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Lecture Summaries

by

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AREA SAMPLING FRAME CONSTRUCTION  
FOR AGRICULTURAL STATISTICS

Topics addressed were the definition and concepts of area frame sampling as well as the person resources, material resources, needs, objectives, and applications of area frame sampling construction for agricultural statistics. A properly constructed area sampling frame provides complete coverage of the population of interest with no overlap between area frame sampling units. An area frame sample can provide estimates with measurable and acceptable reliability for crop hectarages, livestock inventory, cost of production, grain storage on farms, and several other items of interest

Highlights covered were as follows:

1. Data collected from an area sampling frame is an unbiased source of information for government planners and decision makers, agricultural producers, marketers of agricultural products, and consumers.
2. Materials necessary to construct an area sampling frame are the most recent topographic or land use maps, mosaic of aerial photography, LANDSAT imagery at scale of 1:250,000, large tables and good lighting, adequate storage space for maps and photos, planimeters, color pencils, and other minor items.
3. Person resources of 4-6 host country people for area frame construction and one or more host country statisticians to work on the land use strata definitions, count unit and sample unit sizes, and sample design.
4. Cooperation between the host government Statistical Bureau, U.S. - AID Rural Development Officer and Mission, and the U.S. Department of Agriculture.

5. The consecutive steps in area frame construction which are outlined in the reference by Huddleston.\*

6. Examples of the various steps in area frame construction with slides, transparencies, acetate maps and a color composite 1:250,000 LANDSAT image.

7. Detailed documentation of area frame construction procedures was provided to each participating country with the following publications:

a. Huddleston, Harold F., "A Training Course in Sampling Concepts for Agricultural Surveys," Statistical Reporting Service, U.S. Department of Agriculture, Washington, DC, April 1976.

b. Hanuschak, George A., Morrissey, Kathleen M., "Pilot Study of the Potential Contributions of LANDSAT Data in the Construction of Area Sampling Frames," Statistical Reporting Service, U.S. Department of Agriculture, Washington, DC, October 1977,

PRACTICAL EXERCISES IN AREA  
SAMPLING FRAME CONSTRUCTION

I. Kings County, California (U.S.A.)

The exercise was designed to demonstrate the concepts of area sampling frame construction. The basic concepts are similar for developed and developing countries. The participants in the seminar were divided into five working groups and each group completely constructed an area sampling frame for Kings County, California. Materials used by each group were a Kings County Map on a clear acetate overlay at a scale of 1:250,000, a color composite LANDSAT image at the scale 1:250,000, a set of instructions, color grease pencils and count unit listing sheets. The participants interest and work was of very good quality.

## II. Salcedo Province, Dominican Republic

The exercise was designed to demonstrate area sampling frame construction in a developing country. The five working groups of participants each constructed an area sampling frame for Salcedo Province. Materials used were 1:50,000 topographic maps which indicated areas of cultivation, color grease pencils, and a set of instructions. The participants interest and work in this was quite good.

AUXILIARY USE OF LANDSAT DATA  
IN CROP HECTARAGE ESTIMATION

The lecture described the approach of using LANDSAT data as an auxiliary data source along with the primary data sources of a probability area frame ground data sample. This approach is used by the Statistical Research Division of the U.S. Department of Agriculture. A random sample of area units followed by careful data collection provides unbiased estimates of population parameters with measurable sampling errors. Computer classification of LANDSAT data into crop types and then the areal conversion of pixel counts is a biased procedure for areal estimation. Thus, the question arises, "Can LANDSAT data be used in an improved estimation process?" If there is a strong linear relationship between the ground data of interest and the LANDSAT computer classified data then the answer is yes. A regression estimate using LANDSAT data and ground data can have a considerably smaller sampling error than the ground data alone. However, the degree of success is highly dependent upon LANDSAT coverage, cloud cover, haze, geographic area, crops of interest, etc. The following detailed document describes the approach, and the results for the entire state of Illinois in 1975 and was provided to each participating country.

Gleason, C., Allen, R., Cook, P., Craig, M., Hanuschak, G., Sigman, R., Starbuck, R., "The Auxiliary Use of LANDSAT Data in Estimating Crop Acreages: Results of the 1975 Illinois Crop Acreage Experiment," Statistical Reporting Service, U.S. Department of Agriculture, October 1977.