

Statistical Analysis

M.Com2nd Semester

SAMPLING AND ITS TYPES

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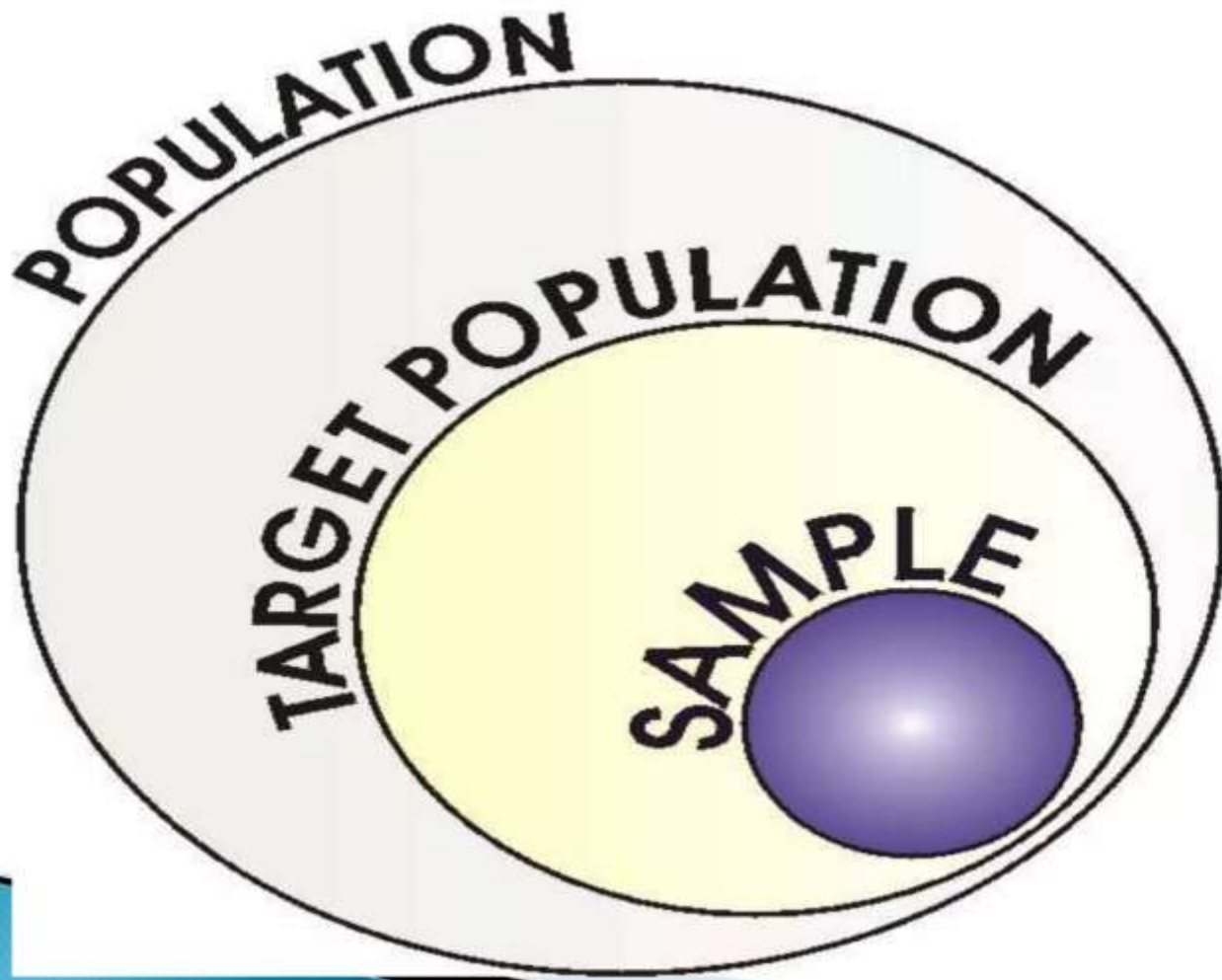


Contents to be Covered

- ▶ Basic Terminologies
- ▶ Population
- ▶ Sample and Sampling
- ▶ Advantages & Disadvantages of Sampling
- ▶ Probability Sampling
- ▶ Non-Probability Sampling

Some Terminologies

- ▶ **Population or Universe:** It refers to the group of people, items or units under investigation and includes every individual.
- ▶ **Sample:** a collection consisting of a part or **subset of the** objects or individuals of population which is selected for the purpose, representing the population
- ▶ **Sampling:** It is the process of selecting a sample from the population. For this population is divided into a number of parts called Sampling Units.



