

1. Introduction

Welcome to the series of E-learning modules on Demographic Methods: Sources of demographic data - Census, Registration.

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

- Explain the concept and sources of demographic data
- Explain the concept of census
- Explain the concept of registration

Introduction

Vital statistics is defined as the branch of biometry, which deals with the data and laws of human mortality, morbidity and demography. The term vital statistics refers to the numerical data or the techniques used in the analysis of vital statistical data.

The data pertaining to vital events occurring in the given section of the population are vital events. We mean such events of human life as fertility and mortality (deaths & births), marriage, divorce, separation, adoptions, legitimating, etc.

Sir Arthur Newsholme defined vital statistics as “The whole study of mankind as affected by heredity or environment in so far as the results of this study can be arithmetically stated.” According to him, “Vital statistics forms perhaps the most important branch of statistics as it deals with mankind in the aggregate. It is the science of numbers applied to the life history of communities and nations.”

The following definition due to Benjamin sufficiently explains the utility of vital statistics to planners, various operating agencies, medical sciences, policy makers etc.

“Vital statistics are conventional numerical records of marriages, births, sickness and deaths by which the health and growth of a community may be studied.”

Demography is the statistical study of human populations and sub-populations. It can be a very general science that can be applied to any kind of dynamic human population, one that changes over time or space.

Demography encompasses the study of the size, structure, and distribution of these populations, and spatial and/or temporal changes in them in response to birth, migration, aging and death.

Demographic analysis can be applied to whole societies or to groups defined by criteria such as education, nationality, religion and ethnicity. Institutionally, demography is usually considered a field of sociology, though there are a number of independent demography departments.

Formal demography limits its object of study to the measurement of population processes. While the broader field of social demography, population studies also analyze the relationships between economic, social, cultural and biological processes influencing a population.

2. Sources of Demography

It is well known that the three main sources of demographic and social statistics are censuses, surveys and administrative records.

These three data sources are the principal means of collecting basic demographic and social statistics as part of an integrated programme of statistical data collection and compilation. This provides a comprehensive source of statistical information for policy formulation, development planning, administrative purposes, research and for commercial and other uses.

While these three sources are complementary, many countries use a combination or all three methods for various reasons. Normally, countries select one of these sources to obtain statistics based on the needs of the respective data users, reliability and timeliness of the results, and practicality and cost effectiveness of the method. However, in many countries, a particular method is used due to statutory requirements.

The term demographics refer to characteristics of a population. There are two types of data collection, they are, direct and indirect - with several different methods of each type.

Direct methods

Direct data comes from vital statistics registries that track all births and deaths as well as certain changes in legal status such as marriage, divorce, and migration (registration of place of residence). In developed countries with good registration systems (such as the United States and much of Europe), registry statistics are the best method for estimating the number of births and deaths.

Census is the other common direct method of collecting demographic data. It is usually conducted by a national government and attempts to enumerate every person in a country. However, in contrast to vital statistics data, which are typically collected continuously and summarized on an annual basis, censuses typically occur every 10 years or so. Thus, they are not usually the best source of data on births and deaths.

After census, analyses are conducted to estimate how much over or undercounting took place. These compare the sex ratios from the census data to those estimated from natural values and mortality data.

Censuses do more than just counting people. In addition to individual characteristics, they collect information about families or households such as age, sex, marital status, literacy/education, employment status, and occupation, and geographical location.

They may also collect data on migration (or place of birth or of previous residence), language, religion, nationality (or ethnicity or race), and citizenship. In countries in which the vital registration system may be incomplete, the censuses are also used as a direct source of information about fertility and mortality.

For example, the censuses of the People's Republic of China gather information on births and deaths that occurred in the 18 months immediately preceding the census.

Indirect methods

Indirect methods of collecting data are required in countries where full data is not available, such as is the case in much of the developing world. One of these techniques is the sister method, where survey researchers ask women how many of their sisters have died or had children and at what age. With these surveys, researchers can then indirectly estimate birth or death rates for the entire population. Other indirect methods include asking people about siblings, parents, and children.

There are varieties of demographic methods for modelling population processes. They include models of mortality (including the life table, Gompertz models, hazards models, Cox proportional hazards models, multiple decrement life tables, Brass relational logits), fertility (Hernes model, Coale-Trussell models, parity progression ratios), marriage (Singulate Mean at Marriage, Page model), disability (Sullivan's method, multistate life tables), population projections (Lee Carter, the Leslie Matrix), and population momentum (Keyfitz).

