

Sample Survey Unit-6

Statistics:- The function of the sample value are called statistics. Let, x_1, x_2, \dots, x_n are n observations of a sample. If $t = f(x_1, x_2, \dots, x_n)$ is a function of x_1, x_2, \dots, x_n then t is called statistics. Hence sample mean (\bar{x}), sample variance (s^2) are called the statistics because its value is totally based on the sample values.

~~Sample Distribution~~:- ~~If we draw a sample of size 'n' from given finite population of size 'N', then the~~

Sample Distribution:- Sample Distribution is the set of values of the statistics like set of mean (\bar{x}), variance (s^2), etc are computed for each of the sample. For example, if we have sample 1, 2, 3, \dots , K then the set of mean values like $\bar{x}_1, \bar{x}_2, \bar{x}_3, \dots, \bar{x}_K$ will constitute the Sample Distribution.

Standard Error:- The standard deviation of the sample distribution of a statistics is known as standard error. Hence the positive square root of the sampling variance is called the standard error of the statistics. Thus, the standard error of the statistic 't' is given by —

$$\text{Standard error}(t) = \sqrt{\text{var}(t)}$$

* Sample/Partial enumeration versus Census/Complete enumeration

Sample/Partial enumeration:-

The Sample Survey is a process of learning about the population on the basis of a sample drawn from it. Thus, in the sampling method, instead of every unit of the universe, only a part of the universe is studied and the conclusions are drawn on that basis for the entire universe.

The advantage of sample survey method are as follows —

(i) Speed:- The sample survey method is less time and labour consuming than complete enumeration, since only a part of the population is inspected.

(ii) Economy:- The sample survey method is more economical than census. Because in a sample survey, there is reduction in the cost of data collection, administration, transport and man hours.

(iii) Infinite and hypothetical population:- If the population is infinite and hypothetical, sampling procedure is the only way of estimating the parameters of a population.

(iv) Administrative convenience:- The administrative and organisation of a sample survey is relatively more convenient as it requires less staff and the field of enquiry is limited.

The disadvantages of Sample Survey method are as follows —

- (i) A sample survey must be carefully planned and executed otherwise the result obtained may be inaccurate and misleading.
- (ii) In the absence of qualified and experienced persons, the information obtained from sample survey cannot be relied upon.
- (iii) If the information is required for each and every unit in the domain of study, a complete enumeration is necessary, the sample survey cannot be used.

Census/complete enumeration:-

In a census method, data are collected for each and every unit of the population which is the complete set of items which are of interest in any particular situation. For example, if the average wage of workers working in sugar industry in India is to be calculated, then wage figures would be obtained from each and every worker working in the sugar industry and by dividing the total wages which all these workers receive by the number of workers working in the sugar industry, we get the figure of average wage.

The advantages of census method are as follows —

- (i) Data are obtained from each and every unit of the population.
- (ii) The result obtained are likely to be more representative, accurate and reliable.
- (iii) Data of complete enumeration, census can be widely used as a basis for various survey.

The disadvantages of census method are discussed below —

- (i) The complete enumeration of the population requires lot of time, money, manpower and administrative personnel.
- (ii) Since the entire population is to be enumerated, the census method is usually very time consuming.

⑧ Distinguish between Sampling and non-Sampling error

⇒ In a sample survey, the result of the studies on various aspects of the population may differ from the census result and thus have certain amount of error. This error is attributed to fluctuation of sampling and is called sampling error. This error is present only in a sample survey and it is completely absent in census method.

The reason of sampling error are —

- (i) Faulty selection of sample.
- (ii) Faulty demarcation of sampling unit.
- (iii) Error due to bias in the estimation method.
- (iv) variability of the population.

On the otherhand, the error which may arise at any stage of planning and execution of the survey and collection, processing and analysis of the data are called as non-sampling error. This error are present both in census survey as well as sample survey.

The reason of non-sampling error are —

- (i) Faulty planning and definition of population or statistical unit.
- (ii) vague and imperfect questionnaire
- (iii) Defective method of interviewing and asking question.
- (iv) Wrong and inadequate answer to the questions.
- (v) Personal fault and bias of the investigator.