1. Introduction

Welcome to the series of E-learning modules on special demographic survey.

By the end of this session, you will be able to:

- Explain special demographic surveys such as:
- Sample enumeration
- Household survey
- Single retrospective survey
- Follow up survey
- Dual record approach
- Estimates of fertility
- Estimates of mortality

Let us start with an Introduction.

Demographic data which are most commonly used include crude birth rate, general fertility rate, age-specific fertility rates, crude death rate, infant mortality rate, life expectancy, total fertility rate, gross reproduction rate and net reproduction ratio.

Demographic data can be used in analyzing certain patterns and trends related to human religion, nationality, education and ethnicity. These data are also the basis for certain branches of studies like sociology and economics.

Les us now discuss about collection of data.

Collection of demographic data can be broadly categorized into two methods: direct and indirect.

Direct demographic data collection is the process of collecting data straight from statistics registries which are responsible for tracking all birth and death records and also records pertaining to marital status and migration.

The most common and popular methods of direct collection of demographic data is the census. The census is commonly performed by a government agency and the methodology used is the individual or household enumeration.

The indirect method of demographic data collection may involve only certain people or informants in trying to get data for the entire population.

For instance, one of the indirect demographic data methods is the sister method. In this method, a researchers only asks all the women on the number of their sisters who have died or have had children who have died at what age they died.

From the collected data, the researchers will draw their analysis and conclusions based on indirect estimates on birth and death rates and then apply some mathematical formula so they can estimate trends representing the while population.

Other indirect methods of demographic data collection may be to collect existing data from

various organizations who have done a research survey and collate these data sources in order to determine trends and patterns.

Let us discuss the various special demographic surveys in today's session.

Sample enumeration census, household survey, single retrospective system, follow up system, dual record approach, estimate of fertility and estimate of mortality.

Sample Enumeration in Census Household Survey

Let us now discuss about sample enumeration in censuses.

As the cost and limited number of questions that can be included in the questionnaire are the main disadvantages of a population and housing census, many countries carry out a sample enumeration in conjunction with the census to collect more detailed information on a separate (longer) questionnaire which is often referred to as the long form.

Collecting additional topics from a sample of population or households during the census operation is a cost-effective way to broaden the scope of the census to meet the increasing and expanded needs for demographic and social statistics.

The use of sampling makes it feasible to produce urgently needed data with acceptable precision when factors of time and cost would make it impractical to obtain such data from a complete enumeration.

The success of the sample enumeration will depend on the strict execution of scientifically designed selection procedures.

The most important factors to be considered in the design are the size and complexities of the sample.

The advice of sampling statisticians who are conversant in both the theory of sampling and practical operations of carrying out a sample survey in the field is indispensable at all stages of the sampling operations.

The collection of more detailed information from a sample of population and households often helps to improve the quality of the data collected through the use of a smaller number of higher-qualified and better-trained enumerators.

The smaller scale census operations enable census organizations to have greater control to minimize non-sampling errors, which in a complete enumeration can be large and unmanageable, in particular, when detailed and complex questions are included.

The advantages of carrying out a sample enumeration as part of census operations, as compared to a separate household survey, are clear.

- First, the infrastructure and facilities that have been established for the census, often with large resources, are available
- Secondly, the state of awareness on the part of the general population regarding census activities through publicity campaigns often create a momentum that is not comparable to any general household surveys conducted separately during the period. Such a momentum may also help improve the quality of data collected
- The momentum and opportunity would also enable the census organization, if necessary, to use a larger sample size than in regular household surveys

Among the disadvantages of conducting a sample enumeration in conjunction with the census operations is

- The risk that such additional tasks could have a negative effect on the overall census project, particularly if the census organization does not have sufficient qualified personnel to manage the sample enumeration. In such a case, the quality of data resulting from both the sample and the complete enumeration may suffer
- In addition, the fielding of a sample enumeration will also increase the census cost, since additional cost will be incurred for recruiting and training of higher-qualified enumerators and supervisors, for printing and processing of a separate questionnaire, and for the additional organization and management
- However, the additional cost will be offset by the advantage gained from obtaining much broader and more detailed data coverage as well as higher quality census results. The census organization should, therefore, carefully weigh the additional census cost against the benefits gained from the sample enumeration

Let us now discuss about household sample surveys.

In principle almost any subject can be investigated through household surveys. With much smaller workloads than in censuses and the opportunity to train fewer personnel more intensively, household surveys can examine most subject matters in much greater detail.

While it is not possible to anticipate all the data needs of a country far into the future at the time a census is being planned, household surveys provide a mechanism for meeting emerging data needs on a continuing basis.

As budgets for national statistical activities are always limited, the flexibility of the household surveys makes it an excellent choice for meeting data users' needs for statistics which otherwise are not available, insufficient or unreliable.

