Note on Estimation Procedure of NSS 65th Round

1. Introduction

1.1 The National Sample Survey (NSS), set up by the Government of India in 1950 to collect socio-economic data employing scientific sampling methods, has started its sixty-fifth round from 1st July 2008. The survey will continue up to 30th June 2009.

2. Outline of Survey Programme

2.1 **Subject Coverage:** The 65th round (July 2008 – June 2009) of NSS is earmarked for survey on 'Domestic Tourism', 'Housing Condition' and 'Urban Slums'. NSS 54th round (January – June 1999) and 43rd round (July 1987 – June 1988) were the two latest rounds where certain data on tourism/ travel habits were collected. Detailed information on housing condition was last collected in NSS 58th round (July – December 2002), prior to which such information were collected during the 49th round of NSS (January – June 1993). Survey on urban slums was last conducted during NSS 58th round.

2.2 **Geographical coverage:** The survey covers the whole of the Indian Union *except* (i) interior villages of Nagaland situated beyond five kilometres of the bus route and (ii) villages in Andaman and Nicobar Islands which remain inaccessible throughout the year.

For Leh (Ladakh) and Kargil districts of Jammu & Kashmir there are no separate sample first-stage units (FSUs) for central sample. For these two districts, state sample is also treated as central sample. *The state DES will provide a copy of the filled-in schedules to Data Processing Division of NSSO for processing.*

2.3 **Period of survey and work programme:** The period of survey is of one year duration starting on 1st July 2008 and ending on 30th June 2009. The survey period of this round is divided into four sub-rounds of three months' duration each as follows:

sub-round 1	:	July - September 2008
sub-round 2	:	October - December 2008
sub-round 3	:	January - March 2009
sub-round 4	:	April - June 2009

In each of these four sub-rounds equal number of sample villages/ blocks (FSUs) have been allotted for survey with a view to ensuring uniform spread of sample FSUs over the entire survey period. Attempt is made to survey each of the FSUs during the sub-round to which it is allotted. *Because of the arduous field conditions, this restriction is not strictly enforced in Andaman and Nicobar Islands, Lakshadweep and rural areas of Arunachal Pradesh and Nagaland.*

2.4 **Schedules of enquiry:** During this round, the following schedules of enquiry are being canvassed:

Schedule 0.0	:	list of households
Schedule 21.1	:	domestic tourism
Schedule 1.2	:	housing condition
Schedule 0.21	:	particulars of slum

2.5 **Participation of States:** In this round all the States and Union Territories except Andaman & Nicobar Islands, Chandigarh, Dadra & Nagar Haveli and Lakshadweep are participating. The following is the matching pattern of the participating States/ UTs.

Nagaland (U)	: triple
J & K , Manipur & Delhi	: double
Maharashtra (U)	: one and half
Gujarat	: less than equal
Remaining States/ UTs	: equal

3. **Sample Design**

3.1 **Outline of sample design:** A stratified multi-stage design has been adopted for the 65th round survey. The first stage units (FSU) are the 2001 census villages (Panchayat wards in case of Kerala) in the rural sector and Urban Frame Survey (UFS) blocks in the urban sector. For towns with no UFS frame available (applicable to Leh and Kargil towns of J & K), each town is treated as an FSU. The ultimate stage units (USU) are households in both the sectors. In case of large FSUs, one intermediate stage of sampling is the selection of two hamlet-groups (hgs)/ sub-blocks (sbs) from each FSU.

3.2 **Sampling Frame for First Stage Units:** *For the rural sector,* the list of 2001 census villages (Panchayat wards for Kerala) constitutes the sampling frame. *For the urban sector,* the list of latest available Urban Frame Survey (UFS) blocks has been considered as the sampling frame. However, for Leh and Kargil towns of J & K, UFS frame was not available. Accordingly, Census 2001 serves as the frame for these two towns (to be referred as non-UFS towns).

3.3 **Stratification for FSU:**

3.3.1 **Rural sector:** All villages of a district form a separate stratum.

3.3.2 **Urban sector:** In the urban sector, strata have been formed within each NSS region on the basis of size class of towns as per Census 2001 town population. This departure has been made in the stratification principle in order to facilitate generation of town-class wise estimates to satisfy the requirements of the user ministries. The stratum numbers and their composition (within each NSS region) are given below.

