_{i=1}^{k} (x_i - \hat{\bar{x}})^2}{k-1}$$

where

$s^2_{\hat{x}}$ = sampling variance of a weighted sample total

k = number of random groups

x_i = weighted sample total for a given random group in the area

$\hat{\bar{x}}$ = average (mean) of the weighted totals for the random groups

Figure E-3i illustrates the application of the formula for self-representing PSU's. Note that the number of employed civilians in the illustration is 320,000 and the standard error is 14,890. The CV (coefficient of variation) is 4.65 percent, which means that the 320,000 figure for employed civilians is subject to a relative error of 4.65 percent.

9.2 *Non-self-representing PSU's*

In estimating the variances for the urban or rural portions of the region, the procedure will be to compute the differences in the weighted sample totals for the pair of non-self-representing PSU's selected from each stratum. The formula is as follows:

$$s^2(\hat{x}) = \sum_{g=1}^{L_h} (\hat{x}_{g_1} - \hat{x}_{g_2})^2$$

where

$s^2(\hat{x})$ = sampling variance for an estimated total in the non-self-representing PSU's

L_h = number of strata of PSU's

$\hat{x}_{g_1}$ = weighted sample total for the first PSU drawn from the stratum

$\hat{x}_{g_2}$ = weighted sample total for the second PSU drawn from the stratum

Figure E-3j illustrates the calculation of the variance for the estimate of employed

Figure E-3i. ESTIMATION OF VARIANCES FOR SELF-REPRESENTING PSU'S

Group	Weighted total of employed civilians (x_i)	$x_i - \hat{\bar{x}}$	$(x_i - \hat{\bar{x}})^2$
1	40,000	-	-
2	36,000	-4,000	16,000,000
3	46,000	+6,000	36,000,000
4	38,000	-2,000	4,000,000
5	47,000	+7,000	49,000,000
6	32,000	-8,000	64,000,000
7	37,000	-3,000	9,000,000
8	44,000	+4,000	16,000,000
	320,000		194,000,000

$k = 8$

$\hat{x} = 320{,}000$ (total)

$\hat{\bar{x}} = 40{,}000$ (average)

$\sum (x_i - \hat{\bar{x}})^2 = 194{,}000{,}000$

$$s^2_{\hat{x}} = \frac{8\ (194{,}000{,}000)}{7} = 221{,}714{,}285.7$$

$$s_{\hat{x}} = \sqrt{221{,}714{,}285.7} = 14{,}890$$

$$CV = \frac{14{,}890}{320{,}000} = .0465 = 4.65 \text{ percent}$$

[9] *Note that s and s^2 are estimates of the true standard error and variance, σ and σ^2.*

Figure E-3j. ESTIMATION OF VARIANCES FOR NON-SELF-REPRESENTING PSU'S

Stratum	Weighted total of employed civilians		$\hat{x}_{g_1} - \hat{x}_{g_2}$	$(\hat{x}_{g_1} - \hat{x}_{g_2})^2$
	PSU-1 $(\hat{x}_{g_1})$	PSU-2 $(\hat{x}_{g_2})$		
1	42,000	38,000	+4,000	16,000,000
2	37,000	48,000	-11,000	121,000,000
3	44,000	42,000	+2,000	4,000,000
4	51,000	47,000	+4,000	16,000,000
5	39,000	44,000	-5,000	25,000,000
6	46,000	38,000	+8,000	64,000,000
7	37,000	42,000	-5,000	25,000,000
8	32,000	35,000	-3,000	9,000,000
9	29,000	33,000	-4,000	16,000,000
10	28,000	31,000	-3,000	9,000,000
11	40,000	46,000	-6,000	36,000,000
12	43,000	35,000	+8,000	64,000,000
	468,000	479,000		405,000,000

$$\hat{x} = 468{,}000 + 479{,}000 = 947{,}000$$

$$s^2(\hat{x}) = \sum(\hat{x}_{g_1} - \hat{x}_{g_2})^2 = 405{,}000{,}000$$

$$s(\hat{x}) = \sqrt{405{,}000{,}000} = 20{,}125$$

$$CV = \frac{20{,}125}{947{,}000} = .021 = 2.1 \text{ percent}$$

civilians for the urban non-metropolitan portion of the Gold Coast Region, where 12 pairs of PSU's were drawn from their respective strata. Note that the number of employed civilians in the illustration is 947,000 and the standard error is 20,125. The CV (coefficient of variation) is 2.1 percent, which means that the 947,000 figure for employed civilians is subject to a relative error of 2.1 percent.

9.3 *Variance summaries*

The variance for the urban portion of a region will be the sum of the variances for the self-representing and non-self-representing urban PSU's. The total variance for the region is obtained by summing the variances for the urban and rural parts. Similarly, variances for the national totals will be derived by summing the total variances for the four regions. The standard error in each case will be the square root of the sum of the variances.

9.4 *Variance components*

For some purposes, it is desirable to determine what proportion of the variance for non-self-representing PSU's is due to the variance between PSU's (that is, the portion arising from the fact that only a sample of PSU's is used) and the variance within PSU's (that is, arising from the fact that only a sample of households is selected within PSU's). This type of information is helpful in deciding how to allocate future samples as between increasing the number of PSU's and increasing the sampling ratios within PSU's. Such calculations are more complicated but can also be derived from the sample data. The procedure will not be described here but can be found in many statistical texts.

9.5 *Variances for ratio estimates*

If a population adjustment is used as described earlier, the estimates become "ratio estimates" and will generally have less sampling variance than simple unbiased estimates. The calculations are more complex in this case. For simplicity it will be assumed that only an overall population adjustment is made.

The formula for the ratio estimate takes the form of $\left(\frac{\hat{x}}{\hat{y}}\right) Y$ where $\hat{x}$ is the characteristic being measured (for example, the number of employed), $\hat{y}$ is the sample estimate of the population (in this case, the population of working age) and Y is the independent estimate of the same population.

In this case

$$s^2_{\frac{\hat{x}}{\hat{y}}Y} = \left(\frac{Y}{\hat{y}}\right)^2 (\hat{x})^2 \left[\frac{s^2_{\hat{x}}}{(\hat{x})^2} + \frac{s^2_{\hat{y}}}{(\hat{y})^2} - \frac{2s_{\hat{x}\hat{y}}}{\hat{x}\hat{y}}\right]$$

where

$s^2_{\frac{\hat{x}}{\hat{y}}Y}$ = variance of a weighted sample total derived through the ratio estimation procedure

$\hat{x}$ = weighted sample estimates of the characteristic being measured (for example, number of employed civilians)

$\hat{y}$ = weighted sample estimate of the population (for example, population of working age)

$s^2_{\hat{x}}$ = variance of $\hat{x}$, as computed earlier

$s^2_{\hat{y}}$ = variance of $\hat{y}$, similarly computed

The covariance is computed by using the same formulas as the variance except that cross-products of $\hat{x}$ and $\hat{y}$ are used in the calculation instead of squares.

In self-representing PSU's

$$s_{\hat{x}\hat{y}} = \frac{k\sum_{i=1}^{k}(x_i - \hat{\bar{x}})(y_i - \hat{\bar{y}})}{k - 1}$$

In non-self-representing PSU's

$$s_{\hat{x}\,\hat{y}} = \sum_{g=1}^{L_h}(\hat{x}_{g_1} - \hat{x}_{g_2})(\hat{y}_{g_1} - \hat{y}_{g_2})$$

The meaning of these symbols is the same as given earlier for the variance formulas. The $\hat{x}$'s refer to the weighted sample estimates for a characteristic (such as employed civilians), and the $\hat{y}$'s refer to the weighted sample estimates of the population (such as population of working age).

10. CONTROLS

In the selection of the sample units, the professional staff of the Statistical Methods Branch of the Population and Housing Division will review the mathematics and will assign one or two persons to be responsible for seeing that the survey design is carried out as planned. This staff will also be responsible for reviewing the listing of housing units and units in collective quarters and for reviewing the counts of vacant units and non-interviews.

Operational control also is very important in a continuing survey, especially when quick count, listing, and interviewing must be carefully scheduled. Control clerks will be responsible for seeing that the proper materials flow from one task to another in the process of implementing the sampling plan.

Chapter E-4. ADMINISTRATIVE STRUCTURE

1. *INTRODUCTION*

Because of its immense scope and tight timing, the 1980 Census operation required an elaborate and extensive administrative structure, both at the NSO headquarters and in the field. One of the advantages of a Household Survey Program of the type adopted in Popstan is that it can be effectively operated within a closely confined system. In fact, the field work will be administered largely from within the NSO. Some decentralization may be found desirable when large-scale specialized surveys are scheduled during the course of the decade.

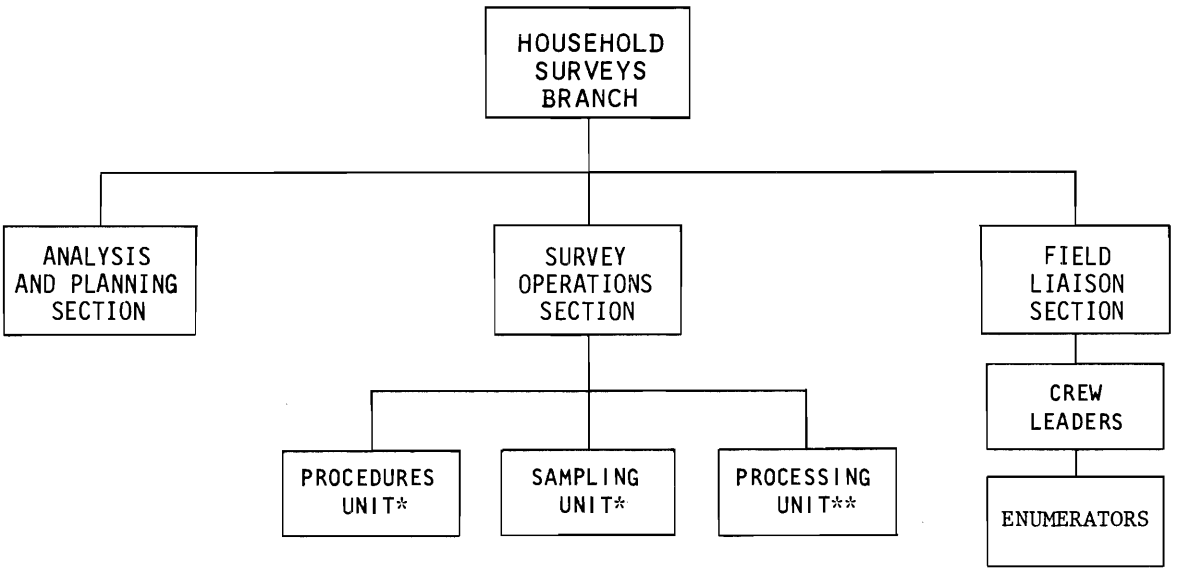
2. *ORGANIZATION CHART*

The permanent organization of the NSO and the expansion for the 1980 Census for Popstan are illustrated in exhibits B-11-1 and B-11-2, which are included as reference exhibits in Part E of the case study. A minimal amount of modification in the present organization will be needed for the Household Survey Program. The focal unit for the direction of the program is the Population and Housing Division. Other continuing divisions of the NSO will be involved in the program but will require no re-organization. The Geography Division will handle the mapping and the Data Processing Division will take care of data keying and computer processing.

3. *POPULATION AND HOUSING DIVISION*

The Population and Housing Division is the major, continuing division of the NSO concerned with demographic statistics. The division played a central role in the planning and conduct of the 1980 Census and will perform a similar function in the operation of the Household Survey Program. For this purpose, the Division will have a Household Surveys Branch, as shown in figure E-4a.

Figure E-4a. ORGANIZATIONAL UNIT FOR THE HOUSEHOLD SURVEY PROGRAM (Part of the Population and Housing Division of the NSO)



**Staff includes liaison for Geography Division.*
***Staff includes liaison for Data Processing Division.*

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3.1 *Analysis and Planning Section*

This section will be responsible for planning the content of the Household Survey Program and for the analysis of the data and the preparation of the publications. The duties of the section will include the following:

(1) Through prescribed channels, consult with other government agencies and with non-government groups to ascertain their data needs and the extent to which these needs can be accommodated through the survey program.

(2) On the basis of data requirements, budgetary considerations, and technical feasibility, plan the content and design of the basic and supplementary inquiries.

(3) Develop the concepts and definitions to be used in the program.

(4) Prepare the proposed tabulation outlines for the basic and supplementary subjects.

(5) Carry out the technical review of the tabulated data, in consultation with the Survey Operations Section, particularly the staff of the Sampling Unit.

(6) Complete the analysis of the tabulated results and prepare the various publications.

(7) Using survey and other available data, prepare intercensal population estimates and population projections for future dates.

3.2 *Survey Operations Section*

This staff is responsible for the survey design, development of the samples, preparation of the questionnaires and other survey forms, data collection procedures and instructions, manual processing, and computer programming. The staff works closely with the liaison staff handling the geographic, field, and computer operations.

3.21 Sampling Unit.--This unit will work closely with the Statistical Methods Branch of the Population and Housing Division to design the samples for the Household Survey Program and to determine the weighting and estimation procedures. The staff will develop the procedures for calculating sampling variances and estimating nonsampling errors from results of the quality control program and other sources. It will also arrange with the Geography Division for the necessary mapping materials.

3.22 Procedures Unit.--This unit will develop the basic survey procedures and the forms and related materials needed for survey purposes. The unit will design the questionnaires for the basic and supplementary subjects, in accordance with the content requirements and concepts that have been adopted. It will prepare the instructional manuals and training materials for use in the survey. Finally, it will determine the timing and scheduling of the interviews. A control clerk will be responsible for (a) keeping records of all sampling materials, (b) scheduling, and (c) preparing periodic progress reports.

3.23 Processing Unit.--This staff will be responsible for developing the specifications and the computer programs needed to carry out the prescribed processing functions, including those required to weight the data file, edit the computer tapes prepared from the questionnaires, and prepare the tables. The unit will act as the liaison between the Survey Operations Section and the Data Processing Division.

The Processing Unit will also carry out manual editing and coding procedures as needed for processing the survey questionnaires. It is expected that most of the forms will be precoded or self-coded so that the amount of manual processing will be minimal.

3.3 *Field Liaison Section*

This staff will represent the principal contact between the NSO and the field staff in conjunction with the Household Survey Program. In addition to supporting staff, the section will have a field supervisor and an assistant

field supervisor who will be responsible for the direction, training, and monitoring of the enumerator staff, with the assistance of crew leaders. The staff will arrange for transmittal of forms, materials, and supplies to the field and will receive completed questionnaires from the field staff and transmit them to the Processing Unit for review and manual processing.

Because of the relatively small size of the operation, the Field Liaison Section will deal directly with crew leaders and enumerators. The staff will keep the Field Operations Division informed of any important matters meriting its attention (such as administrative hindrances imposed by local officials, public reaction to the surveys, etc.), and will enlist the aid of the Field Operations Division in public relations matters and in recruiting field staff.

4. *QUALITY CONTROL*

Quality control will be applied at all stages of the Household Survey Program in much the same way as in the 1980 Census. Procedures for some of the activities will be informal, such as the review of concepts and table formats. In the data collection, quality control will be a continuous activity. In data processing, 100 percent of the work will be verified. The volume of work is too small to justify sample verification. Chapters E-5 and E-6 discuss the quality control of major survey activities.

5. *OPERATIONAL CONTROL*

Several features of Popstan's Household Survey Program make it necessary to exercise considerable care in controlling the movement of materials. Materials will be flowing to the field and back in a constant stream. Within the NSO, maps must be provided, lists must be updated, questionnaires must be reviewed, and proper weights must be established for each segment. The control will ensure that all operations are carried out and that all sample segments are accounted for--in distribution of materials to the field, data collection, return of materials, manual processing, data keying, machine editing, and machine tabulation. Operational control also will ensure that appropriate steps are carried out according to schedule.

Chapter E-5. ENUMERATION PLANS

1. INTRODUCTION

As in the case of the census, the most critical part of the survey operation is the actual collection of data. Unless complete and accurate information is obtained at the time of interview, there is very little that can be done at subsequent stages to rectify the situation. Although the survey timing is more flexible than that of the census, it becomes increasingly difficult, because of the geographic spread of the sample units, to return to households to correct errors detected in the course of later reviews. The only recourse available, in most instances, is to make whatever corrections and imputations seem most reasonable on the basis of the information on hand.

Thus, it is essential to take whatever steps are needed to ensure the greatest possible accuracy at the interview stage. Many different aspects of survey planning and operations have a direct impact on the accuracy of interviews. The design and pretesting of questionnaires are among the most important. The selection and training of enumerators and other field staff represent another crucial element. No less essential are close supervision during the course of the enumeration and the existence of a systematic quality control system. These and related aspects are the subject of this chapter.

As discussed in chapter E-2, the data collection activity involves more than interviewing for information to fill the prescribed questionnaires. A quick count operation and a listing also are needed. Because they are closely linked with the sampling, the quick count and listing operations are discussed in chapter E-3.

2. QUESTIONNAIRE DESIGN

The information obtained in an interview obviously depends on what questions are asked and how they are asked. The effect of the questionnaire on the accuracy of the information obtained is not always recognized. Many studies have shown that significantly different answers can be obtained by even slight modifications in question wording. Ambiguities and lack of clarity in the questions can have a serious effect. Even the order in which questions are asked can be relevant. The outward manner and consistency of the enumerator in asking questions can affect the whole outcome.

As noted in chapter E-4, the responsibility for design of the questionnaires has been assigned to the Survey Operations Section of the Household Surveys Branch (in the Population and Housing Division). This staff will consult closely with the Analysis and Planning Section, in terms of translating the concepts adopted for the various subjects into workable questions for survey use. Unless great care is taken, much can be lost in translating concepts into questions. Data processing personnel will be consulted to ensure that the questionnaires are efficient for coding, editing, and data keying. Finally, and highly important, adequate pretesting will be undertaken to judge the effectiveness of the survey instruments in an interview setting.

In spite of wide experience, questionnaire design is still somewhat more of an art than a science. There are some guidelines, however, which will be followed by the Popstan staff.

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2.1 *Size and identification of forms*

The forms will be large enough to accommodate all of the questions, using print of sufficient size to be read under less than ideal lighting conditions. Sufficient space will be provided for recording all of the answers, including those requiring write-in or narrative entries. Within these constraints, an effort will be made to avoid unwieldy questionnaires that will be difficult to handle during the interview or to carry around. These often conflicting considerations will determine whether an attempt will be made to cover all eligible persons in a household on a single questionnaire, which is the preferable arrangement, or to provide a separate form for each person. In the latter case, it may be possible to bind together several individual questionnaires, such as the number sufficient for most households, in order to reduce control problems. When individual questionnaires are not bound together, provision will be made for adequate household identification codes or numbers on each. The forms for Popstan will carry the prefix letters PHS (Popstan Household Survey) with each form number.

