A 20,000-MILE TRAIN FULL OF CORN, OR FACTS AND FOOD

IMAGINE A TRAIN more than 20,000 miles long, with over 2 million boxcars full of corn. The train would reach from New York to San Francisco about five times.

That's the size of the 1969 corn crop as predicted by the Crop Reporting Board in its December estimate. This is corn used primarily to feed cattle, pigs, chickens, and turkeys. In stark figures, it comes to 4,577,864,000 bushels.

Estimates like this are measures of change, within season, month to month, or year to year, but who needs measures of change? What needs to be measured? How will change be measured? The corn crop makes a good example.

Practically all of us are affected and have an interest—whether we realize it or not—in the Agriculture Department's estimate of the corn crop. Let's see why.

During 1968 we in the United States produced and consumed 20.7 billion pounds of beef, or about 110 pounds for each man, woman, and child. More than two-thirds of the 35 million cattle needed to provide this much beef were raised on a diet with a substantial amount of corn.

Besides beef we produced and consumed 12.9 billion pounds of pork from more than 85 million pigs, most of which were raised on diets heavy with corn. We also consume 7.5 billion pounds of chickens each year, Sundays included, to say nothing of the turkeys that eat out of the corn "pile."

Meat production is not the only use made of corn—corn oil goes into salad and cooking oils and margarine—everyday commodities in nearly every housewife's kitchen. Then there are breakfast cereals as well as corn starches that are basic ingredients in many food products ranging from baby food to desserts. Add alcohol and plastics among numerous other products to which some portion of the annual corn "pile" is important.

See why you have an interest in the corn crop?

Decisions by hundreds of thousands of farmers and firms doing business with farmers are affected by the corn crop estimate. Our highly developed production and marketing system depends on accurate estimates to insure stable supplies and prices of agricultural commodities. Too, if you're a housewife you expect to find "corn fed" beefsteaks, pork chops, and plump chickens any time you go to market.

Besides the corn estimate, the Statistical Reporting Service—in its role as the Agriculture Department's primary fact-gathering agency—issues some 650 reports each year. They include current estimates on acreage, yield, and production of crops; livestock numbers and products; supplies of grain in storage; prices received by farmers; and farm labor reports.

Other articles in this book deal with the dramatic changes in agriculture. These changes have resulted in equally dramatic changes in the need for agricultural statistics and the methods of collecting them.

The first Monthly Crop Report describing the condition of a number of crops was issued by the newly established U.S. Department of Agriculture in July 1863. Since then the number and kinds of statistical reports related to agriculture have developed like an ever-widening stream.

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AUTHOR GLENN D. SIMPSON is Chairman of the Crop Reporting Board and Deputy Administrator, Statistical Reporting Service.

Today probably no major segment of the American economy is as well served by statistical intelligence as agriculture. And the end is not yet in sight. The backlog of requests by data users for still more detailed information about agriculture exceeds by far the added financial resources that Congress and the State legislatures may reasonably be expected to provide for statistical purposes.

Farms are becoming larger and more specialized, and significantly the largest and most specialized are increasing in number. Just one-third of our largest farms now account for over 85 percent of agricultural sales, and this share will increase.

Operators and managers of the larger farms are becoming increasingly aware of the value and influence of statistics in decision making. One can also observe an increasing capability as well as desire on the part of some commodity organizations or groups to provide a share of their own statistical intelligence. They are developing expertise in statistical and economic analysis that makes them less vulnerable to the out-and-out market speculator.

Changing farm technology has also altered the need for statistical data on agriculture. Increasingly, farmers have acquired safeguards against crop failures that frequently crippled their forefathers.

Supplemental water supplies and irrigating procedures, new varieties, fertilizer, pesticides, herbicides, and crop insurance have combined to make many farmers considerably less dependent on day-to-day weather and environmental conditions. Once a crop is planted, there is now far greater assurance that a crop of predictable magnitude will be harvested.

Still another factor bears close examination so far as farmers are concerned. There is evidence that future reports should include less frequent but more accurate statistical measures

Measuring crop frontage on the highway, in 1947.

Above, four cameras are mounted together for high altitude photography. Each camera has specific type of film and filter to provide different data on same crop area. Right, Florida Department of Agriculture inspector marks limb on citrus tree on which fruit will be counted. Projected crop estimates are made from samples like this.

of commercial agriculture. Also, demands for new data nearly always include measures of commodity quality and market timing, currently not available. These facts may be more important than many of the time honored statistical series now produced.

If the foregoing indications of change are valid, conditions exist to reevaluate the Federal crop reporting program for agriculture.

Again using the corn crop as an example, the annual Federal report program is now made up of estimates of acreage farmers intend to plant in March, acreage planted as of July 1, and the acreage harvested in December. Each month from July through November a new monthly forecast of production is prepared. In December the final estimate of acreage and production is published.

