

# Sampling

★ What is sample?

⇒ Sampling is a process used in statistical analysis in which a predetermined number of observations are taken from a large population. The methodology used to sample from a large population depends on the type of analysis being performed, but it may include simple ~~random~~ random sampling or systematic sampling.

Sampling - a valid alternative to a census when;

- A survey of the entire population is impracticable
- Budget constraints restrict data collection
- Time constraints restrict data collection
- Results from data collection are needed quickly.

★ What is population?

⇒ A population, in statistics and other areas of mathematics, is a discrete group of people, animals or things that can be identified by at least one common characteristic for the



## purpose of data collection and analysis.

- It does not necessarily mean a number of people.
- It is a collective term used to describe the total quantity of things of the type which are the subject

So, a population can consist of certain types of objects, organizations, people or even events.

### \* Sampling Frame :

Within this population, there will probably be only certain groups that will be of interest to your study, this selected category is your sampling frame.

### \* Sampling Methods :

Sampling method are of two types :

- Probability Sampling Method
- Non-Probability Sampling Method

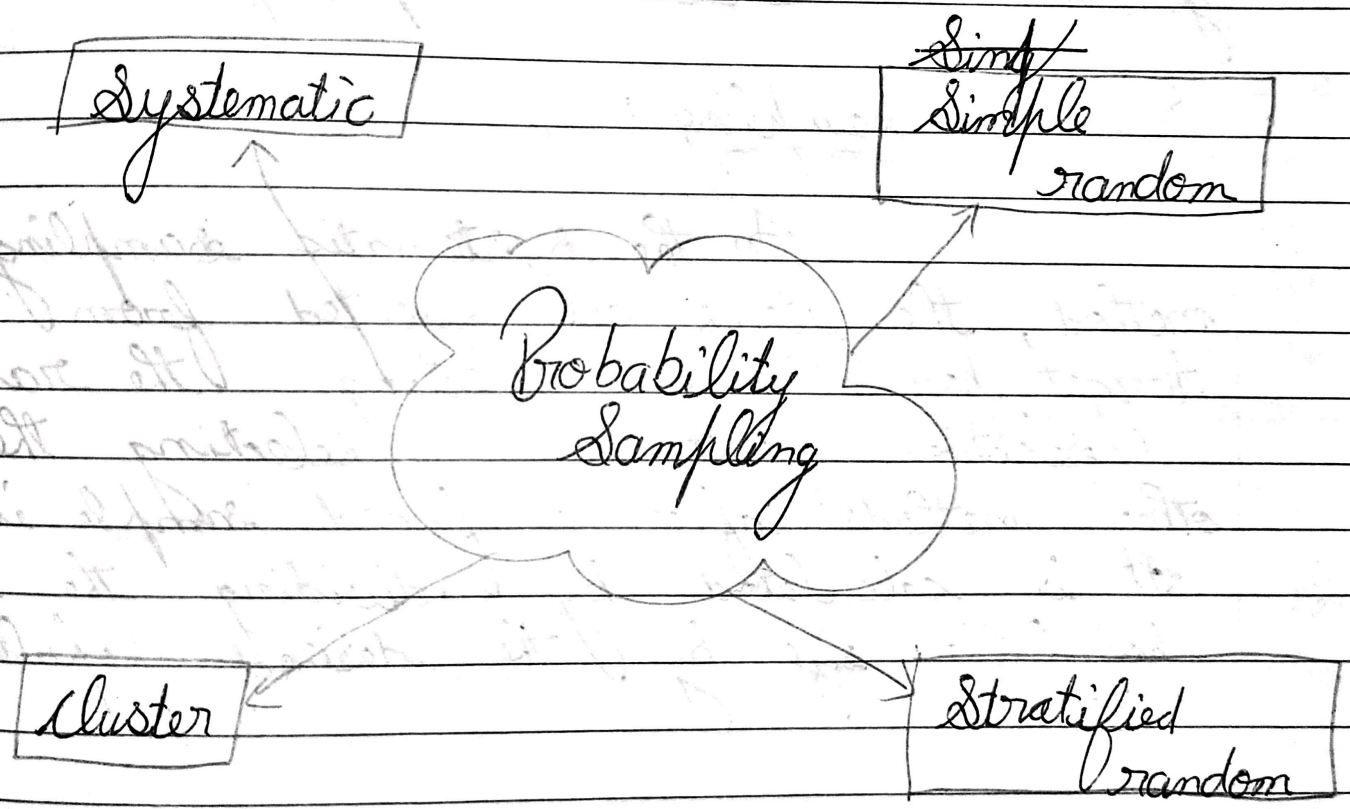
#### 1. Probability Sampling Method :

The most important requirement of probability sampling is that everyone in your population has a known and an equal chance of getting selected



The probability sampling method utilizes some form of random selection. In this method, all the eligible individuals have a chance of selecting the sample from the whole sample space.