Need of Sampling

- ▶ Large population can be conveniently covered.
- ▶ Time, money and energy is saved.
- ▶ Helpful when units of area are homogenous.
- ▶ Used when percent accuracy is not acquired.
- ▶ Used when the data is unlimited.

Advantages of Sampling

- ▶ **Economical:** Reduce the cost compare to entire population.
- ▶ **Increased speed:** Collection of data, analysis and Interpretation of data etc take less time than the population.
- ▶ **Accuracy:** Due to limited area of coverage, completeness and accuracy is possible.
- ▶ **Rapport:** Better rapport is established with the respondents, which helps in validity and reliability of the results

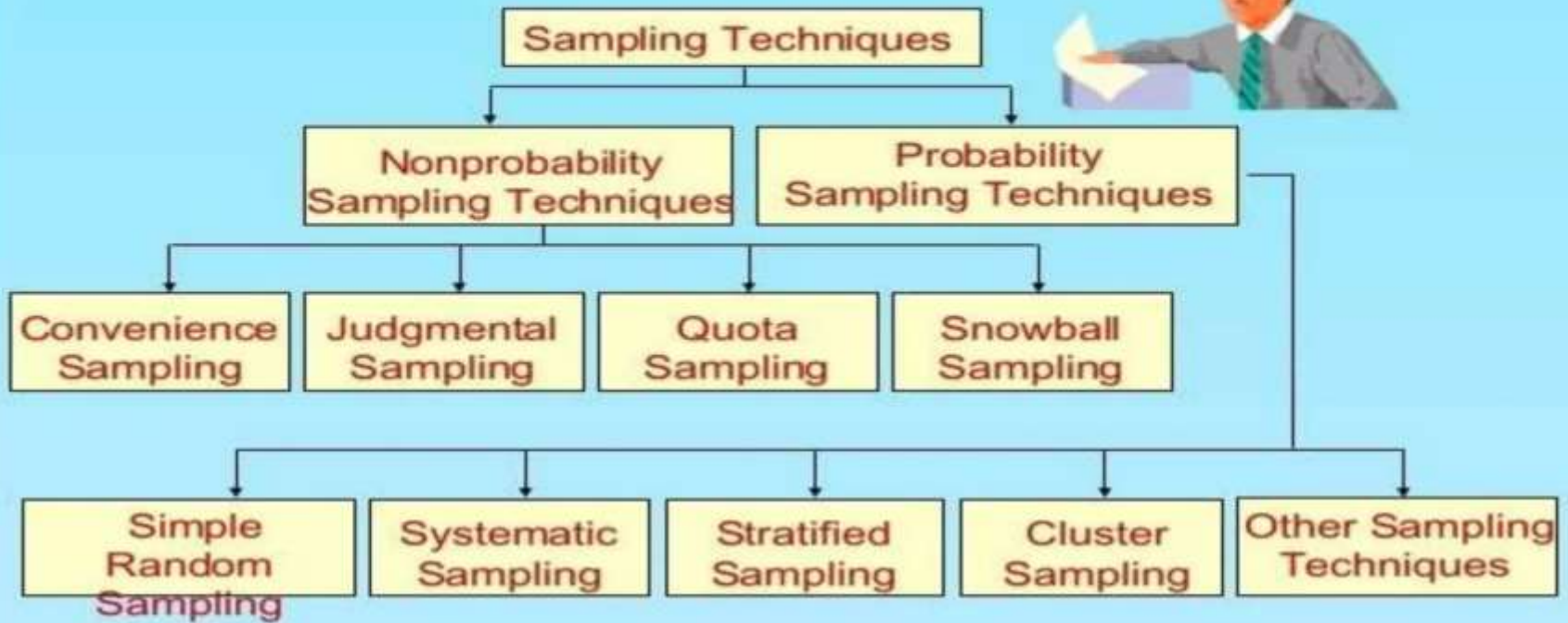
Disadvantages of Sampling

- ▶ **Biasedness:** Chances of biased selection leading to incorrect conclusion
- ▶ **Selection of true representative sample:** Sometimes it is difficult to select the right representative sample
- ▶ **Need for specialized knowledge:** The researcher needs knowledge, training and experience in sampling technique, statistical analysis and calculation of probable error
- ▶ **Impossibility of sampling:** Sometimes population is too small or too heterogeneous to select a representative sample.

Characteristics of a Good Sample

- ▶ A true representative of the population.
- ▶ Free from error due to bias.
