

Accuracy rate calculation on the result of agricultural land area sample survey by ALIS Program

----- The pretest study on Chat Nat Province, Thailand -----

1. Accuracy rate calculation of agriculture land area.

ALIS conducts the estimation of agriculture land area by fellow formula.

$$Y = \frac{\sum_{i=1}^{n'} x_i}{\sum_{i=1}^{n'} y_i} y \quad \text{at the time} \quad y = \frac{\sum_{i=1}^n y_i}{n} N$$

- Y = estimated agricultural land area
- y = estimated agricultural land area by Google map
- N = the number of meshes including agricultural land
- n = the number of first sampling meshed
- n' = the number of second sampling meshes
- y_i = the agricultural land area on i number mesh of first sample
- x_i = the agricultural land area on i number mesh of second sample

The number of sample on this pretest study are shown as follow

- N = meshes
- n = meshes
- n' = meshes

1-1. Accuracy rate calculation of estimation agricultural land area (y) on first sample.

Accuracy rate calculation is conducted by using follow formula

$$\sigma^2 = \frac{\sum(y_i - \bar{y})^2}{n-1}, SE_{\bar{y}} = \sqrt{\frac{N-n}{N} \frac{\sigma}{\sqrt{n}}}, SER_{\bar{y}} = \frac{SE_{\bar{y}}}{\bar{y}} \times 100$$

It calculates Standard Error (SE) and Standard Error Rate (SER) based on the estimation result of first sample operation, become as follow

$$SE_{\bar{y}} = \sqrt{\frac{\quad}{\quad}} =$$

$$SER_{\bar{y}} = \frac{\quad}{\quad} \times 100 = \quad \%$$

1-2 Accuracy rate calculation of area changed rate on second sample. Accuracy rate calculation is conducted by using follow formula

$$\sigma^2(x - Ry) = \frac{\sum(x_i - \hat{R}y_i)^2}{n'-1}, SE_{\bar{x}} = \sqrt{\frac{N-n'}{N} \frac{\sigma}{\sqrt{n'}}}, SER_{\bar{x}} = \frac{SE_{\bar{x}}}{\bar{x}} \times 100$$

It calculates SE and SER based on the result of second sample survey, become as follows

$$SE_{\hat{x}} = \sqrt{\frac{\quad}{\quad}} =$$

$$SER_{\hat{x}} = \frac{\quad}{\quad} \times 100 = \quad \%$$

1-3 Whole accuracy rate calculation

The total of 1-1 and 1-2 become the whole standard error

$$SE_Y = \sqrt{SE^2_{\bar{y}} + SE^2_{\hat{x}}} =$$

$$SER_Y = \frac{SE_Y}{\quad} \times 100 = \quad \%$$

2. Accuracy rate calculation of crop planted area
 ALIS conducts the estimation of crops planted area by follow formula

$$Y' = \frac{\sum_{i=1}^{n'} x_i}{n'} N$$

- Y' = estimated crops planted area
 N = the number of meshes including agricultural land
 n' = the number of second sampling meshes
 x_i = the agricultural land area on i number mesh of second sample

The numbers of samples on this pretest study are shown as follows

- N = meshes
 n' = meshes

Accuracy rate calculation of estimation crops planted area (Y')

Accuracy rate calculation is conducted by using follow formula

$$\sigma^2 = \frac{\sum(x_i - \bar{x})^2}{n' - 1}, SE\bar{x} = \sqrt{\frac{N - n'}{N} \frac{\sigma}{\sqrt{n'}}}, SER\bar{x} = \frac{SE\bar{x}}{\bar{x}} \times 100$$

The SE and SER of each crop as follows;

Rice

$$SE\bar{x} = \sqrt{\frac{\quad}{\quad}} \frac{\quad}{\sqrt{\quad}} =$$

$$SER\bar{x} = \frac{\quad}{\quad} \times 100 = \quad \%$$