This method is more time consuming and expensive than the non-probability sampling method. The benefit of using probability sampling is that it guarantees the sample that should be the representative of the population.



• Simple Random Sampling :

In simple random sampling technique, every item in the population has an equal and likely chance of being selected in the sample.



Since the item selection entirely depends on the chance, this method is known as "Method of chance selection". As the sample size is large, and the item is chosen randomly, it is known as "Representative Sampling".

Example: Suppose we want to select a simple random sample of 200 students from a school. Here, we can assign a number to every student in the school database from 1 to 500 and use a random number generator to select a sample of 200 students.

### • Systematic Sampling :

In the systematic sampling method, the items are selected from the target population by selecting the random selection point and selecting the other methods after a fixed sample interval. It is calculated by dividing the total population size by the desired population size.

Example: Suppose the names of 300 students of a school are sorted in the reverse alphabetical order. To select a sample in a systematic sampling method, we have to choose some 15 students by randomly selecting a starting number, say 5. From number 5 onwards,



will select every 15<sup>th</sup> person from the sorted list. Finally, we can end up with a sample of some students.

• Stratified Sampling :

In a stratified sampling method, the total population is divided into smaller groups to complete the sampling process. The small group is formed based on a few characteristics in the population. After separating the population into a smaller group, the statisticians randomly select the sample.

For example, there are three bags (A, B & C), each with different balls. Bag A has 50 balls, bag B has 100 balls, and bag C has 200 balls. We have to choose a sample of balls from each bag proportionally. Suppose 5 balls from bag A, 10 balls from bag B and 20 balls from bag C.

• Clustered Sampling :

In the clustered sampling method, the cluster or group of people are formed from the population set. This group has similar signifiatory characteristics. Also, they have an equal chance of being a part of the sample. This method uses simple random sampling from the cluster of population.



Example; An educational institution has ten branches across the country with almost the number of students. If we want to collect some data regarding facilities and other things we can't travel to every unit to collect the required data. Hence, we can use random sampling to select three or four branches as clusters.

All these four methods can be understood in a better manner with the help of the figures given below. The contains various examples of how samples will be taken from the population using different techniques.

### Difference between stratified & cluster sampling:

Stratified	Cluster
<ul style="list-style-type: none"> <li>Population divided into few subgroups.</li> </ul>	<ul style="list-style-type: none"> <li>Population divided into many subgroups.</li> </ul>
<ul style="list-style-type: none"> <li>Each subgroup has many elements in it.</li> </ul>	<ul style="list-style-type: none"> <li>Each subgroup has few elements in it.</li> </ul>
<ul style="list-style-type: none"> <li>Subgroups are selected according to some criterion that is related to the variables under study.</li> </ul>	<ul style="list-style-type: none"> <li>Subgroups are selected according to some criteria of ease or availability in data collection.</li> </ul>
<ul style="list-style-type: none"> <li>Homogeneity within subgroups.</li> </ul>	<ul style="list-style-type: none"> <li>Heterogeneity within subgroups.</li> </ul>



• Heterogeneity between subgroups

Homogeneity between subgroups.

• Choice of elements from within each subgroup.

Random choice of subgroups

## 2. Non-Probability Sampling:

The non-probability sampling method is a technique in which the researcher selects the sample based on subjective judgment rather than the random selection. In this method, not all the members of the population have a chance to participate in the study.

### Types of Non-Probability Sampling:

- > Convenience Sampling
- > Judgemental Sampling
- > Snowball
- > Quota

### • Convenience Sampling:

In a convenience sampling method, the samples are selected from the population directly because they are conveniently available for the researcher. The samples are easy to select, and the researcher did not cover the sample that outlines the entire population.



Example:

In researching customer support services in a particular region, we ask you few customers to complete a survey on the product after the purchase. This is a convenient way to collect data. Still, as we only surveyed customers taking the same product. At the same time, the sample is not representative of all the customers in that area.

• Consecutive Sampling:

Consecutive sampling is similar to convenience sampling with a slight variation. The researcher picks a single person or a group of people for sampling. Then the researcher for a period of time to analyze the result and move to another group if needed.

• Quota Sampling:

In the quota sampling method, the researcher forms a sample that involves the individuals to represent the population based on specific traits or qualities. The researcher chooses the sample subjects that bring the useful collection of data that generalizes the entire population.



• Purposive or Judgmental Sampling:

In purposive sampling, the samples are selected only based on the researcher's knowledge. As their knowledge is instrumental in creating the samples, there are the chances of obtaining highly accurate answers with a minimum marginal error. It is also known as judgmental sampling or authoritative sampling.

• Snowball sampling:

Snowball sampling is also known as a chain-referral sampling technique. In this method, the samples have traits that are difficult to find. So, each identified member of a population is asked to find the other sampling units. These sampling units also belong to the same targeted population.