

$$\hat{Y} = \frac{N}{n} \sum_{i=1}^n \sum_{a=1}^{Li} \frac{1}{bia} y_{ia}$$

where y_{ia} is taken as 1 for a-th slum of i-th sample block possessing the characteristic and 0 otherwise.

- (ii) For estimating the number of slum households or slum population in a stratum \times sub-stratum possessing a characteristic:

$$\hat{Y} = \frac{N}{n} \sum_{i=1}^n \sum_{a=1}^{Li} \frac{1}{bia} y_{ia}$$

where y_{ia} is taken as the number of households/ population possessing the characteristic y belonging to the a-th slum of i-th sample block.

A.6 Overall Estimate for Aggregates for a sub-stratum:

Overall estimate for aggregates for a sub-stratum (\hat{Y}_{st}) based on all sub-samples in a sub-stratum is obtained as:

(i) For sub-stratum with 2 sub-samples: $\hat{Y}_{st} = \frac{1}{2} \sum_{m=1}^2 \hat{Y}_{stm}$

(ii) For sub-stratum with 3 sub-samples: $\hat{Y}_{st} = \frac{1}{3} \sum_{m=1}^3 \hat{Y}_{stm}$

A.7 Overall Estimate for Aggregates for a stratum:

Overall estimate for a stratum (\hat{Y}_s) will be obtained as

$$\hat{Y}_s = \sum_t \hat{Y}_{st}$$

A.8 Overall Estimate of Aggregates at State/UT/all-India level:

The overall estimate \hat{Y} at the State/ UT/ all-India level is obtained by summing the stratum estimates \hat{Y}_s over all strata belonging to the State/ UT/ all-India.

A.9 Estimates of Ratios:

Let \hat{Y} and \hat{X} be the overall estimates of the aggregates Y and X for two characteristics y and x respectively at the State/ UT/ all-India level.

Then the combined ratio estimate (\hat{R}) of the ratio ($R = \frac{Y}{X}$) will be obtained as $\hat{R} = \frac{\hat{Y}}{\hat{X}}$.

A.10 **Estimates of Error:** The estimated variances of the above estimates will be as follows:

A.11 **For aggregate \hat{Y} :** $V\hat{ar}(\hat{Y}) = \sum_s V\hat{ar}(\hat{Y}_s) = \sum_s \sum_t V\hat{ar}(\hat{Y}_{st})$ where $V\hat{ar}(\hat{Y}_{st})$ is given by

- (i) for sub-stratum with 2 sub-samples: