

### 6.2.6 Coefficients of Variation

Sampling errors are estimated in terms of coefficient of variation, CV (%), according to the following relationships:

In each stratum  $h$ , the following can be defined:

$N_h$ : the population size

$n_h$ : the sample size

$m_h$ : the number of responding units

$w_{hi}$ : the extrapolation factor of the agricultural holding of order  $i$  belonging to stratum  $h$

$y_{hi}$ : the value of the survey characteristic  $y$  of the holding of order  $i$ ,

$Y_h$ : the sum of the values of the characteristic  $y$  of all holdings in the stratum

$Y$ : the sum of the values of the characteristic  $y$  of all holdings in all strata

$$\text{That is: } Y = \sum_h Y_h$$

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

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

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

The estimations of the variances for  $\hat{Y}_h$  and  $\hat{Y}$  are calculated using the following relations:

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

$$V(\hat{Y}) = \sum_h V(\hat{Y}_h)$$

The coefficient of variation (%) of the  $\hat{Y}$  is given by the following relation:

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