

Survey on the sheep livestock

TYPE

Sample Survey. The sampling method used is the single stratified random sampling. The livestock holdings with sheep 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 sheep in the updated livestock holding register, as follows.

| Size Class | Number of sheep |
|------------|-----------------|
| Class 1 | 1 - 4 |
| Class 2 | 5 - 9 |
| Class 3 | 10 - 19 |
| Class 4 | 20 - 29 |
| Class 5 | 30 - 49 |
| Class 6 | 50 - 99 |
| Class 7 | 100 - 199 |
| Class 8 | 200 - 499 |
| Class 9 | 500 - 999 |
| Class 10 | 1000 + |

Livestock holdings with sheep belonging to class 10 were surveyed exhaustively. The sampling fraction for livestock holdings with sheep is about 0.67%. The sampling error for the estimation of livestock holdings with sheep 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 sheep 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 sheep of order i in the stratum h

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

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

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

N_h : the number of all livestock holdings with sheep 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 sheep 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:

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