Sample size and Sampling strategy

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Do you agree

that

Sample should be a certain proportion of population???

Formula for sample

$$N = (p) * (1 - p)\frac{Z^2}{C^2}$$

Z is confidence level (Usually it is assumed 95% confidence level, then value of Z is 1.96)

C is confidence interval (tolerance for margin of error), usually is assumed 5%, or 0.05.

P is response distribution or variance of the indicator to be measured

Formula for sample

For standard assumptions the value of Z^2/C^2 is 1536.64

Response Distribution value of P	Sample
0.1	138
0.2	246
0.3	323
0.4	369
0.5	384
0.6	369
0.7	323
0.8	246
0.9	138

Correction for Finite sample

$$New\ N = \frac{N}{1 + \frac{N - 1}{Population}}$$

If Original Sample is 384 then population corrected sample is

Population	New Sample
100	80
250	152
500	217
1,000	278
5,000	357
10,000	370
50,000	381
100,000	383
500,000	384
1,000,000	384
2,000,000	384

Study Design

Analytical or Descriptive Depends on Comparing Groups

Yes = Analytical study

- Case Control
- Cross sectional study

No = Descriptive study

Buzz Words of sampling

- **Sampling Frame** (Comprehensive list of all units of population or universe, through which sample is drawn)
- **Sample (**is the subset of population or universe)
- **Sample size** (number of elements selected in a sample)
- **Sampling Unit** (are the elements into which a population is divided i.e. Villages, Health facilities, Households, individuals, etc)
- **Sampling list** (list of all element of the sample on which selected element are marked)
- **Element, or subjects** (the person/ household/village/ Facility, Bank)

Advantages

- Reduced cost
- Greater speed
- Greater scope
- Greater accuracy sometimes gives better results than census

Sampling

Two important things:

- Representativeness and Significance

Steps in sampling

1. Sampling strategy always and invariably follows research design
2. Sample size determination
3. Selection methods

Types of Sampling

1. Probability sampling

- Simple random sample SRS
- Systematic/ PPS
- Stratified
- Cluster
- Multi-stage

2. Non-probability sampling

- Purposive
- Quota
- Judgment/ Convenience
- Snow ball

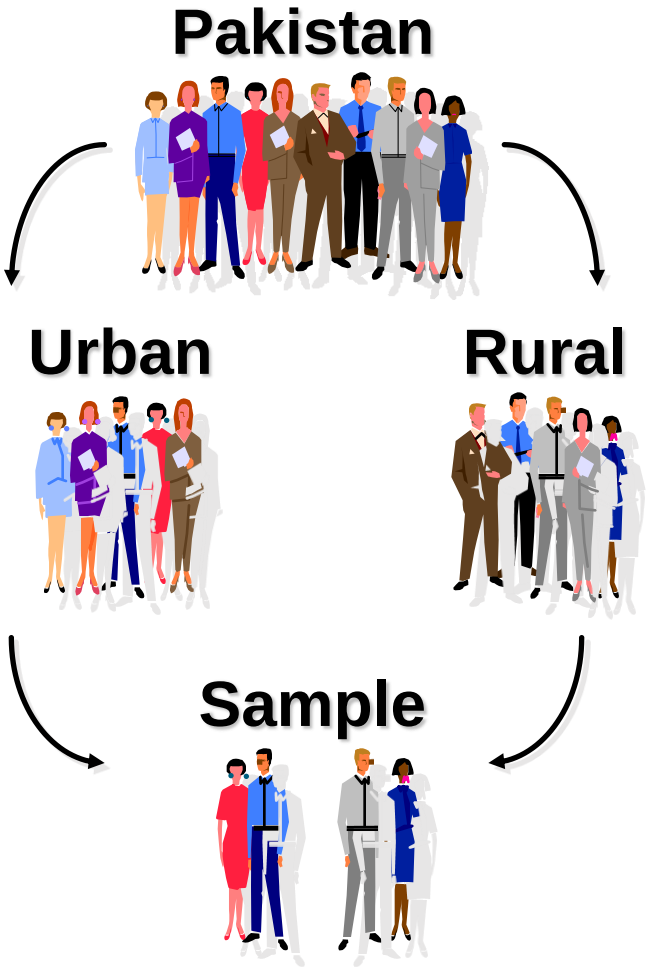
Simple Random Sample

- Each population element has an *equal chance* of being selected
- Selecting 1 subject does affect selecting others
- May use random number table, lottery, Web-based applications (numerous)