- ▶ Adequate in size for being reliable.
- ▶ Units of sample should be independent and relevant
- ▶ Units of sample should be complete precise and up to date
- ▶ Free from random sampling error
- ▶ Avoiding substituting the original sample for convenience.

Classification of Sampling Techniques

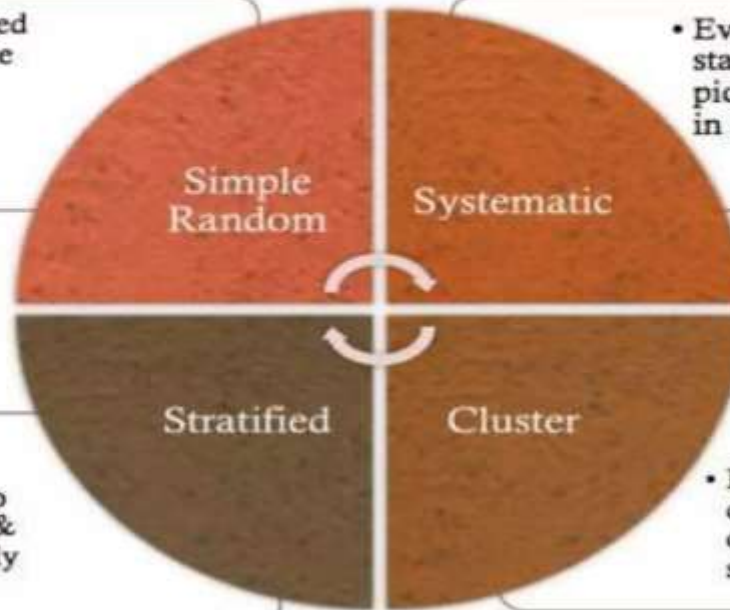


Types of Sampling

1. **Probability Sampling:** A probability sample is one in which each member of the population has an equal chance of being selected.
2. **Non-Probability Sampling:** Nonprobability Sample a particular member of the population being chosen is unknown.
 - ▶ In probability sampling, **randomness is the element of control.** In Non-probability sampling, it relies on personal **judgment.**

Probability Sampling

- All elements are considered and each has equal chance of being selected



- Every n th element chosen started at random & picking every n 'th element in succession

- Population is divided into sub-population/stratum & subjects selected randomly

- Population divided into clusters, random sample of clusters is selected from as simple random design

Probability Sampling

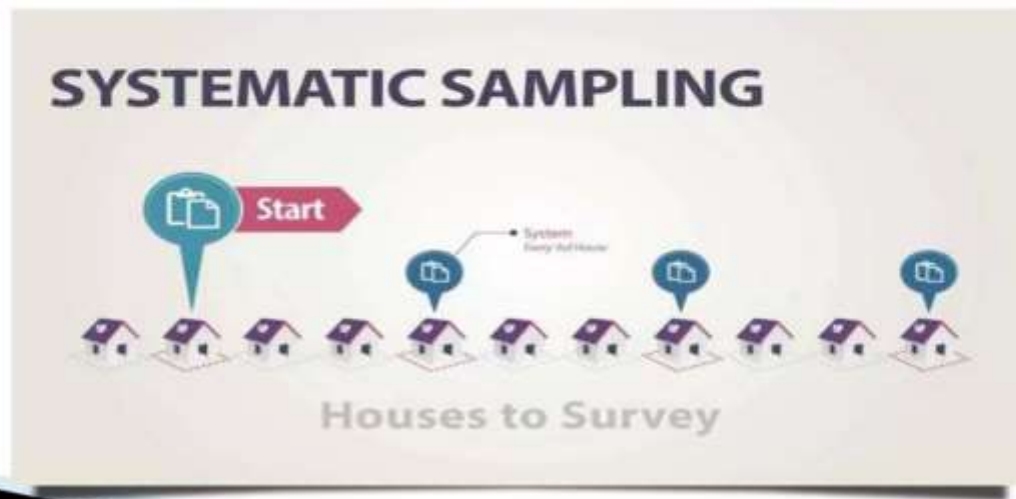
1. **Simple Random Sampling:** Here all members have **the same** chance (probability) of being selected. Random method provides an unbiased cross selection of the population.

