

Sample size determination:

We use the following formula to determine sample size from a population:

$$n = \frac{z^2 p(1-p)}{e^2} \text{ where } z \text{ is the value of Z-score at 95\% or 99\% confidence levels.}$$

p is proportion of events which are to be appeared in the population in which we are interested and (1-p) is the proportion of events not to be occurred in the population,

e is the margin of errors. That is 5% or 1%.

For example:

Suppose in a population the event in which we are interested consists of proportion as 0.5 and we choose 95% confidence levels, then sample size required for this population is given below:

$$n = \frac{(1.96)^2 0.5(1-0.5)}{(0.05)^2} = 384.16 = 384 \text{ to be needed from this population.}$$

Procedure of selecting a random sample:

A practical procedure of selecting a random sample is done by using the random numbers which are given in any Statistics Book.

The procedure takes the following form

- (i) Identifying N units in the population with the numbers 1,2,...N. or preparing a list of the units in the population and serially numbered them.
- (ii) Selecting different numbers from the table of random numbers
- (iii) Taking for the sample the n units whose numbers correspond to those drawn from the table of random numbers.

Example: Select a sample of 34 villages from a list of 338 villages.

Using the three digits number taking either from a row or a column, we have the 34 selected samples

125,326,12,237,35,251,165,131,198,33,161,209,51,52,331,218,337,283,223,241,27
7,42,14,303,40,99,102,173,137,321,335,155,163,81

The procedure involves the rejection of large number of random numbers, nearly two thirds. A device is commonly used to avoid the rejection of such large numbers(**known as Remainder Method of Selection**) is to divide a random

number by 338 and take the remainder as equivalent to the corresponding serial number between 1 to 377, the remainder zero corresponding to 338. It is, however, essential to reject random numbers 677 to 999 and also 000 in adopting this procedure as otherwise villages with serial numbers 1 to 323 will get a larger chance of selection.

Using the random number tables, the following samples have been made.

125,206,326,193,12,237,35,251,325,338,114,231,78,112,126,330,312,165,131,198,
33,161,209,51,52,331,218,337,238,323,263,90,11,223