

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

Module 4: Sampling Methods for Horticultural Surveys

**Session 4.2: Sampling Designs for
Horticulture Surveys**

9 – 20 November 2015,
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Sampling Design – An Overview

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Overview

Horticulture Survey (1)

Two major components of Horticulture surveys:

- * Fruits Survey
- * Vegetable Survey

Two main methods of data collection:

1. Physical observation
2. Farmers'/ growers' interview for estimated production

Vegetables surveys are mostly conducted as a CCS.

(thus not discussed in this session)

Only, the distinction from CCS for some vegetable surveys is that the enumerator may be required pay multiple visits from different pickings.



Overview

Horticulture Survey (2)

For fruits survey, a similar method of physical observation is often adopted.

But, for fruits that are harvested continuously for considerable lengths of time, taking physical observation could be very expensive.

Overview

Sample Design – Common Features

The sample design adopted for both fruits and vegetable surveys are usually stratified three-stage sampling designs.

FSUs: villages

SSUs: Grower Holdings for both and orchards for fruits survey

USUs: sub-plots for vegetable survey and cluster of trees for fruits survey.

First, a geographical stratification is done according to the domains for which estimates are published.

Next, sub-stratification of FSUs in a domain is done according to volume of production observed in the past.

Sampling Design for Fruits Survey

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Sample Design

Distinctive Features of Fruits Survey

Typically, a survey for estimating fruits production is carried out using a stratified three-stage sampling design.

At the second stage, often dual frame is used as follows:

- first, for the orchards (a list of orchards within the FSU)
- second, a list of grower holdings for stray trees.

The estimates obtained from samples drawn from these two lists are pooled to obtain estimates for the entire FSU in the sample.

Sample Design

A Recommended Sample Design (1)

Recommended to use a *dual frame* for each stratum:

1. A list frame for **orchards** from Agricultural Census
2. An area frame of villages (clusters) for **stray trees**

For orchards:

A point to note: Land use (except current fallow) changes gradually. Thus, the land under orchards & plantations observed in Agricultural Census (AC) tend to remain so even in the following years.

A list of orchards, obtained from AC, could thus be used for current horticultural surveys. Adopt a two-stage sample design with

- **FSU:** orchards
- **USU:** trees (for the crop-cutting method of data collection).

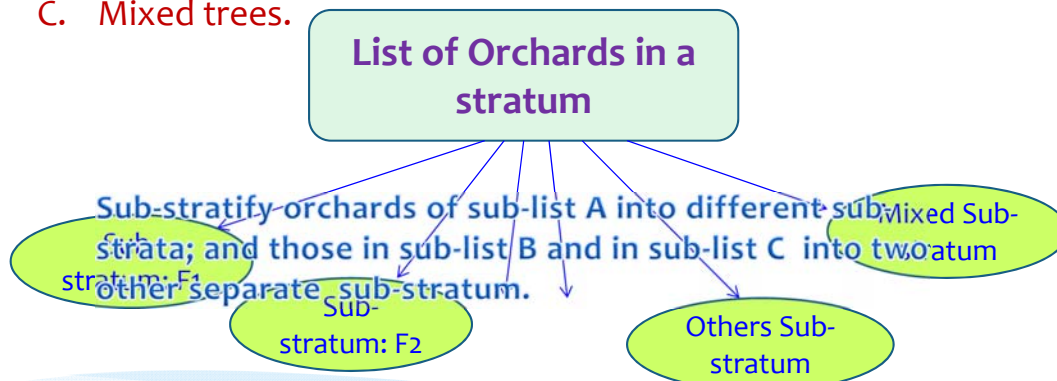
Sample Design

A Recommended Sample Design (1)

For orchards:

Prepare a list of orchards in a stratum from the last AC. Make 3 sub-lists and define sub-strata as follows:

- A. Those having only trees of main fruits of the stratum
- B. Those having only kind of trees of other fruits
- C. Mixed trees.