For Example,

We wish to draw a sample of 50 students from a population of 400 students. Place all 400 names in a container and draw out 50 names one by one.

2. **Systematic Sampling:** Each member of the sample comes after an equal interval from its previous member.

For Example, for a sample of 50 students, the sampling fraction is $50/400 = 1/8$ i.e. select one student out of every eight students in the population. The starting points for the selection is chosen at random.



3. **Stratified Sampling:** The population is divided into smaller homogenous group or strata by some characteristic and from each of these strata members are selected randomly.

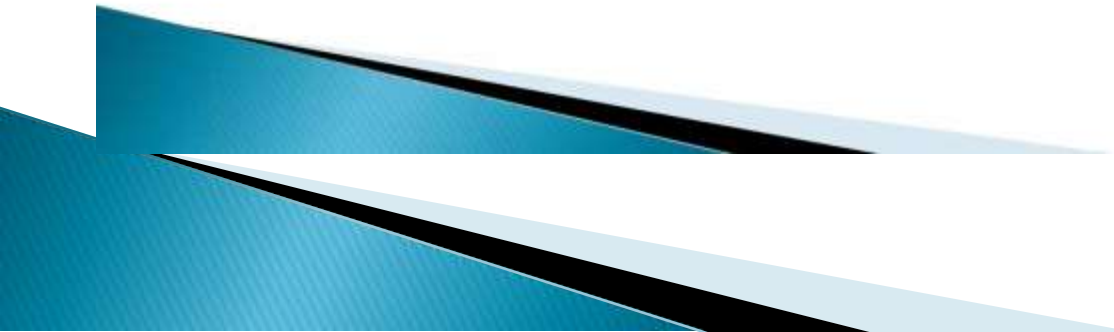
Finally from each stratum using simple random or systematic sample method is used to select final sample.



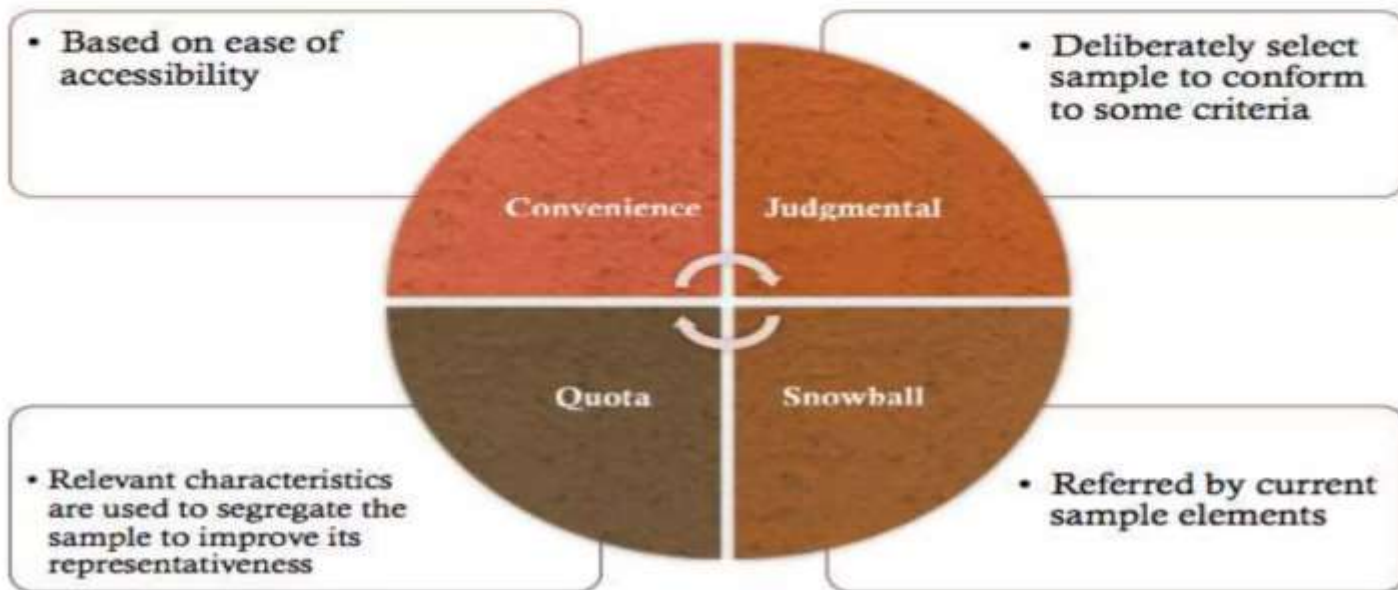
4. **Cluster Sampling (Area Sampling):** A researcher/ enumerator selects sampling units at random and then does complete observation of all units in the group.

