Note on Sampling design and Estimation Procedure of Annual Survey on Unincorporated Sector Enterprises (ASUSE) 2025

1.0 Introduction:

National Statistics Office (NSO) of India conducted Annual Survey on Unincorporated Sector Enterprises (ASUSE) 2025 during January, 2025 to December, 2025. This survey was devoted exclusively to economic and operational characteristics of unincorporated non-agricultural establishments in manufacturing, trade and other services sector. The unit of enquiry of the ASUSE was an 'establishment'.

1.1 **Objective of the survey:**

ASUSE 2025 survey was an integrated survey on economic and operational characteristics of unincorporated non-agricultural enterprises in manufacturing, trade and other services sectors to supplement the corporate sector data. ASUSE 2025 generates estimates at multiple temporal and geographic levels:

Major indicators: quarterly estimates at the all-India level

All indicators: annual estimates at State/UT and all-India levels

1.1.1 **Geographical coverage:** The survey covered the rural and urban areas of whole of India (except the villages in Andaman and Nicobar Islands which were difficult to access).

1.1.2 **Period of survey**: ASUSE 2025 survey period was twelve months, from 1st January 2025 to 31st December 2025. The survey period ASUSE 2025 was divided into four sub-rounds of three months' duration:

Sub-round 1:	January – March 2025
Sub-round 2:	April – June 2025
Sub-round 3:	July – September 2025
Sub-round 4 :	October–December 2025

In each of these sub-rounds, an equal number of sample first stage units (FSUs) i.e. villages/ blocks were allotted for survey. Attempt was made to survey each of the FSUs during the sub-round to which it was allotted. Because of the arduous field conditions, this restriction was not strictly enforced in Andaman and Nicobar Islands, Lakshadweep, Ladakh and rural areas of Arunachal Pradesh and Nagaland.

1.2 **Schedules of enquiry**: During this round, the following schedules of enquiry were canvassed:

Schedule LSU	: list of households and non-agricultural establishments
Schedule ESU	: establishment schedule

1.3 **Sampling design**

1.3.1 **Outline of sampling design**: A stratified multi-stage sampling design was adopted for ASUSE.

Rural sector: The first stage units (FSU) were the census villages in this sector. For rural part of Kerala, Panchayat wards (PW) were taken as FSUs.

Urban sector: The First Stage Units (FSU) was the latest updated UFS (Urban Frame Survey) blocks.

The Ultimate Stage Units (USU) were establishments for both the sectors. In the case of large FSUs, one intermediate stage of sampling was the selection of three hamlet-groups (HGs)/sub-blocks (SBs) from each of the large FSUs.

1.3.2 **Sampling frame for selection of FSUs:**

Census 2011 list of villages was used as the sampling frame for rural areas. Auxiliary information such as number of workers, etc. available from Sixth Economic Census (EC) frame was used for stratification, sub-stratification and selection of FSUs in rural areas (except Kerala). In rural areas of Kerala, list of Panchayat Wards (PW) as per Census 2011 was used as sampling frame. For all urban areas, the latest updated list of UFS blocks (mostly, UFS 2017-22 or UFS 2022-27) was the sampling frame.

1.3.3 **Stratification of FSUs**:

(a) Each district was a stratum. Within each district of a State/UT, generally speaking, two basic strata were formed:

(i) rural stratum comprising of all rural areas of the district and

(ii) urban stratum comprising of all the urban areas of the district. However, within the urban areas of a district, if there were one or more towns with population one million or more as per Census 2011, each of them formed a separate basic stratum and the remaining urban areas of the district was considered as another basic stratum.

- each million plus city as per census 2011 constitutes a separate stratum. Stratum numbers were 01, 02, 03....,19
- rest of the urban areas of the district was given stratum number 20.

(b) A special stratum, in the rural areas only, was formed at State/Ut level before district level strata were formed in each State/UT. This stratum comprises of all the villages with zero worker as per EC 6 and Census 2011. Due to very few number of zero worker villages in Delhi, Goa and Ladakh, no special stratum (zero stratum) had been formed in these States/UTs.

1.3.4 **Sub-stratification of FSUs**:

1.3.4.1 **Rural sector (Except Kerala)**

1.3.4.1.1 Due to very small population size in rural sector of Delhi, all the districts in Delhi were merged and constitute one district only. All the districts in urban part of New Delhi get sample allocation but for keeping similarity with rural part of Delhi, in urban area also districts were merged for multiplier and RSE% computation. Due to small population sizes, no sub-stratum was formed in the rural sector of Delhi (071), Daman & Diu, Dadra & Nagar Haveli (251), Lakshadweep (311) and Puducherry (341). Moreover, some villages (islands) in rural Lakshadweep have been uninhabited for several years and classified as prohibited by the local administration. In this case, to ensure minimum number of samples as per the sampling design, all the remaining four (4) inhabited villages had been automatically selected.

1.3.4.1.2 All the villages with zero worker as per EC6 and census 2011 worker within each State/Ut formed a stratum (say, 'zero stratum') within that State/UTs, wherever available.