Stratum	Composition (within NSS region)
1	All towns with population < 50,000
2	All towns with population 50,000 – 99,999
3	All towns with population 1,00,000 – 4,99,999
4	All towns with population 5,00,000 – 9,99,999
5, 6, ….	Each million plus city

3.3.3 The non-UFS towns of Leh and Kargil of J & K within the NSS region (region number '014') are grouped together to form a separate urban stratum.

3.4 **Sub-stratification**: There is no sub-stratification in the rural sector and for strata corresponding to non-UFS towns. However, to net adequate number of slums, for all other urban strata, each stratum has been divided into 2 sub-strata as follows:

sub-stratum 1: all UFS blocks having area type 'slum area'

sub-stratum 2: remaining UFS blocks

3.5 **Total sample size (FSUs):** 12952 FSUs for central sample and 13996 FSUs for state sample have been allocated at all-India level.

3.6 **Allocation of total sample to States and UTs:** The total number of sample FSUs has been allocated to the States and UTs in proportion to population as per census 2001 subject to a minimum sample allocation to each State/ UT. While doing so, the resource availability in terms of number of field investigators has been kept in view.

3.7 **Allocation of State/ UT level sample to rural and urban sectors:** State/ UT level sample is allocated between two sectors in proportion to population as per *census 2001* with 1.5 weightage to urban sector subject to the restriction that urban sample size for bigger states like Maharashtra, Tamil Nadu etc. should not exceed the rural sample size. At least 4 FSUs have been allocated to each state/ UT separately for rural and urban areas. Further, the State level allocations for both rural and urban have been adjusted marginally in a few cases to ensure that each stratum gets a minimum allocation of 4 FSUs.

The sample sizes by sector for each State/ UT are given in Table 1 of the Appendix.

3.8 **Allocation to strata/ sub-strata:** Within each sector of a State/ UT, the respective sample size is allocated to the different strata in proportion to the stratum population as per census 2001. Allocations at stratum level are adjusted to multiples of 4 with a minimum sample size of 4. Stratum-level sample size in the urban sector pertaining to strata belonging to UFS towns has been further allocated to the 2 sub-strata in proportion to the number of UFS blocks in them with double weightage to sub-stratum 1, subject to a minimum allocation of 4 to each of the two sub-strata.

3.9 **Selection of FSUs:** As per census arrangement the villages have been arranged and FSUs have been selected by circular systematic sampling with probability proportional to population for all rural strata. For urban strata x sub-strata (wherever applicable), the towns within the stratum have been arranged in ascending order of population; then FSUs were selected by circular systematic sampling with equal probability for UFS towns. Within each stratum/ sub-stratum, multiple of 4 FSUs were selected. Samples have been drawn in the form of two independent sub-samples and equal number of samples has been allocated among the four sub rounds.

Since UFS frames are not available for Leh and Kargil towns of Jammu and Kashmir, a somewhat different approach is adopted for the survey in these two towns. Each of these two towns has been treated as an FSU (instead of UFS blocks being considered as the FSUs for UFS towns). Both these towns are selected and repeated in each of the sub-rounds 1 to 4 of the sample list.

3.10 **Selection of hamlet-groups/ sub-blocks**

Large sample FSUs with approximate present population of 1200 or more are divided into a suitable number (say, D) of 'hamlet-groups' in the rural sector and 'sub-blocks' in the urban sector, by more or less equalizing present population of the FSU, as stated below.

approximate present population of the sample FSU		no. of hgs/sbs to be formed
less than 1200	(no hamlet-groups/sub-blocks)	1
1200 to 1799		3
1800 to 2399		4
2400 to 2999		5
3000 to 3599		6
……..and so on		

For rural areas of Himachal Pradesh, Sikkim, hilly districts of Uttaranchal, Poonch, Rajouri, Udhampur, Doda, Leh (Ladakh) and Kargil districts of Jammu and Kashmir and Idukki district of Kerala, the number of hamlet-groups is formed as follows:

approximate present population of the sample village		no. of hgs formed
less than 600	(no hamlet-groups)	1
600 to 899		3
900 to 1199		4
1200 to 1499		5
……..and so on		

Two hamlet-groups (hg)/ sub-blocks (sb) are selected from a large FSU wherever hamlet-groups/ sub-blocks are formed in the following manner – one hg/ sb with maximum percentage share of population is always selected and termed as hg/ sb 1; one more hg/ sb is selected from the remaining hg's/ sb's by SRS and termed as hg/ sb 2. Listing and selection of the households is done independently in the two selected hamlet-groups/ sub-blocks. The FSUs without hg/ sb formation are treated as sample hg/ sb number 1.

