Sampling Methods in Research

Sampling involves the selection of a number of study units from a defined study population. The population is too large for us to consider collecting information from all its members. Instead, we select a sample of individuals hoping that the sample is representative of the population. **When taking a sample, we will be confronted with the following questions:**

✓ What is the group of people from which we want to draw a sample?

✓ How many people do we need in our sample?

✓ How will these people be selected?

1. Meaning and Definition of Sampling

Sampling is an indispensable technique in social sciences research. A research work cannot be undertaken without the use of sampling. The study of the total population is not possible and it is impracticable. The practical limitation cost, time, and other factors which are usually operative in the situation, stand in the way of studying the total population. The concept of sampling has been introduced with a view to make the research findings economical and accurate (Singh, 2006).

• **Coharn W. G. defines the term sampling as:**

'In every branch of science we lack the resources, to study more than a fragment of the phenomena that might advance our knowledge'. In this definition, a 'Fragment' is the sample as 'phenomena' is the population. The sample observations are applied to the phenomena i.e., generalisation.

• **David S. Fox defines the term sampling as:**

'In the social sciences, it is not possible to collect data from every respondent relevant to our study but only from some fractional part of the respondents. The process of selecting the fractional part is called sampling' (cited in Singh, 2006).

•**Cothari C. R. defines the term sampling as:**

'A sample refers to the technique or the procedure the researcher would adopt in selecting items for the sample. Sample design may as well lay down the number of items to be included in the sample i.e., the size of the sample' (1980, p.56).

•**Kumar R. defines the term sampling as:**

'Sampling is the process of selecting a few (a sample) from a bigger group (the sampling population) to become the basis for estimating or predicting the prevalence of an unknown piece of information, situation, or outcome regarding the bigger group. A sample is a subgroup you are interested in' (2011).

2. Sampling Methods

(a) Probability Sampling: A probability sampling scheme is one in which every unit in the population has a chance (greater than zero) of being selected in the sample, and this probability can be accurately determined. Probability sampling includes:

❖ *Simple random sampling:* All subsets of the frame are given an equal probability of selection. In this case each individual is chosen entirely by chance and each member of the population has an equal chance, or probability, of being selected. One way of obtaining a random sample is to give each individual in a population a number, and then use a table of random numbers to decide which individuals to include. As with all probability sampling methods, simple random sampling allows the sampling error to be calculated and reduces selection bias. This sampling method is applicable when population is small, homogeneous, and really available.

❖ *Systematic random sampling* It relies on arranging the target population according to some ordering scheme and then selecting elements at regular intervals theory that ordered list. If you need a sample size n from a population of size x, you should select every x/n^{th} individual for the sample. For example, if you wanted a sample size of 100 from a population of 1000, select every $1000/100 = 10^{th}$ member of the sampling frame. It is important in that the starting point is not automatically the first in the list, but is instead randomly chosen from within the first to the nth element in the list.

❖ *Stratified random sampling:* In this method, the population is first divided into subgroups (or strata) who all share a similar characteristic. It is used when we might reasonably expect the measurement of interest to vary between the different subgroups, and we want to ensure representation from all the subgroups. A subgroup is a natural set of items. Subgroups might be based on company size, gender or occupation (to name but a few). Its purpose is to ensure that every stratum is adequately represented (Ackoff, 1953). For example, in a study of stroke outcomes, we may stratify the population by sex, to ensure equal representation of men and women.

❖ *Cluster sampling:* Cluster sampling is where the whole population is divided into clusters or groups. Subsequently, a random sample is taken from these clusters, all of which are used in the final sample (Wilson, 2010). Cluster sampling is advantageous for those researchers whose subjects are fragmented over large geographical areas as it saves time and money (Davis, 2005). It is an example of 'two-stage sampling'

- First stage a sample of areas is chosen;
- Second stage a sample of respondents within those areas is selected.

(b) Non-probability Sampling: Non probability sampling is often associated with case study research design and qualitative research. With regards to the latter, case studies tend to focus on small samples and are intended to examine a real life phenomenon, not to make statistical inferences in relation to the wider population (Yin, 2003). A sample of participants or cases does not need to be representative, or random, but a clear rationale is needed for the inclusion of some cases or individuals rather than others. It is also known as non-parametric sampling which is used for certain purposes. Non-probability sampling includes:

❖ *Convenience sampling:* Convenience sampling is selecting participants because they are often readily and easily available. Typically, convenience sampling tends to be a favored sampling technique among students as it is inexpensive and an easy option compared to other sampling techniques (Ackoff, 1953). Convenience sampling often helps to overcome many of the limitations associated with research. For example, using friends or family as part of sample is easier than targeting unknown individuals. The researcher using such a sample cannot scientifically make generalisations about the total population from this sample because it would not be representative enough.

❖ *Purposive sampling:* Purposive or judgmental sampling is a strategy in which particular settings, persons or events are selected deliberately in order to provide important information that cannot be obtained from other choices (Maxwell, 1996). It is where the researcher includes cases or participants in the sample because they believe that they warrant inclusion.

❖ *Quota sampling:* Quota sampling is a non random sampling technique in which participants are chosen on the basis of predetermined characteristics so that the total sample will have the same distribution of characteristics as the wider population (Davis, 2005). It is based on first the segmentation of the population into mutually exclusive sub-groups just as in stratified sampling. Then judgment is used to select sub- subjects or units from each segment based on a specified proportion. It is this second step that makes the technique one of the non-probability sampling.

❖ **Snowball sampling:** Snowball sampling is a non- random sampling method that uses a few cases to help encourage other cases to take part in the study, thereby increasing sample size. This approach is most applicable in small populations that are difficult to access due to their closed nature, e.g. secret societies and inaccessible professions (Breweton and Millward, 2001).

3. Size of a Sample

The size of the sample often depends on the researcher's precision to estimate the population parameter at a particular level. However, it is clear that there is no clear rule to determine the size of the sample. The best answer to the question of size is to use a large sample. A larger sample is lively to be much more representative of the population. Furthermore, with a large sample, the data can be more accurate and precise. It was pointed out that in that the larger the sample, the smaller the standard error.