

## Survey on the goats livestock

### TYPE

Sample Survey. The sampling method used is the single stratified random sampling. The livestock holdings with goats included in the survey are stratified as follows:

- By region - NUTS II
- By size class of the holdings. In each geographical region, the holdings are stratified into  $L = 10$  size classes, according to their size, determined by their number of goats in the updated livestock holding register, as follows.

Size Class	Number of goats
Class 1	1 - 4
Class 2	5 - 9
Class 3	10 - 19
Class 4	20 - 49
Class 5	50 - 99
Class 6	100 - 299
Class 7	300 - 499
Class 8	500 - 699
Class 9	700 - 999
Class 10	1000 +

Livestock holdings with goats belonging to classes 9 - 10 were surveyed exhaustively.

The sampling fraction for livestock holdings with goats is about 0.71%.

The sampling error for the estimation of livestock holdings with goat measures less than 2% for the whole country.

### Estimation of the survey characteristics

#### a. Symbols

Defining with index  $i$  the selection order of a livestock holding with goats from the sampling frame in the stratum  $h$  (stratum=geography x size class) and symbolizing with  $y$  one of the survey characteristics, we can define the following:

$y_{hi}$  : the value of the survey characteristic  $y$  of the livestock holding with goats of order  $i$  in the stratum  $h$

$Y_h$  : the sum of the values of the characteristic  $y$  of all livestock holdings with goats falling into the survey and belonging to stratum  $h$

$Y$  : the sum of the values of the characteristic  $y$  of all livestock

holdings with goats under the survey. That is:  $Y = \sum_h Y_h$

$N_h$  : the number of all livestock holdings with goats falling into the survey and belonging to stratum  $h$

$n_h$  : the initial sample size in the stratum  $h$

$m_h$  : the number of respondent units in the stratum  $h$

$r_h$  : the response rate in stratum  $h$  ( $r_h = \frac{m_h}{n_h}$ )

$w_{hi}$  : the extrapolation factor of the livestock holding with goats of order  $i$  belonging to stratum  $h$ . That is:  $w_{hi} = 1/(\text{Probability of selected unit } i \text{ in stratum } h)$

$$r_h^{-1} = \frac{N_h}{n_h} \cdot \frac{n_h}{m_h} = \frac{N_h}{m_h}$$

### ***b. Estimation process***

The estimations of the magnitudes  $Y_h$  and  $Y$  come from the following relations:

$$\hat{Y}_h = \sum_{i=1}^{m_h} w_{hi} \cdot y_{hi}$$

$$\hat{Y} = \sum_h \hat{Y}_h = \sum_h \sum_i w_{hi} \cdot y_{hi}$$

The variance estimation of  $\hat{Y}_h$  and  $\hat{Y}$  is given by:

$$V(\hat{Y}_h) = \frac{N_h(N_h - m_h)}{m_h} S_h^2, \text{ where}$$

$$S_h^2 = \frac{1}{m_h - 1} \left[ \sum_{i=1}^{m_h} y_{hi}^2 - \frac{\left( \sum_{i=1}^{m_h} y_{hi} \right)^2}{m_h} \right], \quad V(\hat{Y}) = \sum_h V(\hat{Y}_h)$$

The coefficient of variation (%) of total estimation  $\hat{Y}$  is given by:

$$CV(\hat{Y}) = \frac{\sqrt{V(\hat{Y})}}{\hat{Y}} * 100$$