1.3.4.1.3 Except for those UTs mentioned in 1.3.4.1.1, for the remaining part of the district of any state/UT (excluding those zero worker villages mentioned above), the principle of forming more sub-strata where variation was higher was adopted. For this purpose, variability of number of workers in a stratum (i.e. districts) was assessed by computing Coefficient of Variation (CV) of the workers belonging to it. For computing those CV, the Sixth EC non-agricultural worker figures were considered first. In absence of the 6^{th} EC worker, census non-agricultural worker figures were considered.

1.3.4.1.4 Three 'non-zero sub-strata' (i.e., number of workers was positive) were formed within each district where CV of worker in a stratum was more than 3; 2 'non-zero sub-strata' were formed where CV of worker in a stratum was more than 2 but less than or equal to 3, and 1 'non-zero sub-stratum' was formed where CV of worker in a stratum was less than or equals 2.

1.3.4.1.5 The 'non-zero sub-strata', as mentioned above, within each stratum was formed by equalizing total worker size of the sub-strata. In other words, the 'non-zero sub-strata' within each stratum was formed in such a way that each of the sub-stratum possesses more or less equal no. of workers. Sub-strata having too few villages were merged with other sub-strata in the same stratum.

1.3.4.2 **Rural sector (Kerala)**

1.3.4.2.1 Four sub-strata were created within each stratum (i.e., district) by dividing the population into quintiles. Thus, each sub-stratum contained about 25% population of the respective stratum

1.3.4.3 **Urban Sector**:

1.3.4.3.1 For each stratum, two sub-strata were formed based on the information as available from the latest available UFS blocks as follows:

sub-stratum 1: UFS blocks identified as Bazaar area (BA)/ Industrial area (IA)/ Hospital area (HA)/ Slum area (SA) which were likely to contain relatively higher number of establishments.

sub-stratum 2: remaining UFS blocks of the stratum

1.3.5 **Allocation of FSUs**:

1.3.5.1 **Total sample size (FSUs)**: About 24300 FSUs was covered for the central sample at all-India level.

Allocation Strategy: Basic objective of ASUSE 2025 was generation of quarterly estimates for major indicators at all-India level as well as annual estimates for all indicators at State/UT/all-India level. Sample FSUs were selected independently on quarterly basis. Sample size at all-India level was decided considering RSE (%) of important indicators at State/UT level and also considering minimum allocation at each stratum × sub-stratum level on quarterly basis. Minimum 2 FSUs were allocated in each quarter at stratum × sub-stratum level to ensure computation of RSE at later stage. In case of million plus cities, a minimum of 20 FSUs were allotted annually. In the rural sector, districts with higher coefficient of variation (CV) of workers were allocated more FSUs to ensure better estimates. Since Bazaar and Hospital areas presumably had more establishments than other areas, more FSUs were allocated to sub-stratum 1 of the urban sector.

1.3.5.2 **Sector-wise allocation of total sample to States and UTs**: In rural area, initially, CVs of workers were calculated separately for all the districts. Next, as per the criteria mentioned in section 1.3.4, number of sub-strata was determined. In rural areas, in each stratum × sub-stratum, a minimum of 8 FSUs had been

allotted for the whole year ensuring minimum 2 FSUs quarterly. Also for zero stratum in each State/UT, 8 FSUs were allocated for the whole year to ensure a minimum of 2 FSUs for each quarter.

In urban area, within each district, 2 sub-strata were formed based on area type as mentioned in para 1.3.4.3.1. Minimum 2 FSUs were allotted quarterly in these two sub-strata ensuring a minimum of 8 FSUs for the whole year. For million plus cities a minimum of 20 FSUs were allotted for the whole year. State level allocation was arrived at after adding sub-stratum level FSU allocation within each State.

1.3.5.3 **Allocation for the State of Kerala**

1.3.5.3.1 Rural sector: 4 sub-strata were formed within each district. Within each stratum × sub-stratum, 2 FSUs were allotted on quarterly basis. Thus, for the whole year, a total of 8 FSUs were allotted for each sub-stratum.

1.3.5.3.2 **Urban sector**: Quarterly, a minimum of 2 FSUs were allotted for each stratum × sub-stratum in the urban sector ensuring 8 FSUs for the whole year.

1.3.6 **Selection of FSUs**:

From each stratum/sub-stratum, required number of sample FSUs were selected by SRSWOR scheme independently on quarterly basis. Sample size for each of the quarters were kept exactly same. Since samples were selected independently for each quarter, there might be cases of repeat samples between quarters.

1.3.7 **Formation of segment 9 and selection of hamlet-groups/ sub-blocks:**

1.3.7.1 **Proper identification of the FSU boundaries**: The first task of the field investigators was to ascertain the exact boundaries of the sample FSU as per its identification particulars given in the sample list. For urban samples, the boundaries of each FSU could be identified by referring to the map for the 'UFS Phase' used for selection of FSUs.

1.3.7.2 **Formation of Segment 9**: All non-agricultural establishments having 10 or more workers in the entire FSU and operated at least one day during last 365 days preceding the day of survey (hereinafter to be called as 'big establishments') were listed and all the eligible units under coverage were surveyed. All the listed 'big establishments' (whether under coverage or not) constitute segment 9. All eligible establishments under coverage in segment 9 were surveyed.