Procedure for Leh and Kargil towns: Sub-blocks are to be formed in usual manner treating the entire town as one FSU. For the selection of two sub-blocks in any given town (FSU) of Leh or Kargil during sub-round 1, the sub-block having maximum percentage share in total approximate present population of the FSU/town is selected with probability 1 (termed as 'sb 1') and another one is selected randomly (termed as 'sb 2'). For the subsequent sub-rounds, 'sb 1' may or may not be the same as that of sub-round 1 depending upon whether it has maximum percentage share in total population or not during the sub-round. Another sub-block, to be treated as 'sb 2' is selected afresh with the help of random number table. If the randomly selected sub-block i.e. 'sb 2' happens to coincide with any of the selected sub-blocks of previous sub-round(s), it is rejected and a fresh sub-block is again selected.

3.11 **Survey on urban slums:** Information on each slum, notified or non-notified, found in the entire selected first stage unit (FSU) is collected through schedule 0.21. In case of sub-block formation/ selection, all the slums located within the boundaries of the entire FSU are to be considered for survey irrespective of the sub-blocks selected.

3.12 **Formation of second stage strata of households**

Two cut-off points 'A' and 'B' (in Rs.), determined from NSS 61st round data for **each NSS region** for urban areas in such a way that top 30% of the population have MPCE equal to or more than 'B' and bottom 30% of the population have MPCE equal to or less than A, have been used for second-stage stratification.

All the households listed in the selected FSU/ hamlet-group/ sub-block have been stratified into five second stage strata (SSS) for schedule 21.1 and into three SSS for schedule 1.2 as given below.

Schedule 21.1 (domestic tourism)

rural	
SSS 1:	households having pucca dwelling structure and having at least one member, who performed at least one overnight trip during last 30 days
SSS 2:	households not having pucca dwelling structure and having at least one member, who performed at least one overnight trip during last 30 days
SSS 3:	remaining households having pucca dwelling structure and having at least one member, who performed at least one same day trip during last 30 days
SSS 4:	remaining households not having pucca dwelling structure and having at least one member, who performed at least one same day trip during last 30 days
SSS5:	other households
urban	
SSS 1:	households with MPCE ≥ B and having at least one member, who performed at least one overnight trip during last 30 days
SSS 2:	households with MPCE < B and having at least one member, who performed at least one overnight trip during last 30 days
SSS 3:	remaining households with MPCE ≥ B and having at least one member, who performed at least one same day trip during last 30 days
SSS 4:	remaining households with MPCE < B and having at least one member, who performed at least one same day trip during last 30 days
SSS 5:	other households

Schedule 1.2 (housing condition)

rural

SSS 1: households having pucca dwelling structure

SSS 2: households having semi-pucca dwelling structure

SSS 3: other households

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urban

SSS 1: households having MPCE of top 30% of urban population (MPCE ≥ B)

SSS 2: households having MPCE of middle 40% of urban population (A < MPCE < B)

SSS 3: households having MPCE of bottom 30% of urban population (MPCE ≤ A)

3.13 **Allocation of households to different SSS**:

Numbers of households allotted for survey from different SSS for various schedules of enquiry are as follows:

SSS	number of sample households allotted for survey	
	FSU without hg/sb formation	FSU with hg/sb formation (for each hg/sb)
schedule 21.1		
SSS 1:	4	2
SSS 2:	2	1
SSS 3:	2	1
SSS 4:	2	1
SSS 5:	2	1
schedule 1.2		
SSS 1:	4	2
SSS 2:	4	2
SSS 3:	4	2

3.14 **Selection of households:** From each SSS the sample households for both the schedules are selected by SRSWOR. If a household is selected both for schedule 21.1 and schedule 1.2 only schedule 21.1 is canvassed in that household and the household is replaced by next household in the frame for schedule 1.2.