2.2 *Wording of questions*

Wherever possible, verbatim questions will be used instead of general captions or statements. For example, the question "Did you do any work at all last week, not including own housework?" is preferable to the caption, "Work status last week." Where verbatim questions are used, greater consistency will be obtained from one household to the next than will be obtained if the enumerators use their own wording.

Questions will be simple, concise, and clear. Previous experience with similar questions may provide some guidance. Often, however, pretesting is needed to determine whether questions are understandable and effective. Complex questions containing more than one idea will be avoided. For example, "When did you last see a doctor and what did he/she say was wrong?" requires answers to two parts and will be avoided. These considerations are sometimes easier to apply in theory than in practice.

Care will be taken to avoid bias in question wording; that is, wording that may induce certain answers whether correct or not. This is more likely to occur when asking about opinions rather than facts. However, where exact wording is not provided, enumerators may rephrase questions in a biased manner because they think they know the answers. They may ask an elderly person, for example, "You didn't work last week, did you?" and induce an answer of "No" even if the person did some work.

2.3 *Sequence of questions*

Since the order of questions can sometimes affect the results, care will be taken in this respect. The order of certain questions will be obvious. For example, it is necessary to ask whether a person worked last week before inquiring about the place of employment. Generally, questions relating to the same general topic will be grouped together on the questionnaire to maintain the trend of thought.

Where order is not obvious, the preferable arrangement will be established through pretesting. Questions that are relatively complex or are more sensitive in nature will be placed toward the end of the questionnaire to avoid possible disruptions.

The order of questioning will be clearly indicated by instructions on the questionnaire, especially where there are skips from one section to another depending on the answers. Otherwise, the enumerator may ask unnecessary questions (sometimes creating embarrassment) or may skip over necessary ones. Instructions and skip patterns will be printed in a different

type to avoid confusion with the questions (for example, questions in bold type and instructions in italic). Judicious use of arrows, pointing in specific directions from various answer boxes, will be helpful in some instances.

2.4 *Recording answers*

It is usually more efficient to record answers by checking a box or circling a printed code than by writing in a verbatim (or abridged) reply. With write-in answers, more space is required on the form and manual coding would be necessary at the data processing stage. In the early stages of the survey program, however, or when a new topic is being introduced, the Popstan questionnaires will allow for write-in entries in certain items until an adequate set of pre-coded categories can be determined. In other cases, the level of detail needed in an item will be such that write-in entries will always be needed.

On the Popstan questionnaires, except for numerical answers (such as the number of hours worked), most of the information is recorded by checking boxes (there is no space problem as with the Phase I questionnaire). "Reason for leaving last job" on the Economic Activity Questionnaire (item 11 of exhibit E-2-2) is an example of a temporary "write-in" item, because there is some initial uncertainty about what answer categories are needed. Write-in spaces will always be needed for occupation and industry (items 17 and 18) since detailed categories are wanted for this information; also it is difficult for enumerators to code items of this kind.

Where answer categories are provided, codes will be printed alongside so that the answers can be keyed directly. Code boxes will also be provided in convenient places for entering the manual codes for write-in entries. Although the placement of codes will be as efficient as possible for data processing, care will be taken not to complicate the questionnaire so that it is difficult to follow in an interview.

3. *PRETESTING*

The importance of pretesting in designing effective questionnaires is apparent. Pretesting will also relate to survey procedures, such as whom to interview in the household and how to schedule return visits for those not found at home.[1]

Pretesting will be undertaken sufficiently far in advance of a survey, so as to allow sufficient time for revising and improving the instruments and procedures. In important cases, the timing should be such as to allow more than one pretest in sequence. In the Popstan situation, pretesting of the Household Record Card and the Economic Activity Questionnaire would start at least a year before the official beginning of the survey. A second pretest of these forms would be undertaken about 6 months before the first survey, incorporating changes indicated by the results of the first pretest. The second pretest would also be the occasion for pretesting the vital statistics forms (exhibits E-2-3, E-2-4, and E-2-5).

Pretesting of the supplementary questionnaires will be undertaken during the second survey period; that is, during the second half of the first survey year (excluding the two interim surveys). Priority will be given to the two supplementary topics, internal migration and natality, that will be introduced. Other supplementary inquiries will be explored on a small scale about a year in advance of the date when they will be included in the survey. It is intended that all new topics be pretested.

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[1] *Pretesting will be applied to all survey operations; see chapter 11 in Part A of the case study.*

Purposive sampling will be used for most of the pretesting. This means that a number of cases will be deliberately selected from among a variety of population groups, so as to test the questionnaires and procedures in as wide a range of situations as possible. For example, cases would be drawn from a number of income groups, from farm as well as nonfarm households, from several geographic locations, etc. Although the number will vary, some 100 to 200 cases will be included in a pretest, spread over three or four different geographic areas. The samples will be separate from the regular survey sample. One of the important items that will be pretested is a mark sensing questionnaire. It will be tested, evaluated, and re-tested. (See Part F of the case study for more detail.)

The evaluation of the pretests will be based mainly on observation of the interviews by field supervisors and NSO professional staff and from an inspection of the completed questionnaires. The samples will be too small and unrepresentative for purposes of compiling statistics.

4. *PREPARATION OF TRAINING MATERIALS*

The preparation of training materials will also be the responsibility of the Survey Operations Section of the Household Surveys Branch. These materials will be carefully reviewed by the Analysis and Planning Section for conformity with data and conceptual requirements, and by the Field Liaison Section for practicality for field use. In preparing these materials, advantage can be taken of experience in the development of similar materials for the 1980 Census. Pretesting of various materials will be incorporated in the field pretests of the questionnaires and procedures.

4.1 *Crew Leader's Household Survey Manual*

This manual would cover the crew leader's responsibilities for recruitment, assistance with training, supervision of enumerators, and control of field materials and completed work.

4.2 *Enumerator's Household Survey Manual*

This manual will cover the technical and administrative procedures. Among the matters that will be discussed are the functions of the NSO, background and purposes of the survey program, administrative requirements of enumerators, rules for canvassing and listing, techniques for interviewing and gaining cooperation, and detailed technical instructions for the various basic questionnaires and related forms.

4.3 *Instructions for supplementary subjects*

Crew leader and enumerator instructions for the supplementary subjects will be issued as separate chapters of the respective manuals. They will be provided several months in advance of the date scheduled for the supplement.

4.4 *Training guide*

A verbatim training guide will be prepared for use in group training sessions scheduled as part of the initial training of enumerators. Although only two trainers will be used and there is only a relatively small staff of enumerators, a verbatim guide will ensure greater consistency in training. Also, other personnel may occasionally be pressed into training roles when emergencies arise. The training guide will generally follow the Enumerator's PHS Reference Manual.[2]

4.5 *Other training manuals*

Other training manuals will be prepared for "refresher" training sessions and for the supplementary subjects. These will be detailed outlines rather than verbatim guides. The cost and time to prepare verbatim guides for each supplement would not be justified.

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[2] *PHS refers to Popstan Household Surveys.*

4.6 *Home study materials*

The training program will often call for advance study at home by enumerators prior to group training sessions. This will be the case both for initial training and refresher training. Various materials will be prepared for this purpose, including instructional memoranda and tests and exercises to be completed by the enumerators and mailed in.

4.7 *Other training materials*

Various additional training materials will be needed for purposes of group sessions. They will include test exercises, mock interviews, and filmstrips.

5. *RECRUITMENT OF STAFF*

The recruitment of enumerators will be the responsibility of the Field Liaison Section of the Household Surveys Branch. The Field Operations Division will assist with recruitment, if necessary.

5.1 *Crew leaders*

The first requirement will be the recruitment of crew leaders--one per region plus an assistant part time in St. Regis and another in Tanga. They will be recruited at least a year in advance of the first survey so as to be available for participation in the pretests. Probably the best source of these personnel will be from among the most efficient crew leaders or similar employees in the 1980 Census operation, particularly those retained for Phase II.

5.2 *Enumerators*

The enumerators will be recruited at least 6 months before the start of the first survey, as they will be needed for some of the preparatory activities, especially the listing of addresses for the selection of the sample. When the surveys are on a quarterly basis, about 26 enumerators will be needed--22 full time and 4 part time. The distribution will be as follows:

(1) St. Regis and Tanga Metropolitan Areas. Three full-time enumerators will be stationed in each of the two metropolitan areas, for a total of 6.

(2) Non-self-representing PSU's. Four full-time enumerators will be stationed in each region for a total of 16. They will be traveling from place to place and can be recruited in almost any convenient place within the region.

(3) Self-representing PSU's. One part-time enumerator will be stationed in each of the three largest self-representing urban PSU's--Loma, Bara, and Port Moro--where there would be interviewing in only about 4 or 5 weeks of each quarter. A fourth part-time enumerator would cover the workloads in Cendari (three weekly workloads per survey) and Kingston (two weekly workloads).

The census records will again be the best source for recruiting enumerator personnel. Other possible sources will be local officials or teachers who have a wide acquaintanceship with local residents. In addition to the immediate numbers needed, certain reserves will be identified who can be quickly recruited as replacements or for use in specialized surveys.

5.3 *Qualifications*

Enumerators recruited for the survey should be at least secondary school graduates. The majority will have to travel, so that unmarried persons might be more appropriate for that purpose. Those stationed in the metropolitan and other self-representing areas must be available for night and weekend work, because it is especially difficult to find people at home in those places. All recruits should have pleasant personalities and be able and willing to deal courteously with people in all walks of life. They should be able to pass qualifying tests, which include map reading and simple mathematical skills as well as oral and reading abilities. Crew leaders should have the same qualifications

as enumerators, plus some administrative or supervisory capability.

6. *TRAINING OF ENUMERATORS*

No preparatory step is more important than the careful training of enumerators. The field supervisor and assistant supervisor will be trained in the NSO by the professional staff of the Survey Operations Section, assisted by the Analysis and Planning Section. Their training will cover all of the supervisory functions, as well as the technical aspects of the survey.

The supervisor and assistant will train the crew leaders on all the enumeration procedures and all the additional responsibilities of crew leaders. The training will be carried out in the NSO and will last for 1 week. At a later point, crew leaders will also participate in the training specified for enumerators. They will assist in some aspects, such as correcting tests given to enumerators, conducting mock interviews in training sessions, checking practice interviews, etc.

The training program for the enumerator staff in general is described below. Where group sessions are specified, the enumerators will be divided into two equal groups, one to be trained by the field supervisor and the other by the assistant supervisor (of the Field Liaison Section). One training group will be assembled at the NSO and the other in a convenient location in another region.

6.1 *Initial training*

The initial training of enumerators will provide the basic knowledge needed to conduct the field work. It will consist of group sessions (classroom type), practice interviewing, and home study.

6.11 First group session.--The first 1-day group session will be held about 6 months prior to the first survey, primarily to train enumerators on how to divide selected EA's into sectors (quick count) in preparation for the listing of units. This assumes a decision is made to subdivide EA's prior to listing of addresses, rather than listing entire EA's. The decision will vary, depending on local conditions.

6.12 Second group session.--A 1-day session will be held about 4 months prior to the start of the survey to train enumerators on the listing of addresses in the sectors selected for the sample. Enumerators will have been sent some instructions to study in advance of the session. Some practice listing will be scheduled after the session. The listing will be carried out in nonsample segments near the training site.

6.13 First home study.--A home study assignment requiring about 10 hours of time will be scheduled about 2 weeks prior to the start of the first survey. The material will relate mainly to interviewing procedures and to completing the Household Record Card and the Economic Activity Questionnaire. The Enumerator's Household Survey Manual will have been distributed prior to that time and enumerators will be instructed to read specified sections of the manual in conjunction with the home study. Test exercises will be provided to be completed by the enumerators and mailed to the Survey Operations Section in the NSO.

6.14 Third group session.--The third group session will be held about a week prior to the start of the first survey and will last 2 days. All of the basic material about interviewing, getting respondents to cooperate, minimizing non-interviews, and related matters will be covered. The principal subject matter will be the Household Record Card and the Economic Activity Questionnaire. The basic verbatim training guide will be used by the trainers. The home study exercises will be reviewed and corrected. Other exercises will be completed

during the group session. Every effort will be made to obtain enumerator participation, including the use of oral question-and-answer sessions and mock interviews.

6.15 Practice interviewing.--Directly following the group session, enumerators will carry out practice interviewing in segments which have been set aside for this purpose in the training city. They will be expected to complete 6 to 8 interviews in 1 day, part of which will be observed by the crew leaders and professional staff of the Survey Operations Section. The following day, there will be a half-day session to review the practice experience, cover any final instructions, and give enumerators their first assignments.

6.16 Second home study.--A 4-hour home study assignment, covering the basic survey matters once again, plus any special matters arising in the early stages, will be sent to enumerators about half-way through the first survey (that is, at about the 3-month point). They will complete and mail in test exercises, which will be returned to them after correction.

6.17 Third home study.--Another 4-hour home study will be sent to enumerators near the end of the first survey. Considerable emphasis will be given to the vital statistics questionnaires (exhibits E-2-3, E-2-4, and E-2-5) the use of which will begin in the second survey (second half of the first year). Test exercises will again be provided, to be completed and mailed in.

6.18 Fourth group session.--A 1-day group training session will be scheduled about a week prior to the start of the second survey. The focus will be on the survey experience up to that point and on the upcoming vital statistics inquiries. The verbatim training guide will be used for the vital statistics training. Test exercises, question and answer periods, and mock interviews will be included. The fourth group session will mark the end of the initial training period.

6.2 *Training for replacements*

The amount of training input will be similar for replacement enumerators, although the pattern will necessarily differ because of the small numbers involved and the intermittent occurrence of vacancies. About the same quantity and type of home study will be involved as described above. Instead of group sessions, training of an individual enumerator will generally be necessary. More improvisation will be required in lieu of the training guide. More use will be made of practice interviewing.

6.3 *Refresher training*

There will be a continuous use of "refresher" training; that is, periodic training to keep up to date. After initial training, it is assumed that enumerators will forget some of the concepts they will have been taught. Refresher training will help to maintain and monitor the level of training. Refresher training will consist mainly of home study and group sessions.

Home study for refresher training will be scheduled four times a year, just prior to each new quarterly survey (once the operation is on a quarterly basis). A good part of each home study assignment will be devoted to the supplement scheduled for the next survey. Group training sessions (generally of 1-day's duration) will be held about twice a year, again just preceding the next survey. The scheduling of group sessions may coincide with that of supplements, especially the more complex ones and those not previously included in the survey. The scheduling of enumeration, as described in the next section, will allow time for inclusion of refresher training.

7. *WORKLOADS AND SCHEDULING*

As noted in chapters E-2 and E-3, the enumeration will be spread over the entire survey period. In the first 2 years, when semi-annual surveys are scheduled, some enumeration will occur about every other week. Once the operation is on a quarterly basis, there will be some enumeration in 12 weeks of each quarter. In each case, the total enumeration assignment in a given week will consist of about one-twelfth of the overall sample, or over 1,000 units nationally. The 13th week of the quarter will be reserved for training and similar purposes.

In each of the two metropolitan areas, the total workload consists of 2,280 units per survey. About one-twelfth of the units will be enumerated each time. Thus, the weekly sample in each area will consist of about 190 units, in 38 segments of 5 units per segment. The interviewing staff in each metropolitan area will consist of three resident enumerators who will be employed on a full-time basis in order to complete the work.

A slightly different system will be used in the five other self-representing areas. In the larger three (in terms of the workload), a part-time enumerator will cover the assignments. Enumeration will take place in these areas in only selected weeks in each quarter (or semi-annual period)--5 weeks in Loma, 4 each in Bara and Port Moro. In the other two of these areas, the interviewing would be even less frequent (3 weeks in Cendari and 2 weeks in Kingston); one part-time enumerator will cover the assignments in both PSU's.

In each of the other sample areas (the non-self-representing PSU's), the total sample will consist of 35 to 50 units. These will be in segments of 5 units each in the urban PSU's and 10 each in the rural PSU's. The entire sample in each such area will be enumerated in a single week. Thus, enumerators will work in a different area each week, in accordance with the scheduling of the enumeration. Allowing for travel time and the greater distances in rural areas, the assigned sample will represent a reasonable workload for a single enumerator. The week-by-week scheduling of areas for enumeration will be laid out far in advance, so that enumerators can be appropriately assigned. Consecutive assignments to individual enumerators will be made in such a way as to minimize travel, without regard to whether the areas are urban or rural.

The typical scheduling for the Gold Coast Region, which contains the two metropolitan areas and another self-representing urban PSU, as well as non-self-representing PSU's, is shown in figure E-5a.

The workloads for the other regions differ in the following manner:

(1) Samchok Region. No metropolitan areas but three self-representing urban PSU's. Loma will have 50 units in each of weeks 2, 4, 7, and 10, and 45 units in week 12. Cendari will have 40 units in each of weeks 1, 6, and 11, and Kingston will have 35 units in each of weeks 4 and 9. The weekly workload for non-self-representing urban PSU's will be 70 units (instead of 90), with 35 units in each of two PSU's.

(2) Western Region. No metropolitan areas or self-representing urban PSU's. The weekly workload for non-self-representing urban PSU's will be 100 units (instead of 90), with 50 units in each of two PSU's.

(3) Atlifica Region. No metropolitan areas. One self-representing urban PSU (Port Moro) will have a workload of 40 units in each of weeks 3, 6, and 9, and 45 units in week 12. The workload for non-self-representing urban PSU's will be the same as the Gold Coast Region (90 units), with 45 in each of two PSU's per week.

The procedure to be followed by enumerators in accomplishing their assignments is described below.

(1) Where a PSU is within easy commuting distance of the enumerator's home, the enumerator will travel to the PSU from home each day, returning home each night. Some overnight stays at the PSU might be necessary, however, to enumerate households not at home during daytime hours.

(2) Where a PSU is not within commuting distance of home, and where adequate living quarters for short-term stays are obtainable in the PSU, the enumerator will make arrangements to live in the PSU during the enumeration week. This usually will be more economical than commuting each day.

(3) Other arrangements will be necessary where a PSU is not within commuting distance of the enumerator's home and where short-term living quarters are not obtainable in the PSU. For example, the enumerator might arrange to stay at the place nearest the PSU that has adequate short-term living quarters and then commute to the PSU from there.

