Survey Sampling

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Key Words

- Population
- Parameter
- Census , Complete Enumeration
- Sample, Sampling Method
- Statistic
- Non sampling error, Sampling error
- Principal steps for survey
- Principle of survey

KEY WORDS

- Sampling Frame
- Sampling unit
- Precision
- Questionnaire
- Probability sampling
- Non Probability sampling, Judgment sampling
- Population size (N)
- Sample Size(n)
- Margin of error

SURVEY SAMPLING

- What is Survey Sampling?

Survey Sampling is collecting members from a target population to be in a sample for a sample survey

Survey – Type of questionnaire (in person, phone ,internet survey)

- Parts of Survey

Sample selection

Data collection

Estimation – using estimators from the collected data to make inferences about population

Sample selection- Probability

Difference

Parameter	Statistic
o A value describe some aspect of population	o Based on a sample
o A normal curve of a population can be characterized by two parameters – average (mean) & amount of variation.	Calculated from a sample taken from a population
o Descriptive measure of population	o Descriptive measure of sample
o Actual value of population	o Estimate of population(parameter)
o Not Always possible to measure	o Always possible to measure

Statistic

- From a given population, it is possible to draw a multiple samples, the result (statistic) obtained from different samples will vary

Statistic

  is a characteristic of a small part of population

- is a variable & known number depend on sample of population

Parameter

- is a fixed unknown numerical value

Need of sample

- Inferential Statistics give us knowledge about a population parameter on based on a statistic computed from a sample randomly drawn from that population want to know

- Probability sampling method-the probability of each unit appearing in sample to be known

- Non Probability sampling method-based on convenience or judgment

Census (Complete Enumeration) & Sampling Method

Methods of collecting data about the population

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Inference about population parameter

Census and Sampling

Census	Sampling
- All the members of population are enumerated - Expensive method - Time consuming process	- A data set is selected from a large population, represents the entire group - Economical method - Fast process

Census and Sampling

Census	Sampling
- Suitable for population is heterogeneous in nature - Non sampling error	- Suitable for population is heterogeneous in nature - Sample have margin of error, which gets lower as sample size increases - Both Sampling & Non sampling error

Sampling error

- Occurs when researchers take a random sample instead of observing every individual subjects that comprises population.

- While dealing with large population the sampling becomes the only option hence sampling error is extremely difficult to avoid.

Sampling error

- Incurred when the statistical characteristics of a population are estimated from a subset or sample of that population

- Exact measurement of sampling error is not feasible because the true population values (parameters)are unknown

Sampling error

- Difference between a sample statistic to estimate population parameter and actual but unknown value of parameter e g- difference between population mean and sample mean

Characteristics – Sampling error

➢ Decreases as sample size increases

➢ Reduced by an appropriate sampling design

➢ Controlled in probability sample survey

➢ Stratification

➢ Sampling variance is used measure to quantify sampling error

Margin of error

– A number used to give an indication of the amount of uncertainty due to sampling error when using data from a random sample to estimate population parameter

The largest possible margin of error is determined by sample size

Non sampling Error

- Non sampling error is an umbrella term which comprises of a errors , other than the sampling error. Example: Error in questionnaire design, approach, coverage, information provided by the respondents, data preparation, collection ,tabulation and analysis.