4. **Estimation Procedure**

4.1 **Notations:**

s = subscript for s-th stratum

t = subscript for t-th sub-stratum (only for UFS towns of urban sector)

m = subscript for sub-sample (m =1, 2)

i = subscript for i-th FSU [village (panchayat ward)/ block/ non-UFS town]

d = subscript for a hamlet-group/ sub-block (d = 1, 2)

j = subscript for j-th second stage stratum in an FSU/ hg/sb [j = (1, 2, 3, 4 or 5 for schedule 21.1), (1, 2 or 3 for schedule 1.2)]

k = subscript for k-th sample household under a particular second stage stratum within an FSU/ hg/sb

D = total number of hg's/ sb's formed in the sample FSU

D* = 0 if D = 1

= (D – 1) for FSUs with D > 1

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

Z = total size of a rural stratum (= sum of sizes for all the FSUs of a stratum)

z = size of sample village used for selection.

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

H = total number of households listed in a second-stage stratum of an FSU / hamlet-group or sub-block of sample FSU

h = number of households surveyed in a second-stage stratum of an FSU / hamlet-group or sub-block of sample FSU

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,

$y_{stmidjk}$ = observed value of the characteristic y for the k-th household in the j-th second stage stratum of the d-th hg/ sb (d = 1, 2) of the i-th FSU belonging to the m-th sub-sample for the t-th sub-stratum of s-th stratum.

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

4.2 **Formulae for Estimation of Aggregates for a particular sub-sample and stratum (for rural/non-UFS towns of urban i.e. Leh and Kargil) / sub-stratum (for UFS towns of urban):**

4.2.1 **Schedule 0.0:**

4.2.1.1 **Rural:**

(i) For estimating the number of households in a stratum possessing a characteristic:

$$\hat{Y} = \frac{Z}{n}\sum_{i=1}^{n}\frac{1}{z_i}\left[y_{i1} + D_i^* \times y_{i2}\right]$$

where y_{i1} , y_{i2} are the total number of households possessing the characteristic *y* in hg's 1 & 2 of the i-th FSU respectively.

ii) For estimating the number of villages in a stratum possessing a characteristic:

$$\hat{Y} = \frac{Z}{n}\sum_{i=1}^{n}\frac{1}{z_i}y_i$$

where y_i is taken as 1 for sample villages possessing the characteristic and 0 otherwise.

4.2.1.2 **Urban:**

(i) For estimating the number of households in a sub-stratum possessing a characteristic:

$$\hat{Y} = \frac{N}{n}\sum_{i=1}^{n}\left[y_{i1} + D_i^* \times y_{i2}\right]$$

where y_{i1} and y_{i2} are the totals of observed values for the characteristic *y* belonging to sub-blocks 1 and 2 respectively, of the i-th FSU.

Note: There are only two FSUs (Leh and Kargil towns) in NSS region '014' of J & K. Both of these have been selected and repeated in each of the sub-rounds and they belong to sub-stratum 2. In this case, N = 2 in the above formula and n will be the number of FSUs actually surveyed including repetitions (n = 8 for the whole round and n = 4 for a sub-sample of the whole round assuming no casualty).

4.2.2 **Schedules 21.1 / 1.2:**

4.2.2.1 **Rural:**

(i) For j-th second stage stratum of a stratum:

$$\hat{Y}_j = \frac{Z}{n_j}\sum_{i=1}^{n_j}\frac{1}{z_i}\left[\frac{H_{i1j}}{h_{i1j}}\sum_{k=1}^{h_{i1j}} y_{i1jk} + D_i^* \times \frac{H_{i2j}}{h_{i2j}}\sum_{k=1}^{h_{i2j}} y_{i2jk}\right]$$

(ii) For all second-stage strata combined:

$$\hat{Y} = \sum_j \hat{Y}_j$$

4.2.2.2 **Urban:**

(i) For j-th second stage stratum of a sub-stratum:

$$\hat{Y}_j = \frac{N}{n_j}\sum_{i=1}^{n_j}\left[\frac{H_{i1j}}{h_{i1j}}\sum_{k=1}^{h_{i1j}} y_{i1jk} + D_i^* \times \frac{H_{i2j}}{h_{i2j}}\sum_{k=1}^{h_{i2j}} y_{i2jk}\right]$$

(ii) For all second-stage strata combined:

$$\hat{Y} = \sum_j \hat{Y}_j$$

(iii) Estimate for a stratum ($\hat{Y}_s$) will be obtained by adding sub-stratum level estimates ($\hat{Y}_{st}$).