(4) In assigning PSU's to particular enumerators, one of the factors will be the location of the PSU in relation to the enumerator's home.

Figure E-5a. TYPICAL QUARTERLY WORKLOAD FOR THE GOLD COAST REGION

Week[1]	Metropolitan areas (number of units[2])		Self-representing urban area of Bara (number of units[2])	Non-self-representing areas			
				Urban		Rural	
	St. Regis	Tanga		PSU codes[3]	Number of units[2]	PSU codes[3]	Number of units[4]
1	190	190	-	1-2	90	25-26	80
2	190	190	45	3-4	90	27-28	80
3	190	190	-	5-6	90	29-30	80
4	190	190	-	7-8	90	31-32	80
5	190	190	40	9-10	90	33-34	80
6	190	190	-	11-12	90	35-36	80
7	190	190	-	13-14	90	37-38	80
8	190	190	45	15-16	90	39-40	80
9	190	190	-	17-18	90	41-42	80
10	190	190	-	19-20	90	43-44	80
11	190	190	40	21-22	90	45-46	80
12	190	190	-	23-24	90	47-48	80

[1] *13th week reserved for training.*
[2] *Units are grouped in segments (clusters) of 5 HU's.*
[3] *Codes are arbitrary consecutive numbers for illustrative purposes. The pair of PSU's for any week represents the two selected from the same stratum (see chapter E-3). The workload is divided equally between the two PSU's.*
[4] *Units are grouped in segments (clusters) of 10 HU's.*

Although the use of mainly full-time enumerators, in the manner described, has various advantages, there is the possibility that fatigue will develop because of the almost continuous enumeration and extensive travel involved. This should not be a problem in the first 2 years, when enumeration assignments will be made only every other week. By the third year, when quarterly surveys begin, consideration will be given to adding an enumerator or two per region, probably on a part-time basis. These added personnel will relieve other enumerators of assignments for a few weeks each quarter, if this proves to be desirable.

8. *HANDLING OF FIELD MATERIALS*

The Field Liaison Section of the Household Surveys Branch will be responsible for the shipment and receipt of field materials. The staff will have appropriate clerks for this purpose.

8.1 Materials shipped to field

About 2 weeks before any given weekly assignment, the Field Liaison Section will ship the following materials to the crew leader in a given region:

(1) The prepared Household Record Cards for units in that assignment which have been previously enumerated. Once the sample is being rotated, a set of blank forms will also be included, containing only the addresses of sample units and other housing identification, for new units being added at the time. A Control Record will be maintained in the Field Liaison Section listing the household identification of every unit assigned. The enumerator will also receive a supply of entirely blank Household Record Cards for use at addresses where entirely new households have moved in since the previous visit.

(2) Blank Economic Activity Questionnaires with a sufficient

supply to cover each unit in the assignment and an adequate reserve.

(3) Blank Population Change Questionnaires (enough for each unit plus a reserve), Birth Records, Death Records, and supplementary questionnaires being used at that time.

(4) Previously filled Household Survey Listing Sheets for sectors (or for EA's) for which listings are to be brought up to date, and blank listing sheets for sample sectors or segments to be newly listed.

All of the above materials for a given segment will be inserted in a Household Survey Segment Folder. The name of the enumerator to whom the segment is assigned will be indicated. Control counts (number of households interviewed, number of persons interviewed, etc.) will be indicated on the outside cover of the folder. Since the folder will be used to contain the questionnaires and listing sheets throughout the processing steps (up through data keying), the steps will be listed on the outside cover, similar to the EA Books in Phase I and the Segment Folders in Phase II (as described in Parts C and D of the case study). The crew leader will arrange for the material to reach the appropriate enumerator in advance of the time when the assignment is scheduled.

8.2 *Receipt of materials from field*

When an enumerator completes the work in a given segment, the folder containing the completed questionnaires and listing sheets will be sent to the crew leader. After a review, the crew leader will transmit the materials to the Field Liaison Section. The staff will proceed as follows:

(1) Check off each completed or non-interviewed household on the Control Record.

(2) Check whether a Household Record Card, an Economic Activity Questionnaire, and a Population Change Questionnaire (starting with the second survey) are present for each unit. These forms will be prepared even for units which are non-interview.

(3) Check that a Birth or Death Record or a supplementary questionnaire has been completed, wherever needed.

(4) Check that Household Survey Listing Sheets have been prepared or brought up to date, as required.

(5) Bring any deficiencies to the attention of the crew leader for follow-up.

(6) Transmit completed questionnaires to the Processing Unit for processing purposes.

8.3 *Method of shipment*

Shipment of materials between the Field Liaison Section and the crew leaders will be either by mail or special freight service, depending on the more reliable arrangement. However, the crew leader in St. Regis will pick up the materials in person. Shipments between the crew leaders and enumerators will be by mail, express service, or use of scheduled buses, depending on the most reliable method between the enumerators' and crew leaders' locations. In areas near St. Regis, however, delivery to enumerators will be made in person.

9. *INTERVIEWING RULES*

The basic rules for interviewing will be stipulated in the instructional manuals and covered thoroughly in the training. Such important matters as courtesy in interviewing persons in all walks of life, and asking questions as worded and in proper sequence, have already been noted. Other significant points are discussed below.

9.1 *Whom to interview*

Generally speaking, a responsible adult member of the household present at the time of interview can be asked to supply the information for the entire household. If the respondent is unable to answer for a particular individual, a return visit will be scheduled to interview that person. In some cases, an older child may be the most literate and educated

member of the household. If this is the case, that person could be used as the respondent in collaboration with an older adult member.

9.2 *Callbacks and non-interviews*

It is imperative to obtain interviews with as large a proportion of eligible sample households as possible. Otherwise, the survey results may not be representative of the population as a whole. Persons difficult to find at home and those who are less cooperative often tend to be different from the average household, so it is important to attempt to obtain interviews in such cases.

A certain proportion of sample units will be vacant or occupied by persons ineligible for interview (such as those with a usual residence elsewhere). In such cases, no interview is intended and the only step needed is to indicate the circumstances on the questionnaires.

The situation is different for units occupied by persons eligible for interview; that is, units where occupants are temporarily away or for some reason will not supply the information. Non-interviews in these cases can cause a bias in the survey results.

In Popstan, households where it is difficult to find persons at home represent one of the most common problems. In such cases, an inquiry will be made of neighbors or other persons nearby to find out when someone is likely to be home. A return visit will be scheduled for that time. Visits at night or on weekends will often be necessary for these cases. In any event, at least three return visits, at appropriate times, should be made to attempt an interview. Households away on vacation or a visit all week represent a different situation. There is no point in making return visits that week. Instead, in the metropolitan areas at least, an arrangement will be made to keep these cases open for another week or two, if the household is expected back by that time.

A relatively few households may refuse to supply information for various reasons. In such instances, the enumerator will make a reasonable effort to enlist cooperation by explaining more fully the purposes and importance of the survey to the people of Popstan and emphasizing the assurances of confidentiality. If still unsuccessful, the best procedure is to refer the case to the crew leader for further follow-up. A first step will be an explanatory letter to the household signed by a senior NSO official. A special visit by the crew leader will then be attempted, if feasible. These steps will be too late for the present survey, but could result in cooperation in subsequent visits.

For households which are finally non-interview for any reason, a questionnaire of each type will be submitted anyway so that the control clerk can account for each sample unit. The forms will contain only the reason for non-interview.

10. *ROLE OF CREW LEADERS*

Some of the functions of the crew leaders have been indicated in previous sections. A summary of their duties is given below:

(1) They will assist with the training of enumerators and will observe the enumerators in listing and interviewing.

(2) They will receive field materials from the Field Liaison Section for transmittal to the enumerators in their respective regions.

(3) They will, in turn, receive completed materials from the enumerators for transmittal to the Field Liaison Section. Before such transmittal, they will check whether all the necessary forms and questionnaires for a segment have been prepared. If not, they will check back with the enumerator to determine what the problem is and to rectify it, if possible.

(4) Before transmittal, they will perform an edit (prescribed by the NSO) of the forms and questionnaires. They will correct obvious errors and they will contact the enumerator, if possible, to rectify remaining problems.

(5) They will carry out the quality control program (see below).

(6) Assistant crew leaders will be available for emergency interviewing in their regions.

11. QUALITY CONTROL PROGRAM

The training program previously described and the field edit of questionnaires by crew leaders represent important aspects of quality control. Some additional elements of quality control over the field work are described below.[3]

11.1 Observation of interviews

Observing enumerators in the actual conduct of interviews is one of the best ways of ascertaining how well the work is being carried out. Among the matters to be observed is how satisfactorily the enumerator is able to explain the program to new respondents, whether he/she is courteous and tactful in conducting interviews, whether the questions are being asked as worded and in an orderly manner, and whether additional probing is carried out when the replies are not responsive to the questions. The effectiveness with which the enumerator plans the assignment, follows a logical travel route, arranges for callbacks for households not at home, and similar matters will also be observed.

Although enumerators being observed might not perform in precisely their usual fashion, experience has indicated that those who have developed poor habits find it difficult to change just because they are being watched. Moreover, they cannot conceal deficiencies of which they are unaware.

The Popstan plan calls for observing each enumerator twice a year, for a 1-day period each time (and more often for replacement enumerators). The field supervisor and assistant field supervisor in the Field Liaison Section will carry out these observations and fill a systematic rating sheet covering different aspects of the enumerator's work. This performance will be discussed with the enumerator immediately afterwards and additional instruction and training will be scheduled, if required. Enumerators whose work is below standard will be scheduled for observation more frequently or will be replaced.

11.2 Field review

Crew leaders will review the enumerator's completed work before sending it to the NSO (refer to section 10 above). Even if the current work cannot be corrected, the crew leader will discuss the weaknesses with the enumerator to prevent continuation of errors.

11.3 Reinterview program

Because observation alone will not always reveal deficient work, a reinterview procedure is also specified. On the average of twice a year, about half of each enumerator's assignment for a given week will be reinterviewed to see whether the answers differ from the original information. Enumerators will be aware they are subject to reinterview, but the checks will be randomized in such a fashion that no one will know precisely when his/her work is scheduled for reinterview. The reinterviews will generally be limited to the basic forms--Household Record Card, Economic Activity Questionnaire, and the vital statistics forms.

A good part of the reinterviews will be carried out by the field supervisor and the

[3] *Many of the forms that will be used to keep records of the results of the quality control measures will be adaptations of those used in the 1980 Census. (Refer to Parts C and D of the case study.)*

assistant field supervisor in the Field Liaison Section. However, crew leaders will also carry out part of the work. The reinterviewer will have the results of the original interview on hand, but will not refer to that information until the reinterview is completed. A comparison will then be made between the two versions and any significant differences (as defined for this purpose) will be checked with the respondent to find out which answers are correct. Since there will inevitably be a delay of 2 or 3 weeks between the two interviews (the reinterview questions will relate back to the original date), some differences would be expected simply due to the passage of time.

Differences remaining in the enumerator's work after reconciling the results with the respondents will be considered as errors, even though they might not have been made by the enumerator. Consistently high error rates would, nevertheless, be indicative of inadequate work, requiring retraining or replacement. Such situations will rapidly be brought to the attention of the enumerator by the persons in the Field Liaison Section (not by the crew leaders, who will feel responsible and defensive of the enumerators). Suggestions for improvement will be offered. In addition to controlling the work of individual enumerators, differences found in reinterviews will be tabulated for the sample as a whole as an indication of the extent of nonsampling or response errors.

11.4 Computer edits

Aside from the preliminary field edit by the crew leaders, there will be virtually no manual edit of the completed questionnaires. Instead, a computer edit will be made to identify omissions, inconsistencies, or highly irregular entries. Computer listings will be made of these errors for review and disposition by the professional staff of the Household Surveys Branch. In addition to this processing need, error rates will be compiled by item for the survey as a whole and even for individual enumerators (as identified by codes on the computer record). These will be referred to the crew leaders for follow-up. They will also serve as the basis for special training materials in an effort to avoid consistent types of errors.

12. OPERATIONAL CONTROL

Many materials will flow to and from the field staff so that accurate records will be needed to account for all the cases. As with quality control, forms used in the 1980 Census will be adapted for the purpose. For data collection, one of the principal operational control forms will be the Crew Leader's Record Book similar to the one used in the 1980 Censu (see chapter 4 in Part C of the case study).

13. COMPENSATION OF FIELD STAFF

Crew leaders will be paid at an annual rate, with reimbursement for travel expenses. Enumerators will be paid a fee for completion of a weekly assignment. The fee will vary according to the number of sample units. Additional payment will be made for travel and living expenses. Training time will be compensated on an hourly basis.

Chapter E-6. PROCESSING OPERATIONS

1. IMPORTANCE OF GOOD PROCESSING SYSTEM

Although data collection is the most important phase of a survey operation from the standpoint of the accuracy of the statistics, data processing may be the most crucial aspect in terms of meeting the timetable. Problems which arise in the course of data processing are often unanticipated and difficult to resolve. This is especially true when computers are used for this purpose. There can be no denial of the great advantages of computers in terms of flexibility, speed, and economy, once the system is stabilized. The time and effort needed to prove in a new system is, however, often unpredictable.

One benefit of a continuing survey program is that it is feasible and cost effective to invest the time and effort needed to produce a comprehensive, computer-oriented data processing system. Once the system is installed, there can be great confidence that the continuing statistics will be compiled promptly and accurately. Not only will the potential range of tabulations be far more extensive than would otherwise be possible, but more precise weighting and estimation procedures and more sophisticated data editing methods can be utilized. Processing of supplementary data will be subject to somewhat more uncertainty, but those difficulties will diminish as the inquiries are repeated from time to time. Even ad hoc or specialized surveys will benefit from some of the elements built into the continuing system.

1.1 Data entry device

For the Household Survey Program, Popstan will use the key-to-disk equipment that was acquired for the 1980 Census. As soon as the program is well under way, small-scale tests will be conducted with the optical reader.[1]

1.2 Computer software

Software packages will be used for editing and tabulating. The software is easily adapted to the basic and supplemental questionnaires and permits considerable flexibility in producing tabulations for research as well as for immediate publication.

2. ORGANIZATION OF DATA PROCESSING

Under the arrangement adopted in Popstan, the responsibility for data processing will be shared by the Population and Housing Division and the Data Processing Division as explained in chapter E-4. The Analysis and Planning Section of the Household Surveys Branch of the Population and Housing Division will determine the content of the tabulations. The Processing Unit of that branch will perform whatever manual processing is needed and will develop specifications for data keying, for weighting the data, and for preparing the tabulations. Also, the computer programmers on the staff will prepare the computer edit and tabulation programs using the software that was used in the 1980 Census. The actual keying and computer operations will take place in the Data Processing Division.

Opinions of the NSO staff differed on the desirability of assuming responsibility in the manner described above, especially the assignment of the computer programming to a subject matter staff. For large projects, all computer

[1] *Optical scanning will be carefully tested and processed in a few PSU's. The primary purpose is to evaluate its potential for use in censuses.*

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programming is done in the Data Processing Division so that the limited supply of programmers can be assigned as needed to various projects. Although some efficiencies in the use of programming personnel may thereby be achieved, the programmers are relatively far removed from any specific subject matter, and misunderstandings and inadequate communication frequently occur. In the case of the Household Survey Program, which is a continuing, multi-subject survey, there will be sufficient work to occupy the full attention of several computer systems analysts and programmers. Their location in a technical branch of a subject matter division will facilitate their role as an intermediary between those with principally subject matter expertise and those with a primarily technical orientation.

3. *STAGES IN DATA PROCESSING*

The content requirements of the tabulations should be decided well in advance of the start of data collection, so that the computer programming and other processing planning can proceed. Although sometimes difficult to achieve, it is important to complete the computer programming at least by the time the first actual data are received, in order to avoid serious delays in compiling the results. Testing (often called "debugging") of computer programs is an especially difficult and laborious task. Test decks (simulated survey data) or even pretest results are sometimes used for this purpose. Once the survey is under way, the various data processing operations include the activities described below.

3.1 *Receipt and control*

The basic control over the field work is maintained by the Field Liaison Section of the Household Surveys Branch. This staff makes sure that the necessary forms and questionnaires are received for every assigned survey unit or that a satisfactory accounting is made for missing items. As the check-in is completed, the Household Record Cards and Household Survey Listing Sheets will be filed for subsequent use in the survey. The Population Change Questionnaires will also be filed as these are not tabulated. The remaining questionnaires for each completed sample segment will be transmitted to the Processing Unit for manual processing.

3.2 *Non-interview adjustment*

Although a major, continuing effort will be made to reduce non-interviews, there will be some eligible households for which interviews are not obtained. An adjustment for these cases will be made at the beginning of the processing operation.

This step will be accomplished in the Processing Unit of the Survey Operations Section. Essentially, this will be done by replacing a non-interview unit with an interviewed unit in the same sample segment. In a segment where a non-interview exists, an interviewed unit will be selected manually, at random, and a duplication number of "2" will be entered in a designated place on the questionnaire(s) for that unit. This means that the selected interviewed questionnaires will be keyed and tabulated twice, once for the interviewed household itself and once for the non-interview it is replacing. The reason for making the substitutions in the same segment is that the replacement is more likely to be similar to the non-interviewed unit. If there are several non-interviews in a segment, the replacement procedure will be applied to adjacent segments in order to avoid duplicating a unit more than once. In that situation, it will be necessary to hold back the segment containing the non-interviews until all segments for the same PSU have been manually processed.

Note that the procedure for handling non-interviews differs from the adjustment for non-interviews in Phase II of the 1980 Census. In Phase II, the adjustment was accomplished in

the ratio estimation that established the final weights by inflating the Phase II sample counts to Phase I control totals for each domain (publication area) for 10 age-sex groups. Unlike the Household Surveys, there was no intermediate step to adjust for non-interviews separately from the final ratio estimation factor. It was possible to adjust for non-interviews and coverage simultaneously in 10 age-sex groups in each domain so that differential response was reflected by area, and by two demographic characteristics.

For the Household Surveys, it was decided that the 2-step procedure is preferable because only a single independent estimate will be available (total population). Population estimates will not be available by age groups and sex; neither will totals be available by region. Therefore, the use of a single factor to adjust the weight for every sample case will not reflect differential non-interview and coverage rates in different parts of the country. The NSO decided to adjust for non-interviews in the Household Survey Program on a segment-by-segment basis, but to adjust for coverage at the national level.