For example, the study involves Primary schools.

Select randomly 15 schools. Then study all the children of 15 schools. In cluster sampling the unit of sampling consists of multiple cases. It is also known as area sampling, as the selection of individual member is made on the basis of place residence or employment.

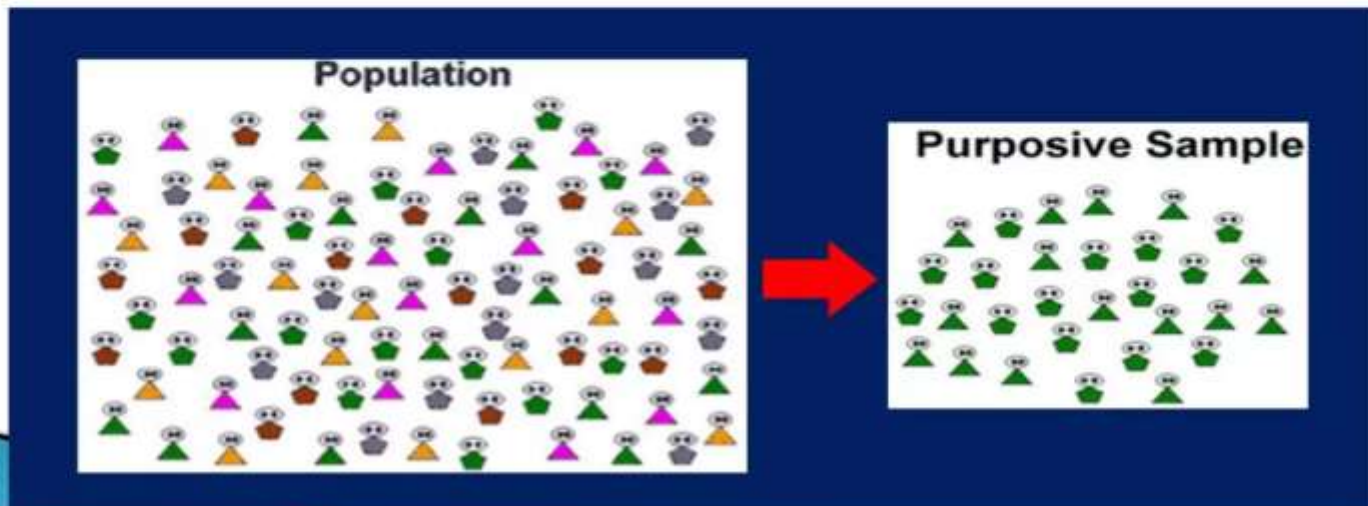


Non-Probability Methods



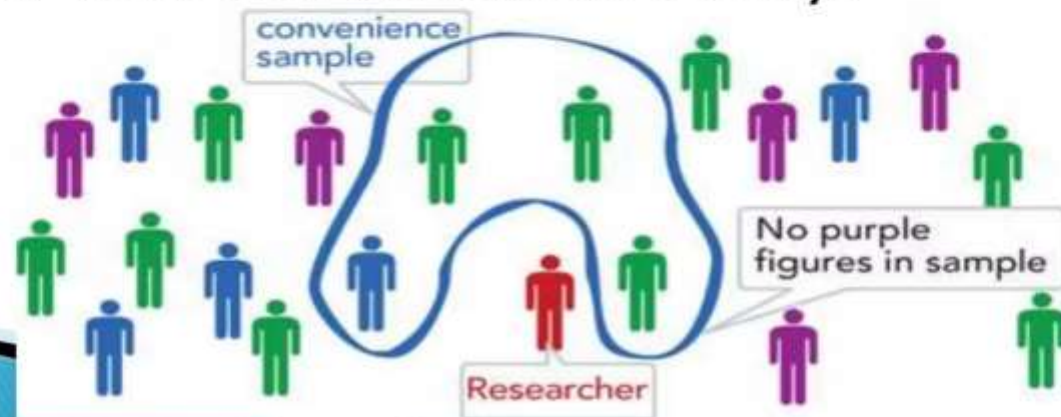
Non Probability Sampling

1. **Purposive Sampling**: In this sampling method, the researcher selects a "typical group" of