Note: As mentioned earlier in section 4.2.1.2, N = 2 in the above formula in the case of NSS region '014' of J & K comprising two towns of Leh and Kargil.

4.3 **Overall Estimate for Aggregates**:

Overall estimate for aggregates for a stratum ($\hat{Y}_s$) based on two sub-samples is obtained as:

$$\hat{Y}_s = \frac{1}{2}\sum_{m=1}^{2}\hat{Y}_{sm}$$

4.4 **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.

4.5 **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 $\hat{R} = \frac{\hat{Y}}{\hat{X}}$.

4.6 **Schedule 21.1:** *Estimation of total number of trips, expenditure by a sample household and the number of visitors:*

4.6.1 *Number of trips*

(a) Total number of overnight trips and same day trips during last 30 days and last 365 days can be estimated by using the relevant information recorded against items 7.1, 7.2, 8.1 and 8.2 of block 3.

4.6.2 *Expenditure incurred*

(a) *Overnight trips*

Information on the total expenditure for latest 3 trips in last 30 days is recorded in block 6.1. Let this expenditure be denoted by '$E_{ON\text{-}3\text{-}30}$'. Total expenditure for all trips of 30 days (say $E_{ON\text{-}30}$) may be estimated by multiplying '$E_{ON\text{-}3\text{-}30}$' by an adjustment factors as under:

$E_{ON\text{-}30}$ = $E_{ON\text{-}3\text{-}30}$ × [(Total no. of member-nights, i.e. col. 2 of block 5.1 multiplied by col. 11 of block 5.1, for all overnight trips listed in block 5.1) / (Total no. of member-nights for the latest 3 overnight trips for which expenditure is available)].

(In the above derivation of $E_{ON\text{-}30}$, it has been assumed that distribution of expenditure is uniform over the member-nights).

Once expenditure for last 30 days (i.e. $E_{ON\text{-}30}$) is worked out, annual expenditure (say $E_{ON\text{-}365}$) may be estimated as:

$E_{ON\text{-}365}$ = $E_{ON\text{-}30}$ × (No. of overnight trips during last 365 days, i.e., item 7.2, block 3) / (No. of overnight trips during last 30 days, i.e., item 7.1, block 3)

(b) *Same-day trip*

For same-day trips, total expenditure for all trips of last 30 days (say $E_{SD\text{-}30}$) is directly available in block 6.2. Utilising this information, annual expenditure (say $_{SD\text{-}365}$) may be estimated as:

$E_{SD\text{-}365}$ = $E_{SD\text{-}30}$ × (No. of same-day trips during last 365 days, i.e., item 8.2, block 3) / (No. of same-day trips during last 30 days, i.e., item 8.1, block 3)

4.6.3 *Estimated number of visitors*: Numbers of overnight visitors and same-day visitors for a sample household may be obtained by counting the number of positive entries in columns (11) – (14) of block 4. Number of overnight visitors for 365 days may be estimated from the counts of positive entries in column (11) of sample households and that of same-day visitors for 365 days may be obtained from the counts in column (13) of block 4.

4.7 **Estimates of Error**: The estimated variances of the above estimates will be as follows:

4.7.1 **For aggregate** $\hat{Y}$:

$\hat{Var}(\hat{Y}) = \sum_s \hat{Var}(\hat{Y}_s)$ where $\hat{Var}(\hat{Y}_s)$ is given by

$\hat{Var}\left(\hat{Y}_s\right)=\frac{1}{4}\left(\hat{Y}_{s1}-\hat{Y}_{s2}\right)^2$ for rural stratum, $\hat{Y}_{s1}$ and $\hat{Y}_{s2}$ being the stratum estimates for sub-sample 1 and 2 respectively

and

$\hat{Var}\left(\hat{Y}_s\right)=\sum_t \frac{1}{4}\left(\hat{Y}_{st1}-\hat{Y}_{st2}\right)^2$ for urban stratum, where $\hat{Y}_{st1}$ and $\hat{Y}_{st2}$ are the estimates for sub-sample 1 and sub-sample 2 respectively for stratum 's' and sub-stratum 't'.