Stratified Sampling

Divide population into subgroups
- Mutually exclusive
- Exhaustive
- At least 1 common characteristic of interest

Select SRS from subgroups

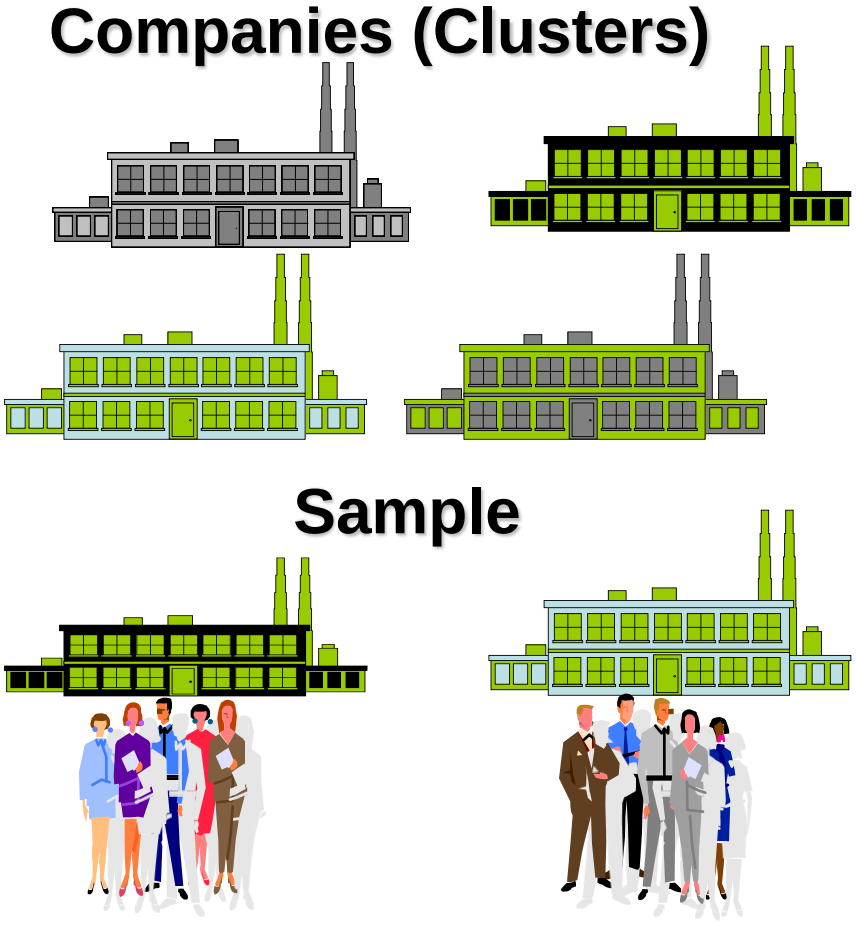


Cluster Sampling

Divide population
into clusters to reduce travel cost

If managers
are elements then
companies are clusters

Select clusters PPS
Survey all or a random sample of
elements in cluster



2. Non-probability Samples

- **Purposive**
- **Judgment**
  - Use experience to select sample
  - Example: Test markets
- **Quota**
  - Similar to stratified sampling except no random sampling
- **Convenience** (Chunk)
  - Use elements most available
- **Snowball**
  - When one cannot get list of the population who share same characteristics.