individuals who might represent the larger population and then collects data from this group. Also known as **Judgmental Sampling**.



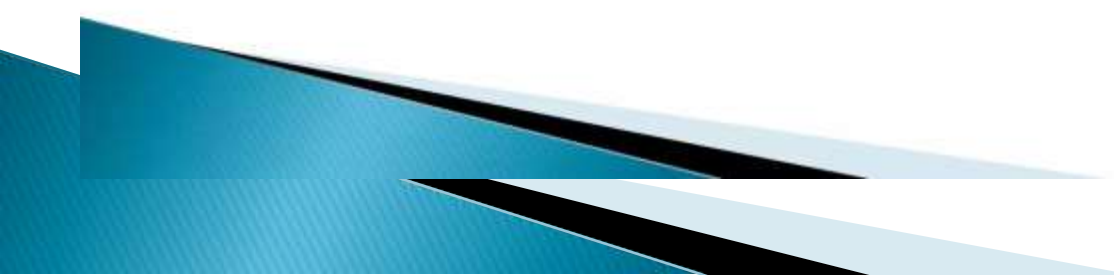
2. **Convenience Sampling** : It refers to the procedures of obtaining units or members who are most conveniently available. It consists of units which are obtained because cases are readily available.

In selecting the incidental sample, the researcher determines the required sample size and then simply collects data on that number of individuals who are available easily.