1.3.7.3 **Criterion for hamlet-group/sub-block formation**: Having constituted segment 9 as stated above, it was determined whether listing to be done in the whole sample FSU or not. For this, approximate present population (P) and approximate total number of non-agricultural establishments (E) for the whole FSU should be ascertained first from knowledgeable persons. Depending upon the values of 'P' and 'E', it was divided into a suitable number (say, DP and DE) of 'hamlet-groups' in the rural sector and 'sub-blocks' in the urban sector as stated below. Final value of number of 'hamlet-groups' to be formed in the rural sector (or 'sub-blocks' to be formed in the urban sector), say 'D', was the higher of the two values 'DP' and 'DE' based on the dual criteria.

Population and establishment (dual) criteria

Approximate population (P)	no. of HGs/SBs to be formed(D_P)	approx no. of non-agricultural establishments (E)	no. of HGs/ SBs to be formed(D_E)
less than 1200	1	less than 120	1
1200 - 1599	4	120 - 159	4
1600 - 1999	5	160 - 199	5
2000 - 2399	6	200 - 239	6
and so on	…	and so on	…

Example: If in a village (FSU) approximate population (P) was 1400 and approximate number of non-agricultural establishments (E) was 200, then DP was 4 whereas DE was 5. The number of hamlet-groups to be formed was maximum of DP and DE, i.e., 5 in this case. Thus, in this case, the number of hamlet-groups to be formed was decided on the basis of DE and so, hamlet groups were formed in such a fashion that each 'HG' had more or less equal number establishments (see paragraph 1.3.7.4 below).

For rural areas of (i) Himachal Pradesh, (ii) Sikkim, (iii) Andaman & Nicobar Islands, (iv) Uttarakhand (except four districts Dehradun, Nainital, Hardwar and Udham Singh Nagar), (v) Poonch, Rajouri, Udhampur, Reasi, Doda, Kishtwar, Ramban districts of Jammu & Kashmir, (vi) Ladakh and (vii) Idukki district of Kerala, the number of hamlet-groups/sub-blocks were formed as follows:

Population and establishment (dual) criteria

population (P)	no. of HGs to be formed (DP)	no. of non-agricultural establishments (E)	no. of HGs to be formed (D_E)
less than 600	1	less than 120	1
600 - 799	4	120 - 159	4
800 - 999	5	160 - 199	5
1000 - 1199	6	200 - 239	6
and so on	…	and so on	…

1.3.7.4 **Formation and selection of hamlet-groups/sub-blocks**:

In case, the hamlet-groups/sub-blocks were to be formed in the FSU, the same should be done either by approximately equalizing population or by equalizing number of non-agricultural establishments. If the

criterion for deciding the value of 'D' was population (i.e., DP), then HG/SB were formed by equalizing population and if establishment criterion was used for deciding 'D' (i.e. based on DE), then by equalizing the number of non-agricultural establishments. If the value of 'D' was same for both population and establishment criteria, then HG/SB were to be formed by equalizing establishments.

1.3.7.5 **Segments 1 & 2**: Two segments (in addition to segment 9 already formed) were selected from a large FSU wherever hamlet-groups/sub-blocks had been formed in the following manner – Segment 1 was the HG/SB having maximum number of hired worker establishments (HWE) under the coverage. Two more HGs/SBs were selected from the remaining HGs/SBs of the sample FSU with equal probability following the method of SRSWOR and combined to form Segment 2.

Listing and selection of the establishments was done independently in the two selected segments. FSUs without HG/SB formation were treated as sample segment 1, and in such cases, there was no segment 2.

1.3.8 **Listing of establishments and formation of their frame**: All the households and non-agricultural establishments (NAEs) [including those found to be temporarily locked after ascertaining temporariness of locked NAEs through local enquiry] were listed for each segment. Although all non-agricultural establishments were to be listed, only the unincorporated manufacturing, trade and service sector establishments which were eligible was covered. Further, those establishments which operated for at least 30 days (15 days for seasonal/casual establishments and SHGs) during the reference period (i.e., last 365 days preceding the date of survey) qualify for survey. Such establishments hereafter be referred to as 'eligible establishments.

1.3.9 **Formation of Second Stage Strata (SSS) and allocation of establishments**

Eighteen (18) second-stage strata (SSS) were formed within each sample FSU. Composition of various SSS and allocation of sample establishments was as under:

SSS no.	NIC 2008 codes	Description of major activities	Allocation of sample establishments
1	any of the NICs under survey coverage	Society/Trust/Association/Club/Body of individuals, etc.	2
2	any of the NICs under survey coverage	Co-operatives	2
3	64309 (special code)	Self-Help Groups	2
A. Hired Worker Establishments (HWE)			
(i) SSS pertaining to Manufacturing establishments			
4	01632, 19, 21, 26, 30, 35103, 35105, 35106, 35107, 35109,45200,45403	Cotton ginning, cleaning and bailing, coke and refined petroleum products, pharmaceuticals, medicinal chemical and botanical product, computer, electronic and optical products, other transport equipment, electric power generation etc., 'repair and maintenance of motor vehicles, motor cycles, etc.'	2
5	10, 11	Food products and beverages	2
6	13, 14, 15, 16, 17, 18, 31	Textiles, wearing apparel, leather and related products, wood	2