Sample Design

A Recommended Sample Design (2)

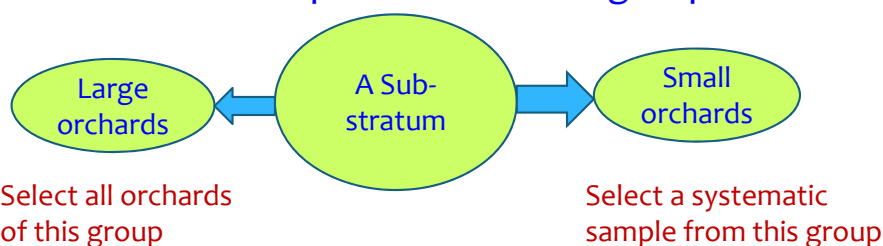
For orchards (Contd.):

Divide each sub-stratum further into two groups:

- I. Large orchards / plantations
- II. Small orchards

Select those in group I with probability 1.

Select a random sample from those in group II.



Sample Design

A Recommended Sample Design (2)

For Stray Trees:

Adopt a two-stage sample design with

- **FSU:** area units – villages or clusters
- **USU:** households

Select a random sample at each stage.

Data on output of fruits may be collected for all the trees owned by the selected households.

Sample Design

Data Items and Method of Collection

Data Items	Method of Collection
Products – may be more than one	For Seasonal fruits in orchards: CCE For other fruits in orchards & stray trees: Growers' interview
Bye-products (all)	Growers' interview
Inputs	Growers' interview
Resources – number of trees by type, etc.	Growers' interview

Sample Design

Selection of sample trees (1)

This requires a list of orchards in the FSU and a list of holdings with stray trees.

From the list of holdings, a sample could be drawn by SRSWOR. From each of the sampled holdings, the following should be collected

Number of trees – young,
bearing and
non-bearing

A small sample (of say one or two) bearing tree are sampled from list of bearing trees in the holding.

Sample Design

Selection of Cluster for Fruits Survey (1)

An illustrative example of steps involved:

- * South west corner of the selected orchard is located first.
- * Fruit trees are numbered in a serpentine fashion from southwest corner moving towards the length (customary) of the orchard.
- * Numbering of trees should be done as per status of tree i.e. bearing, non-bearing and young

Sample Design

Selection of Cluster for Fruits Survey (2)

(contd.)

- * All fruit bearing trees will be considered for making the cluster.
- * A cluster consists of four fruit bearing trees.
- * Therefore, all fruit bearing trees of the selected orchard are divided by 4 to obtain the total number of clusters.
- * There is a chance of having one or two or three trees in the last cluster.
- * Out of total number of clusters, three clusters are selected randomly for recording the produce.

Sample Design

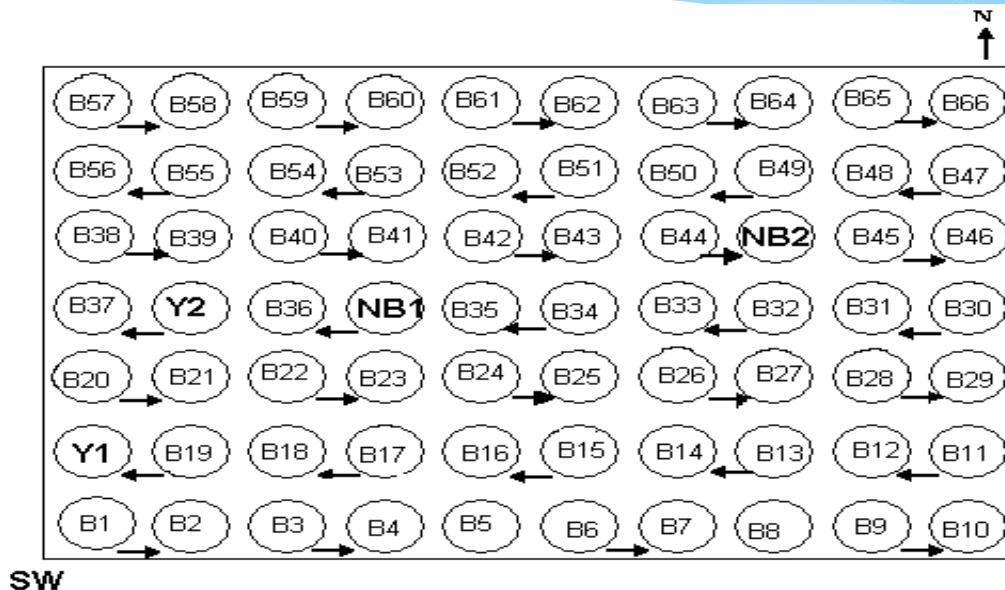
Selection of Cluster for Fruits Survey (3)