Multi-Stage Sampling

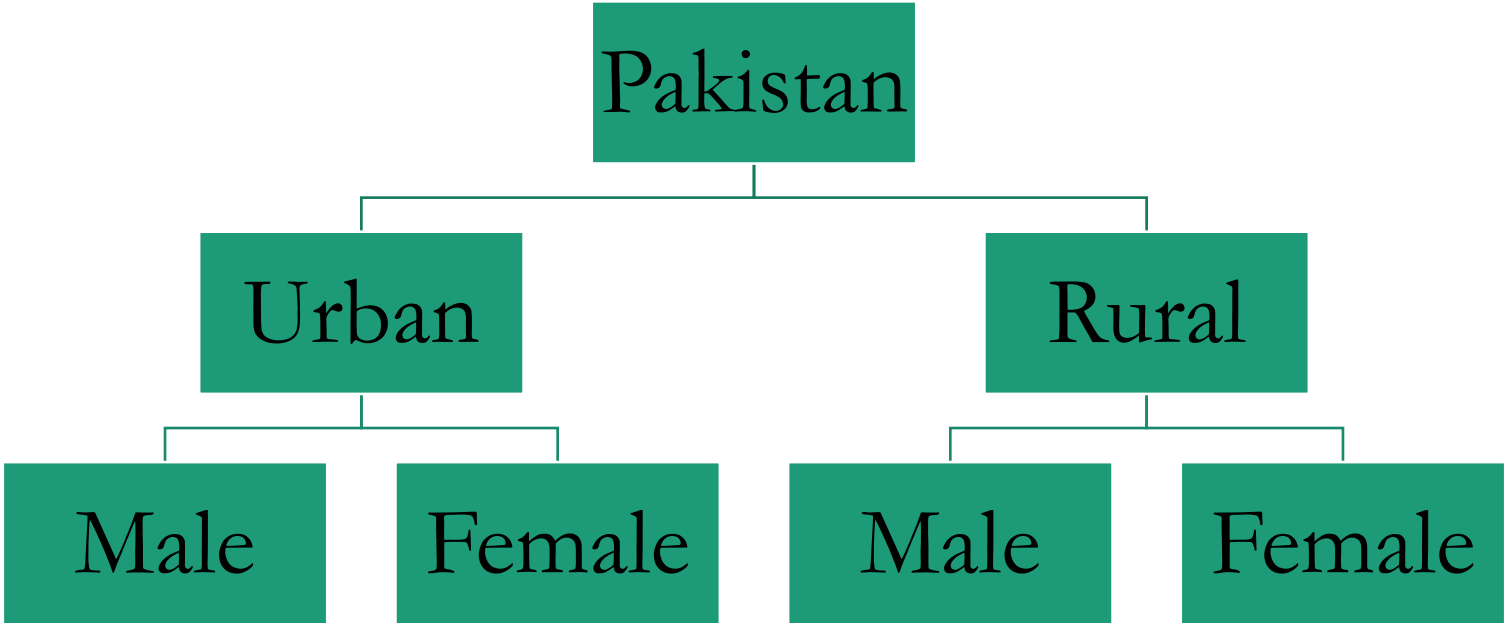
The sampling method used in national surveys is often multistage (e.g., household within cluster, themselves taken within strata)

Multi-stage Sampling

When population is Heterogeneous (different type of people) or complex population (country population), it is necessary to go for multi-stage sampling.

- **1st Stage – Stratification** (Provinces, Rural/Urban/major urban cities, income levels and other well defined social attributes)
- **2nd Stage – Clusters (Usually PPS)** Selecting clusters from each Strata (Primary Sampling Units (PSU) in rural areas and Enumeration Blocks (EB) in urban areas - divided into approx 250 households each)
- **3rd Stage – (Usually SRS/Systematics)** Households/ Individuals (Secondary Sampling Units (SSU) selected from each clusters)

Sample Size

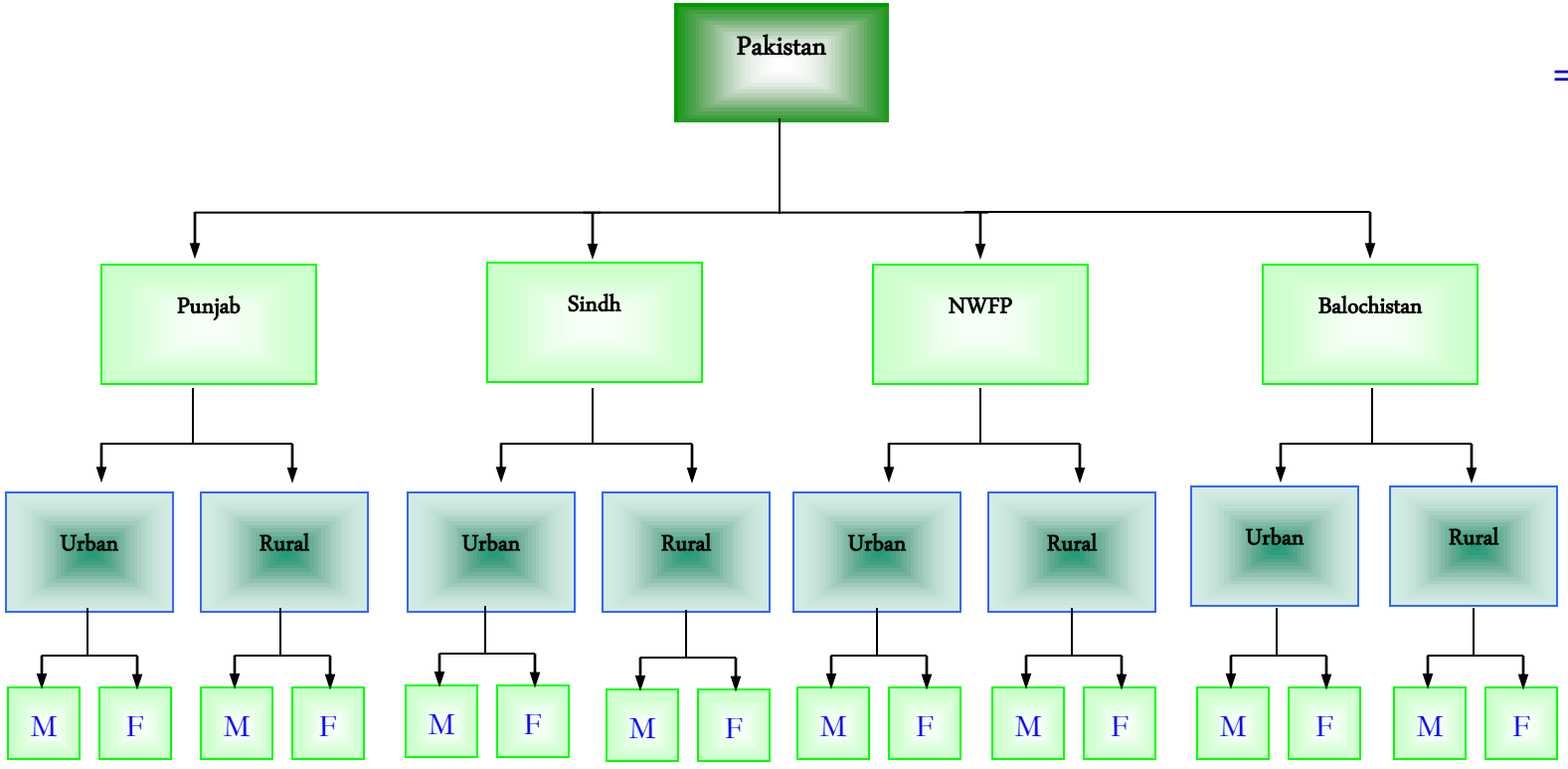


= 384

2 x 384 = 768

2 x 2 x 384=1536

Appropriate Sample Size



= 384

384 x 4 = 1536

384 x 4 x 2=3072

384x4x2x2=6144

WFP World Food Programme wfp.org

VAM-Unit

Sample Size for national Surveys

District Representative Survey	
Districts Including ICT	117
Each district is divided among U-R	2
Total Stratums	234
Sample from each stratum	384
Total Sample	89,856

Province Representative Survey	
Major cities	14
Provinces	4
ICT	1
Total	19
U-R is taken as separate stratum	2
Total Stratums	38
Sample from each stratum	384
Total Sample	14,592

An example of SRS

T H A N K S