

## Demography

### ❖ Demographic methods & its importance:

According to Donald J. Bogue, "Demography in the mathematical and statistical study of the size, composition and spatial distribution of human population and of changes over time in these aspects through the operations of the five processes of fertility, mortality, marriage, migration and social mobility".

Demographic methods are used to provide useful information about the size and structure of human populations and the processes that govern population changes. A population, of course, may range in size from a small number of individuals surveyed locally to a large national population enumerated in periodic censuses to even larger aggregated entities. We use demographic methods not only in purely demographic applications, but also in a variety of other fields, among them sociology, economics, anthropology, public health, and business. Demographers, like all researchers, must pay careful attention to the quality of data that enter into their analyses. Some circumstances under which we use these methods are more trying than others. In cases in which the data are viewed to be accurate and complete, the methods we use to analyze them are more straightforward than those that are applied to data of imperfect quality.

Not only in India, but in all over the world, though population has been rapidly increasing, it does not serve much purpose. It is with the help of serious study of population problems that one would come to know about the extent of increase in population and also the responsibility of the state and citizens in respect of social, economic and political problems of people as well as the state and their possible solution as well. For such reasons, the study of demography and its methods are quite Importance of important.

### ❖ Measurement of population:

In order to determine the population at any time 't' after the census or between two censuses, a number of methods have been devised. Here we discuss a suitable method which makes use of births, deaths and migration statistics. If we assume that

- the census data gives us the total size of the population of region or community together with age and sex distribution and
- the birth, death and migration statistics during different periods are obtained from registers, then the population  $P_t$ , at any time  $t$  is given by the relation :

$$P_t = P_0 + (B - D) + (I - E)$$

where  $P_0$  is the total population at the last census,  $B$  and  $D$  give respectively the total number of births and deaths in the intervening period  $t$  and  $I$  is the total number of immigrants into the region and  $E$  is the total number of emigrants from the region during the period  $t$ .

### ❖ Rates and ratios of vital events:

Generally by vital event, we mean such events of human life such as fertility, mortality, marriage, divorce, migration, separation, adoption etc. In order that these events are of some utility to a statistician, from statistical analysis point of view, these are generally transformed by rates or ratios which are described below:

- Rate of a vital event is defined as the ratio of the total number of occurrences of the event to the total number of persons exposed to the risk of occurrence of that event. More specifically, if  $N$  be the number of occurrences of a certain vital event say,  $E$  during a given period and  $P$  be the size of the population within which the event occur. Then  $\frac{N}{P}$  is regarded as rate of that vital event, and  $\frac{N}{P}$  is multiplied by a constant  $k$  (usually 100 or 1000) to give the rate per 100 or per 1000 of the population. For example, Crude Death Rate (CDR), Crude Birth Rate (CBR), General Fertility Rate (GFR) etc.

Vital Ratio represents the size of the number say  $P$  relative to another number say  $Q$  and is denoted by  $\frac{P}{Q}$ .  $P$  and  $Q$  both may come from same or different sources of data. For example, sex ratio, child women ratio, dependency ratio etc.

The sex ratio is defined as the total number of females per thousand males, i.e.,

$$\text{Sex Ratio} = \frac{P}{Q} = \frac{\text{Female Population}}{\text{Male Population}} \times 1000$$