

ESTIMATION PROCEDURE

Weighting of Sample Data

The weighting procedure described hereunder has been adopted from the "Report on the Nepal Labour Force Survey 1998/99". This is due to the fact that the sample selection procedure adopted in the HCSRN was similar to the Nepal Labour Force Survey, 1998/99.

To obtain estimates for the population as a whole, we need to consider the selection probabilities at each stage of selection.

First stage: Probability of selecting a particular ward $i = 165 \frac{N_i}{\sum_i N_i}$

where N_i is the number of households in ward i in the 1991 Population Census and $\sum N_i$ is the total number of households in the rural sampling frame

When cartographic work is done in the selected ward i , a number of sub-wards are created with size $K_{i1}, K_{i2}, K_{i3},$ etc., where the total size of the ward $\sum K_{ij}$ is unlikely to be equal to the original size of the ward N_i . One of these sub-wards is then selected with PPS for inclusion in the survey.

Intermediate stage: Probability of selecting the j^{th} sub-ward $= \frac{K_{ij}}{\sum_j K_{ij}}$

where K_{ij} is the number of households counted in the j^{th} sub-ward of ward i in the cartographic survey
and $\sum_j K_{ij}$ is the total number of households counted in the i^{th} ward in the cartographic survey

The interviewer then visits the j^{th} sub-ward during the HCSRN, lists all the households, and attempts to interview 12 selected households (no substitutes are allowed).

Final stage Probability of selection of a household $= \frac{N_{ij}}{K_{ij}^*}$

where N_{ij} is the number of households successfully interviewed
and K_{ij}^* is the number of households counted at the listing stage

The overall probability of selection for an individual household is the multiplication of the selection probabilities at the three stages.

$$\text{Overall selection probability} = 165 \frac{N_i}{\sum N_i} \frac{K_{ij}}{\sum_j K_{ij}} \frac{N_{ij}}{K_{ij}^*}$$

The grossing up factor is the inverse of this probability, and the formula can be rewritten as follows:

$$\text{Grossing up factor} = \frac{\sum N_i}{1980} \frac{\sum_j K_{ij}}{N_i} \frac{K_{ij}^*}{K_{ij}} \frac{12}{N_{ij}}$$

(1) (2) (3) (4)

Each of the numbered ratios in the above formula has been elaborated below:

- (1) is the simple grossing up factor required to go from the original rural sample size of 1980 households to the total number of rural households in the original sampling frame;
- (2) reflects the change in the number of households found in the i^{th} ward during the cartographic work, as compared with the corresponding figure in the original frame;
- (3) reflects the change in the number of households found in the j^{th} sub-ward of the i^{th} ward during the listing work, as compared with the corresponding figure during the cartographic work;
- (4) is the adjustment factor required to make allowance for any non-response, which occurs during the fieldwork in a particular sub-ward.

In order to calculate grossing up rates, the following sizes of measures for each PSU was maintained: (i) census ward, (ii) cartographic ward, (iii) cartographic sub-ward, (iv) listing ward or sub-ward, and (v) households subsequently interviewed.

Evaluation of the achieved sample

Only three small districts (Manang, Dolpa, and Humla) did not feature in the sample at all. On the other hand, several other small districts such as Mustang, Rasuwa and Mugu were represented.

Sampling Error

Two types of errors that occur in a sample survey are sampling error and non-sampling error. Sampling errors arise through selecting only part of the target population. Sampling errors reflect the difference between an estimate derived from a survey and the 'true value' that would be obtained if the whole target population were included. Non sampling errors may occur at any stage of the survey. It is more difficult to measure non-sampling errors mathematically whereas sampling errors can be measured mathematically.

The sampling error of key aggregates measured in this survey is given in the tables below. These sampling errors are calculated by means of the STATA 5.0 package that were used for processing this survey result. Sample design and sample size are the main factors that influence the size of the sampling error. The tables show approximate sampling error for some key aggregates. In the case of total per capita consumption in rural Nepal, which is Rs.11, 928, the 95 percent lower and upper bounds for the estimate, are Rs.11, 605 and Rs.12, 251 respectively. This means that we are 95 percent confident that the average per capita consumption of rural part of Nepal lies within this range.

Table A1: Approximate sampling error for per capita total consumption

(in rupees)

| | Estimate of 95% confidence interval | | |
|--------------|-------------------------------------|--------------|--------------|
| | Mean | Lower | Upper |
| Total | 11928 | 11605 | 12251 |
| Mountain | 12214 | 11169 | 13259 |
| Hill | 12868 | 12338 | 13399 |
| Terai | 11085 | 10653 | 11517 |

Table A2: Approximate sampling error for per capita consumption on food

(in rupees)

| | Estimate of 95% confidence interval | | |
|--------------|-------------------------------------|-------------|-------------|
| | Mean | Lower | Upper |
| Total | 7221 | 7042 | 7401 |
| Mountain | 8089 | 7388 | 8791 |
| Hill | 7658 | 7360 | 7955 |
| Terai | 6694 | 6468 | 6919 |

Table A3: Approximate sampling error for per capita consumption on non-food
(in rupees)

| | Estimate of 95% confidence interval | | |
|--------------|-------------------------------------|-------------|-------------|
| | Mean | Lower | Upper |
| Total | 3447 | 3272 | 3622 |
| Mountain | 2818 | 2287 | 3349 |
| Hill | 3714 | 3424 | 4003 |
| Terai | 3339 | 3102 | 3576 |

Table A4: Approximate sampling error for per capita consumption on housing
(in rupees)

| | Estimate of 95% confidence interval | | |
|--------------|-------------------------------------|------------|------------|
| | Mean | Lower | Upper |
| Total | 511 | 490 | 533 |
| Mountain | 597 | 526 | 667 |
| Hill | 639 | 603 | 676 |
| Terai | 388 | 362 | 414 |

Table A5: Approximate sampling error for per capita consumption on own account production
(in rupees)

| | Estimate of 95% confidence interval | | |
|--------------|-------------------------------------|------------|------------|
| | Mean | Lower | Upper |
| Total | 749 | 700 | 798 |
| Mountain | 710 | 605 | 814 |
| Hill | 857 | 790 | 925 |
| Terai | 664 | 586 | 743 |