Second Regional Training Course on Sampling Methods for Producing Core Data Items for Agricultural and Rural Statistics

Module 3: Sampling Methods for Crop-Cutting Surveys

Session 3.3: Estimation Methods for Output, Resources and Input from Crop Cutting Surveys

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Jakarta, Indonesia

UNITED NATIONS **SIAP**
Statistical Institute for
Asia and the Pacific

IMPROVING AGRICULTURAL STATISTICS
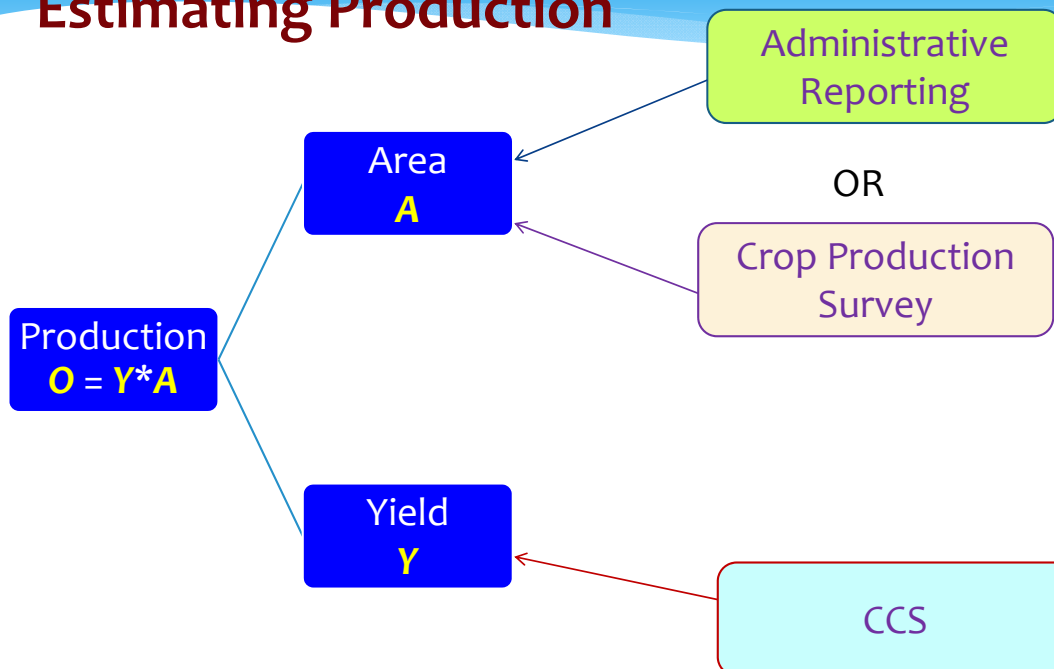**Global Strategy**

BPS, Statistics Indonesia

Contents

- Agricultural Surveys
- Important Definitions
- Crop Cutting Surveys
- Estimation of Crop Area and Production
- Sample Selection and Statistical units

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Estimating Production

Administrative Reporting

OR

Crop Production Survey

Area
A

Production
O = Y*A

Yield
Y

CCS
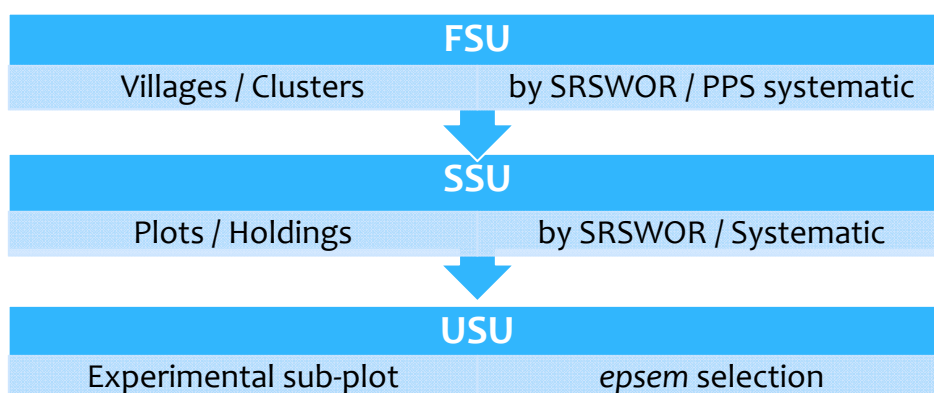
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Estimating Yield – CCS

* Usually, a stratified multi-stage random sampling design is adopted.