SSS no.	NIC 2008 codes	Description of major activities	Allocation of sample establishments
		and wood products, paper and paper products, printing, furniture etc.	
7	12, 20, 22, 23, 24, 25, 27, 28, 29, 32, 33	Tobacco, chemical and chemical products, rubber and plastic products, other non-metallic mineral products, basic metals, fabricated metal product, electrical equipment, machinery and equipment n.e.c., motor vehicles, trailers and semi-trailers, other manufacturing activities, repair and installation of machinery and equipment.	2
(ii) SSS pertaining to Trading establishments			
8	45(excluding 45200, 45403), 46, 47	Wholesale and retail trade and repair of motor vehicles and motorcycles, 'Other wholesale trade' and 'Other retail trade'.**excluding** 'repair and maintenance of motor vehicles, motor cycles, etc.'	4
(iii) SSS pertaining to Other services establishments			
9	56	Food and beverage service activities	2
10	85	Education	2
11	86, 87	Human health activities, residential care activities	2
12	36 – 39, 49211, 49219, 4922 (including 49227), 4923, 50, 52, 53, 55, 58 – 63, 64193, 64300, 6491, 64920, 64921, 64929, 6499, 6612, 6619, 662, 663, 68 (including 68108,68109) – 75, 77 – 81(including 81309), 82, 88, 90 – 93, 941, 94910, 94919, 9499, 95, 96 (including 96099)	Other services activities	4
B. Own Account Establishments (OAEs)			
13	01632, 10–33, 35103, 35105, 35106, 35107, 35109,45200,45403	Manufacturing activities including 'repair and maintenance of motor vehicles, motor cycles, etc.'	4
14	45 (excluding 45200, 45403), 46, 47	Wholesale and retail trade and repair of motor vehicles and motorcycles, 'Other wholesale trade' and 'Other retail trade'. **excluding** 'repair and maintenance of motor vehicles, motor cycles, etc.'	4
15	56	Food and beverage service activities	2
16	85 (including 85999)	Education	2

SSS no.	NIC 2008 codes	Description of major activities	Allocation of sample establishments
17	86, 87	Human health activities, residential care activities	2
18	36 – 39, 49211, 49219, 4922, 4923, 50, 52, 53 55, 58 – 63, 64193, 64300, 6491, 64920, 64921, 64929, 6499, 6612, 6619, 662, 663, 68 (including 68108, 68109) – 75, 77 – 81(including 81309), 82, 88, 90 – 93, 941, 94910, 94919, 9499, 95, 96 (including 96099 & 96999)	Other services activities	4
Total no. of sample establishments in a FSU			**46**

If there was segment formation in an FSU then allocation of sample establishments was divided equally among the two segments.

1.3.9.1 In addition to the above, all the eligible establishments of segment 9 were surveyed.

1.3.10 **Selection of Establishment:** Sample establishments from each SSS (excluding segment 9) were selected by SRSWOR.

2. Estimation Procedure

2.1 Notations:

s = subscript for s-th stratum

t = subscript for t-th sub-stratum

i = subscript for i-th FSU [village/ block]

d = subscript for a segment (d = 1, 2, 9)

j = subscript for j-th second stage stratum in an FSU/ segment (j=1, 2, 3..... , 18)

k = subscript for k-th sample establishment under a particular second stage stratum within an FSU/ segment

r = quarter

D = total number of HGs/ SBs formed in the sample

FSU D* = 0 if D = 1

= (D – 1)/2 for FSUs with D > 1

N = total number of FSUs in any rural/urban sub-stratum

n = number of sample FSUs surveyed including 'uninhabited' and 'zero cases' but excluding casualty for a particular sub-stratum

E = total number of establishments listed in a second-stage stratum of an FSU / segment of sample FSU

e = number of establishments surveyed in a second-stage stratum of an FSU / segment of sample FSU (excluding casualty establishments)

x, y= observed value of characteristics x, y under estimation

$\hat{X}$, $\hat{Y}$ = estimate of population total X, Y for the characteristics x, y

Under the above symbols,

$y_{srtidjk}$ = observed value of the characteristic y for the k-th establishment in the j-th second stage stratum of the d-th segment (d = 1, 2, 9) of the i-th FSU belonging to the t-th sub-stratum of s-th stratum in r-th quarter.

However, for ease of understanding, a few symbols had been suppressed in following paragraphs where they were obvious.

Formulae for estimation of aggregates for a particular quarter at stratum × sub-stratum level:

2.2.1 **Schedule LSU:**

2.2.1.1 Rural/Urban:

(i) For estimating the number of establishments in a Stratum × Sub-Stratum possessing a characteristic:

$$\widehat{Y_r} = \frac{N_{st}}{n_{rst}} \sum_{i=1}^{n} [\, y_{ir9} + y_{ir1} + D_{ir}^{*} \times y_{ir2} \,]$$

Where y_{ir9}, y_{ir1}, y_{ir2} are the total number of establishments possessing the characteristic y in segment 9, 1 & 2 respectively in the i^{th} FSU belonging to the r^{th} quarter.

