Concept of Population

A population refers to the entire set of individuals, items or data points that are being studied or analysed. It encompasses all possible observations that could be made for a particular characteristics or phenomenon. For example, if you are studying the average height of all adult women in a country, the population would include every adult woman in that country.

Definitions of Population

1. A population in statistics refers to that complete set of items or individuals that are being studied, from which samples can be drawn. The population includes all the observations of a particular characteristics, such as all people, objects or events that fit certain criteria (Triola M.F,2018).
2. The population in statistics is the entire collection of data or observations that are of interest in a statistical study. It is the total group from which statistical inferences are drawn and it can be finite or infinite (Weiss N.A,2012).
3. The population refers to the complete set of elements that the researcher wishes to study and make generalisations about. This can include people, objects, events or measurements that are relevant to research question (Cochran, W.G,1977).

Population in statistical context can be represented by:

Population in statistics can be represented through

Population Distribution Graph

This could be a histogram or a probability distribution curve (like a normal distribution) that visually represents the frequency of datapoints within a population.

Sampling Diagram

A population might be illustrated as a large group, with samples taken from it to make inferences. A population of all students in a school might be represented, with smaller samples shown as subsets.

Venn Diagram

A venn diagram could represent overlapping populations, showing different groups within a larger population.

Importance of Population

The importance of population in statistics lies in its role in providing a complete understanding of the group being studied, ensuring that the inferences made about a sample can be generalized to the larger group.

- A proper definition of the population is crucial in selecting representative samples, which ensures accurate results and reliable conclusions in research.
- The population serves as the foundation for statistical analysis, allowing researchers to identify trends, make predictions and perform hypothesis testing.

Figure 1

Characteristics of population



Concept of Sample

A sample refers to a subset of individuals, items or data points selected from a larger population. The sample is used to make inferences or draw conclusions about the population without need to study the entire population, which may be impractical or impossible. Proper sampling methods are essential to ensure that the sample is the representative of the population helping the researchers generalize findings accurately.

Key Points

These are the key points

Representative:

A sample should be representative of the population to ensure accurate inferences.

Sampling Methods:

Various methods (E.g. Random sampling, stratified sampling) are used to select a sample.

Purpose:

The sample is used to estimate population parameters like mean, variance or proportions.

Definitions of Sample

A sample is a subset of individuals or observations drawn from a larger population, used to make inferences about that population without examining every member of the population. It is typically selected such a way that it represents the larger population as closely as possible (Triola, M.F,2018).

> A sample refers to a group of items or individuals selected from a population for analysis. The goal of sampling is to obtain a smaller manageable group that reflects the characteristics of population (Weiss, N.A.2012).
>
> A sample refers to make statistical inferences about a population. By studying the sample, researchers can estimate population parameters such as the mean, variance or proportion (Cochran, W.G.1977).

Sampling Process

Basic steps involved in sampling process:

1. **Define the Population**

   Identify the group of population you want to study.

2. **Choose the sample frame**

   Develop a list or map of the elements from which the sample will be drawn.

3. **Select a Sample Method**

   Choose appropriate sampling method.

4. **Determine the Sample Size**

Decide how many individuals or items should be included in the sample.

5. **Collect the Sample**

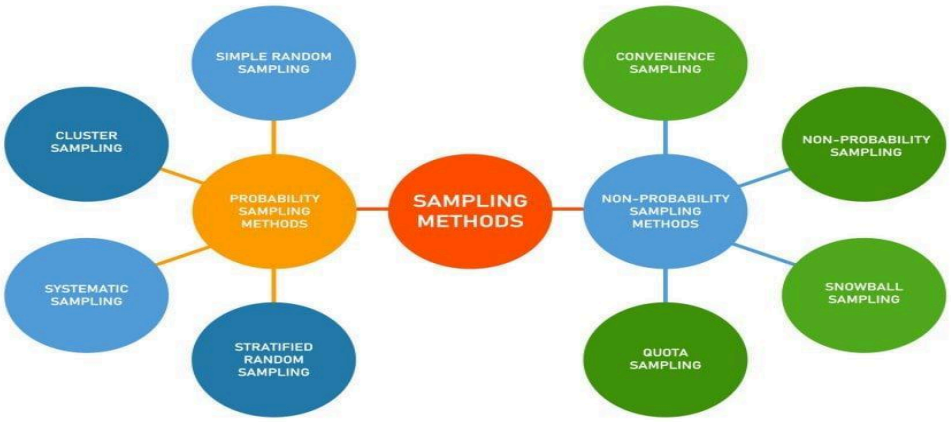
   Implement the chosen sample method and collect data from the selected sample.

