

SAMPLE SURVEY

10/7/14

Some Basic Definitions :

1) Finite Population :

By a finite population, we mean any well defined set containing a finite number of elements (distinguishable elements). These elements may be persons, countries, plants, farms, insects, electrical devices etc. The population will then consists of these elements :
[the plants of certain kind in a specified field, the farms of a specified size, the unemployed persons in India, etc.]

The elements of a finite population will be entities possessing particular characteristics, in which an enquirer would be interested and they will be referred to as population units. The number of elements in a finite population is called Population size. Usually it is denoted by N . With each unit in a population of size N , a number from 1 to N is assigned. These numbers are called ~~labels~~^{labels} of the unit and the population together with its identification number system is known as a list ; they remain unchanged through out the study. The values of the population units with respect to the characteristics Y under study will be denoted by Y_1, Y_2, \dots, Y_N .

→

Here Y_i denotes the value of the unit bearing label ~~label~~ i , with respect to the variable Y .

2) Sample :

A sample is a subset of a population selected to obtain information concerning the characteristics of the population. If the population consists of N elements, A_1, A_2, \dots, A_N ; then the sample will consist of some of these elements. E.g $\rightarrow \{A_1, A_3, A_5, A_7\}$

In fact, the word population is used to denote that aggregate from which the sample is chosen.

? [The population to be sampled should coincide with the population about which information is wanted, (the target population)]. Sometimes for reasons of practicability or convenience, the sampled population is more restricted than the target population. [The elements of the population, from which we select sample are called Sampling Units.]

Inference — Deductive [Complete enumeration/census]
 — Inductive [Sampling enquiries]

Two types of Sampling Enquiries: *

Sampling enquiries may be broadly classified into two groups —

i) The enquiries which can be answered by ~~and~~ conducting an experiment, suitably designed or controlled by the experimental are known as designs of experiments. Thus, if we want to know which of the five given varieties of rice is expected to give the maximum yield, we have to conduct an experiment with a sample

of experimental plots, suitably controlled [E.g: Fertilizer] and we can then base our conclusions on the basis of experimental data.

ii) The enquiries which can be answered by conducting a survey based samples, are known as sample survey. Here, the individuals to be sampled occur in nature and cannot be subjected to any experimental control. Members are sampled as they appear in nature and required information is obtained from them.

Need For Sampling :

The use of sampling in making inferences about a population is possibly - as old as civilization itself, when one has to make inferences about a large lot and it is not practicable to examine each individual member of the lot, one invariably takes recourse to sampling; i.e, one examines only a few members of the lot and on the basis of this information, one makes decisions about the whole lot.

* Advantages of Sample Survey over Complete enumeration:

The main advantages or merits of sampling techniques over the complete enumeration can be obtained as follows -

i) Less time :

There is a considerable saving in time and labour in sample survey. Since, only a part of the population has to be examined. The sampling results can be obtained more rapidly and the data can be obtained more faster, since relatively fewer data have to be collected and processed.

→

ii) Reduced Cost :

Sampling usually results in reduction in cost. In terms of ~~money~~ money as well as man hours. Although, the amount of labour and the ~~expenses~~ ^{expense} involved in ~~collective~~ ^{collecting} information per unit sample are generally greater than that in complete census. The total cost of the sample survey is expected to be much smaller than that of a complete census. Since, in most of the cases our resources are limited in terms of time and money, within which the results of the survey should be obtained. It is usually imperative to resort to sampling rather than the complete census.

iii) Greater Accuracy :

The results of a sample survey are usually much more reliable than those obtain from a complete census. Due to the following reasons —

- a) It is always ^{possible} ~~positive~~ to determine the extent of sampling error.
- b) The non-sampling errors due to the number of factors such as training of field workers, measuring and recording observations, location of units, incompleteness of returns, biases due to interviewers etc, are likely to be a serious nature in complete census, than in a sample survey. In a sample survey non sampling errors can be controlled more effectively by employing more qualified and better trained personnel, better supervision and better equipments for processing and analysis of relatively

limited data. Moreover it is easier to guard against incomplete and inaccurate returns. There can be a follow up in case of non-response ~~or~~ incomplete response. Effective control of non-sampling errors more than compensates the errors in the estimates due to sampling. As such more sophisticated statistical techniques can be employed to obtain relatively more reliable results.

iv) Greater Scope :

Sample survey has generally greater scope compared with complete census. The complete census is impracticable, rather inconceivable if the survey requires a highly trained personnel and more sophisticated equipment for the collection and analysis of data. Since, sample survey saves time and money which is possible to have a thorough and intensive enquiry, because, a more detailed information can be obtained from a small group of respondents.

* v) If the population is too large, e.g : trees in a jungle, we are left with no way but sampling.

vi) If testing is destructive, i.e, if the quality of an artificial article can be determined only by destroying the article in the process of testing, e.g :

i) Testing the quantity of milk, or chemical salt by analysis.



- ii) Testing the breaking strengths of chalks .
- iii) Testing the crackers and explosives
- iv) Testing the life span of an electric bulb etc .

Complete enumeration is impracticable and sampling technique is the only method to be used in such cases.

vii) If the population is hypothetical, e.g, in coin tossing problem where the process may continue ~~is indefinitely~~ indefinitely, sampling method is the only scientific method of estimating the parameters of the ~~the~~ universe.

Limitations of Sampling : *

Sampling theory has its own limitations and problems which may ~~be~~ ^{occur,} briefly outlined as follows —

- i) Proper care should be taken in the planning and execution of the sample survey, otherwise the results obtained might be inaccurate and misleading.

ii) Sampling theory requires the services of trained and qualified personnel and sophisticated equipment for its planning, execution, and analysis. In the absence of these the results of the sample survey are not trustworthy.

iii) However, if the information is required about each and every unit of the universe, there is no way but to resort to complete enumeration. Moreover, if time and money are not important factors or if the population is not too large, a complete census may be better than any sampling method.