2.2.2 **Schedule ESU:**

2.2.2.1 Rural/ Urban:

Estimation formula for a sub-stratum of a State/UT:

(i) For establishments selected in j^{th} second stage stratum in r^{th} quarter:

$$\widehat{Y_{rJ}} = \frac{N_{st}}{n_{rstj}} \sum_{i=1}^{n_{rj}} [\, \sum_{k=1}^{e_{ir9j}} y_{ir9jk} + \frac{E_{ir1j}}{e_{ir1j}} \sum_{k=1}^{eir1j} y_{ir1jk} + D_{ir}^{*} \times \frac{E_{ir2j}}{e_{ir2j}} \sum_{k=1}^{e_{ir2j}} y_{ir2jk}]$$

(ii) For all selected establishments in that sub-stratum:

$$\widehat{Y_r} = \sum_j \widehat{Y_{rJ}}$$

Note: For segment 9, an adjustment may be necessary if E≠ e for a second stage stratum due to casualty at the detailed enquiry stage. In that case, contribution of segment 9 (i.e. $\sum_{k=1}^{e_{ir9j}} y_{ir9jk}$) in the above formulae may be replaced by $\frac{E_{ir9j}}{e_{ir9j}} \times \sum_{k=1}^{e_{ir9j}} y_{ir9jk}$, where E_{ir9j} = number of listed establishments in the segment 9 for j^{th} SSS of i^{th} FSU as per column (4) of block 6a of schedule LSU belonging to the r^{th} quarter and e_{ir9j} = number of establishments in segment 9 actually surveyed in j^{th} SSS of i^{th} FSU belonging to the r^{th} quarter as per column (6) of block 6a of schedule LSU) .

If in a particular FSU× SSS, all the segment 9 establishments could not be surveyed in a particular quarter in that case this particular FSU will be casualty for segment 9 for that particular SSS in that quarter.

$E_{ir9j} = e_{ir9j}$, if there is no casualty.

2.3 **Overall Estimate for aggregates for a stratum in a particular quarter**:

Overall estimate for a stratum ($\widehat{Y_{rs}}$) will be obtained as

$$\widehat{Y_{rs}} = \sum_t \widehat{Y_{rst}}$$

2.4 **Overall quarterly estimate of aggregates at State/UT/all-India level**:

The overall quarterly estimate ($\widehat{Y_r}$) at all-India level will be obtained by summing the stratum estimates $\widehat{Y_{rs}}$ over all strata belonging to all the State/UT.

Quarterly estimate ($\widehat{Y_r}$) at State/Ut level will be obtained by summing the stratum estimates $\widehat{Y_{rs}}$ over all strata belonging to the particular State/UT

2.5 **Estimates of Ratios in a particular quarter:**

Let $\widehat{Y_r}$ and $\widehat{X_r}$ be the overall quarterly 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 ($\widehat{R_r}$) of the ratio ($R_r = \frac{Y_r}{X_r}$) will be obtained as

$\widehat{R_r} = \frac{\widehat{Y_r}}{\widehat{X_r}}$.

2.6 **Estimation of Errors (Quarterly basis):**

2.6.1 **Formula for quarterly estimated variance (for Rural/ Urban):**

2.6.1.1 The sampling scheme in the current round is SRSWOR. Sample FSUs are selected independently on quarterly basis. Assuming the sampling fraction is small, the difference between variance estimates using the SRSWR and SRSWOR becomes negligible. In such cases, samples may be treated as drawn with SRSWR and variance estimates in any particular quarter may be given below as per following formulae:

(a) **Formula for aggregate $\widehat{Y_r}$ (for Rural/Urban):**

$$\widehat{Var}(\hat{Y}_r) = \sum_s \widehat{Var}(\widehat{Y_{rs}}) = \sum_s \sum_t \widehat{Var}(\widehat{Y_{rst}})$$

$$\widehat{Var}(\widehat{Y_{rst}}) = \frac{1}{n_{rst}(n_{rst}-1)} \sum_{i=1}^{n_{rst}} \left(N_{st}\, \widehat{Y_{rsti}} - \widehat{Y_{rst}}\right)^2$$

(b) **Formula for ratio $\widehat{R_r}$ (for Rural/Urban Quarterly basis)**

$$\widehat{MSE}(\widehat{R_r}) = \frac{1}{\widehat{X_r^2}} \sum_s \sum_t \widehat{MSE_{st}}\,(\widehat{R_r})$$

Note that, $\widehat{X_r^2}$ MSE ($\widehat{R_r}$) is unbiasedly estimated by V ($\widehat{Y_r} - R_r\widehat{X_r}$) at $R_r = \widehat{R_r}$

$$\widehat{MSE_{st}}(\widehat{R_r}) = \frac{1}{n_{rst}(n_{rst}-1)} \sum_{i=1}^{n_{rst}} [N_{st}\ (\widehat{Y_{rsti}} - \widehat{R_r}\widehat{X_{rsti}}) - (\widehat{Y_{rst}} - \widehat{R_r}\widehat{X_{rst}})]^2$$

Where $N_{st}\ \widehat{Y_{rsti}} = \sum_j \sum_k y_{rstijk} \times n_{rstj} \times$multiplier,

$N_{st}\widehat{X_{rsti}}$= $\sum_j \sum_k x_{rstijk} \times n_{rstj}$ ×multiplier.

multiplier formula is given below.