Once the non-interview adjustment is completed for a segment, non-interview cases will not be processed further. (Counts will be made later to measure the extent of non-interviews.) The interviewed questionnaires for 10 segments will be grouped into work units for convenience in data processing. Control counts will be maintained for each work unit.

3.3 *Manual editing*

A manual edit of the questionnaires was carried out in the field by crew leaders before the questionnaires were transmitted to the NSO. Hopefully, the most obvious errors will have been caught at that stage and corrected in the field to the extent possible.

No further manual edit will be performed at the processing stage for the basic Economic Activity Questionnaire or the Birth and Death Records. Instead, a computer edit will be made at a subsequent stage. A manual edit may be carried out for some of the supplementary topics where it is not feasible or cost efficient to develop a computer edit.

3.4 *Coding*

Most of the entries on the basic and supplementary questionnaires will be numbers (number of hours worked) or will be recorded by checking pre-coded boxes that can be keyed directly. There are some cases where write-in entries will be made because there is insufficient advance knowledge to set up pre-coded boxes. An example is item 11 of the Economic Activity Questionnaire on reasons leaving last job or business. In the early surveys, this item will be coded manually in the Processing Unit, using a tentative list of categories. After some experience in the first survey or two, it will be possible to set up pre-coded categories for use in the enumeration.

The items on the Economic Activity Questionnaire that will require coding in every survey will be occupation and industry. Detailed codes are wanted for these items to provide flexibility for combining them into different kinds of groupings. Because of the complexity of this coding, quality control will be implemented. The codes will be verified 100 percent and some reasonable production standards will be established. The size of the workload is too small to justify sample verification. The verification will be carried out independently; that is, the codes will be verified by a second group of coders and the results will be compared. Records of errors and production will be kept on each coder so that action can be taken on coders whose work is not acceptable.

Coders who show high-quality work will be designated as "senior" coders and will be given a slightly higher job classification and pay rate. A sample of the work done by the senior coders will be reviewed by the professional staff to determine whether they are maintaining an accepted level of production and quality.

Some coding will also be required for certain of the supplementary inquiries. The requirements will be established as needed.

3.5 *Data keying*

After the coding is completed, the questionnaires will be sent to the Data Processing Division where the information will be keyed. A verification system and production standards will be established for data keying in the same manner as for the keying operation in Phase II of the 1980 Census. Verification will be on a 100-percent basis, rather than a sample. The workload will be relatively small and keying will not be a continuous operation. Since the sample is spread over either 6 months or 3 months, the work units will be permitted to accumulate for a week or so to provide enough work for a few data keyers to be occupied for several days at a time.

3.6 *Computer edit*

After keying is completed, the information will be transferred to computer tape by means of disk-to-tape equipment. An edit will then be performed on the computer, using software packages. A computer edit is far more efficient, and has much greater flexibility, than anything that can be done manually. Errors arising from keying or failure in the disk-to-tape equipment can be detected as well as those attributable to the interviewing or clerical coding. As in Phase I, the computer edit will be aimed at three principal types of errors--omitted items, inconsistency between items, and impossible or improbable entries.

(1) Omissions. Cases where no entry appears where one is required (for example, no entry for hours worked for a person reported as working).

(2) Inconsistencies. Cases where the entries for two or more items do not bear a possible or reasonable relationship to each other (such as where a 12-year old boy is reported as working as a physician).

(3) Impossible entries. Cases where the entries are beyond prescribed limits (for example, a code "3" for sex, where only code "1" for male and code "2" for female are specified).

A diary will be prepared that will show the number and kinds of errors. The diary will be examined by the staff of the Processing Unit and, if the number of errors exceeds the acceptable level, appropriate corrections will be made. In considering corrections, the rule will be to make as few changes as possible in the original data, unless clearly indicated. Corrections will also be based as much as possible on other information on the same questionnaire.

In the case of an omitted, incorrect, or impossible entry that cannot otherwise be resolved, values will be assigned, using the hot deck procedure that was used in Phase II of the 1980 Census. Briefly, it is a method that uses the valid response for the last person in the file with similar characteristics. Stored values are constantly changing and reflect the last valid response to an item.

The decision on whether or not to allocate for missing entries depended on a number of considerations. The simplest procedure is always to provide for a "not reported" category in a distribution. For new topics particularly, a "not reported" category will be desirable. This approach also reveals the true situation to the users. The existence of "not reported" cases is troublesome in data analysis, however, and users are often compelled to make crude allocations on their own. Compromises are possible whereby allocations are made for basic items,

especially where the omission rate is small; whereas, a "not reported" category is permitted in other distributions.

In addition to providing a basis for correction, computer edits will be used to compile statistics on the number and kinds of errors made. These will be useful in guiding training and instructional programs. They may also suggest some desirable changes in questionnaire formats. Error rates will be compiled for individual enumerators; therefore, enumerator identification codes will need to appear on the records. Error rates will be reported to the enumerators so that remedial action can be taken.

3.7 *Weighting and population adjustment*

There is a basic weight for every questionnaire, which is the reciprocal of the sampling ratio (for example, 300 if 1 in 300 units was selected for that part of the sample). These basic weights will be entered in each record.

Adjustment for non-interviews will have been accomplished by entering duplication numbers on selected questionnaires at the beginning of the processing, and thus providing for keying them twice to reflect non-interviews.

Estimates can be prepared by tabulating the file with the basic weights and the allowance for non-interviews. However, improvements in reliability (lower standard errors) will be achieved by certain additional steps, one of which is the so-called population adjustment.

One trait of sample population surveys is that there is likely to be an undercount of the population. Even censuses are subject to that problem, and population surveys do not benefit from the wide publicity and universal canvassing which occur during a census operation. It is also likely that certain population groups will be undercounted more than others. Young, mobile persons are especially likely to be missed. Also, persons living in crowded areas in improvised housing are difficult to enumerate completely. Where such undercounts exist, the sample estimates of employed and unemployed persons, for example, are probably understated. The margin of error is likely to be greater for absolute numbers than for percentage distributions. Differentials in the coverage of various population groups can affect even the percentage distributions, sometimes in unpredictable ways.

One way of reducing this problem is to adjust the sample for undercounting. The Analysis and Planning Section prepares periodic intercensal population estimates in some detail by projecting the census results on the basis of births and deaths and migration since the census date. Although these are also subject to error, they are probably more reliable, and are certainly more consistent, than population estimates obtained directly from the sample. A comparison between the independent population estimates and the sample estimates will be the basis for the adjustment. A sample count will be made by summing the weights in the records. This count will be compared with the independent estimate and an adjustment will be made depending on the margin of difference. For example, if the total sample estimate falls 5 percent below the independent estimate, all of the basic weights will be increased by 5 percent. (Refer to chapter E-3 for more detail.)

This type of adjustment will be made for the population as a whole. A better procedure (assuming that independent estimates are prepared in this detail) would be to perform the adjustment separately for each of a set of age-sex groups (perhaps 10-year age groups). In this way, the effect of differential coverage of the various groups in the survey can be minimized. It should be noted that this step, like the non-interview adjustment, only serves

to reduce rather than eliminate the biases of undercoverage. It cannot be safely assumed that persons who are interviewed are precisely similar to those who are missed, even within the same demographic groups.

These various stages of weighting (non-interview adjustment, assignment of the basic weights, and population adjustment) can be accomplished efficiently and precisely on the computer. There will be some benefit, however, in carrying out these steps at the pre-computer stages in the early surveys, while the merits of various alternative estimation procedures are being considered. At a later time, the NSO will convert entirely to a computerized process to accomplish all the adjustments.

3.8 *Recoding*

In the course of the computer edit, it will also be possible to achieve any necessary recoding. One form of recoding is to reduce a long distribution of values into a shorter number of groupings. For example, the actual age of each person appears on the record. The tabulations, however, will generally call for a grouping of ages, such as 5-year age groups. The computer program will insert an additional code (recode) on the record indicating the 5-year group in which the person's age falls. Recoding consistent with the tabulation requirements will significantly simplify the programming of the tables.

A particularly important recode for the intercensal program will be the economic activity recode. On the basis of the concepts used, and the entries in a number of items on the Economic Activity Questionnaire, a determination will be made as to whether the person is employed, unemployed, or not in the labor force. The recode for employed persons will distinguish between (a) persons at work and (b) persons temporarily absent from their jobs. The unemployed will be divided into (a) persons looking for work and (b) those who would be looking but they feel no jobs are available. Persons not in the labor force will be classified by their principal activity--own housework, going to school, unable to work, and other.

3.9 *Tabulation*

The final step will be to use the edited and recoded computer tapes to prepare the various tabulations that have been specified. In addition to the publication tables, a number of detailed tabulations will be generated for research purposes. The computer software that Popstan will use makes it possible to produce many tables at relatively low cost.

The tabulations will be transmitted to the Analysis and Planning Section for critical review and analysis. Tabulations needed for computation of sampling variances will be made from time to time on the basis of specifications prepared by the Sampling Unit.

Generally, tabulations will be made at the completion of a survey. However, when the surveys are on a semi-annual basis, quarterly tabulations will be provided so that early assessments can be made of the validity of the results.

4. *CONTROLS*

For both quality control and operational control, the procedures and the forms will be similar to those used in the 1980 Census. One of the main differences is that the Household Survey Program is spread over a half-year or a quarter of the year. There will be time to follow-up on errors or problems that occur in the early weeks of the program.

4.1 *Quality control*

Manual coding and data keying will be verified 100 percent since the workload is too small to make sample verification practicable.

Records of errors will be kept so that persons doing poor work can be identified; they will be either retrained or assigned to other work.

To check the computer edit and tabulation program, live data from the first few weeks will be used. Results compiled manually will be compared with the computer results.

4.2 *Operational control*

Control of materials to and from the field and within organizational units in the NSO will be handled very carefully. Throughout the data processing, control counts will be maintained by work unit to ensure that all the segments and all the units in the sample are processed.

Chapter E-7. PUBLICATION, ANALYSIS, AND USE OF DATA

1. PUBLICATION POLICY

The final step of the survey process is the review and analysis of the data and the issuance of the statistics to users through various publications or other means. In a current program, timeliness in the publication of results is an obvious need. Release of the data in the Popstan surveys will not be made hurriedly, however, before there is reasonable assurance that identifiable errors have been found and corrected to the extent possible. Careful review will be especially necessary in the early stages of the survey program and when new subject matter is being introduced.

In issuing the results of the surveys, the NSO will follow the policy of the Ministry of Economy.[1] The publications will be as factual and objective as possible and will steadfastly avoid subjective interpretations that can be construed as biased or politically motivated. Enough information will be provided for an understanding of the data and of significant developments which have occurred. The statistics supporting the textual presentation will be provided in as much detail as warranted by considerations of reliability. Any available information on reliability, especially but not restricted to sampling variances, will be included. Brief technical descriptions of the survey operation will be provided, as well as a discussion of the concepts that are used and a statement on comparability with the 1980 Census. More detailed documentation will be available in separate publications.

[1] *This policy does not apply to data collected in pretests.*

2. TECHNICAL REVIEW

The responsibility for review and analysis of the results rests with the Analysis and Planning Section of the Household Surveys Branch (see chapter E-4), although other technicians will assist with certain aspects (such as nonresponse and sampling problems). The first step will involve a technical review of the results. This step can be distinguished from quality control, which is concerned with the accuracy of the various operations as they occur. Technical review is concerned with the validity of the findings after all previous stages have been completed. Some aspects of the technical review follow.

2.1 Non-interview rates

Information will be compiled each time on the proportion of eligible households which were not interviewed, with separate measures for each area down to the primary sampling unit (PSU) level. Although an adjustment procedure will be followed in these instances, non-interview rates exceeding 5 to 10 percent can result in considerable biases in the data. It will be too late, at this point, to take remedial action for purposes of the immediate statistics. However, steps will be taken to (a) explore the reason certain enumerators (as indicated by the rates in their PSU's) are failing to complete their assignments satisfactorily and (b) avoid a continuation of reporting high non-interview rates. Discussion of the extent of non-interviews and how they are handled in the data processing will be included in the publications, with appropriate cautions appended, as necessary.

PREVIOUS PAGE BLANK

2.2 *Population coverage*

Where population adjustments are used, information will also be available on the ratios of the sample results to the independent population estimates for the various age-sex groups. When the deficiencies are large in general or when they vary greatly among groups, further exploration is indicated. One action will be to re-examine the validity of the independent estimates themselves. If there are no serious defects in the independent estimates, consideration will be given to ways of reducing this difference in future surveys. Information on undercoverage of the population revealed by the re-interview program will be helpful in this respect. Some discussion of this matter will be covered in the technical sections of the publications, with any inferences as to the possible effect of population undercoverage on the statistics.

2.3 *Non-response items*

The computer edit will provide data on the extent of omissions, inconsistencies, or other errors in various questionnaire items. Where unusual numbers of errors are indicated, an investigation will be made of possible defects in the computer edit program. If the error rates are substantiated, consideration will be given to the suppression of certain items (with appropriate footnote explanation) in the publication tables or to the retention of a "not reported" category instead of allowing allocations.[2] Efforts to avoid repetition of the problem in future surveys will be made through special instruction or additional training. Continuing problems with certain questionnaire items may also indicate the need for review and possible revision of the question wording or questionnaire format.

2.4 *Internal validity checks*

Once the tabulations are completed, one of the first steps will be to review them from the standpoint of internal validity. Certain patterns are expected on the basis of common-sense judgments or other data in the subject field. Examples are the expected variations in labor force participation, unemployment among different age-sex groups, or the occupational and industrial distribution of male compared with female workers. In subsequent periods, an examination will be made of changes from the previous survey (allowing for the expected seasonal pattern) or from the previous year, considering the rates of change that might reasonably occur.

2.5 *External validity checks*

Comparisons will also be made with various sources external to the survey, such as the census, data from business establishment surveys, social insurance records, etc. In these comparisons, appropriate allowances will be made for conceptual differences, variations in data collection methods, and differences in timing.

2.6 *Procedure in case of wide differences*

When wide differences are observed in the course of internal or external checks, an examination will be made of the possibility of failings in the computer programs or even some consistent errors made in coding or other manual operations. Although this may be rare, it may even be possible sometimes to detect a consistent and correctable error made by an individual enumerator. When operational errors are found, they should be corrected to the extent possible,

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[2] *A continuing survey differs from the census in this respect. In a census, the final format of the tables must be determined well in advance of the data processing if the census results are to serve the needs of users. In Popstan's surveys, which are spread throughout the survey period, preliminary results can warn the staff of high non-response rates and other problems.*

even if this requires some delay in publication. A preliminary report may be issued, omitting those parts subject to correction. If no evident errors are found, the original data will be issued but some references to unusual patterns will be included in the text.

3. *ELEMENTS OF A TYPICAL PUBLICATION*

Once the technical review is completed, the next steps will be to complete the data analysis (in terms of the subject matter implications of the survey results) and to prepare the various planned publications. The NSO researched many different kinds of publications and styles of presentation and set up the following elements as the framework for a typical report.

3.1 *Summary of findings*

The publication will begin with a summary of major developments, including the changes from the previous period or from earlier surveys. Summary text tables will be helpful in this context. An example of such a table for an employment status report is given in figure E-7a. Note that the time periods in figures E-7a to E-7d are not consistent. Different dates are used simply for illustration.

3.2 *Detailed analysis*

The summary would be followed by more detailed analysis, which explores various aspects of the subject in greater depth. For example, in an employment status report, there will probably be a detailed section on unemployment. Included will be text tables, similar to the table shown in figure E-7b.

3.3 *Definitions and explanations*

This essential section will cover a number of points. First, there will be a brief description of the survey operation, the size and distribution of the sample, etc., with references to other publications where more detail may be found. Second, the basic concepts and definitions and other terms used in the publications will be explained in a concise manner. Finally, available information bearing on the validity of the results will be included, such as sampling variances, level of non-response, and other known sources of error.

3.4 *Detailed tables*

The report will conclude with a set of detailed tables. In addition to absolute numbers, these will include various derived figures helpful in making comparisons, such as percent distributions, ratios of one element to another, etc. The detail shown will generally be limited to statistics with a stated minimum level of reliability (in terms of sampling variances). Sometimes, a few figures that fall below that standard might be included in order to round out a distribution. It will be useful, in such instances, to identify these estimates (such as

Figure E-7a. ILLUSTRATIVE TEXT TABLE OF SUMMARY DATA

Table A. ECONOMIC ACTIVITY AND SEX, FOR CIVILIANS 12 YEARS OR OLDER: 1983 AND 1982

Economic activity and sex	1983	1982	Percent change
Both sexes.....			
In labor force.....			
Percent of total civilians.....			
Employed.....			
In agriculture.....			
In non-agricultural industries.....			
Unemployed.....			
Percent of labor force.....			
Not in labor force.....			
Male..... *(Repeat)*			
Female..... *(Repeat)*			

by asterisks) that are based on fewer than a minimum number of sample cases. Illustrations of the kinds of detailed tables that will be included in an employment status report are shown in figure E-7c. Note that these do not comprise a comprehensive set of tables for a report on employment. They are merely illustrative of the kinds of tables to be shown.

3.5 *Graphs and charts*

The use of graphs and charts will be very helpful in the exposition of a given subject and will add interest and variety to the presentation. Trend graphs are quite effective in depicting changes over time. Bar charts constitute a good method of comparing different groups, such as the unemployment rates for different regions. Pie charts are useful in illustrating the components of a total, such as the broad occupational make-up of the employed. Sketches of these types of graphs and charts appear in figure E-7d.

4. *GUIDELINES IN PREPARING ANALYTICAL TEXT*

The NSO set up some guidelines for the subject specialists to follow when they prepare the analytical texts. The objective is to produce reports that will be consistent in presentation.

(1) Writing style. Write clearly and concisely. Write for the general reader (including the policy maker)--not the technician.

(2) Description of numbers. Avoid lengthy recitations in the text of the numbers which appear in the tables. Cite only those necessary to the exposition. The charts and tables will more clearly depict the details.

(3) Limitations of analysis. Do not press the analysis beyond the level of validity of the statistics, even if convinced that certain facts or relationships are true. Be forthright in conceding the limitations of the data and do not make distinctions that are not supported by the data.

(4) Objectivity in conclusions. Be objective in reaching conclusions and be sure they are based on factual evidence and not on interpretations that can be seriously questioned.