A suggested future statistical program for corn could include the estimate of acreage planted in late July. Next would be an early season production forecast the first of September after the crop has grown to the stage where the potential output can be predicted with a high degree of certainty.

The crop is "made" by about October 1 and the next production estimate would be appropriate as of this date. The wrap-up at the end of the season would provide a full accounting including the new statistics that measure the important aspects of crop quality.

These less frequent estimates would be based on highly refined sampling procedures and have a predictable degree of accuracy at a very high level, say one percent or less for the United States.

Many farm operators now have the capability to keep track of crop progress between the less frequent dates suggested above. Any future

advances in the science of weather forecasting could be expected to increase this capability. Farmers would improve their decisionmaking ability by the increased accuracy of reports when they are issued.

This example, using a modification of statistics for corn, can be applied as well to a wide array of commodities including fruits and vegetables. Statistics on livestock must be improved as regards accuracy, additional needed detail, and improved timeliness.

In the past, data were obtained from a cross-section of farmers chiefly by mass distribution of questionnaires to a broad spectrum of farm operators by rural mail carriers, or by direct mailing of questionnaires to large numbers of names and addresses without knowing whether they were big or small producers or how they specialized. These methods are just about obsolete, if greater accuracy in statistical measurement is going to be achieved.

What are the recently developed sampling procedures currently in use and eligible for future use? One of them is the area sample, a set of small blocks of land (segments containing about one square mile) selected at random across the United States.

In June and December each year paid enumerators visit these segments to account for the activities of interest taking place on a given date, whether in crops, livestock, poultry, or farm labor.

This sample data can be projected into estimates for the States, regions, and the United States with any desired level of statistical accuracy. The size of the sample (number of area segments) controls the level of statistical accuracy, assuming good workmanship by the hired enumerators.

The area sample is an expensive data collection procedure, and that limits its use. To overcome this deficiency, USDA's Statistical Reporting Service is extending its efforts to compile lists of farm operators that are as nearly complete as possible. The objective is to draw up lists that contain names, addresses, and principal agricultural activities of practically all the farms in the United States.

These lists will permit a statistical breakthrough. It will be possible to select from a list a random sample of farm operators of known size and commodity specialization to which questionnaires can be mailed. The area sample will be jointly employed to measure the changes or incompleteness in the list sample.

Complete coverage of these samples for major surveys by mail, telephone,

Infrared photos are taken from aircraft at USDA research station in Weslaco, Tex., with data from ground obtained simultaneously by use of a lift. "Ground truth" data correlate actual crop condition with aerial photos.

and personal visit will provide the levels of statistical accuracy being demanded by data users.

The complex agricultural production and marketing systems required to feed and clothe our growing population cannot operate without more accurate and timely measures of change.

Much progress has been made to reduce the need to take the time of the farm operator in answering survey questionnaires. The objective measurement procedure is currently being widely used to measure yields per acre for such crops as corn, cotton, soybeans, wheat, oranges, filberts, and others.

In the major producing areas for these commodities, fields where very precise measurements and counts can be made are randomly selected. These tallies are converted into forecasts and estimates of yield per acre or per tree with a high level of statistical accuracy.

Once the fields are selected, the farm operator's permission is sought to enter them to select and identify for future visits precise locations where the counts are made. The work is done by trained enumerators. When the crop is mature the sample plots are harvested and the product measured for yield, moisture, and other useful crop quality factors like protein and oil content.

Following harvest, sample fields are gleaned to get measures of crop losses which could eventually lead to improved harvesting practices.

Probably before another decade has passed the use of high-level or earth satellite photography will have taken its place in providing additional measures of American agriculture.

This technique may provide new bases for sample selection and measures of crop progress. It should permit accurate counting of some major aspects of the livestock population, such as the number of cattle being fattened to produce the steady flow of choice beef to consumers.

Remote sensing and accurate identification of plants from satellite photographs should permit selection of high and low yielding fields of growing crops, providing a refinement in selection of sample fields for actual objective tallies on the ground. Development and progress of crop diseases or insect infestation should be measurable, as well as the condition of growing crops due to excess or shortage of moisture.

These new capabilities based on advances in space age science figure to help greatly in improving agricultural estimates. They could reduce the burden on farmers in gathering data, and permit more accurate, less frequent, yet more useful measures of change that will benefit both producers and consumers of food, feed, and fiber.

COMMODITY POLICIES AND PROGRAMS

SINCE THE DEPRESSION of the 1930's, nearly every industrialized nation has sought to protect farmers from low prices. The United States is no exception. Over the past four decades, this country has created and maintained an extremely complex agricultural price-support system. Commodity programs have demonstrated remarkable ability to survive despite widespread criticism, and a marked reduction in the political influence of agriculture in Congress.

Falling farm prices, high indebtedness, and a wave of foreclosures set the stage for direct government intervention in pricing farm products in the period between the two world wars. By the mid-1920's, a majority of those in Congress were convinced that government intervention was essential to improve farm prices, but it was not until 1929 that Congress