2.6.2 **Estimates of Relative Standard Error (RSE):**

$\widehat{RSE(\widehat{Y_r})}$= $\frac{\sqrt{\widehat{Var(\widehat{Y_r})}}}{\widehat{Y_r}}$×100

$\widehat{RSE}(\widehat{R_r})$= $\frac{\sqrt{\widehat{MSE}(\widehat{R_r})}}{\widehat{R_r}}$ × 100

2.7 **Multipliers:**

The formulae for multipliers at Stratum/sub-stratum/second-stage stratum level for a schedule type are given below:

Schedule Type: LSU (rural/urban)

Segment 9	Segment 1	Segment 2
$\frac{N_{st}}{n_{rst}}$	$\frac{N_{st}}{n_{rst}}$	$\frac{N_{st}}{n_{rst}} \times D^*_{sti}$

Schedule Type: ESU (rural/urban)

Segment 9	Segment 1	Segment 2
$\frac{N_{st}}{n_{rstj}} \times \frac{E_{rsti9j}}{e_{rsti9j}}$	$\frac{N_{st}}{n_{rstj}} \times \frac{E_{rsti1j}}{e_{rsti1j}}$	$\frac{N_{st}}{n_{rstj}} \times D^{*}_{rsti} \times \frac{E_{rsti2j}}{e_{rsti2j}}$
j=1,2,3……,18 r=1,2,3,4		

Note:

(i) During calculation of multipliers, classification of any establishment in SSS is taken as per the information collected in listing Schedule.

(ii) While generating quarterly estimates, only FSUs allotted in that particular quarter and also canvassing completed (canvassing of LSU and ESU for all requisite establishments completed) are considered for calculation of number of FSUs surveyed (ns count) in that particular quarter. However, in the calculation of annual estimates, FSUs canvassed outside the time period of their allotted quarters (except for those FSUs which do not have any quarter restriction) are included in their respective quarters.

(iii) For those areas where there is no sub round restriction, estimates are generated annually only.

2.8 **Formula for annual aggregate estimates:**

Annual estimate will be generated for a particular **stratum × sub-stratum** taking simple average of quarterly estimates of that particular stratum × sub-stratum.

$\widehat{Y_{ast}} = \frac{1}{r} \times \sum_{q=1}^{r} \hat{y}_{stq}$.

$\widehat{y_{stq}}$ is estimated value of characteristic y in s^{th} stratum and t^{th} sub-stratum in q^{th} quarter. r can take any value between 1 to 4 depending on the condition depicted below:

1. If any particular stratum × sub-stratum has contribution (i.e., at least one FSU was surveyed in the particular stratum ×sub-stratum) in all 4 quarters then value of r will be 4.

2. If any particular stratum × sub-stratum becomes void in one particular quarter (i.e., all the FSUs of that particular stratum × sub-stratum become casualty in that particular quarter) then value of r will be 3.

3. Similarly, if a particular stratum × sub-stratum becomes void in two quarters (i.e., all the FSUs of that particular stratum × sub-stratum become casualty in two quarters) then value of r will be 2.

4. If annual estimates of any characteristic for a particular stratum ×sub-stratum is obtained from one quarter only, then value of r will be 1.

Hence, generation of annual estimates of any indicator requires the following steps:

1. Calculation of quarterly multipliers as per the formula stated earlier.
2. Stratum × sub-stratum level annual estimates of any indicator to be obtained by first multiplying quarterly multiplier values and quarterly indicator values for all contributing quarters and then adding them up.
3. Next, the added estimate at stratum × sub-stratum level to be divided by the number of contributing quarters (no_qtr).
4. State/UT level estimates will be obtained after adding all stratum × sub-stratum level estimates of a particular State/UT.
5. All-India level estimates will be obtained by adding all stratum × sub-stratum level estimates for all State/Ut.

2.9 Estimates of Error (Annual):

2.9.1 For aggregate $\widehat{Y_a}$ (Rural/ Urban):

$\widehat{Y_a}=\frac{1}{r}\sum_s\sum_t\sum_{q=1}^{r}\widehat{Y_{stq}}$, r can take any values between 1 to 4 as per scenario.

$\widehat{Var}(\widehat{Y_a})=\frac{1}{r^2}\times\sum_s\sum_t\sum_{q=1}^{r}\widehat{Var}(\widehat{Y_{stq}})$

Where $\widehat{Y_{stq}}$ is the estimated value of characteristic Y in qth quarter of sth stratum and tth sub-stratum.

$\widehat{Var}(\widehat{Y_{stq}})=\frac{1}{n_{stq}(n_{stq}-1)}\sum_{i=1}^{n_{stq}}\left(N_{st}\,\widehat{Y_{stqi}}-\widehat{Y_{stq}}\right)^2$

1.9.2 For Ratio estimates $\widehat{R_a}$ (Rural/ Urban):

Annual ratio estimates will be obtained as:

$\widehat{R_a}=\frac{\widehat{Y_a}}{\widehat{X_a}}$, where $\widehat{Y_a}=\frac{1}{r}\times\sum_s\sum_t\sum_{q=1}^{r}\widehat{Y_{stq}}$, r can take any values between 1 to 4 as per scenario.