5. *USES OF DATA*

Although the rationale can be readily given for collecting various kinds of statistics, it is more difficult to ascertain how the data are actually used, once they are compiled and disseminated. Inquiries on this subject addressed to regular recipients of statistical data often bring only very general and imprecise replies. On the assumption that statistics are informative and even educational, the act of dissemination itself may represent an important use, involving not only the official publications but secondary sources such as newspaper and radio accounts and speeches by authorities. The fact that statistics may affect individual action may be demonstrated by the often erratic behavior of commodity markets in response to the issuance of favorable or adverse economic data. Since most statistics reflect situations that are beyond the scope of individual action, however, it is likely that their influence will be mainly on government action and policy making.

There is no question that a comprehensive and accurate body of statistics is invaluable in helping to shape government policy. It is important to recognize the limitations of statistical data, however, in this and other respects. The attempted use of statistics to "trigger" immediate government action can be an especially hazardous undertaking. For example, there have sometimes been efforts to target certain actions to take place when a crucial statistic such as the unemployment rate reaches a certain level, perhaps cutting off immigration or creating an emergency pool of public jobs. Since unemployment fluctuates

widely, and survey data are subject to appreciable sampling variation and other measurement problems, such precipitous actions can be ill-advised and unnecessary. A better choice would be to monitor employment developments carefully and to gradually apply measures needed to stop clearly adverse trends. Some general indications of the types of uses for the range of statistics embodied in Popstan's Household Survey Program are described below.

5.1 *Employment and income*

A clear-cut use will be the monitoring of these data by the agency responsible for economic planning and development. The data will be converted into a set of meaningful indices, with adjustments for seasonality and other types of deviations. These measures will be made available both to the public and to policy makers, with a discussion of their possible implications for suitable action. Sometimes, after careful study over time, certain indices may be identified as "leading indicators"; that is, predictors of future economic trends. This type of analysis, although it must proceed cautiously, can be especially useful for policy purposes.

Aside from the matter of economic trends, the employment status inquiries embrace a wide body of useful statistics for policy purposes. Concentration of unemployment or underemployment in certain areas or among certain classes of the population can exhibit the need for pinpointing remedial action where most essential. The existence of an experienced labor reserve in certain sectors can guide economic development, whereas its lack can reveal the need for educational and training programs.

The data on income, both in money and in non-money terms, provide the best measure of economic well-being. The extent to which the fruits of economic growth and development are being equitably distributed among the population will be exhibited by these statistics. The existence of pockets of extreme poverty and the extent to which the program is responding to government action will be important guideposts in shaping future policy.

5.2 *Health needs*

Certain important evidences of health needs will be available from supplementary inquiries for those agencies responsible for health matters. Most immediate will be indications of failure in the immunization program, which should stimulate action at various levels to avert the danger of epidemics. Indications of the lack of use of health services and facilities by certain population groups or in certain geographic regions should stimulate investigations as to whether this is due to lack of adequate facilities, ignorance of the importance of preventive care, economic limitations, or other causes. The results of such investigations will presumably provide guidelines for government policy and action. Similarly, clear evidences of nutritional inadequacies will stimulate the kind of detailed examination needed to shape remedial programs.

5.3 *Schooling and literacy*

The school enrollment statistics will reveal the success of government programs to promote universal education, at least at the elementary level, and guide investigations by authorities into the reasons children are being held out of school. The slow effort to reduce and eventually eradicate the widespread problem of illiteracy in Popstan will be monitored through the survey.

5.4 *Housing*

Although the resources to solve the immense problem of providing adequate housing for the entire population may not be attainable until well into the future, the survey will identify the worst elements and the most

pressing needs. The survey will guide efforts to reduce extreme hardship, especially with respect to crowding or lack of sanitary facilities. The impact of specific building programs, and the extent to which these efforts are reaching the intended recipients, will be examined.

5.5 *Migration*

The migration statistics, especially the data on rural and urban flows, will provide systematic information on this seemingly uncontrollable trend. These data will assist in the estimation of resources needed to accommodate particularly the rural-to-urban flow and the estimation of counter measures needed to reduce or control the flow.

5.6 *Population policy*

The vital statistics and natality data will be crucial in developing accurate population estimates and forecasts needed to assess the impact of population pressures on economic growth. At the same time, the survey data will assist efforts to improve the birth and death registration systems needed to pinpoint population changes at the local level.

Figure E-7b. ILLUSTRATIVE TEXT TABLE OF DETAILED DATA

TABLE B. UNEMPLOYMENT RATES BY AGE AND SEX, FOR CIVILIANS 12 YEARS OR OLDER, URBAN AND RURAL: 1981 TO 1983

	TOTAL			URBAN			RURAL		
AGE AND SEX	1983	1982	1981	1983	1982	1981	1983	1982	1981
BOTH SEXES									
12 TO 14 YEARS									
15 TO 19 YEARS									
20 TO 24 YEARS									
25 TO 34 YEARS									
35 TO 44 YEARS									
45 TO 54 YEARS									
55 TO 64 YEARS									
65 YEARS OR OLDER									
MALE . . . . . *(Repeat)*									
FEMALE . . . . . *(Repeat)*									

Figure E-7c. ILLUSTRATIVE DETAILED TABLES

TABLE 1. ECONOMIC ACTIVITY BY AGE AND SEX, FOR CIVILIANS 12 YEARS OR OLDER: FIRST HALF 1984

ECONOMIC ACTIVITY AND SEX	TOTAL	AGE							
		12 TO 14 YEARS	15 TO 19 YEARS	20 TO 24 YEARS	25 TO 34 YEARS	35 TO 44 YEARS	45 TO 54 YEARS	55 TO 64 YEARS	65 OR OLDER
BOTH SEXES									
IN LABOR FORCE									
PERCENT									
EMPLOYED									
IN AGRICULTURE									
IN NON-AGRICULTURAL INDUSTRIES									
UNEMPLOYED									
PERCENT OF LABOR FORCE.									
NOT IN LABOR FORCE									
HOMEMAKER									
STUDENT									
OTHER									
MALE . . . . . *(Repeat)*									
FEMALE . . . . . *(Repeat)*									

TABLE 2. ECONOMIC ACTIVITY BY SEX AND GEOGRAPHIC AREA, FOR CIVILIANS 12 YEARS OR OLDER: FIRST HALF 1984

ECONOMIC ACTIVITY AND SEX	TOTAL	REGION				METROPOLITAN AREA	
		SAMCHOK	GOLD COAST	WESTERN	ATLI-FICA	ST. REGIS	TANGA
BOTH SEXES							
IN LABOR FORCE							
PERCENT							
EMPLOYED							
IN AGRICULTURE							
IN NON-AGRICULTURAL INDUSTRIES							
UNEMPLOYED							
PERCENT OF LABOR FORCE . . .							
NOT IN LABOR FORCE							
HOMEMAKER							
STUDENT							
OTHER							
MALE . . . . . *(Repeat)*							
FEMALE . . . . . *(Repeat)*							

Figure E-7c. ILLUSTRATIVE DETAILED TABLES--Continued

TABLE 3. MAJOR OCCUPATION GROUP BY SEX, FOR EMPLOYED CIVILIANS 12 YEARS OR OLDER: FIRST HALF 1984

MAJOR OCCUPATION GROUP	NUMBER OF PERSONS			PERCENT		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
EMPLOYED CIVILIANS				100.0	100.0	100.0
PROFESSIONAL, TECHNICAL, AND RELATED WORKERS						
ADMINISTRATIVE AND MANAGERIAL WORKERS .						
CLERICAL AND RELATED WORKERS						
SALES WORKERS						
AGRICULTURAL, ANIMAL HUSBANDRY, AND FOREST WORKERS; FISHERS AND HUNTERS . .						
MINERS AND QUARRY WORKERS						
VEHICLE OPERATORS						
CRAFT WORKERS AND OPERATORS						
IN MANUFACTURING						
IN CONSTRUCTION						
IN OTHER INDUSTRIES						
PERSONAL SERVICES AND RELATED WORKERS .						
LABORERS						
OTHER WORKERS						
NOT REPORTED						

TABLE 4. MAJOR INDUSTRY GROUP BY SEX, FOR EMPLOYED CIVILIANS 12 YEARS OR OLDER: FIRST HALF 1984

MAJOR INDUSTRY GROUP	NUMBER OF PERSONS			PERCENT		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
EMPLOYED CIVILIANS				100.0	100.0	100.0
FARMING, FORESTRY, FISHING, HUNTING . .						
MINING, QUARRYING						
MANUFACTURING						
ELECTRICITY, GAS, WATER						
CONSTRUCTION						
WHOLESALE OR RETAIL TRADE						
TRANSPORTATION, STORAGE, COMMUNICATION .						
FINANCING, BUSINESS SERVICES						
PUBLIC ADMINISTRATION						
SOCIAL OR PERSONAL SERVICES						
NOT REPORTED						

TABLE 5. NUMBER OF HOURS WORKED IN AGRICULTURE AND NON-AGRICULTURAL INDUSTRIES DURING SURVEY WEEK BY SEX, FOR EMPLOYED CIVILIANS AT WORK: FIRST HALF 1984

HOURS WORKED	EMPLOYED IN AGRICULTURE			EMPLOYED IN NON-AGRICULTURAL INDUSTRIES		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
EMPLOYED CIVILIANS . .						
1 TO 14 HOURS						
15 TO 24 HOURS						
25 TO 34 HOURS						
35 HOURS						
36 TO 44 HOURS						
45 TO 59 HOURS						
60 TO 74 HOURS						
75 HOURS OR MORE						
AVERAGE (HOURS)						

Figure E-7c. ILLUSTRATIVE DETAILED TABLES--Continued

TABLE 6. WEEKLY EARNINGS BY SEX, FOR WAGE AND SALARY WORKERS IN AGRICULTURE AND NON-AGRICULTURAL INDUSTRIES: FIRST HALF 1984

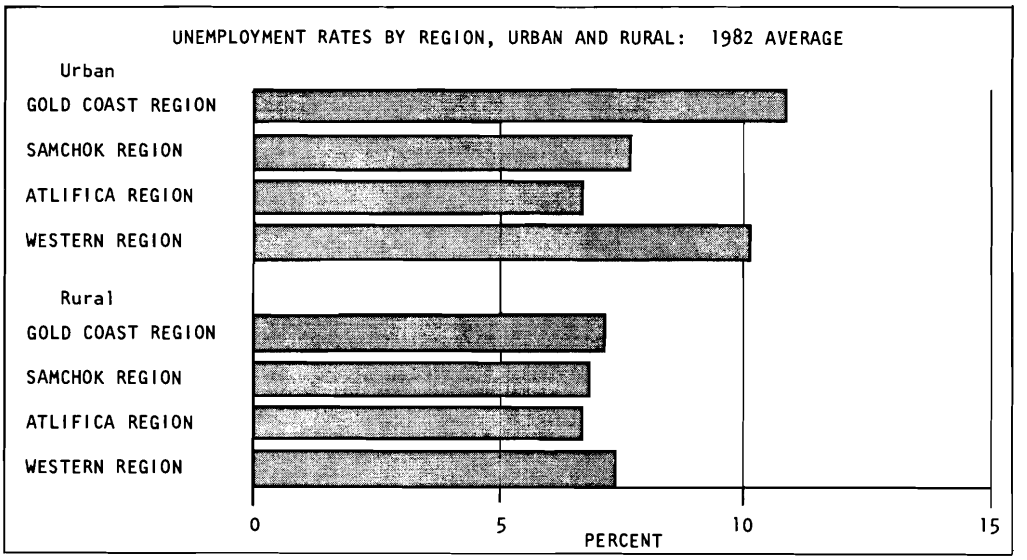
WEEKLY EARNINGS	EMPLOYED IN AGRICULTURE						EMPLOYED IN NON-AGRICULTURAL INDUSTRIES					
	NUMBER OF PERSONS			PERCENT			NUMBER OF PERSONS			PERCENT		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
TOTAL				100.0	100.0	100.0				100.0	100.0	100.0
NO MONEY EARNINGS.												
UNDER 5 GOLDARS .												
5 TO 9 GOLDARS . .												
10 TO 14 GOLDARS .												
15 TO 19 GOLDARS .												
20 TO 24 GOLDARS .												
25 TO 34 GOLDARS .												
35 TO 44 GOLDARS .												
45 TO 59 GOLDARS .												
60 OR MORE												
AVERAGE (GOLDARS).												

TABLE 7. DURATION OF UNEMPLOYMENT BY SEX, FOR UNEMPLOYED CIVILIANS, URBAN AND RURAL: FIRST HALF 1985 AND 1984

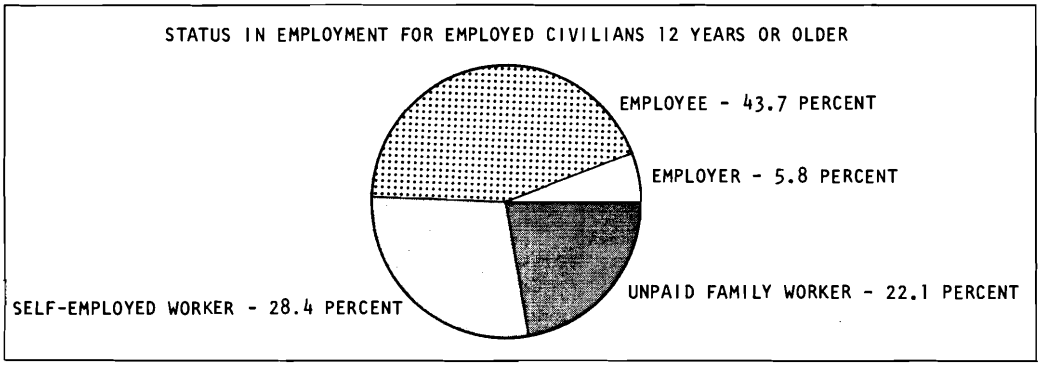
DURATION OF UNEMPLOYMENT AND RESIDENCE	FIRST HALF 1985			FIRST HALF 1984		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
UNEMPLOYED PERSONS						
1 WEEK OR LESS						
2 WEEKS						
3 WEEKS						
4 WEEKS						
5 TO 7 WEEKS						
8 TO 10 WEEKS						
11 TO 14 WEEKS						
15 TO 26 WEEKS						
27 TO 52 WEEKS						
53 WEEKS OR MORE						
AVERAGE (WEEKS)						
URBAN . . . . . *(Repeat)*						
RURAL . . . . . *(Repeat)*						

Figure E-7d. ILLUSTRATIONS OF GRAPHS AND CHARTS

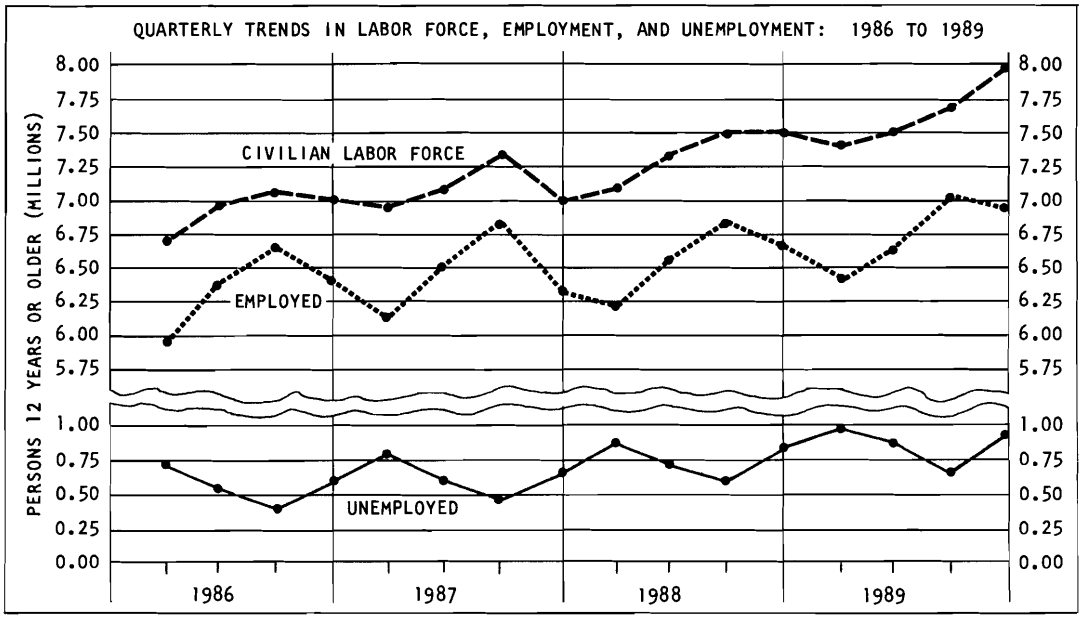
BAR CHART



PIE CHART



TREND GRAPH



APPENDIX

Exhibit E-2-1. HOUSEHOLD RECORD CARD

FORM PHS-300 (OCTOBER 1983)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

HOUSEHOLD RECORD CARD
POPSTAN HOUSEHOLD SURVEY

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation

a. Province
b. District
c. Barrio/village
d. Place

RESIDENCE		SEGMENT		UNIT	
1. Stratum code	2. District	3. Rotation, quarter, week	4. Control Card No.	5. Unit serial No.	6. HRC No.

