

Exercise.6

Selection of simple random sampling using lottery method and random numbers

Simple Random sampling (SRS)

The basic probability sampling method is the simple random sampling. It is the simplest of all the probability sampling methods. It is used when the population is homogeneous.

When the units of the sample are drawn independently with equal probabilities. The sampling method is known as Simple Random Sampling (SRS). Thus if the population consists of N units, the probability of selecting any unit is $1/N$.

A theoretical definition of SRS is as follows

Suppose drawn sample of size n from a population of size N . There are ${}^N C_n$ possible sample of size n . If all possible samples have an equal probability $1/{}^N C_n$ of being drawn, the sampling is said to be simple random sampling.

There are two methods in SRS

1. Lottery method
2. Random no. table method

Lottery method

This is most popular method and simplest method. In this method all the items of the universe are numbered on separate slips of paper of same size, shape and color. They are folded and mixed up in a drum or a box or a container. A blindfold selection is made. Required numbers of slips are selected for the desired sample size. The selection of items thus depends on chance.

For example if we select 5 students out of 50 students on slips of the same size and mix them, then we make a blindfold selection of 5 students. This method is also called unrestricted random sampling because units are selected from the population without any restriction. This method is mostly used in lottery draws. If the universe is infinite, this method is inapplicable. There is a lot of possibility of personal prejudice if the size and shape of the slips are not identical.

Random number table method

As the lottery method cannot be used when the population is infinite, the alternative method is using of table of random numbers.

There are several standard tables of random numbers. But the credit for this technique goes to Prof. LHC. Tippett (1927). The random number table consists of 10,400 four-figured numbers. There are various other random numbers. They are fishers and Yates (1938) comprising of 15,000 digits arranged in twos. Kendall and B.B Smith (1939) consisting of 1, 00,000 digits grouped in 25,000 sets of 4 digit random numbers, Rand corporation (1955) consisting of 2, 00,000 random numbers of 5 digits each etc.,

Learning Exercise

The following data refers to the Kapas yield of 96 plants.

82	102	88	93	97	38	103	92
102	62	63	72	64	68	59	69
73	65	46	79	87	84	29	52
28	36	37	53	49	51	30	37
56	66	42	37	35	97	32	35
89	99	54	72	26	67	18	27
60	72	33	42	52	82	14	22
57	73	63	61	63	92	40	58
62	61	43	25	42	36	17	30
75	87	47	56	76	36	35	44
56	51	111	73	93	58	49	89
50	80	54	55	91	12	82	76

Select a sample of 25 plants by using simple random sampling method. Also calculate the mean of the 25 samples and verify whether the mean is equal to the mean of the 96 plants.