- Mainly Two types of Non sampling Error

1 Response error

2 Non response error

Other Non sampling errors

- Observational error

- Coverage error

- Processing error

- Interviewer error

Steps of sample survey

1. Objectives of the survey

2. Population to be sampled

3. Data to be collected

4. Degree of precision sought, cost and timing

5. Questionnaire to be prepared

6. Selection Sampling design

7. Selection of Sampling unit
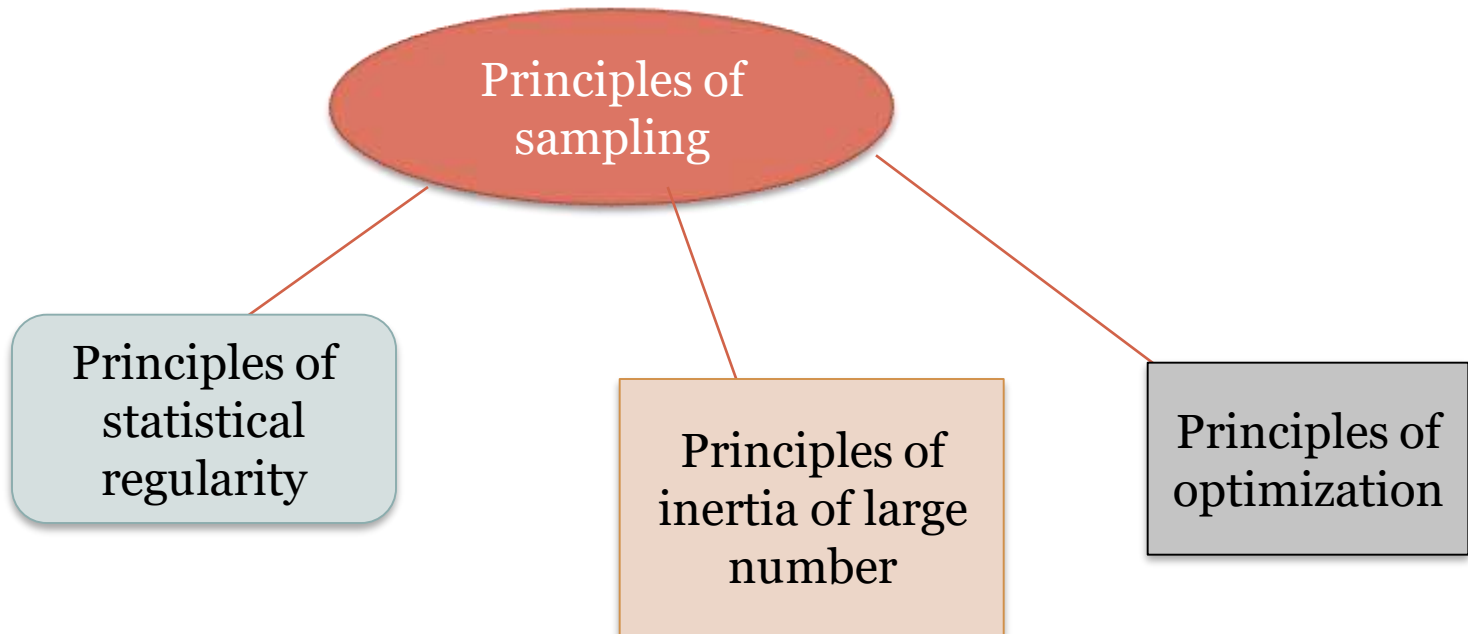
Steps of sample survey

8. Pre test

9. Organization of field work

10. Summary and analysis of the data
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11. Information gain in future survey

Principles of sampling

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Sampling unit

- The population is divided into a finite number of distinct and identifiable units is called Sampling units

- In sampling an agricultural crop, unit might be a field, a farm or an area of land whose shape and dimension are at our disposal

- When studying a group of college students, a single student could be a sampling unit

Sampling Frame

The lists of all the sampling units with proper identification, The frame may consist of either lists of units or map of the area (in case a sample of area is been taken), such that every element in the population belongs to one and only one unit.

Characteristics

1. All units have logical and numerical identifier.

2. Every element of population is present only once in the frame

3. Data is up to date

Number of possible Samples

No of all possible samples of size
n without replacement from N

$$N C n$$

Population Size N

Sample Size
n

N=8   n= 2
No of possible
samples -28
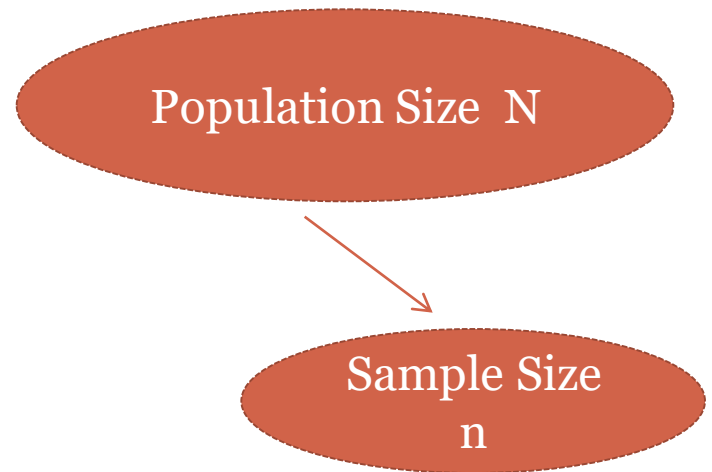
Number of possible Samples

No of all possible samples of size

n with replacement from N

Characteristics :

$$N^n$$

N=8, n=2

No of possible samples   64

Note- Statistic is a function of sample observation

Sample size Table

Required Sample Size[†]

Population Size	Confidence = 95%				Confidence = 99%			
	Margin of Error				Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376
2,000	322	563	869	1655	498	808	1141	1785
2,500	333	597	952	1984	524	879	1288	2173
3,500	346	641	1068	2565	558	977	1510	2890
5,000	357	678	1176	3288	586	1066	1734	3842
7,500	365	710	1275	4211	610	1147	1960	5165
10,000	370	727	1332	4899	622	1193	2098	6239
25,000	378	760	1448	6939	646	1285	2399	9972
50,000	381	772	1491	8056	655	1318	2520	12455
75,000	382	776	1506	8514	658	1330	2563	13583
100,000	383	778	1513	8762	659	1336	2585	14227
250,000	384	782	1527	9248	662	1347	2626	15555
500,000	384	783	1532	9423	663	1350	2640	16055
1,000,000	384	783	1534	9512	663	1352	2647	16317
2,500,000	384	784	1536	9567	663	1353	2651	16478
10,000,000	384	784	1536	9594	663	1354	2653	16560
100,000,000	384	784	1537	9603	663	1354	2654	16584
300,000,000	384	784	1537	9603	663	1354	2654	16586