7a. ADDRESS *(House No., Street, Apt. No., and other identification)*

7b. What is your mailing address? *(Ask if above address is not adequate for mailing)*

7c. FOR COLLECTIVE QUARTERS ONLY:
Name of place
Type

ASK IN SURVEY PERIOD INDICATED

(Circle Y – Yes or N – No)

	Survey period number 1	2	3	4
(If address in item 7a identifies single-unit structure) 8a. Are there any occupied or vacant living quarters besides your own on this floor? or on any other floor of this building? If "Yes," and the quarters are a separate housing unit, refer to Household Survey Listing Sheet, Form PHS-303; if not on Listing Sheet, enumerate as an additional unit.	Y N	Y N	Y N	Y N
(If address in item 7a identifies entire floor or part of a floor) 8b. Are there any occupied or vacant living quarters besides your own -- If entire floor -- on this floor? If part of floor -- in the . . . of this floor? If "Yes," and the quarters are a separate housing unit, refer to Household Survey Listing Sheet, Form PHS-303; if not on Listing Sheet enumerate as an additional unit.	Y N	Y N	Y N	Y N
(Ask at all units except apartment houses) 9. Is there any other building on this property for people to live in -- either occupied or vacant? If "Yes," and the quarters are a separate housing unit, refer to Household Survey Listing Sheet, Form PHS-303; if not on Listing Sheet and quarters should be in sample, enumerate as an additional unit.	Y N	Y N	Y N	Y N

23. TYPE OF LIVING QUARTERS
1 ☐ Conventional HU
2 ☐ Improvised HU (makeshift shelter of waste materials, barn, cave, warehouse, etc.)
3 ☐ Mobile HU (tent, boat, wagon, etc.)
4 ☐ Collective quarters – *Specify in 7a. Omit 24–26.*

24. NUMBER OF HOUSING UNITS IN THIS HOUSE (BUILDING)
1 ☐ 1 unit, detached
2 ☐ 1 unit, attached
3 ☐ 2 to 4 units
4 ☐ 5 to 9 units
5 ☐ 10 units or more

25. ROOMS
How many rooms are in this unit? . . . . . Number

26. TENURE
Is this unit owned by someone living in it or is it rented?
OCCUPIED:
1 ☐ Owned or being bought
2 ☐ Rented for cash
3 ☐ Rent free or other arrangement
4 ☐ VACANT

27. TELEPHONE
Does this unit have a telephone?
1 ☐ Yes → Telephone number
2 ☐ No

28. CROPS
Does any member of this household produce crops on his/her own account on a total area of ¼ hectare or more?
1 ☐ Yes 2 ☐ No

29. LIVESTOCK AND POULTRY
Does any member of this household keep any farm animals (livestock) or have 20 or more fowl -- chickens, turkeys, ducks, etc.?
1 ☐ Yes 2 ☐ No

Line No. (Circle Line No. of resp.) (10)	NAME (family name first) (11)	RELATIONSHIP TO HOUSEHOLD HEAD (12)	HOUSEHOLD MEMBER (13)	SEX (14)	What is . . . 's date of birth? (15a) Day	(15b) Mo.	(15c) Year	AGE LAST BIRTHDAY (16a)	(16b)	Month and year of age change (16c)	MARITAL STATUS (17)	CHANGES IN HOUSEHOLD COMPOSITION Line No.	Date of change	(18)
1			Y N	M F								1		
2			Y N	M F								2		
3			Y N	M F								3		
4			Y N	M F								4		
5			Y N	M F								5		
6			Y N	M F								6		
7			Y N	M F								7		
8			Y N	M F								8		
9			Y N	M F								9		
10			Y N	M F								10		
11			Y N	M F								11		
12			Y N	M F								12		

What are the names of all other persons who are living or staying here?
List all persons staying here and all persons who usually live here who are absent.
Be sure to INCLUDE infants under 1 year of age.

FOR PERSONS WITH "YES" IN ITEM 13

(Circle Y – Yes or N – No)
(Circle M – Male or F – Female)
(Enter in numerals)
Enter age as of last birthday. If under 1 year of age, enter "0."
(Enter in numerals)
(M, D, S, W, or NM)
(Fill at second or later survey period. On appropriate line, enter the month and year a person was added to or left the household and the reason for the change; for example, moved to Victoria in May 1982.)

(ASK EACH SURVEY PERIOD)

	19a. (Circle Y – Yes or N – No)	19b. (Circle Y – Yes or N – No)	20. SURVEY PERIOD No.	Date of interview Day	Mo.	Year	21a. Tally of visits	21b. Noninterview reason
19a. I have listed (Read names in item 11) Is there anyone else staying here, including any new babies? *(If "Yes," add name to household)*								
19b. Have I missed anyone who usually lives here but is temporarily away on business? in a hospital? or on a visit or vacation? *(If "Yes," add name to household)*	Y N	Y N	1					
	Y N	Y N	2					
	Y N	Y N	3					
	Y N	Y N	4					

22. COMMENTS

NOTES

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Exhibit E-2-2. ECONOMIC ACTIVITY QUESTIONNAIRE

FORM PHS-601
(OCTOBER 1983)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

Form _____ of _____ forms

ECONOMIC ACTIVITY

POPSTAN HOUSEHOLD SURVEY

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period (Item 20)	b. Stratum code (Item 1)	c. District (Item 2)	d. Rotation, quarter, week (Item 3)	e. Control Card No. (Item 4)	f. Unit serial No. (Item 5)	g. HRC No. (Item 6)	FOR OFFICE USE ONLY: Interview completion status

h. Interview completion status

1 ☐ Interview completed → Line No. of respondent _____

☐ Noninterview → Person supplying information _____

Check reason below

TYPE A

2 ☐ No one home at time of call
3 ☐ Temporarily absent for a period of time
4 ☐ Refusal
5 ☐ Other – occupied *(Specify)* _____

TYPE B

6 ☐ Vacant – regular
7 ☐ Vacant – unfit
8 ☐ Vacant – under construction, not ready
9 ☐ Vacant – temporarily used for business or storage

TYPE C

☐ Demolished
☐ House, tent, trailer, etc., moved from site
☐ Permanent business or storage

OTHER *(Specify)* →

_____

_____

i. Family name of head

j. Interviewer's name | No.

k. Date of present interview

FOR OFFICE USE ONLY

HOUSING DATA (From HRC)	
l. Type of living quarters (Item 23)	
m. Number of units in structure (Item 24)	
n. Rooms (Item 25)	
o. Tenure (Item 26)	
HOUSEHOLD DATA (Determine from HRC Items 10–18)	
p. Number of persons in household (1) Total	
(2) Related to head	
q. Number of unmarried children under 18 (1) Related to head (including own children)	
(2) Own children of head	
r. Type of family nuclei	

INDIVIDUAL PERSONAL CHARACTERISTICS (From HRC for persons under 12 years of age)

s. Line No. (Item 10)	t. Relationship (Item 12)	u. Sex (Item 14)	v. Age last birthday (Item 16)	w. Marital status (Item 17)

Notes

Exhibit E-2-2. ECONOMIC ACTIVITY QUESTIONNAIRE--Continued

NOTE: Complete for each person 12 years or older.

a. HRC Line number	b. Name of this person	c. Relationship	d. Sex	e. Age	f. Marital status

1. What was . . . doing most of last week?
1 ☐ Working *(Skip to 12)*
2 ☐ Own housework
3 ☐ Going to school
4 ☐ Something else *(Specify)* _____

2. Did . . . do any work at all last week not including own housework?
1 ☐ Yes *(Skip to 12)*
2 ☐ No

3. Even though . . . did not work last week, did he/she have a job or business?
1 ☐ Yes
2 ☐ No *(Skip to 5)*

4. Why was . . . absent from work last week?
1 ☐ Own illness
2 ☐ Bad weather
3 ☐ Vacation
4 ☐ Labor dispute
5 ☐ Personal reasons
} *(Skip to 13)*
6 ☐ Waiting to start new job *(Skip to 10)*
7 ☐ Seasonal factors
8 ☐ Temporarily laid off (less than 30 days)
9 ☐ Indefinite layoff (30 days or more)
0 ☐ Other *(Specify)* _____

5. Has . . . done anything to look for work during the past 4 weeks?
1 ☐ Yes
2 ☐ No *(Skip to 7)*

6. How many weeks has . . . been looking for work/laid off?
_____ Weeks

7. Is there any particular reason . . . could not take a job at this time?
1 ☐ Yes
2 ☐ No *(Skip to 9)*

8. What is . . .'s reason for not taking/looking for a job at this time?
1 ☐ Believes no work available
2 ☐ Illness
3 ☐ Family responsibilities
4 ☐ Attending school
5 ☐ On vacation
6 ☐ Waiting to go back to old job
7 ☐ Does not want job
8 ☐ Unable to work
9 ☐ Other *(Specify)* _____

9. Does . . . intend to look for work within the next 12 months?
1 ☐ Yes – definitely
2 ☐ Yes – possibly
3 ☐ No

10. When did . . . last work at a job or business?
_____ Month and year
0000 ☐ Never worked *(End interview for this person)*

11. Why did . . . leave this job or business?
_____
_____
_____
_____ ☐☐
(Skip to 17)

12. How many hours did . . . work last week at all jobs not including own housework?
_____ Hours
(If 35 hours or more, skip to 17)

13. Does . . . usually work 35 hours or more a week at all jobs?
1 ☐ Yes *(Skip to 16)*
2 ☐ No

14. Would . . . prefer to work 35 hours or more per week?
1 ☐ Yes
2 ☐ No

15. Is there any reason . . . could not work 35 hours or more a week at this time?
1 ☐ Yes
2 ☐ No *(Skip to 17)*

If codes 1 through 5 in question 4, skip to 17.

16. What is the reason . . . worked less than 35 hours last week?
1 ☐ Illness
2 ☐ Bad weather
3 ☐ Holiday
4 ☐ Did/does not want full-time work
5 ☐ Could only find part-time work
6 ☐ Labor dispute
7 ☐ Too busy with housework, school, personal business
8 ☐ New job started during week
9 ☐ Other *(Specify)* _____

17. What was . . .'s principal job last week/last job?
_____
_____ ☐☐

18. In what kind of business or industry is/was this principal job?
_____
_____ ☐☐

19. For this principal job was . . . –
1 ☐ **An employee of private company or business?**
2 ☐ **A government employee – National or local?**
3 ☐ **An employer with paid employees?**
4 ☐ **A self-employed or own-account worker?**
5 ☐ **An unpaid worker in family farm or business?**
6 ☐ **In the Armed Forces?**

20. How much does/did . . . usually earn in a week at all jobs (before deductions)?
_____ Goldars
99999 ☐ Pay in kind only

Exhibit E-2-3. POPULATION CHANGE QUESTIONNAIRE

FORM PHS-602
(OCTOBER 1988)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

Interviewer's name

Date of present interview

POPULATION CHANGE
POPSTAN HOUSEHOLD SURVEY

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.	h. Date of previous interview

Section A – DEATHS

INTERVIEWER: Refer to item 18 of Household Record Card.

1. Indicate whether any persons who were household members in previous interview are no longer living in this unit. Check appropriate box below. Line No. refers to item 10 on Household Record Card.

☐ One or more household members no longer living in this unit — Line Nos.: ___ ___ ___ ___ ___ *(Go to item 2a)*

☐ Entire household moved *(Go to item 2b)*

☐ All household members in previous interview still living in this unit *(Skip to item 3a)*

INTERVIEWER: Ask separately for each person identified by Line Nos. listed above:

2a. What is the reason . . . is no longer living in this unit? *Fill appropriate boxes.*

2b. According to my records, the *(give name)* **household was living in this unit on (date in item h). Can you tell me if any of the members of that household died while they were still residents of this unit?** *Fill appropriate boxes.*

Died while still resident of this unit– Line Nos.: ___ ___ ___ ___ ___

Left for other reasons– Line Nos.: ___ ___ ___ ___ ___

Do not know – Line Nos.: ___ ___ ___ ___ ___

INTERVIEWER: Find out and enter in "Notes" names and addresses of anyone who might know about these persons.

3a. (Aside from . . . (deceased in item 2) Was there anyone who lived in this unit at any time since (date in item h) and has died, including infants?

☐ Yes – – one or more died → Name ___ → ☐ Resident of this unit OR ☐ Visiting here – – had usual residence elsewhere

Name ___ → ☐ Resident of this unit OR ☐ Visiting here – – had usual residence elsewhere

☐ No

3b. When . . . died, was he/she a resident of this unit, or was he/she just visiting here?

Section B – BIRTHS

INTERVIEWER: Refer to item 15 of Household Record Card.

4. Indicate whether there were any children born after the date in item h, above.

☐ One or more children born since (date in item h), still living → Line Nos.: ___ ___ ___

☐ No children born since (date in item h)

5. **Did any of the women 12 to 49 years old who are now members of this household** *(read names)* **give birth to a live child since (date in item h) and the child has died?**

☐ Yes – – one or more children born since (date in item h), now dead

Name of child	Name of mother	Line No. of mother
Name of child	Name of mother	Line No. of mother

☐ No

☐ No woman 12 to 49 years old currently members of this household

INTERVIEWER: Ask for each woman 12 to 49 years old who died while a resident of this unit, as indicated in items 2 and 3.

6. **Had . . . given birth to a live child since (date in item h), and the child has died?**

☐ Yes – – one or more children born since (date in item h), now dead

Name of child	Name of mother	Line No. of mother
Name of child	Name of mother	Line No. of mother

☐ No

☐ No woman 12 to 49 years old died while resident of this unit

INSTRUCTIONS: Fill Death Record (Form PHS-604) for each death indicated in item 2 above, and for each person checked "Resident of this unit" in item 3b.

Fill Birth Record (Form PHS-603) for each birth indicated in items 4, 5, and 6 above.

Notes

Exhibit E-2-4. BIRTH RECORD

FORM PHS-603
(OCTOBER 1955)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL — This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

Interviewer's name

Date of present interview

BIRTH RECORD
POPSTAN HOUSEHOLD SURVEY

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.

Section A – INFORMATION ABOUT CHILD

1. Name of child

2. HRC Line No. *Check if not on HRC* ☐

3. Sex
1 ☐ Male
2 ☐ Female

4. Date of birth Day | Month | Year

5. Is the child living?
1 ☐ Yes
2 ☐ No

6. Where was the child born? *(COMPLETE)* →
Check one:
1 ☐ In this sample unit — District | Province
2 ☐ In general hospital → Name of hospital
3 ☐ In institution → Name of institution | Type of institution
4 ☐ Other place → *Specify – "Home of relative," "In doctor's office," etc.*

7. Who attended the birth?
Check one:
1 ☐ Physician → Name | Address
2 ☐ Nurse or other medically-trained person (except physician or midwife) → Name | Address
3 ☐ Midwife
4 ☐ Other person → *Specify – "Relative," "Neighbor," "Friend"*

8. Has this birth been reported to the Registrar of Births?
1 ☐ Yes → Date reported *(Month and year)* | Location of Registrar of Births: District | Province
2 ☐ No
3 ☐ Do not know

Section B – INFORMATION ABOUT MOTHER

9. Full name of mother

10. HRC Line No. *Check if not on HRC* ☐

11. Age at time of child's birth

12. Relationship to head of household
1 ☐ Head 2 ☐ Spouse 3 ☐ Daughter 4 ☐ Other relative 5 ☐ Nonrelative

13. Marital status
1 ☐ Married 2 ☐ Divorced 3 ☐ Separated 4 ☐ Widowed 5 ☐ Never married

14. Where was the mother's residence at the time of the birth?
1 ☐ In this sample unit
2 ☐ Elsewhere → (House No.) (Street) (Place) (Barrio/Village) (District) (Province)

15a. Before the birth, was . . . seen or treated by a physician, nurse, or other medically-trained person during pregnancy?
1 ☐ Yes → **15b. How many times?** . . . . . Number
2 ☐ No **15c. What is the name and address of the physician (nurse or other medically-trained person)?** . . . . . Name | Address
OR ☐ Various physicians at hospital or clinic

16. Including this child, how many children were born alive to . . .? . . . . . Number

17. How many of these children are still living? . . . . . _____ Number **OR** 00 ☐ None

Exhibit E-2-5. DEATH RECORD

FORM PHS-604
(OCTOBER 1963)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

Interviewer's name

Date of present interview

DEATH RECORD
POPSTAN HOUSEHOLD SURVEY

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.

1. Name of person who died

2. HRC Line No. *Check if not on HRC* ☐

3. Sex
1 ☐ Male
2 ☐ Female

4. Relationship to head
1 ☐ Head 2 ☐ Spouse 3 ☐ Son or daughter 4 ☐ Other relative 5 ☐ Nonrelative

5. Marital status
1 ☐ Married 2 ☐ Divorced 3 ☐ Separated 4 ☐ Widowed 5 ☐ Never married

6. Age at time of death
Age _____ **OR** If under one year, give date of birth → Day | Month | Year

7. When did . . . die? → Day | Month | Year

8. Where did . . . die? *(Complete)* →
Check one:
1 ☐ In this sample unit
2 ☐ In general hospital → Name of hospital
3 ☐ In institution → Name of institution | Type of institution
4 ☐ Other place → *Specify – "At work," "On street," etc.*

District | Province

9. Who attended the death?
Check one:
1 ☐ Physician → Name | Address
2 ☐ Nurse or other medically-trained person (except physician) → Name | Address
3 ☐ Other person → *Specify – "Relative," "Neighbor," "Friend"*
4 ☐ No one

10a. What was the cause of death?
1 ☐ Accident or injury *(Describe)* _____
2 ☐ Homicide or suicide
3 ☐ Illness

FOR OFFICE USE ONLY

→ **10b. Type of illness** (Heart attack, cancer, tuberculosis, childbirth, pneumonia, etc.) *(Specify)* _____

10c. Had . . . ever seen a physician about this illness?

1 ☐ Yes → **10d. Before . . . 's death, when did he/she last see a physician about this illness?** . . . . . Month | Year

10e. What is the name and address of the physician?
Name | Address

2 ☐ No

11. Has this death been reported to the Registrar of Deaths?
1 ☐ Yes →
2 ☐ No
3 ☐ Do not know

Date reported *(Month and year)* | Location of Registrar of Deaths: District | Province

INTERVIEWER: Ask for each person 16 to 65 years old

12. Was . . . a member of the Armed Forces when he/she died? . . . . . 1 ☐ Yes 2 ☐ No

Exhibit E-2-6. ANNUAL INCOME AND WORK EXPERIENCE QUESTIONNAIRE

FORM PHS-607 (OCTOBER 1985)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential, treatment and cannot be used for taxation, investigation, or regulation.

ANNUAL INCOME AND WORK EXPERIENCE
POPSTAN HOUSEHOLD SURVEY

Interviewer's name

Date of present interview

NOTE: Complete for each person 12 years old or older

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), FORM PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.

1. HRC line No.

2. Name of this person

3. In the past 12 months, how many weeks did . . . work, either full time or part time (including paid vacations and sick leave)?

_____ Weeks

OR

00 ☐ None *(Skip to item 9)*

4. When . . . was working in the past 12 months, did he/she usually work full time (35 or more hours a week) or part time?

1 ☐ Full time
2 ☐ Part time

5. With respect to . . .'s principal job in the past 12 months:

a. What kind of work was it? →

b. What kind of business or industry was it? →

c. Was . . . --

1 ☐ Employee of private company or business for pay or wages
2 ☐ Government employee – National or local
3 ☐ Employer with paid employees
4 ☐ Self-employed or own-account worker
5 ☐ Unpaid worker in family farm or business
6 ☐ Armed Forces

6a. In the past 12 months, did . . . work for an EMPLOYER for wages or salaries, or for benefits of any kind?

1 ☐ Yes
2 ☐ No *(Skip to item 7a)*

b. How much did . . . receive in the past 12 months in cash wages, salaries, commissions or tips from all jobs?

_____ Goldars

OR

00000 ☐ None

c. In addition, did . . . receive any of the following in the past 12 months?

(1) Free housing

1 ☐ Yes *(Specify type – House, apt., room, etc.)*

2 ☐ No

(2) Free meals

1 ☐ Yes
2 ☐ No *(Skip to (4)*

(3) How many meals a week?