And $\widehat{X_a}==\frac{1}{r}\times\sum_s\sum_t\sum_{q=1}^{r}\widehat{X_{stq}}$, r can take any values between 1 to 4 as per scenario.

$\widehat{MSE}\,(\widehat{R_a})=\frac{1}{\widehat{X_a}^2}\sum_s\sum_t\widehat{MSE}_{st}(\widehat{R_a})$

Note that, $\widehat{X_a^2}$ MSE $(\widehat{R_a})$ is unbiasedly estimated by V $(\widehat{Y_a}-R_a\,\widehat{X_a})$ at $R_a=\widehat{R_a}$

So, $\widehat{MSE}\,(\widehat{R_a})=\frac{1}{\widehat{X_a^2}}\times$ [Var $(\widehat{Y_a})+\widehat{R_a^2}$ Var $(\widehat{X_a})-2\,\widehat{R_a}$ covariance ($\widehat{Y_a},\widehat{X_a}$)]

Where, $\widehat{Var}(\widehat{Y_a})=\frac{1}{r^2}\times\sum_s\sum_t\sum_{q=1}^{r}\widehat{Var}(\widehat{Y_{stq}})$, r can take any values between 1 to 4 as per scenario.

$\widehat{Var}(\widehat{X_a}) = \frac{1}{r^2} \times \sum_s \sum_t \sum_{q=1}^{r} \widehat{Var}(\widehat{X_{stq}})$, r can take any values between 1 to 4 as per scenario.

$$\widehat{Var}(\widehat{Y_{stq}}) = \frac{1}{n_{stq}(n_{stq}-1)} \sum_{i=1}^{n_{stq}} \left(N_{st}\, \widehat{Y_{stqi}} - \widehat{Y_{stq}}\right)^2$$

$$\widehat{Var}(\widehat{X_{stq}}) = \frac{1}{n_{stq}(n_{stq}-1)} \sum_{i=1}^{n_{stq}} \left(N_{st}\, \widehat{X_{stqi}} - \widehat{X_{stq}}\right)^2$$

Covariance ($\widehat{Y_a}, \widehat{X_a}$) = covariance ($\frac{1}{r}\sum_s \sum_t \sum_{q=1}^{r} \widehat{Y_{stq}}, \frac{1}{r}\sum_s \sum_t \sum_{q=1}^{r} \widehat{X_{stq}}$) , r can take any values between 1 to 4 as per scenario.

$= \frac{1}{r^2} \sum_s \sum_t$[covariance ($\widehat{Y_{st1}}, \widehat{X_{st1}}$)+ covariance ($\widehat{Y_{st2}}, \widehat{X_{st2}}$)+ covariance ($\widehat{Y_{st3}}, \widehat{X_{st3}}$)+ covariance ($\widehat{Y_{st4}}, \widehat{X_{st4}}$)]

Note that covariance ($\widehat{Y_{sti}}$, $\widehat{X_{stj}}$) =0 for i≠j, as samples are drawn independently on quarterly basis.

Note that $\widehat{Y_{st1}}$, $\widehat{X_{st1}}$ is the estimated value of Y and X in s[th] stratum and t[th] sub-stratum in quarter 1.

$\widehat{Y_{st2}}$, $\widehat{X_{st2}}$ is the estimated value of Y and X in s[th] stratum and t[th] sub-stratum in quarter 2.

$\widehat{Y_{st3}}$, $\widehat{X_{st3}}$ is the estimated value of Y and X in s[th] stratum and t[th] sub-stratum in quarter 3.

$\widehat{Y_{st4}}$, $\widehat{X_{st4}}$ is the estimated value of Y and X in s[th] stratum and t[th] sub-stratum in quarter 4.

Covariance ($\widehat{Y_{stq}}$, $\widehat{X_{stq}}$) = $\frac{1}{n_{stq}(n_{stq}-1)} \sum_{i=1}^{n_{stq}} (N_{st}\, \widehat{Y_{stqi}} - \widehat{Y_{stq}})\, (N_{st}\widehat{X_{stqi}} - \widehat{X_{stq}})$

Finally, RSE (%) of any annual estimates are calculated using formula described below,

$$\widehat{RSE(Y_a)} = \frac{\sqrt{\widehat{Var(Y_a)}}}{\widehat{Y_a}} \times 100$$

$$\widehat{RSE}(\widehat{R_a}) = \frac{\sqrt{\widehat{MSE}(\widehat{R_a})}}{\widehat{R_a}} \times 100$$

2.10 **Adjustment of multipliers due to status of the establishment as 'out of coverage'**

Let, E = total number of establishments for a Second Stage Stratum (SSS)
e = total number of surveyed sample establishment for an SSS
m = total number of sample surveyed establishment out of coverage for an SSS

Then
(i) Proportion of sample establishment out of coverage = m/e in an SSS
(ii) Estimated number of establishments out of coverage = E*m/e in an SSS

Adjustments was done in the following manner:

(i) Adjusted number of establishments within the coverage = (E - E*m/e) in an SSS
(ii) Adjusted number of sample establishment within the coverage = (e-m)

Thus, in such situation, **E** in the multiplier in para 2.7 above was replaced by **E * (1 – m/e)** and **e** was replaced by **(e – m)**.