A country may employ more than one data source because the statistics are critically important for policy and development planning and no particular source is able to provide sufficiently reliable estimates for those statistics.

On the other hand, employing two or all three sources to collect the same statistics will certainly increase the cost of the data collection. It is therefore necessary that the national statistical authority should only take such a decision for the highly critical statistics.

For example, data on fertility are often collected through all three sources, particularly in developing countries. The three sources may not give the same results, but countries with a lack of data often use all the sources in order to obtain better estimates of the fertility levels and trends in the country.

3. Demography - Census

Let us discuss the census and registration method in detail.

During the past several decades, population censuses have been carried out in almost every country of the world and some countries have conducted censuses for more than a century.

The main reason censuses are carried out by so many countries is that, for the entire country or a well-defined territory of the country, a population census is the only data source, which collects information from each individual, and each set of living quarters.

Censuses must be carried out as nearly as possible in respect of the same well-defined point of time and at regular intervals so that comparable information is made available in a fixed sequence (United Nations 1998).

Population censuses are the ideal method of providing information on size, composition and spatial distribution of the population including their demographic and socio-economic characteristics.

Population censuses provide data either for the whole population or for a very large sample of the population, so that estimates may be produced for relatively small geographic areas and population subgroups.

It is also ideal for the segmentation of a population into various population subgroups based on some specified characteristics and for identifying target populations for policy and/or planning for both governments and private businesses.

A population census is also a very important source for population estimates needed to calculate vital rates based on data derived from civil registration. It is also important in providing the base population for the estimates of statistics obtained from demographic surveys.

To successfully cover all population within a defined area in a relatively short period of time, a census must be carefully planned, prepared and well executed. The planning, preparation and implementation, which includes a series of complex interrelated activities may be broadly categorized as follows:

- (a) Securing the required legislation, political support and funding
- (b) Mapping and listing of all households in all areas to be enumerated
- (c) Planning and printing of the questionnaires, instruction manuals and procedures
- (d) Establishing the logistics for shipments of all census materials
- (e) Recruiting and training all census personnel
- (f) Organizing the field operations
- (g) Launching publicity campaigns
- (h) Preparing for data processing and
- (i) Planning for tabulation, production and dissemination of the census results

The above list is by no means complete, but these requirements for planning, preparation and implementation make the population and housing censuses the most extensive, complicated

and expensive statistical operation for any country to undertake.

To keep the census operation cost-effective, the census organizations are usually under a strong pressure to keep census questionnaires limited to the most basic items. Nevertheless, the topics to be covered in the census should be determined upon balanced consideration of:

- (a) Needs of data users in the country
- (b) Availability of information on the topics from other data sources
- (c) International comparability
- (d) Willingness and ability of the public to give adequate information on the topics and
- (e) Available resources for conducting the census

A balanced consideration should take into account the advantages and limitations of alternative methods of obtaining data on a given topic within the context of an integrated national programme for gathering demographic and social statistics to meet the national needs.

The full range of national uses (for example, policy, administration and research) and national users (for example, national and local government agencies, those in the private sector, and academic and other researchers) should be considered in determining whether a topic should be included in the census.

Each country's decision with regard to the topics to be covered should depend upon a balanced appraisal of how urgently the data are needed and whether the information could be obtained equally well or better from other sources.

While census data provide a unique quantitative foundation for use in national and sub-national planning across a large number of sectors, censuses have a number of disadvantages. First, a successful census requires very large resources in terms of manpower, funds and materials, while government budgets are coming under closer scrutiny with constraints increasingly being imposed on public spending.

Further, there have been recent cutbacks in the funding for international development assistance, which, in the past, has been a major source of funding for censuses in many developing countries.

In addition, censuses are carried out very infrequently that is once in 10 years for most countries, which cannot provide detailed information on any given topic and often suffer a variety of errors that are difficult to control. In this climate, increased attention is being focused on the resource requirements for carrying out censuses and on alternative methods and strategies for obtaining the needed data.

4. Demography - Administrative Records

The other important data source that is commonly used in many countries is administrative records. The statistics compiled from various administrative processes can be very valuable to the overall national statistical system. Many social statistics are produced as a by-product of these administrative processes.