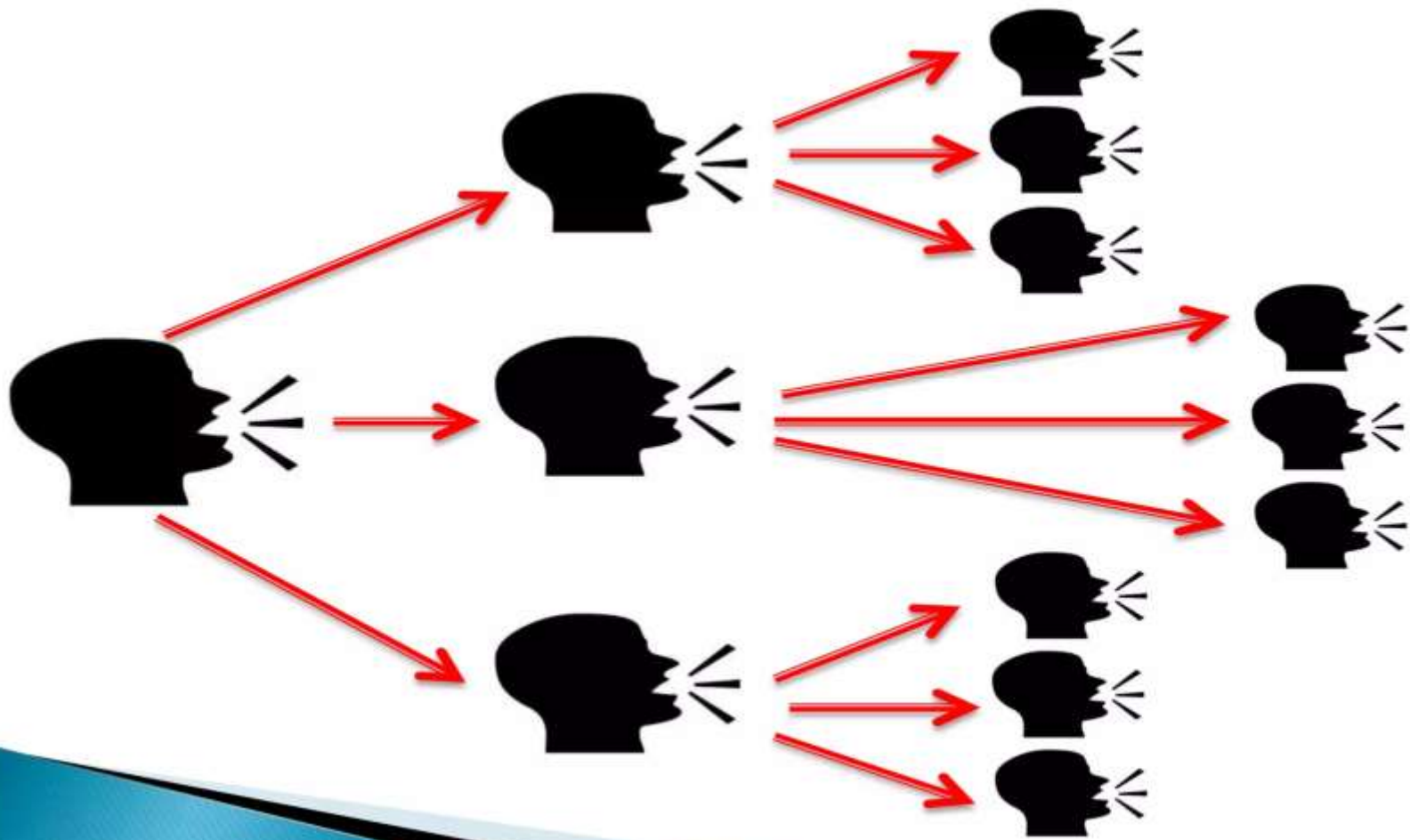
3. **Quota Sampling:** The selection of the sample is made by the researcher, who decides the quotas for selecting sample from specified sub groups of the population.
- ▶ For example, an interviewer might be need data from **40 adults and 20 adolescents in order to study students' television viewing habits.**

Selection will be

- ▶ 20 Adult men and 20 adult women
 - ▶ 10 adolescent girls and 10 adolescent boys
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4. Snowball Sampling:

- ▶ In snowball sampling, the researcher Identifying and selecting available respondents who meet the criteria for inclusion.
 - ▶ After the data have been collected from the subject, the researcher asks for a referral of other individuals, who would also meet the criteria and represent the population of concern.
 - ▶ chain sampling, chain-referral, sampling referral sampling
- 





| Probability (Random) Sampling | Non-Probability (Non-Random) Sampling |
|--|--|
| <ul style="list-style-type: none">• You can generalize to the population defined by the sampling frame | <ul style="list-style-type: none">• You cannot generalize beyond the sample |
| <ul style="list-style-type: none">• Allows use of statistics, tests hypotheses | <ul style="list-style-type: none">• Exploratory research, generates hypotheses |
| <ul style="list-style-type: none">• Can estimate population parameters | <ul style="list-style-type: none">• Population parameters are not of interest |
| <ul style="list-style-type: none">• Eliminates bias | <ul style="list-style-type: none">• Adequacy of the sample can't be known |
| <ul style="list-style-type: none">• Must have random selection of units | <ul style="list-style-type: none">• Cheaper, easier, quicker to carry out |

THANKS