_____ Number

(4) Other free benefits

1 ☐ Yes *(Specify)* _____
2 ☐ No

7a. In the past 12 months, did . . . work at all in his/her OWN BUSINESS OR PROFESSION for profit or fees?

1 ☐ Yes
2 ☐ No *(Skip to item 8a)*

b. How much were the total (gross) sales, receipts, or fees in the past 12 months from this enterprise?

_____ Goldars

c. How much was the net profit in the past 12 months from the enterprise (after business expenses)?

_____ Goldars

d. In addition, did . . . use any goods or products from the enterprise for his/her own household in the past 12 months?

1 ☐ Yes
2 ☐ No *(Skip to item 8a)*

e. How much were they worth?

_____ Goldars

8a. In the past 12 months, did . . . operate his/her own FARM enterprise as an owner or tenant, or did he/she receive part of the farm production as a sharecropper?

1 ☐ Yes
2 ☐ No *(Skip to item 9)*

b. How much were the total (gross) sales of products from . . .'s farm in the past 12 months?

_____ Goldars

c. How much net cash income did . . . earn from his/her farm in the past 12 months after business expenses?

_____ Goldars

d. In addition, did . . . raise any food products on the farm for use by his/her own household?

1 ☐ Yes
2 ☐ No

e. About what part of the total food used by . . .'s household was raised on his/her farm?

1 ☐ All
2 ☐ 1/2 or more, but not all
3 ☐ 1/4 or more, but less than 1/2
4 ☐ Less than 1/4

9. In the past 12 months, did . . . receive any money income from--	Amount *(Goldars)*
a. Retirement pensions or disability payments from the Government or private companies?	₵
b. Income from investments such as interest from savings or bonds or dividends from securities?	₵
c. Net income from renting property to others or from roomers or boarders (not reported above)?	₵
d. Any other money income such as government assistance, contributions from persons or agencies outside the household, etc.?	₵

GO TO NEXT PERSON 12 OR OVER

Exhibit E-2-7. INTERNAL MIGRATION QUESTIONNAIRE

FORM PHS-605
(OCTOBER 1984)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

INTERNAL MIGRATION
POPSTAN HOUSEHOLD SURVEY

Interviewer's name

Date of present interview

NOTE: Complete for each person

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.

	First person	Second person	Third person	Fourth person
1. HRC Line No.	Line No.	Line No.	Line No.	Line No.
2. Name of this person	Name	Name	Name	Name
INTERVIEWER: Refer to HRC item 16 3. Is this person's age one year or over? *(If "No," end questions for this person)*	1 ☐ Yes, one year or over 2 ☐ No	1 ☐ Yes, one year or over 2 ☐ No	1 ☐ Yes, one year or over 2 ☐ No	1 ☐ Yes, one year or over 2 ☐ No
4. Was . . . living in this same house (apartment) at this time one year ago? *(If "Yes," end questions for this person)*	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No
5. Where was . . . living at this time one year ago? a. If in Popstan	Province District Barrio/village Urban place OR 9 ☐ Not in urban place	Province District Barrio/village Urban place OR 9 ☐ Not in urban place	Province District Barrio/village Urban place OR 9 ☐ Not in urban place	Province District Barrio/village Urban place OR 9 ☐ Not in urban place
b. If in a foreign country	Name of country	Name of country	Name of country	Name of country
INTERVIEWER →	*GO TO NEXT PERSON*	*GO TO NEXT PERSON*	*GO TO NEXT PERSON*	*GO TO NEXT PERSON*

	Fifth person	Sixth person	Seventh person	Eighth person
1. HRC Line No.	Line No.	Line No.	Line No.	Line No.
2. Name of this person	Name	Name	Name	Name
INTERVIEWER: Refer to HRC item 16 3. Is this person's age one year or over? *(If "No," end questions for this person)*	1 ☐ Yes, one year or over 2 ☐ No	1 ☐ Yes, one year or over 2 ☐ No	1 ☐ Yes, one year or over 2 ☐ No	1 ☐ Yes, one year or over 2 ☐ No
4. Was . . . living in this same house (apartment) at this time one year ago? *(If "Yes," end questions for this person)*	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No
5. Where was . . . living at this time one year ago? a. If in Popstan	Province District Barrio/village Urban place OR 9 ☐ Not in urban place	Province District Barrio/village Urban place OR 9 ☐ Not in urban place	Province District Barrio/village Urban place OR 9 ☐ Not in urban place	Province District Barrio/village Urban place OR 9 ☐ Not in urban place
b. If in a foreign country	Name of country	Name of country	Name of country	Name of country
INTERVIEWER →	*GO TO NEXT PERSON*	*GO TO NEXT PERSON*	*GO TO NEXT PERSON*	*GO TO NEXT PERSON*

Exhibit E-2-8. SCHOOL ENROLLMENT AND EDUCATIONAL ATTAINMENT QUESTIONNAIRE

FORM PHS-610
(JULY 1986)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

Interviewer's name

Date of present interview

SCHOOL ENROLLMENT AND EDUCATIONAL ATTAINMENT
POPSTAN HOUSEHOLD SURVEY

NOTE: Complete for each person 5 years old or over

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.

1. HRC Line No. | **2. Name of this person**

INTERVIEWER: Refer to HRC item 16

3. Check the appropriate age group for this person
1 ☐ 5 to 29 years
2 ☐ 30 years or over *(Skip to item 7a)*

4. Is . . . attending or enrolled in school?
1 ☐ Yes
2 ☐ No *(Skip to item 7a)*

5a. What is the level and year of school?

Primary	01 ☐	02 ☐	03 ☐	04 ☐	05 ☐	*(Skip to item 6)*
Middle	06 ☐	07 ☐	08 ☐			
High school	09 ☐	10 ☐	11 ☐	12 ☐		
University	13 ☐	14 ☐	15 ☐	16 ☐	17+ ☐	

20 ☐ Special or trade school

b. What is the name of the school?

_____

_____

c. For what occupation is . . . being trained?

_____
_____
_____ *(Skip to item 7a)*

6. Is it a public, parochial, or private school?
1 ☐ Public
2 ☐ Parochial
3 ☐ Private
(Skip to item 8)

Ask if "30 years or over" in item 3, "No" in item 4, or "Special or trade school" in item 5a

7a. What is the highest grade or year of regular school that . . . has attended?

00 ☐ Never attended school *(Skip to 8)*

Primary	01 ☐	02 ☐	03 ☐	04 ☐	05 ☐
Middle	06 ☐	07 ☐	08 ☐		
High school	09 ☐	10 ☐	11 ☐	12 ☐	
University	13 ☐	14 ☐	15 ☐	16 ☐	17+ ☐

b. Did . . . complete that grade or year?
1 ☐ Yes
2 ☐ No

Ask if "Never attended school" in item 7a or "Primary – 3 or LESS" in item 5a or item 7a

8. Is . . . able to read and write?
1 ☐ Yes
2 ☐ No

GO TO NEXT PERSON 5 OR OVER

1. HRC Line No. | **2. Name of this person**

INTERVIEWER: Refer to HRC item 16

3. Check the appropriate age group for this person
1 ☐ 5 to 29 years
2 ☐ 30 years or over *(Skip to item 7a)*

4. Is . . . attending or enrolled in school?
1 ☐ Yes
2 ☐ No *(Skip to item 7a)*

5a. What is the level and year of school?

Primary	01 ☐	02 ☐	03 ☐	04 ☐	05 ☐	*(Skip to item 6)*
Middle	06 ☐	07 ☐	08 ☐			
High school	09 ☐	10 ☐	11 ☐	12 ☐		
University	13 ☐	14 ☐	15 ☐	16 ☐	17+ ☐	

20 ☐ Special or trade school

b. What is the name of the school?

_____

_____

c. For what occupation is . . . being trained?

_____
_____
_____ *(Skip to item 7a)*

6. Is it a public, parochial, or private school?
1 ☐ Public
2 ☐ Parochial
3 ☐ Private
(Skip to item 8)

Ask if "30 years or over" in item 3, "No" in item 4, or "Special or trade school" in item 5a

7a. What is the highest grade or year of regular school that . . . has attended?

00 ☐ Never attended school *(Skip to 8)*

Primary	01 ☐	02 ☐	03 ☐	04 ☐	05 ☐
Middle	06 ☐	07 ☐	08 ☐		
High school	09 ☐	10 ☐	11 ☐	12 ☐	
University	13 ☐	14 ☐	15 ☐	16 ☐	17+ ☐

b. Did . . . complete that grade or year?
1 ☐ Yes
2 ☐ No

Ask if "Never attended school" in item 7a or "Primary – 3 or LESS" in item 5a or item 7a

8. Is . . . able to read and write?
1 ☐ Yes
2 ☐ No

GO TO NEXT PERSON 5 OR OVER

Exhibit E-2-9. NATALITY QUESTIONNAIRE

FORM PHS-606
(APRIL 1985)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

Interviewer's name

Date of present interview

NATALITY
POPSTAN HOUSEHOLD SURVEY

NOTE: Complete for each female 12 years old or over

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.

	First person	Second person	Third person	Fourth person
1. HRC Line No.	Line No.	Line No.	Line No.	Line No.
2. Name of this person	Name	Name	Name	Name
3. How many children have been born alive to . . .? *(If "None," skip to item 5)*	Number OR 00 ☐ None	Number OR 00 ☐ None	Number OR 00 ☐ None	Number OR 00 ☐ None

4. What is the sex and date of birth of her – *Complete for each child:*	First person Sex (Circle one)	Date of birth Day	Month	Year	Second person Sex (Circle one)	Date of birth Day	Month	Year	Third person Sex (Circle one)	Date of birth Day	Month	Year	Fourth person Sex (Circle one)	Date of birth Day	Month	Year
First child	1 - M 2 - F				1 - M 2 - F				1 - M 2 - F				1 - M 2 - F			
Second child	1 - M 2 - F				1 - M 2 - F				1 - M 2 - F				1 - M 2 - F			
Third child	1 - M 2 - F				1 - M 2 - F				1 - M 2 - F				1 - M 2 - F			
Fourth child	1 - M 2 - F				1 - M 2 - F				1 - M 2 - F				1 - M 2 - F			
Fifth child	1 - M 2 - F				1 - M 2 - F				1 - M 2 - F				1 - M 2 - F			
Sixth child	1 - M 2 - F				1 - M 2 - F				1 - M 2 - F				1 - M 2 - F			
Seventh child	1 - M 2 - F				1 - M 2 - F				1 - M 2 - F				1 - M 2 - F			
Eighth child	1 - M 2 - F				1 - M 2 - F				1 - M 2 - F				1 - M 2 - F			
Ninth child	1 - M 2 - F				1 - M 2 - F				1 - M 2 - F				1 - M 2 - F			
Tenth child	1 - M 2 - F				1 - M 2 - F				1 - M 2 - F				1 - M 2 - F			

	First person	Second person	Third person	Fourth person
5. Has . . . ever been married? *(If "No," end questions for this person)*	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No
6. When was . . . first married?	Day / Month / Year	Day / Month / Year	Day / Month / Year	Day / Month / Year
7. Has . . . been married more than once?	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No
INTERVIEWER →	*GO TO NEXT FEMALE 12 OR OVER*	*GO TO NEXT FEMALE 12 OR OVER*	*GO TO NEXT FEMALE 12 OR OVER*	*GO TO NEXT FEMALE 12 OR OVER*

Exhibit E-2-10. IMMUNIZATION AGAINST COMMUNICABLE DISEASES QUESTIONNAIRE

FORM PHS-609
(APRIL 1986)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

IMMUNIZATION AGAINST COMMUNICABLE DISEASES
POPSTAN HOUSEHOLD SURVEY

Interviewer's name

Date of present interview

NOTE: Complete for each person 24 years old or under

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.

READ TO RESPONDENT: **We want to find out how many children and young people have been protected against contagious diseases. First, we are going to ask about poliomyelitis, sometimes called polio or infantile paralysis. There are two kinds of polio vaccine, one received as an injection or shot, and the other taken by mouth.**

1. HRC Line No. **2. Name of this person**	**1. HRC Line No.** **2. Name of this person**
3. Has . . . had any polio shots (or injections)? 1 ☐ Yes 2 ☐ No *(Skip to 6)*	**3. Has . . . had any polio shots (or injections)?** 1 ☐ Yes 2 ☐ No *(Skip to 6)*
4. How many shots? 1 ☐ 2 ☐ 3 ☐ 4 or more ☐	**4. How many shots?** 1 ☐ 2 ☐ 3 ☐ 4 or more ☐
5. In what year did . . . receive the last shot? _____ Year	**5. In what year did . . . receive the last shot?** _____ Year
6. Has . . . had any polio vaccine by mouth (oral vaccine)? 1 ☐ Yes 2 ☐ No *(Skip to 8)*	**6. Has . . . had any polio vaccine by mouth (oral vaccine)?** 1 ☐ Yes 2 ☐ No *(Skip to 8)*
7. How many times? 1 ☐ 2 ☐ 3 ☐	**7. How many times?** 1 ☐ 2 ☐ 3 ☐
8. Has . . . ever been vaccinated against smallpox? 1 ☐ Yes 2 ☐ No *(Skip to 10)*	**8. Has . . . ever been vaccinated against smallpox?** 1 ☐ Yes 2 ☐ No *(Skip to 10)*
9. At what age did . . . receive the most recent vaccination? _____ Age	**9. At what age did . . . receive the most recent vaccination?** _____ Age
INTERVIEWER: Refer to HRC item 16 **10.** Is this person's age 11 or under? 1 ☐ Yes, 11 or under 2 ☐ No *(End questions for this person)*	*INTERVIEWER: Refer to HRC item 16* **10.** Is this person's age 11 or under? 1 ☐ Yes, 11 or under 2 ☐ No *(End questions for this person)*
11. Has . . . received any shots for diphtheria, whooping cough, and tetanus? 1 ☐ Yes 2 ☐ No *(Skip to 13)*	**11. Has . . . received any shots for diphtheria, whooping cough, and tetanus?** 1 ☐ Yes 2 ☐ No *(Skip to 13)*
12. How many shots? 1 ☐ 2 ☐ 3 ☐ 4 or more ☐	**12. How many shots?** 1 ☐ 2 ☐ 3 ☐ 4 or more ☐
13. Has . . . received a skin test for tuberculosis? 1 ☐ Yes 2 ☐ No 3 ☐ Don't know	**13. Has . . . received a skin test for tuberculosis?** 1 ☐ Yes 2 ☐ No 3 ☐ Don't know
14. Has . . . ever had regular (red) measles? 1 ☐ Yes 2 ☐ No	**14. Has . . . ever had regular (red) measles?** 1 ☐ Yes 2 ☐ No
15. Has . . . been vaccinated against regular (red) measles? 1 ☐ Yes 2 ☐ No	**15. Has . . . been vaccinated against regular (red) measles?** 1 ☐ Yes 2 ☐ No
16. Has . . . ever had German measles? 1 ☐ Yes *(End interview for this person)* 2 ☐ No	**16. Has . . . ever had German measles?** 1 ☐ Yes *(End interview for this person)* 2 ☐ No
17. Has . . . been vaccinated against German measles? 1 ☐ Yes 2 ☐ No	**17. Has . . . been vaccinated against German measles?** 1 ☐ Yes 2 ☐ No
GO TO NEXT PERSON 24 OR UNDER	*GO TO NEXT PERSON 24 OR UNDER*

Exhibit E-2-11. USE OF MEDICAL FACILITIES QUESTIONNAIRE

FORM PHS-611
(JULY 1967)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

Interviewer's name

Date of present interview

USE OF MEDICAL FACILITIES
POPSTAN HOUSEHOLD SURVEY

NOTE: Complete for each person

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.

1. HRC Line No.

2. Name

3a. During the past 3 months, has . . . been seen or examined by a doctor?

1 ☐ Yes → **3b. What is the doctor's name?** _____

2 ☐ No *(Skip to Item 6a)*

4. How long ago was it since . . . last saw a doctor?

1 ☐ Within a year
2 ☐ One to 3 years ago
3 ☐ Over 3 years ago
4 ☐ Never *(Skip to item 7a)*

5. At that time, what did . . . go to the doctor for?
Check each box that applies, then skip to item 7a:

1 ☐ Diagnosis or treatment → **What was the doctor's diagnosis or treatment for?** *(Specify)* _____
2 ☐ Prenatal or postnatal care
3 ☐ General physical checkup
4 ☐ Eye examination or glasses
5 ☐ Other *(Specify)* _____

6a. How many times did . . . see a doctor during the past 3 months? → Number of times

b. How many of these times were –
Enter 0 if none

(1) _____ *(Number)* **At home?**
(2) _____ *(Number)* **In the doctor's office?**
(3) _____ *(Number)* **In a clinic or hospital?**
(4) _____ *(Number)* **At some other place?**

c. What did . . . have done at these visits?
Check each box that applies:

1 ☐ Diagnosis or treatment → **What was the doctor's diagnosis or treatment for** *(Specify)* _____
2 ☐ Prenatal or postnatal care
3 ☐ General physical checkup
4 ☐ Eye examination or glasses
5 ☐ Other *(Specify)* _____

7a. During the past 3 months, has . . . visited a dentist?

1 ☐ Yes → **7b. What is the dentist's name?** _____ *(Skip to Item 9a)*

2 ☐ No

8a. How long ago was it since . . . last visited a dentist?

1 ☐ Within a year
2 ☐ One to 3 years ago
3 ☐ Over 3 years ago
4 ☐ Never *(Skip to item 10)*

b. At that time, what did . . . go to the dentist for?
Check each box that applies, then skip to Item 10:

1 ☐ Filling teeth
2 ☐ Extractions
3 ☐ Surgery
4 ☐ Treatment of gums
5 ☐ Cleaning of teeth
6 ☐ Other *(Specify)* _____

9a. How many times did . . . visit a dentist during the past 3 months? → Number of times

b. What did . . . have done at these visits?
Check each box that applies:

1 ☐ Filling teeth
2 ☐ Extractions
3 ☐ Surgery
4 ☐ Treatment of gums
5 ☐ Cleaning of teeth
6 ☐ Other *(Specify)* _____

10. Has . . . been a patient in a hospital overnight or longer since this time last year?

1 ☐ Yes *(Go to item 11a)*

2 ☐ No *(End questions for this person)*

11a. How many times was . . . in the hospital since this time last year? . . . . . Number of times

COMPLETE FOR EACH TIME	FIRST TIME	SECOND TIME	THIRD TIME
11b. How many nights was . . . in the hospital?	Number of nights	Number of nights	Number of nights
11c. What was the condition for which . . . entered the hospital?	Condition	Condition	Condition
11d. Was any surgery done?	1 ☐ Yes *(Specify)* _____ 2 ☐ No	1 ☐ Yes *(Specify)* _____ 2 ☐ No	1 ☐ Yes *(Specify)* _____ 2 ☐ No
11e. What is the name of the hospital and where is it located?	Name	Name	Name
	Place	Place	Place
	District	District	District
	Province	Province	Province

GO TO NEXT PERSON

Exhibit E-2-12. CONSUMPTION OF HIGH-PROTEIN FOODS QUESTIONNAIRE

FORM PHS-612
(JULY 1967)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

CONSUMPTION OF HIGH-PROTEIN FOODS
POPSTAN HOUSEHOLD SURVEY

Interviewer's name

Date of present interview

NOTE: Complete for each household

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.

