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Statistical Improvements in Turkey

By Charles F. Sarle

Sound statistics are basic to the effective operation of any industry. This article tells of improvements which the Turkish Government is making in its statistics on agriculture through the use of techniques that have been demonstrated in the United States.

TURKEY is scheduled to have a modern crop and livestock reporting service. Preceding its development will be the taking of a census of population, agriculture, and manufacturing. The Central Statistical Office of Turkey will be responsible for the census of population and agriculture, which will be taken this fall and it expects to take a census of manufacturing and business in early 1951.

The United States is providing a three-man statistical mission to assist in getting this work under way. The experience will provide our statisticians with a valuable opportunity to test the effectiveness of modern sampling techniques under unusual conditions.

Under present plans a probability sample survey with specially trained interviewers will be made at the time the agricultural census is taken, to obtain at least a partial measure of the bias that is inherent in any agricultural census taken by village headmen in a rural culture that has actually changed very little, psychologically speaking, in hundreds of years. The last agricultural census in Turkey, made in 1927, was accompanied by a country-wide sample survey that showed an average understatement of 27 percent in the figures obtained by village headmen. This sample survey was made under the direction of a Belgian consulting statistician employed by the Turkish Government of that time. Most of the techniques of modern sampling were employed, except that the sample was not selected on the basis of probability—a method that has become common practice in the United States, in India, and in Japan during this decade.

A sample of 8,000 out of about 40,000 villages was selected, utilizing stratification and a higher sampling rate in the areas where agricultural production was most important. Within each sample village six sample households were selected. The households within the sample villages were

stratified on the basis of their economic status and two households were selected from each of the three strata. The data obtained by the survey interviewers were compared with the census data obtained from the same sample households by the village headmen. The average understatement of 27 percent was ascertained in this way.

Making that sample survey was a remarkable achievement, in view of the time and conditions when it was made—more than 20 years ago when only a very small percentage of the villages of Turkey had elementary schools of any kind. (Today, about 43 percent of the villages have elementary schools.) Even in the United States, at that time, only a few statisticians were showing interest in modern sampling methods.

Census Methods Used in Turkey

Turkey had a population census in 1927, in 1935, and each fifth year since. The population census of 1927 had one serious weakness. The sex ratio of males to females for the younger or military-age group was much lower than for the other age groups, indicating a serious underenumeration of males of military age. The country had rather recently passed through two wars: through World War I, as an active belligerent, and the Turkish Revolution of the early 1920's when after several years of fighting, the Greek Army of invasion was driven out.

Two interesting controls are used in taking a population census in Turkey. Before each quinquennial population census, all doorways or entrances of buildings that open upon a public thoroughfare are given numbers by the local authorities. If a given building has more than one entrance on this thoroughfare, it is given a letter as well as a number. For example, if a building has three entrances, they are numbered, say 19A, 19B, and 19C. The population census is

taken on a Sunday and all persons are required to stay within the places where they live until the census is completed, when a signal is given. Everyone can then go about his business as usual. Anyone who will have to be away from home must get a permit from the local police and wear an arm band on the day the census is taken. No enumerators are hired as the taking of the census is a regular duty of the local officials.

This spring and summer the numbering of doorways throughout Turkey will be brought up to date. In taking the population census next October a household questionnaire will be used rather than the individual questionnaire that was used previously.

Agricultural Statistics in Turkey

Those who attempt to use the agricultural statistics of Turkey generally recognize that the present agricultural statistical service is wholly inadequate to meet the needs of the expanding national economy of that country. An imposing array of agricultural statistics in great geographical detail are now published by the Central Statistical Office, but they have not been made available until about 2 years after the crops to which they apply have been harvested. This delay was inevitable under the methods of compilation used thus far. Each of the 497 county agricultural agents, most of whom are graduates of secondary agricultural schools, had to estimate the area and production of crops for each of the villages in his county, or *ilce*. On the average, there are about 70 villages per county and few of the county agents have an allowance for travel within the county. These village data were tabulated at the agricultural office of the respective province, and were eventually forwarded to the Agricultural Section of the Central Statistical Office in Ankara, the capital. The Agricultural Section consists of one statistician and a few clerks, and it handles a multitude of agricultural data from various sources. Eventually the data from the county agents and other sources are prepared in rather elaborate geographic detail for publication. An abstract of the compilation is now published in English.