2.11 **Treatment for zero cases, casualty cases etc.**:

2.11.1 While counting the number of FSUs surveyed (n_{rst} or n_{rstj}) in a stratum/sub-stratum for a particular quarter (say, r), all the FSUs with survey codes 1 to 6 in Schedule LSU were considered. In addition, if no USU was available in the listed frame then also that FSU was treated as surveyed. However, if the USUs of a particular schedule type were available in the frame of the FSU but none of these could be surveyed then that FSU was also treated as casualty and it was not be treated as surveyed in respect of that schedule.

2.11.2 ***Casualty cases***: FSUs with survey code 7 as per Schedule LSU were treated as casualties. In addition to this, an FSU, although surveyed, might be treated as casualty for a particular schedule type and a particular *second stage stratum* as given in the following para:

2.11.2.1 FSUs with survey codes 1 or 4 as per schedule LSU having number of establishments in the frame of j-th second stage stratum greater than 0 but number of establishments surveyed according to data file, considering both segments together, as nil (i.e. $E_{ri1j} + E_{ri2j} > 0$ but $e_{ri1j} + e_{ri2j} = 0$) were considered as casualties for j-th second stage stratum.

All the FSUs with survey codes 1 to 6 as per schedule LSU minus the number of casualties as identified above were taken as the number of surveyed FSUs (n_{rstj}) for that (stratum/sub-stratum) × (second stage stratum).

When casualty for j-th second stage stratum occurs for a particular segment but not for the other segment, the FSU will not be treated as casualty but some adjustments in the value of E for the other segment were done as follows:

(i) Suppose for segment 1 of a particular FSU, $E_{ri1j} > 0$ but $e_{ri1j} = 0$ while for segment 2, $E_{ri2j} > 0$ and $e_{ri2j} > 0$. In that case ($D^*_{ri} \times E_{ri2j}$) will be replaced by ($E_{ri1j} + D^*_{ri} \times E_{ri2j}$) in the formula for multiplier of segment 2.

(ii) Suppose for segment 1 of a particular FSU, $E_{ri1j}>0$ and $e_{ri1j} > 0$ while for segment 2, $E_{ri2j}>0$ but $e_{ri2j}=0$. In that case E_{ri1j} will be replaced by ($E_{ri1j} + D^*_{ri} \times E_{ri2j}$) in the formula for multiplier of segment 1.

It may be noted that n_{rstj} would be same for segment 1 & 2 of an FSU.

3.0 **Treatment in cases of void second-stage strata/sub-strata /strata**

A stratum/sub-stratum might be void because of the casualty of all the FSUs belonging to the stratum/sub-stratum.

3.1 When a stratum/sub-stratum was void, the following procedure was adopted:

Case (I): ***Stratum/Sub-stratum void cases at FSU levels (i.e. all FSUs having survey code 7)*****:**

(i) If a rural/urban sub-stratum was void then it was merged with the other similar sub-stratum of the same stratum.

(ii) If a complete rural/urban stratum was void due to all FSUs being casualty, it was excluded from the coverage of the survey. The state level estimates were based on the estimates of regions for which estimates were available and remarks to that effect would be added in appropriate places.

Case (II): ***Stratum/Sub-stratum void case at second stage stratum level (i.e. all the FSUs were casualties for a particular second stage stratum*****):**

(i) An FSU might be a casualty for a particular *second stage stratum* although survey code was not 7. If some FSUs of a stratum/sub-stratum became casualties for a particular *second stage stratum*, then stratum/sub-stratum level estimates were generated for this particular second stage stratum based on surveyed FSUs in this particular SSS. If all the FSUs of a stratum/sub-stratum became casualties in this manner for a particular *second stage stratum*, the stratum/sub-stratum would become void for this particular second stage stratum.

4.0 **Note on Annual sampling weights:**

In ASUSE 2025 sample FSUs were selected independently on quarterly basis. Sampling weights were calculated for each quarter at State × Stratum × sub-stratum × FSU × SSS level.

Quarterly sampling weight for a particular FSU × SSS was divided by no_qtr for generating annual sampling weights for this particular (FSU × SSS). no_qtr represents the number of quarters for which a particular State × stratum × sub-stratum combination contributed to the estimates, i.e; at least one FSU surveyed in this State × stratum × sub-stratum. Maximum value of no_qtr is 4.

In annual multiplier sampling weights for some FSU×SSS is less than 1 as quarterly weights of these FSU × SSS is 1. It happened due to complete enumeration of FSU(s) for a particular State × stratum × sub-stratum (due to very few FSUs). If number of establishments surveyed and listed in a particular SSS are exactly same then weight is 1 for this FSU × SSS of that particular quarter. This is a rare event. In such scenario annual weights will be less than 1.