(contd.)

- * Say there are 66 fruit bearing trees which form 17 clusters (16 are complete clusters and 17th cluster has two trees). Out of 17 clusters, three clusters have to be selected using two-digit random number table. Column number 1 of two digits is referred for selection of cluster.

Sample Design

Selection Cluster for Fruits Survey (4)



Sample Design

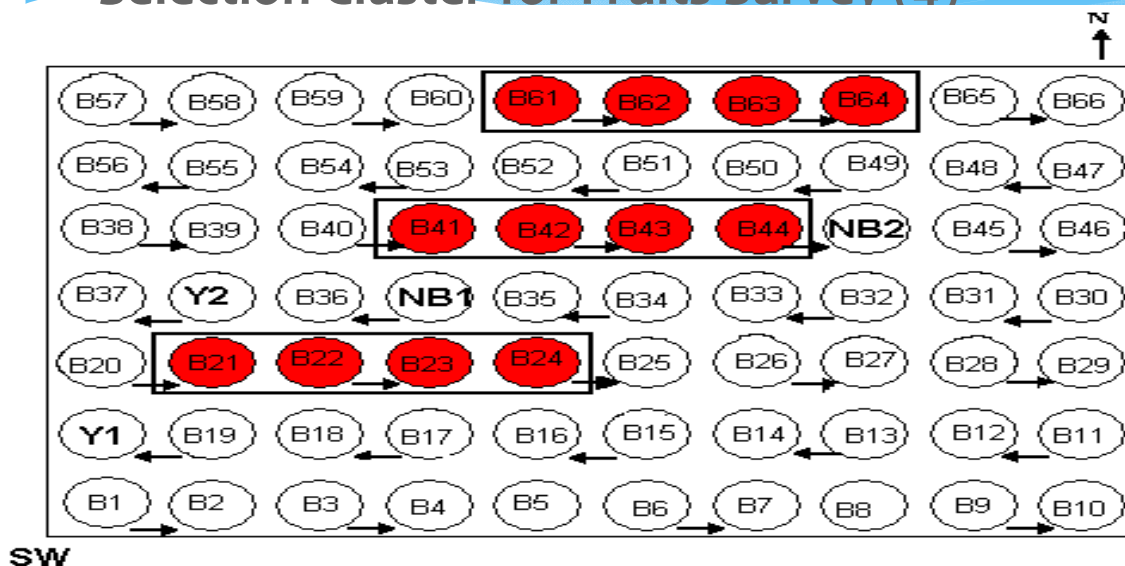
Selection Cluster for Fruits Survey (4)

(contd.)

- * Say, while drawing random numbers, 11, 06 and 16 appear.
- * Therefore, we select clusters number 06, 11 and 16. (Fig.-2).
- * The cluster number 6 contains tree number 21, 22, 23 and 24.
- * Cluster number 11 has tree number 41, 42, 43 and 44.
- * cluster number 16 consists of tree number 61, 62, 63 and 64.

Sample Design

Selection Cluster for Fruits Survey (4)



Thanks