



Sampling

• All items, elements or observation of interest having similar properties. known as population

- aggregate of all units under consideration.
- no. of unit belonging to a population is population size (N)

4 types of population.

1. finite → ~~is~~ countable unit
Ex: Population of student enrolled in CA course.
2. Infinite → uncountable unit
Ex: population of stars.
3. existent population → population consisting of a real objects.
No. of CA form. student
4. Imaginary population → population that exists just hypothetically like population of head when coin is tossed.
student of all courses.

* Census → study of every elements of population.

Sample → part of a population with a view to represent the all population.
↳ consists of (n) units.

↳ sample size.

- ↳ The unit forming the sample → sampling unit.
- ↳ A detailed and complete list of all sampling units - sampling frame

ParameterStatistic

- Statistical measures (mean, median) computed from population.
- characteristic of population based on all unit of the population.
- It is the statistical measures computed from sample.

populationSample

Sample help in Estimation of population.

μ ← Mean → \bar{x}

σ^2 ← Variance → S^2

σ (sigma) ← Standard deviation → S

N ← size → n

p ← proportion → \hat{p}

↳ Sampling is technique of selecting population to make statistical inferences from them and estimate characteristic of the whole universe.

- law of statistical regularity

Principles of sample survey

↳ sample of fairly large size is drawn from the population under discussion at random then an average the sample would possess the characteristics of population

Principle of Inertia: It states that a small sample size increases, the result are likely to be more reliable, accurate, provided other factor are kept constant

Principle of optimisation:

The Principle stresses the need of obtaining optimum result in term of efficiency and cost of sampling design with the sources available at our disposal.

Principle of validity

↳ A sampling design is termed as valid if it enables us to obtain valid tests and estimates about the population parameter.

comparison b/w sample survey and complete (census) enumeration.

↳ when complete info. is collected from all the units belonging to a population, called census.

Speed

Cost

Reliability

Accuracy

census is free from sampling error

Sampling → has sampling error

Error in Sample Survey
bias in error

Value of population parameter
↓
sample.

Types of error

Sampling error

non sampling error

• only a part of population is investigated in sampling.

Error due to recording observation.

error happen in both census & sample.

Types of Sampling

- Probability sampling: always a fixed, pre assigned prob. for each member of the population to be a part of the sample taken from that population

- random sampling → sample ma anna ka equal chances hona
↳ independent of each other.

- ↳ It is effective when :- population is not very large.

- sample size is not very small.
- the population under consideration is not heterogenous.

- stratified sampling :- too much heterogenous.
↳ help in reduction of variability.

* Proportional allocation
↳ Bowley's allocation
↳ not much variation
blw the strata variances.

↳ sample size is
proportional to the
population size
 $n \propto N$

* Neyman's allocation
↳ sample size
↳ directly varies
with population
size and population
standard deviation
 $n \propto NS$

Multistage Sampling

- ↳ very flexible
- ↳ quite large coverage, population.
- ↳ cost-effective
- ↳ less accurate

I stage → cities → villages → area
 II stage III stage

Non Probability sampling.

↳ aka purposive

or Judgemental sampling

- picking people as per purpose
- अपना मान मन्त्रि का sample banana.

Mixed sampling.

- systematic sampling → where the units constituting the sample are selected at regular interval after selecting the very first unit at random i.e. equal probability.

Linear.

$$N = nk$$

Circular.

$$N = nk + p$$

• Sampling fluctuation.

variation is values of statistics.

Standard Error (E)

↳ standard deviation of the statistic

Sampling Distribution → probability distribution of given statistic

SE can be regarded as a measure of precision achieved by sampling.

SE is inversely proportional to the square root of sample size.

Sampling with replacement

- Total no. of sample, $N \rightarrow$ sample size, n pop. size

Sampling without replacement

- Total no. of sample ${}^N C_n$.