Many countries have instituted a continuing survey programme, which include periodic surveys (such as annual or quarterly labour force surveys or annual surveys on cost of living etc.) and ad-hoc surveys to meet specific statistical data needs.

Although ad-hoc surveys may satisfy immediate purposes, they do not ordinarily provide a framework for a continuing data base and time series.

Continuing periodic surveys, on other hand, are normally carried out to investigate a highly important phenomenon that needs to be monitored frequently.

All household survey programmes should be a part of the overall integrated statistical data collection system of the country, including censuses and administrative records, so that the overall needs for statistical data can be adequately met.

Other advantages for countries that have a continuing household survey programme include the opportunity of developing adequate in-house technical and field staff that continue gaining experience with the repeated surveys overtime.

In addition, a continuing survey programme increases the cost-effectiveness of the available resources that have been accumulated and maintained over time such as sampling frame,

cartographic maps, the field operation infra-structure, data processing, and capacity in technical know-how both in the central and field offices.

There are different types of household surveys that can be organized for collecting demographic and social statistics, including multi-subject surveys, specialized surveys, multi-phase surveys, panel surveys, etc.

Each of these has its advantages and disadvantages and the selection of a specific programme depends upon the subject matter requirements as well as resource considerations.

In multi-subject surveys a variety of different subjects is covered in the course of a single survey cycle or round.

There are options for some of the subjects to be covered for all households and certain subjects to be alternated among different sub-samples of households.

The multi-subject surveys generally provide much greater economy than a series of surveys covering the same range of subjects.

Specialized surveys are concerned with a single subject or issue.

The surveys can be ad-hoc or part of a national survey but conducted with separate samples because of the subject matter or other considerations.

They may be conducted periodically, irregularly or only once.

In multi-phase surveys, information is collected in succeeding phases, with one phase serving as the forerunner to the next.

The initial phase normally uses a larger sample to be screened based on certain characteristics of the sample units, to help determine the eligibility of sample units to be used in the subsequent phases.

Multi-phase surveys are a cost-effective way to reach the target population in the latter phases to obtain detailed information on the particular subject under investigation. Fertility or demographic and health surveys usually adopt this type of survey.

In panel surveys successive surveys to the same sample units are carried out deliberately spaced over time, e.g. monthly, quarterly, half-yearly or annually, to obtain information to measure changes of certain characteristics over time.

One of the major advantages of this type of survey is that longitudinal measures of changing behaviour over time can be obtained. This survey is often called a "longitudinal" survey.

The disadvantage of the panel survey is the difficulty of maintaining the same respondents over a long period of time, including tracing those who move out of the sample areas and dealing with respondents who are fatigued or who have lost interest in the survey.

3. Single Round Retrospective Survey & Follow Up System

Let us discuss the single round retrospective survey.

Countries have conducted two types of single-round retrospective surveys. One type has made use of a shorter questionnaire similar to the census type. The other has used an individual extended questionnaire combined with a shorter or extended, household questionnaire.

The individual extended questionnaire was intended for a subsample of the population only, usually women of child-bearing age.

In both, the households in the sample were interviewed once.

The adoption of an extended household questionnaire with retrospective questions on fertility and mortality, has given the opportunity for mutual evaluation and plausibility of the parameters they yield.

The main difference stems from the fact that a survey is in a better position than a census to gather better quality data. This is so because,

- 1. It is related to a small part of the population, and thus the interviewers are less numerous compared to those required for a population census
- 2. The latter allows for a better training of the staff and a closet supervision of the fieldwork
- 3. Furthermore, all the subsequent stages up to the dissemination of the data can be closely controlled

A retrospective survey of this type is also more suitable than a census to paraphrase the questions in a most desirable way.

For example, children still living and children who have died for whom the following questions can be addressed for each sex:

Of all sons that you have ever borne alive: How many sons are living with you in this household? How many sons are living elsewhere in another household? How many sons have died?

Let us now discuss follow up survey method.

A prospective survey approach was developed to collect current data on fertility, nuptiality and mortality in order to avoid as much as possible memory lapse and misunderstanding of the reference period. In this approach, cluster samples of households are interviewed repeatedly within certain periods of time.

- 1. An inventory of all resident members of the household and certain basic particulars are recorded in the first round
- 2. At each subsequent round, changes in the household composition since the last interview are recorded including information on births, marital status, deaths, and in-

and out migration among members of the household

3. Special instructions are given to the interviewers to record emigrations and also to be sure that a death is not omitted

To improve the reports on infant deaths, a question on whether or not the interviewed woman in her childbearing period is pregnant at the time of each interview is sometimes recorded. Thus, in the subsequent rounds, the outcome of those pregnancies can be obtained and infant deaths, neonatal deaths and maternal deaths registered.