For example, education statistics from periodic reports by the ministry of education, health statistics from periodic reports based on hospital records, employment statistics compiled from employment extension services, etc.

The reliability of the statistics depends upon the completeness of the administrative recording process and the completeness of the reporting system. It is very important to continuously monitor and improve the system of recording, reporting and compiling for producing such statistics.

Since they constitute complementary sources of data to those obtained from censuses and surveys, it is also necessary as far as feasible to keep all concepts, definitions and classifications used in these records the same as those in the other data sources so that data can be compared.

In many developing countries, while administrative records for various social programmes can be a very cost-effective data source, they are not well developed, resulting in the unreliability of the data produced.

While the administrative processes are continuing for the purpose of record keeping and administration, the compilation of statistics is secondary.

Often, the administrators at the different levels of reporting offices do not receive clear guidelines on the statistical requirements that need to be maintained (concepts, definitions, classifications, timeliness, etc) and there is a lack of effort by the statistical authority of the administration to ensure completeness and consistency of the data.

Disadvantages of administrative records are:

- They are often limited in content and their uses are restricted for legal or administrative purposes
- Similarly, they do not usually have the adaptability of household surveys or censuses from the standpoint of concepts or subject detail
- Sources of these kinds are often incomplete, inconsistent or limited in their coverage, and in many fields, such as health conditions, nutrition or household expenditures, appropriate administrative records are not available
- Moreover, administrative records often focus on the individual and do not provide any information on the household or family, limiting the analytical usefulness of the data

5. Demography - Civil Registration System

A civil registration system is one such source that many countries have developed with varying success. The importance of developing a civil registration system cannot be over emphasized. It is necessary that national governments establish and maintain continuous, comprehensive and universal vital statistics to meet national needs in a timely manner.

Civil registration is a major foundation for a legal system for establishing the rights and privileges of individuals in a country. It is comprehensively maintained and is the main source of vital statistics.

The United Nations for many years has put considerable efforts into accelerating the improvement of civil registration and vital statistics systems in developing countries including: updating the principles and recommendations of a vital statistics system, organizing various training programmes, publishing several handbooks for countries which are making an effort to improve their system, and providing advisory services to countries which request them.

Countries that have established a civil registration and vital statistics system with reasonable completeness should be able to produce vital statistics reports from the system periodically, such as number of live births by sex, date and place of births, complete with the demographic and socioeconomic characteristics of the mother and father.

Number of deaths by age, sex, place of deaths and cause of deaths complete with the demographic and socioeconomic characteristics of the decedents. Also statistics on marriages and divorces, can be generated from this system.

Another useful advantage for countries having a comprehensive civil registration is the sense of awareness and appreciation that the general population tends to have on the importance of legal document, vital statistics, and administrative disciplines.

A reasonably complete civil registration system can further be developed into a population register system, which can provide demographic and social statistics of the population in a defined area. In particular, if the system is computerized and updated electronically from various registration points, the statistics may be produced almost at any time that the reporting is required.

A population register system maintains central databases of every individual in the country that are continuously updated when there are changes in the characteristics of the individual.

Countries that have established a Central Population Registry (CPR) develop a unique Personal Identification Number (PIN) for each individual.

Combined with other social and economic registers (e.g. social security registers, taxation registers, student registers, employee pension insurance registers, register of building and dwelling, register of enterprises and establishment, etc.) can be a very powerful data source.

Once such a system is established, the need to conduct the traditional decennial census becomes less important, since the system can already produce the basic census-type information.

It is important to note, that only the information that is recorded in the register can be compiled and produced as a register-based census. For example, if there is no register data for people engaged in housekeeping, such data cannot be categorised separately.

It is necessary to understand that developing a population register even for developed countries is not a short-term project and not without large investment. The success of the system may be achieved if it has the total political support of the government as well as the population at large, with established legislation, infrastructure and national budget.

Some developing countries have attempted establishing a population register system, while many of them understand the benefits of developing such a register. The majority of these countries still do not totally comprehend the implication and requirement for such a development like the need for a legal basis, administrative and organizational infrastructure, technical capacity, equipment, public awareness and cooperation, time, costs, etc.

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

- The concept and sources of demographic data
- The concept of census
- The concept of registration