

Estimation for a Population Proportion from Stratified Random Sampling

The formulas for estimating a population proportion p and its bound from StRS are:

$$\hat{p}_{st} = \frac{1}{N} \sum_{i=1}^L N_i \hat{p}_i = \sum_{i=1}^L \left(\frac{N_i}{N} \right) \hat{p}_i, \text{ and}$$
$$\hat{V}(\hat{p}_{st}) = \frac{1}{N^2} \sum_{i=1}^L N_i^2 \left(\frac{\hat{p}_i \hat{q}_i}{n_i - 1} \right) \left(\frac{N_i - n_i}{N_i} \right).$$

Sample size calculation for estimation of proportions from StRS

The same approach to calculation of sample size as used for means and totals gives:

n_i is proportional to $N_i \sqrt{p_i q_i / c_i}$ with

$$n = \frac{\sum_{i=1}^L N_i^2 p_i q_i / a_i}{N^2 D + \sum_{i=1}^L N_i p_i q_i},$$

where $D = B^2/4$.