4.7.2 **For ratio** $\hat{R}$:

$$\hat{MSE}(\hat{R})=\frac{1}{4\hat{X}^2}\sum_s\left[\left(\hat{Y}_{s1}-\hat{Y}_{s2}\right)^2+\hat{R}^2\left(\hat{X}_{s1}-\hat{X}_{s2}\right)^2-2\hat{R}\left(\hat{Y}_{s1}-\hat{Y}_{s2}\right)\left(\hat{X}_{s1}-\hat{X}_{s2}\right)\right]$$

for rural

and

$$\hat{MSE}(\hat{R}) = \frac{1}{4\hat{X}^2}\sum_s\sum_t\left[\left(\hat{Y}_{st1}-\hat{Y}_{st2}\right)^2+\hat{R}^2\left(\hat{X}_{st1}-\hat{X}_{st2}\right)^2-2\hat{R}\left(\hat{Y}_{st1}-\hat{Y}_{st2}\right)\left(\hat{X}_{st1}-\hat{X}_{st2}\right)\right]$$

for urban, where $\hat{Y}_{s1}$, $\hat{Y}_{st1}$ and $\hat{Y}_{s2}$, $\hat{Y}_{st2}$ are the estimates for sub-sample 1 and sub-sample 2 respectively for stratum 's' and sub-stratum 't'.

4.7.3 **Estimates of RSE**:

$$\hat{RSE}\left(\hat{Y}\right) = \frac{\sqrt{\hat{Var}\left(\hat{Y}\right)}}{\hat{Y}} \times 100$$

$$\hat{RSE}\left(\hat{R}\right) = \frac{\sqrt{\hat{MSE}\left(\hat{R}\right)}}{\hat{R}} \times 100$$

5. **Multipliers**:

The formulae for multipliers at stratum/sub-stratum level for a sub-sample and schedule type are given below:

sch type	sub-stratum	formula for multipliers	
		hg / sb 1	hg / sb 2
0.0	rural	$\frac{Z_s}{n_{sm}} \times \frac{1}{z_{smi}}$	$\frac{Z_s}{n_{sm}} \times \frac{1}{z_{smi}} \times D^*_{smi}$
	Urban	$\frac{N_{st}}{n_{stm}}$	$\frac{N_{st}}{n_{stm}} D^*_{stmi}$
21.1/ 1.2	rural	$\frac{Z_s}{n_{smj}} \times \frac{1}{z_{smi}} \times \frac{H_{smi1j}}{h_{smi1j}}$	$\frac{Z_s}{n_{smj}} \times \frac{1}{z_{smi}} \times D^*_{smi} \times \frac{H_{smi2j}}{h_{smi2j}}$
	Urban	$\frac{N_{st}}{n_{stmj}} \times \frac{H_{stmi1j}}{h_{stmi1j}}$,	$\frac{N_{st}}{n_{stmj}} \times D^*_{stmi} \times \frac{H_{stmi2j}}{h_{stmi2j}}$,
j = 1, 2, 3, 4, 5 for sch. 21.1 = 1, 2, 3 for sch. 1.2			

Note: (i) For estimating any characteristic for any domain not specifically considered in sample design, indicator variable may be used.

(ii) Multipliers have to be computed on the basis of information available in the listing schedule irrespective of any misclassification observed between the listing schedule and detailed enquiry schedule.

(iii) For estimating number of villages possessing a characteristics, D^*_{smi} = 1 in the relevant multipliers and there will be only one multiplier for the village.

(iv) In case of Schedule 0.21, all the slums in the FSU will be surveyed irrespective of sub-block formation. The multiplier will be $\frac{N_{st}}{n_{stm}}$ in this case for each FSU.

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

6.1 While counting the number of FSUs surveyed (n_{sm} or n_{stm}) in a stratum/sub-stratum, all the FSUs with survey codes 1 to 6 in schedule 0.0 will be considered. In addition, if no SSU is available in the frame for a particular schedule then also that FSU will be treated as surveyed in respect of that schedule. However, if the SSUs of a particular schedule type are available in the frame of the FSU but none of these could be surveyed then that FSU has to be treated as casualty and it will not be treated as surveyed in respect of that schedule.