Current levels, structure and differentials on fertility and mortality can be directly calculated from these data without relying upon any demographic model.

The follow-up survey method, which involves re-interviewing, permits correction of inconsistent data found in previous rounds.

It also allows the inclusion of a retrospective survey so that two different approaches can be made to measure fertility and mortality without significantly increasing the cost.

4. Dual Records System Approach

Let us now discuss dual records system approach.

The dual-records system was devised to obtain further refinements in the measurement of current fertility and mortality and thus of the natural population growth rate. Data on vital events in this system are obtained in a defined area by two independent data collection methods, a periodic household survey and a separate reporting method.

The latter records vital events on a current basis in the sample households, which may involve regular visits to the household, or it, may rely on a network of informers, the recorder verifying the occurrence of the events.

It also can be the civil registration system itself.

- 1. The first round of the household survey is very much like the initial visit in the multiround surveys, as all resident members of the household are identified and their particulars recorded
- 2. In the subsequent rounds of the survey, the changes in the household's composition that have taken place since the last visit are recorded
- 3. After each household interview survey, the births and deaths observed independently in the two subsystems of data are matched to ascertain the events reported by both data collection methods
- 4. The events is reported by the special recording subsystem only, and the events identified in the household survey only

In the dual-records system, every event recorded by either of the subsystems is counted as an event.

Therefore, it is crucial that the matching of records from the two subsystems should be of high quality so that the unmatched out-of-scope events can be deleted after a thorough field check.

The problem in the developing countries where manual matching is more likely to be used. Manual matching is a difficult and laborious process despite the identifying information on the two sets of records being fairly clear.

- 1. While household surveys are not as expensive as population censuses, they are costly to organize, particularly at the beginning when countries do not have a continuing programme of household surveys
- 2. As in the case of the census, household surveys are also subject to non-sampling errors as a result of the interviewing process. In addition, household surveys are also subject to sampling error, which increases quickly with the level of geographical detail sought
- 3. An adequate sample survey design is usually possible only with the availability of detailed population or household lists, maps and other geographical materials; the various control figures and other inputs which can only be obtained from a census
- 4. In this sense, the census is the major source for preparing a survey sample design

Problems found in data from population censuses and surveys, especially those from singleround surveys, have led to the development of indirect techniques of demographic estimation.

These methods are based on mathematical models and utilize data from surveys and censuses concerning children ever born alive, children surviving, date of most recent child born alive and its survival status, survival of mother and father, survival of the first spouse, age, sex and marital status and so on, to generate different kinds of fertility and mortality estimates.

5. Estimates of Fertility & Estimates of Mortality

Let us discuss about the estimates of fertility.

Data on children born alive in the previous year(s) from censuses and surveys are used to estimate current age-specific fertility rates, birth rate, general and total fertility rates and the gross and net reproduction rates.

The quality of data is improved by asking all women of reproductive ages about the date of their last child born alive instead of the traditional question on births in the past year.

In the former case, births in the previous year are singled out at the processing stage and are cross-tabulated by five-year age groups of women in the child-bearing period. As such data always contain errors, a number of methods for adjusting the data have been proposed.

For instance, it was proposed that the pattern of the specific fertility rates could be issued correct but the level must be adjusted upwards to correspond with the level of the experience of fertility of all women in their younger ages, that is, under 35 years of age. This group is regarded as providing the most accurate information.

Let us discuss the estimates of Mortality.

Mortality estimates for different age and sex groups can be made by the indirect method, using retrospective data on children ever born alive and surviving, survival of mother and father, and survival of first spouse.

The number of children ever born alive and the number of surviving may be transformed into estimates of mortality in infancy and childhood.

For estimates of adult mortality, data collected from retrospective surveys on orphan hood and widowhood may be used.

The combination of those estimates then can led to the estimation of a complete pattern of mortality by age and sex.

By using the data on child survivorship to estimate childhood mortality, the proportion of children that died among the children ever borne by women in the various age groups is converted into the probability of dying before attaining certain childhood ages.

A set of multipliers were calculated representing certain fertility and mortality patterns. The calculation assumes a stable or stationary population, that is, there have been no changes in fertility and mortality levels over the years.

Subsequent modifications in the model have, however, made it possible to take into account changes in the levels of fertility and mortality.

Another assumption is that the children of women in the different age groups experience the

same level of mortality.

The mortality estimates for the various childhood ages represent average death rates for children of mothers in the different age groups.

Therefore, no timing can be assigned to the estimates to derive.

Here's a summary of our learning in this session on special demographic surveys, where we have understood:

- The sample enumeration
- The household survey
- The single retrospective survey
- The follow up survey
- The dual record approach
- The estimates of fertility
- The estimates of mortality