* Typically, stratification is done at a sub-district level.

* From each stratum

FSU	
Villages / Clusters	by SRSWOR / PPS systematic

SSU	
Plots / Holdings	by SRSWOR / Systematic

USU	
Experimental sub-plot	*epsem* selection

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Estimating Yield – *epsem* Selection (1)

For a district:

* Number of stratum (**s**): **S**

* Area under the crop in the **s**[th] stratum: a_s

* Number of villages / clusters (**i**): n_s
  selected by SRSWOR

* Number of plots **(j)** in the **i**[th] village: n_{si}
  selected by *epsem*

* One experimental sub-plot selected by *epsem*

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Estimating Yield – *epsem* Selection (2)

If y_{sij} be the observed yield from the selected sub-plot of the **j**[th] plot of the **i**[th] village / cluster of the **s**[th] stratum, then

Estimated average of *green yield* for the **s**[th] stratum is:

$$\widehat{\overline{Y}}_s{}^{g} = \frac{1}{n_s}\sum_{i=1}^{n_s}\frac{1}{n_{si}}\sum_{j=1}^{n_{si}} y_{sij}$$

Estimate of district level average yield of the *dry marketable produce* per hectare is given by

$$\widehat{\overline{Y}}^m = d.f.\frac{\sum_{s=1}^{S} a_s\widehat{\overline{Y}}_s{}^{g}}{\sum_{s=1}^{S} a_s}$$

where

d: driage ratio

f: conversion factor for green yield to dry marketable produce per hectare.

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Crop Cutting Surveys

Estimating Output – *PPS selection of FSU* (1)

For a district:

* Number of stratum (s): S

* Area under the crop in the sth stratum: a_s

* Number of villages / clusters (i): n_s
  selected by PPS,
  with selection probability: p_{si}

* Area under crop in i^{th} village/ cluster: a_{si}

* Number of plots *(j)*: n_{si}
  selected by *epsem*

* One experimental sub-plot selected by *epsem*

Crop Cutting Surveys

Estimating Output – *PPS selection of FSU* (2)

If y_{sij} be the observed yield from the selected sub-plot of the jth plot of the ith village / cluster of the sth stratum, then

Estimated *green output* for i^{th} village / cluster of the sth stratum is:

$$\widehat{O}_{si} = a_{si}\cdot\frac{1}{n_{si}}\sum_{j=1}^{n_{si}} y_{sij}$$

Estimated *green output* for the sth stratum is:

$$\widehat{O}_s = \frac{1}{n_s}\sum_{i=1}^{n_s} \widehat{O}_{si}\big/ p_{si}$$

Estimate of district level *dry marketable produce* is given by

$$\widehat{O} = d.f.\sum_{s=1}^{S} \widehat{O}_s$$

Crop Cutting Surveys

Estimating Yield – *PPS selection of FSU*

For estimating yield from the CCS, we have to estimate the area under the crop for the district.

This is done as:

$$\widehat{A}_s = \frac{1}{n_s} \sum_{i=1}^{n_s} a_{si}$$

and total under the crop for the district is given by

$$\widehat{A} = \sum_{s=1}^{S} \widehat{A}_s$$

Estimate of district level average yield of the *dry marketable produce* per hectare is thus given by

$$\widehat{Y} = \widehat{O}_s \big/ \widehat{A}_s$$

THANKS