6.2 *Casualty cases*: FSUs with survey code 7 as per schedule 0.0 are treated as casualties. In addition to this, an FSU, although surveyed, may have to be treated as casualty for a particular schedule type and a particular *second stage stratum* as given in the following para:

6.2.1 FSUs with survey codes 1 or 4 as per schedule 0.0 having number of households in the frame of j-th second stage stratum greater than 0 but number of households surveyed according to data file, considering both hg/sb together, as nil (i.e. $H_{i1j} + H_{i2j} > 0$ but $h_{i1j} + h_{i2j} = 0$) will be taken as casualties for j-th second stage stratum.

All the FSUs with survey codes 1 to 6 as per schedule 0.0 minus the number of casualties as identified above will be taken as the number of surveyed FSUs (n_{stmj}) for that (stratum/sub-stratum) ×(second stage stratum).

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

(i) Suppose for hg/sb 1, $H_{i1j} > 0$ but $h_{i1j} = 0$ while for hg/sb 2, $H_{i2j} > 0$ and $h_{i2j} > 0$. In that case $D_i^* \times H_{i2j}$ will be replaced by $(H_{i1j} + D_i^* \times H_{i2j})$ in the formula for multiplier of hg/sb 2.

(ii) Suppose for hg/sb 1, $H_{i1j} > 0$ and $h_{i1j} > 0$ while for hg/sb 2, $H_{i2j} > 0$ but $h_{i2j} = 0$. In that case H_{i1j} will be replaced by $(H_{i1j} + D_i^* \times H_{i2j})$ in the formula for multiplier of hg/sb 1.

It may be noted that n_{smj} or n_{stmj} would be same for hg/sb 1 & 2 of an FSU.

7. **Treatment in cases of void second-stage strata/sub-strata /strata/NSS region at FSU or household level**

7.1 A stratum/sub-stratum may be void because of the casualty of all the FSUs belonging to the stratum/sub-stratum. This may occur in one sub-sample or in both the sub-samples. If it relates to only one sub-sample, then estimate for the void stratum/sub-stratum may be replaced with the estimate as obtained from the other sub-sample for the same stratum/sub-stratum.

7.2 When a stratum/sub-stratum is void in both the sub-samples, the following procedure is recommended:

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

(i) If an urban stratum is void then it may be merged with a stratum having nearest size class of towns within the same NSS region.

(ii) If an urban sub-stratum is void then it may be merged with the other sub-stratum of the stratum.

(iii) If a rural stratum (district) is void due to all FSUs being casualty, it may be excluded from the coverage of the survey. The state level estimates will be based on the estimates of districts for which estimates are available and remarks to that effect may be added in appropriate places. Similarly, if all the urban strata of an NSS region are void, it may be excluded from the coverage.

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

An FSU may be a casualty for a particular *second stage stratum* although survey code is not 7. If all the FSUs of a stratum/sub-stratum become casualties in this manner for a particular *second stage stratum*, the stratum/sub-stratum will become void. In such cases, sub-strata will be merged with other sub-strata for all the second stage strata as in *Case (I) above.*

However, if whole district/stratum becomes void in this manner for a particular second stage stratum, adjustment for this type of stratum void case may be done according to the following guidelines.

The adjustment will be made involving other strata (within NSS region) of the State/U.T. Suppose A, B, C and D are the four strata in the State/UT/Region and stratum C is void for j-th *second stage stratum*. If $\hat{Y}_{aj}$, $\hat{Y}_{bj}$ and $\hat{Y}_{dj}$ are the aggregate estimates for the strata A, B and D respectively, then the estimate $\hat{Y}_{cj}$ for stratum C may be obtained as $\left(\frac{\hat{Y}_{aj}+\hat{Y}_{bj}+\hat{Y}_{dj}}{Z_a+Z_b+Z_d}\times Z_c\right)$ where Z_a, Z_b, Z_c and Z_d are the sizes of strata A, B, C and D respectively.