Preparing for the New Census

The Central Statistical Office has made excellent progress in preparing for the 1950 agricultural

census. In 1948 a country-wide survey was made of all villages and towns. The respondent was the village headman and his staff, all of whom are elected annually by the villagers at what in New England would be called a town meeting. Questions concerning the economic life of the village as a whole were in the questionnaire, including several global questions concerning land use, such as area of land in field crops, in vegetable crops, orchards, and vineyards; extent of hayland, pasture, and range. The number of livestock kept was also asked. These data have been entered on punched cards, and can be used when the 1950 agricultural census is planned.

Last year, under the able leadership of the Director of the Central Statistical Office, a much more intensive country-wide village survey was made. The questionnaire included questions concerning the area of the individual crops within the village, the numbers of fruit and nut trees, grapevines, and olive trees; and the numbers of different kinds of livestock. Fourteen teams of two persons each were trained and then assigned for 3 months to the 14 districts into which the 63 provinces had been grouped. The military department furnished jeeps for the transportation of these teams and for their later use in their respective districts. These teams conducted training schools for the county agricultural agents, who in turn called in the village headmen and instructed them in the use of the agricultural questionnaire. The county agents saw that the village headmen went over the filled questionnaires critically and returned them. The teams traveled extensively in their districts, supervising and assisting both the county agents and the village headmen.

Data collected in this fashion for the village are subject to understatement bias. One village headman told a supervisor who asked about the accuracy of the data submitted, "If I reported all of the area and production of crops in this village as I know it to be, someone would kill my donkey some night." But these data by villages will be valuable in the planning of the census. They will be especially useful in designing the sample for the survey that is to parallel this census.

Probability Sampling Already Tried

A country-wide probability sample survey of 166 villages with subsampling of households within

the sample villages, was made in the fall of 1949. Data thus obtained will be valuable in connection with designing the sample of the parallel surveys. A statistician from India was employed by the Central Statistical Office from August to November in 1949. He designed the sample, using modern principles of probability sampling. An internal statistical analysis of the data from this survey yet to be made will show the comparative variance for households within villages and between villages, and this will make it possible to allocate survey resources much more efficiently than would otherwise be possible. For example, if the variance is high within villages and low between villages, a smaller sample of villages will be used with a higher rate of sampling of households within villages. But if the reverse is true, a larger sample of villages with a lower sampling rate within villages will be used.

During a 5-week stay in Turkey last fall the writer selected 10 qualified trainees to come to

this country for intensive training of 6 to 9 months. Two of these were for work on agricultural census and crop and livestock estimating methods, 2 were for work on sampling, 1 each for work on the population census, the census of manufacturing and business, the collection of information on labor statistics and family budgets, and collection of information on national income, and 1 each to work on economic planning, and machine methods and sample expansions. Three of these trainees arrived last January. Incidentally, 3 of the 10 trainees are women.

At the request of the Director of the Central Statistical Office the writer also prepared, while in Turkey last fall, a report that analyzed briefly the needs of the Turkish economy for current and reliable agricultural statistics and that made specific recommendations regarding the organization and functions of a modern agricultural statistical service for Turkey. It is this service that will now be developed for that country.

Problems in Sampling a Heterogeneous Agriculture

By George Knutson and Floyd K. Harmston

Sampling for agricultural items having low frequencies of occurrence or a very sporadic geographical distribution, which is characteristic of the agriculture in the West, involves several special problems. One of these is the delineation of areas which will be useful as a basis for stratification for selecting samples and for analytical purposes. The authors give their views on the classification of agriculture with reference to Wyoming particularly.

IT HAS LONG BEEN the practice of agricultural statisticians to work with samples that were aimed at getting a cross-section of all farms in a State. Such a procedure is satisfactory when all farms in the universe are fairly similar with respect to the characteristics to be estimated from the sample. But when the agriculture in a State is heterogeneous a general-purpose sample of farms does not yield results of the required precision for sporadically distributed items, unless a prohibitively high sampling rate is used.

So far, the commonly used method for working with problems of heterogeneity has been the classification of areas by districts. Geographical districting has been used in the Department's work

in agricultural estimates for a long time, in an attempt to bring "like" agricultural areas into the same subuniverse. These areas follow county lines. The method has a certain degree of merit. Recently, area interview surveys have utilized type-of-farming maps in allocating sampling areas; this amounts to districting into strata the parts of which are not necessarily geographically contiguous.

The problems of heterogeneity, however, are not completely solved by any such simple procedure. State statisticians, particularly those in the West, have lamented the lack of research on them. There seems to be a tendency to select the most homogeneous areas for use in sampling re-