READ TO RESPONDENT: **We want to find out how often certain foods were served in the home last week.**

1a. How many days LAST WEEK did this household have meat -- beef, pork, lamb, etc. -- for any meal?	_____ Number of days **OR** 0 ☐ None
b. Was any of this meat from animals owned by the household?	1 ☐ Yes 2 ☐ No
2a. How many days LAST WEEK did this household have fish or other seafood for any meal?	_____ Number of days **OR** 0 ☐ None
b. Was any of this caught by the household?	1 ☐ Yes 2 ☐ No
3a. How many days LAST WEEK did this household have chicken or other fowl for any meal?	_____ Number of days **OR** 0 ☐ None
b. Were any of these fowl owned by the household?	1 ☐ Yes 2 ☐ No
4a. How many days LAST WEEK did this household have eggs for any meal?	_____ Number of days **OR** 0 ☐ None
b. Were any of these from fowl owned by the household?	1 ☐ Yes 2 ☐ No
Ask only if the household has any children 11 years or under **5a. How many days LAST WEEK did the children have any milk -- including fresh, canned, or powdered milk?**	_____ Number of days **OR** 0 ☐ None
b. Was any of this from animals owned by the household?	1 ☐ Yes 2 ☐ No

Notes

Exhibit E-2-13. HOUSING CHARACTERISTICS QUESTIONNAIRE

FORM PHS-608
(JANUARY 1986)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

Interviewer's name

Date of present interview

HOUSING CHARACTERISTICS
POPSTAN HOUSEHOLD SURVEY

NOTE: Complete for each listing unit

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.

1. Type of living quarters

1 ☐ Conventional HU
2 ☐ Improvised HU (makeshift shelter of waste materials, barn, cave, warehouse, etc.)
3 ☐ Mobile HU (tent, boat, wagon, etc.)
4 ☐ Collective quarters *(End questions for this unit)*

2. Number of housing units in this house (building)?

1 ☐ 1 unit, detached
2 ☐ 1 unit, attached
3 ☐ 2 to 4 units
4 ☐ 5 to 9 units
5 ☐ 10 units or more

3. How many rooms are in this unit?

_____ rooms

4. PRINCIPAL MATERIAL OF EXTERIOR WALLS *(Check by observation):*

1 ☐ Stone, cement, stucco, brick
2 ☐ Metal
3 ☐ Wood
4 ☐ Bamboo, leaves, reed, mud
5 ☐ Other material

5. Was this unit constructed in the last 12 months?

1 ☐ Yes
2 ☐ No

6. STRUCTURAL CONDITION *(Check by observation):*

1 ☐ Acceptable
2 ☐ Not acceptable
3 ☐ Inadequate original construction

7. Is there piped running water for this unit?

1 ☐ Hot and cold piped water inside building (structure)
2 ☐ Cold (only) piped water inside building (structure)
3 ☐ Piped water outside building (structure) within 100 meters
4 ☐ Piped water outside building (structure) beyond 100 meters
5 ☐ No piped water

8. What is the source of the drinking water for this unit?

1 ☐ Pipe or pump inside building
2 ☐ Pipe or pump outside building
3 ☐ Bottled or canned water
4 ☐ Closed well or closed spring
5 ☐ Open well or spring
6 ☐ River, lake, other

9. What type of toilet facilities are available for this unit?

1 ☐ Flush toilet for exclusive use of the occupants of this HU
2 ☐ Flush toilet shared with occupants of another HU
3 ☐ Out-house or out-building
4 ☐ Covered pit
5 ☐ Open pit, ditch, pail
6 ☐ Other

10. What type of bathing facilities are available for this unit?

1 ☐ Bathtub or shower with piped water for exclusive use of the occupants of this HU
2 ☐ Bathtub or shower with piped water shared with occupants of another HU
3 ☐ Hand basin with piped water
4 ☐ Portable tub or basin
5 ☐ Other

11. What type of sewage disposal does this house have?

1 ☐ Public sewage disposal system
2 ☐ Septic tank or cesspool
3 ☐ Other *(Specify)*

_____

4 ☐ None

12. OCCUPANCY/VACANCY STATUS *(Check one):*

1 ☐ Occupied
2 ☐ Vacant – for rent or for sale . . . . . .
3 ☐ Vacant – other *(Specify)* . . . . . .

_____

(End questions for this unit)

13. Is this unit owned or being bought by some member of the household, or is it rented? *(HRC item 26)*

1 ☐ Owned or being bought *(Skip to 15)*
2 ☐ Rented for cash
3 ☐ Rent free . . . . . .
4 ☐ Other *(Specify)* . . . . . .

_____

(Skip to item 15)

14. What is the monthly rent?

_____ Goldars

15. Is there a telephone in this unit?

1 ☐ Yes *(Specify number)*

_____

2 ☐ No

16. Is there a television in this unit?

1 ☐ Yes
2 ☐ No

17. What type of lighting does this unit have?

1 ☐ Electric
2 ☐ Gas
3 ☐ Kerosene or oil
4 ☐ Other or none

18. What kind of fuel is used most in this unit for cooking?

1 ☐ Electricity
2 ☐ Gas
3 ☐ Kerosene or oil
4 ☐ Coal or charcoal
5 ☐ Wood
6 ☐ Other or none

19. What type of refrigeration is used?

1 ☐ Electric, gas, kerosene refrigerator
2 ☐ Icebox
3 ☐ Spring, stream, none

20. Were any articles produced in this housing unit for sale or barter during the past 12 months?

1 ☐ Yes
2 ☐ No *(End questions for this unit)*

21. What was the principal type of product? *(Specify)*

_____

Exhibit E-2-14. RECREATIONAL AND CULTURAL OPPORTUNITIES QUESTIONNAIRE

FORM PHS-613
(JANUARY 1988)

MINISTRY OF ECONOMY
NATIONAL STATISTICAL OFFICE

CONFIDENTIAL – This information is accorded confidential treatment and cannot be used for taxation, investigation, or regulation.

Interviewer's name

Date of present interview

RECREATIONAL AND CULTURAL OPPORTUNITIES
POPSTAN HOUSEHOLD SURVEY

TRANSCRIBE FROM HOUSEHOLD RECORD CARD (HRC), Form PHS-300

a. Survey period	b. Stratum code	c. District	d. Rotation, quarter, week	e. Control Card No.	f. Unit serial No.	g. HRC No.	h. Date of previous interview

1. How often do members of this household --

a. Go to the movies?
1 ☐ Once a week or more
2 ☐ Less than once a week, but at least once a month
3 ☐ Less than once a month
4 ☐ Rarely or never

b. Attend live theatre performances or concerts?
1 ☐ Once a week or more
2 ☐ Less than once a week, but at least once a month
3 ☐ Less than once a month
4 ☐ Rarely or never

c. Visit museums?
1 ☐ Once a week or more
2 ☐ Less than once a week, but at least once a month
3 ☐ Less than once a month
4 ☐ Rarely or never

d. Go to sporting events?
1 ☐ Once a week or more
2 ☐ Less than once a week, but at least once a month
3 ☐ Less than once a month
4 ☐ Rarely or never

e. Eat meals in restaurants or other eating places (not including meals while at work)?
1 ☐ Once a week or more
2 ☐ Less than once a week, but at least once a month
3 ☐ Less than once a month
4 ☐ Rarely or never

f. Go on picnics or other outdoor excursions (in season)?
1 ☐ Once a week or more
2 ☐ Less than once a week, but at least once a month
3 ☐ Less than once a month
4 ☐ Rarely or never

g. Visit friends or relatives?
1 ☐ Once a week or more
2 ☐ Less than once a week, but at least once a month
3 ☐ Less than once a month
4 ☐ Rarely or never

2. Is there a library within walking or easy commuting distance of this household?
1 ☐ Yes
2 ☐ No *(Skip to 4)*

3. How often do members of this household borrow books from the library?
1 ☐ Once a week or more
2 ☐ Less than once a week, but at least once a month
3 ☐ Less than once a month
4 ☐ Rarely or never

4. What kind of facilities are nearby where children can play?
1 ☐ Public park or playground
2 ☐ School facilities
3 ☐ Other facilities *(Specify)* _____
4 ☐ Empty lot, street, or none

5. Does this household have a television set?
1 ☐ Yes
2 ☐ No *(Skip to 8)*

6. How many hours a day do the adults (16 years or older) in this household watch television?
_____ Average number of hours

7. How many hours a day do the children (under 16 years) in this household watch television?
_____ Average number of hours
OR
00 ☐ No children under 16

8. Do any of the adults (16 years or older) in this household participate in active sports?
1 ☐ Yes
2 ☐ No *(Skip to 10)*

9a. In which sports do they participate? *List most frequent first*	9b. How often (in season)? Once a week or more	Less than once a week, but at least once a month	Less than once a month
(1)	1 ☐	2 ☐	3 ☐
(2)	1 ☐	2 ☐	3 ☐
(3)	1 ☐	2 ☐	3 ☐
(4)	1 ☐	2 ☐	3 ☐

DURING THE PAST 3 MONTHS

10. Did members of this household go on a trip or vacation lasting 3 days or longer?
1 ☐ Yes
2 ☐ No *(End interview for this household)*

11. How many trips or vacations were taken?
_____ Number

12. For the longest trip, who from this household went on this trip?
Line numbers from HRC____ ___ ___ ___ ___ ___

13. Where did . . . go on this trip?
_____

14. How far away is this?
_____ Kilometers

15. What was the purpose of this trip?
1 ☐ Vacation
2 ☐ Visit friend or relatives
3 ☐ Other *(Specify)* _____

16. How long were . . . away on this trip?
_____ Days

OTHER EXHIBITS FOR REFERENCE

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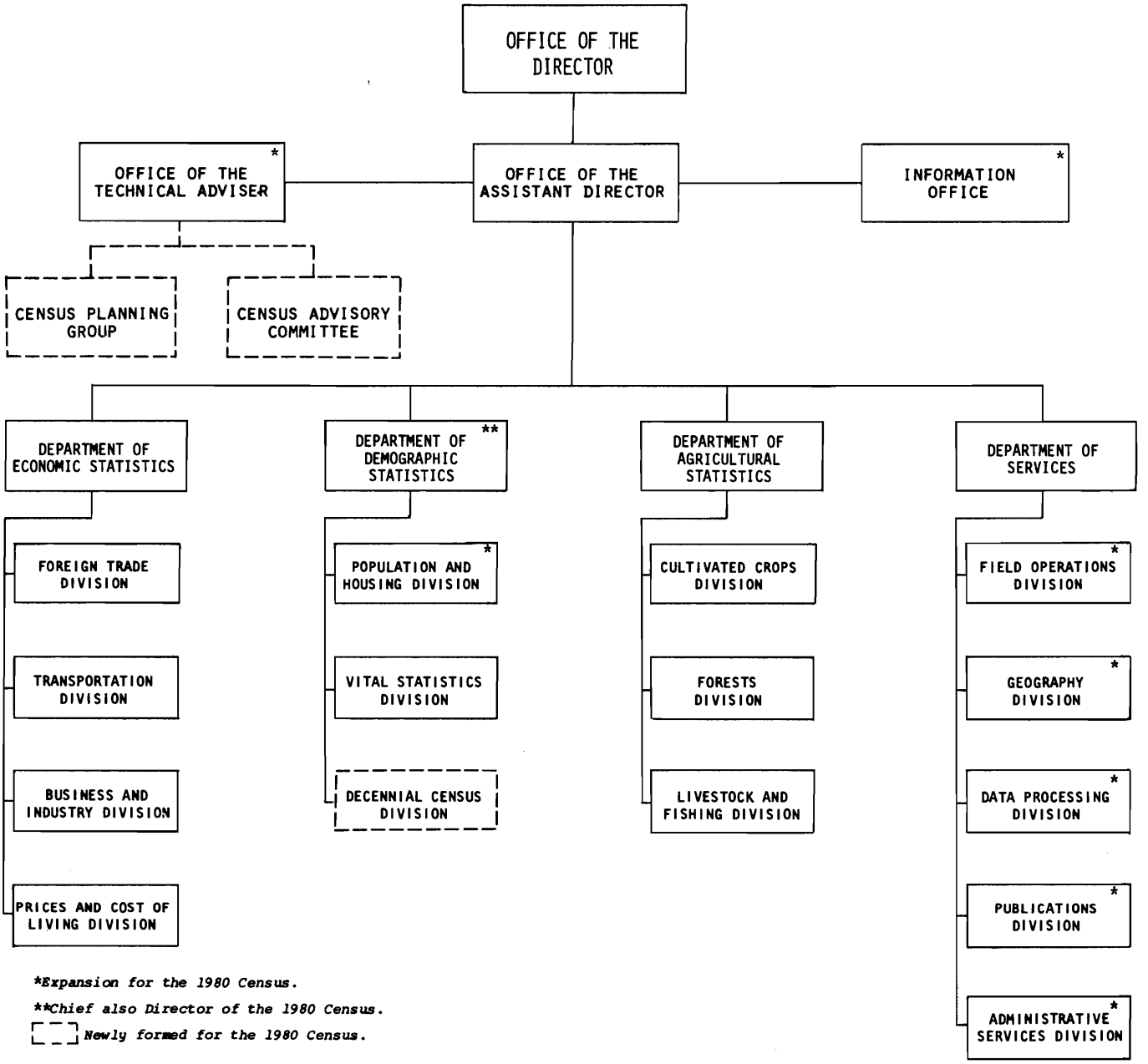
Exhibit B-11-1. ORGANIZATION OF THE NATIONAL STATISTICAL OFFICE



**Expansion for the 1980 Census.*

***Chief also Director of the 1980 Census.*

Newly formed for the 1980 Census.

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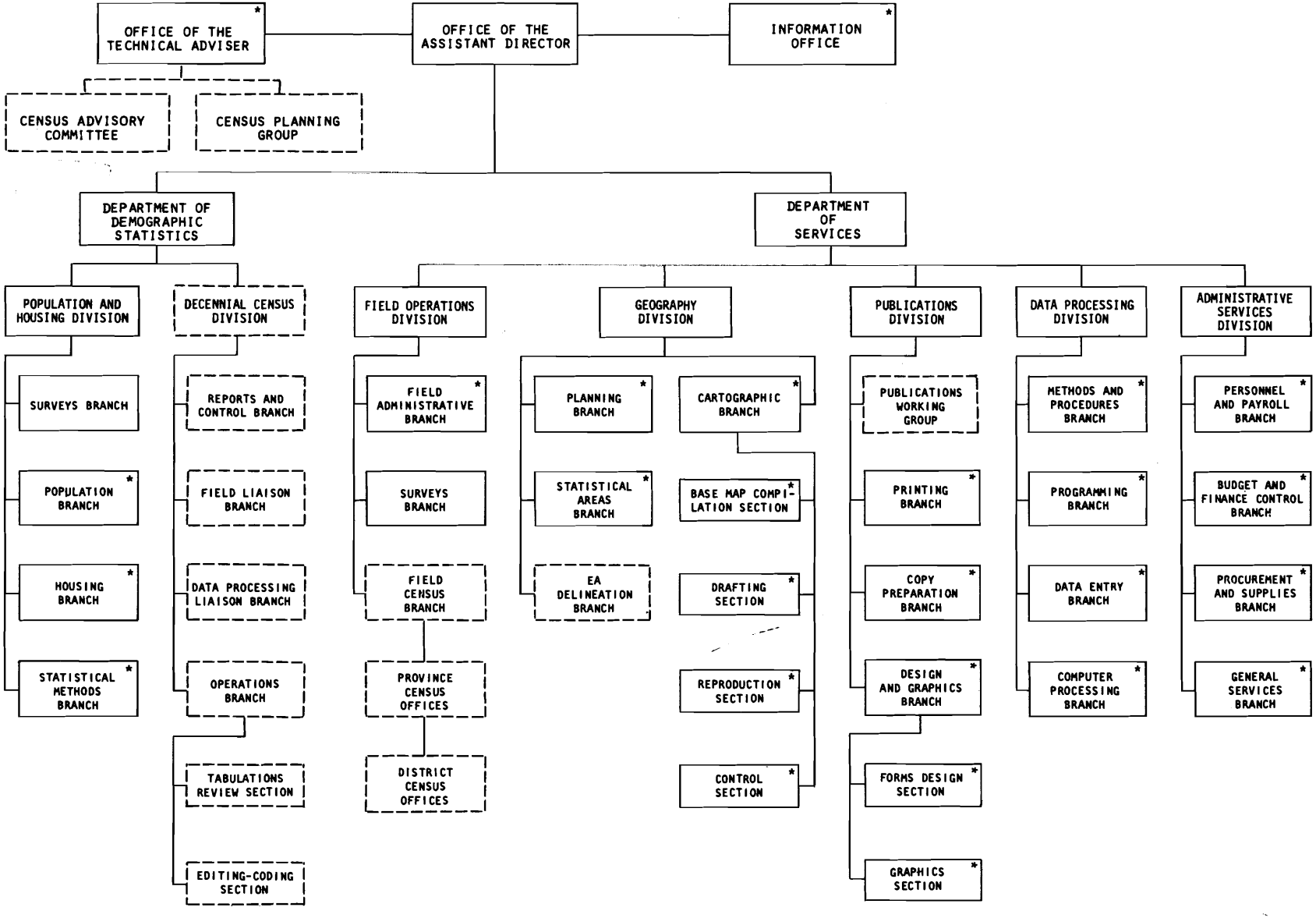
Exhibit B-11-2. DETAILED ORGANIZATION OF THE DEPARTMENT OF DEMOGRAPHIC STATISTICS AND THE DEPARTMENT OF SERVICES



*Expansion for the 1980 Census.

[- -] *Newly formed for the 1980 Census.*

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