8. **Reference to the values of Z_{st}, N_{st}, n_{st}, z_{sti}, D_{sti}, D^*_{sti}, H_{sti1j}, h_{sti1j}, H_{sti2j}, h_{sti2j}:**

(a) Values of $\mathbf{Z_s}$, $\mathbf{N_{st}}$ and allotted $\mathbf{n_s}$ or $\mathbf{n_{st}}$ for the whole round are given in appendix Table 2 for rural sector and in Table 3 for urban sector.

(b) $\mathbf{n_s}$ or $\mathbf{n_{st}}$ should not be taken from the tables. The values of $\mathbf{n_{sm}}$ or $\mathbf{n_{stm}}$ for each sub-sample are to be obtained following the guidelines given in para 6 above. It includes uninhibited and zero cases but excludes casualty cases.

(c) The value of $\mathbf{z_{si}}$ for the samples selected by PPS is to be taken from the column of sample list under the heading "frame population" for rural samples. Value of $\mathbf{D_{si}}$ or $\mathbf{D_{sti}}$ are to be taken from item 16 of block 1, sch 0.0. $\mathbf{D^*_{si}}$ or $\mathbf{D^*_{sti}}$ is to be calculated from the value of D_{si}.

(d) Values of $\mathbf{H_{si1j}}$ /$\mathbf{H_{sti1j}}$, $\mathbf{H_{si2j}}$ /$\mathbf{H_{sti2j}}$ are to be taken from col.(5), block 6 of sch 0.0 for respective hg/sb.

(e) The value of $\mathbf{h_{si1j}}$ /$\mathbf{h_{sti1j}}$ and $\mathbf{h_{si2j}}$ /$\mathbf{h_{sti2j}}$ should not be taken from col (9), block 6 of sch.0.0. The figures should be obtained by counting the number of households in the data file excluding the casualty households.

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APPENDICES

Table 1: Distribution of sample villages and blocks

State/UT		number of sample villages/blocks					
		central sample			state sample		
code	name	total	rural	urban	total	rural	urban
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
01	JAMMU & KASHMIR	264	*176	*88	480	320	160
02	HIMACHAL PRADESH	192	160	32	192	160	32
03	PUNJAB	288	160	128	288	160	128
04	CHANDIGARH	48	8	40	0	0	0
05	UTTARANCHAL	112	72	40	112	72	40
06	HARYANA	240	144	96	240	144	96
07	DELHI	288	16	272	576	32	544
08	RAJASTHAN	560	384	176	560	384	176
09	UTTAR PRADESH	1568	1120	448	1568	1120	448
10	BIHAR	560	472	88	560	472	88
11	SIKKIM	112	88	24	112	88	24
12	ARUNACHAL PRADESH	144	104	40	144	104	40
13	NAGALAND	112	80	32	176	80	96
14	MANIPUR	288	192	96	576	384	192
15	MIZORAM	160	64	96	160	64	96
16	TRIPURA	288	216	72	288	216	72
17	MEGHALAYA	176	128	48	176	128	48
18	ASSAM	464	376	88	464	376	88
19	WEST BENGAL	1008	632	376	1008	632	376
20	JHARKHAND	272	184	88	272	184	88
21	ORISSA	488	384	104	488	384	104
22	CHATTISGARH	216	152	64	216	152	64
23	MADHYA PRADESH	704	456	248	704	456	248
24	GUJRAT	528	280	248	336	176	160
25	DAMAN & DIU	32	16	16	32	16	16
26	D & N HAVELI	32	16	16	0	0	0
27	MAHARASTRA	1040	520	520	1296	520	776
28	ANDHRA PRADESH	760	488	272	760	488	272
29	KARNATAKA	544	304	240	544	304	240
30	GOA	40	16	24	40	16	24
31	LAKSHADWEEP	16	4	12	0	0	0
32	KERALA	520	336	184	780	504	276
33	TAMIL NADU	792	400	392	792	400	392
34	PONDICHERRY	56	16	40	56	16	40
35	A & N ISLANDS	40	24	16	0	0	0
ALL		12952	8188	4764	13996	8552	5444

**Includes 16 rural and 8 urban samples to be surveyed in the state sample only by DES, J & K and schedules of which are to be sent to DPD for inclusion in the central sample data.*