6. **Analyse and Interpret**

   Analyse the sample data and use it to make inferences about the entire population.

Figure 2

Types of sampling



Importance of sampling

A sample is critical in statistics because it allows researchers to make inferences about a larger population without having to collect data from every individual. Sampling is essential for efficiency especially when studying large populations as it saves time, costs and resources. A well-chosen sample can provide reliable and accurate insights that are applicable to the broader population, ensuring the validity of statistical conclusions. Sampling enables the researchers to estimate population parameters, test hypothesis and identify trends all of which are fundamental to data driven decision making.

Figure 3

Showing the population and the sample

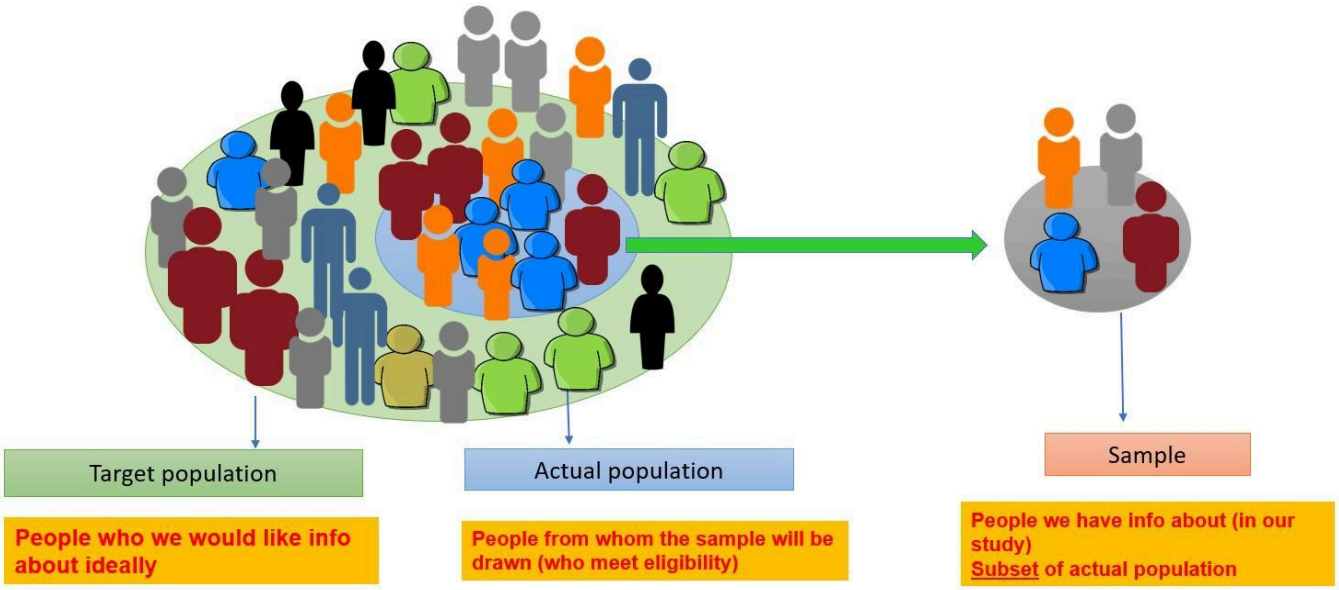


Table 1

Sl. No	Feature	Population	Sample
1	Size	Large	Small
2	Data	Difficult to collect	Easy to Collect
3	Cost	Expensive	Less Expensive

4	Accuracy	Accurate, Hard to analyse	Less accurate but generalizable
5	Purpose	Provides complete data	Represents population to make inferences

Differentiate between Population and sample

Conclusion

Understanding the difference between population and sample is essential in research and data analysis. Sampling allows researchers to draw conclusions about the population without needing to study everyone. To ensure the results are valid and representative, the sample must be selected carefully to reflect the diversity and characteristics of population.

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