

# INTERNATIONALLY COMPARABLE STATISTICS OF FOOD AND AGRICULTURE

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**M**ORE than 40 years ago, in 1905, an international conference in Rome laid the foundation for organized international efforts for the development of internationally comparable statistics concerning food and agriculture. The International Institute of Agriculture which resulted from that conference was given this assignment as one of its major tasks. At that time, as Hobson points out, such a development was not the result of clearly felt and expressed needs of governments. It was rather the enthusiasm of David Lubin which first led to a recognition of the needs. Lubin, a successful merchant, had turned to agriculture but soon found that he and other farmers were hampered by a lack of statistical information about agriculture. In the proposals for what eventually became the Institute, therefore, the assembly of reliable information about the world's agriculture was of major importance.

From the time of its founding until its absorption into the Food and Agriculture Organization, the Institute devoted a large share of its efforts to the promotion of agricultural statistics. It assembled such information on agricultural matters as could be secured and in turn made it generally available. Through methodological publications, conferences, conventions, and through personal consultation, the Institute kept the goal of an adequate statistical program for agriculture before the nations of the world. In 1925 it began to sponsor a world-wide census of agriculture, and engaged a missionary who went to the ends of the earth, stimulating interest and helping governments plan for their census work. The late Mr. Estabrook, who was loaned to the Institute for that purpose, spent more than four years, visiting eighty countries in behalf

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of that census. Twenty years later it is clear that the results of his work go far beyond the summary publications in which the Institute issued the results for those countries which were able to carry through at least in part the census program.

The oncoming war interfered with a similar venture for 1940, as it also disrupted the network of information about the world's agriculture which had gradually been built up. The Institute staff was sharply reduced, those who remained turned their attention to the summarization of materials which had become available but had not been analyzed or published because of the pressure of current business, and they prepared themselves to resume publication of international statistics as soon as the necessary communications could be re-established. Those first postwar publications leave many gaps and are subject to many revisions, but they did provide badly needed information and made a start in re-establishing statistical series and developing them to meet the new needs.

Governments generally need information on production, marketing, and utilization of food and agricultural products, on the numbers of livestock, on the prices at which products are moved, on the many elements that make up farmers' costs and incomes, and on many other factors which effect the well-being of agricultural workers and the levels of production and consumption. As food production and consumption become more and more matters of public policy, the need for reliable information on these matters is correspondingly increased.

An international organization is dependent on national sources for its statistics. It has neither the authority nor the resources to go into any country on its own. Improvement in statistics and in the comparability of the series that are made available therefore is a cooperative endeavor. This was clearly recognized in the establishment of FAO, for in accepting the Constitution member governments pledged themselves to supply the necessary information to the Organization.

The conditions under which agricultural statistics are assembled necessarily have a bearing on the character and qual-

ity of the statistics. The fact that agricultural production is generally carried out on numerous small holdings limits the character and quantity of the statistics that can be obtained. The wide diversity of marketing and processing channels and the fact that much of the production is consumed on the holding on which it is produced mean that much of the world's agricultural production does not pass through marketing or processing "bottlenecks" where it could be easily counted. Annual fluctuations in crop production may be very large, and this in turn affects the possibility of preparing accurate estimates. Insofar as agricultural statistics are instruments of administration they are subject to various sources of bias which are not always readily detected or allowed for.

The collection of food and agricultural statistics is in virtually all cases a responsibility of governments. Only in a few instances is the production of a crop so concentrated or of sufficient commercial interest that private agencies assemble the requisite figures. Being a governmental responsibility, the collection of statistics about agriculture is necessarily closely related to the structure of a country's government. Food and agricultural statistics are generally collected as part of an administrative operation. Few countries have seen fit to collect and publish current agricultural statistics as a separate operation, concerned only with the production of the statistical information. Under war and postwar conditions production statistics on area and production of crops frequently were related to the controls on the movement of crops which existed, or to the food collection program. Collection of data on the area under given crops may be a by-product of the system of assessment of land for taxation. Wherever a highly integrated system of controls of agricultural products or the movement of food has been developed, the administration of those controls has required some statistics, and the reports required for administration of that program have generally been available also for statistical purposes. But it requires very little study to show that these are not generally the conditions making for

adequate statistics, for here there tends to be an incentive to concealment, consciously or subconsciously. There may of course be controls which would reduce the volume of understatement. In those cases in which the cadastral maps have been kept up to date, the recording of the crops standing in each field may be quite complete. Yield estimates may be based entirely on objective measurements of the outturn of the crop on sample areas. But it is generally true that where the statistics are dependent upon some non-statistical operation, they will be affected by the nature of that operation, and they are likely to be deficient in respect to other objectives. The biases introduced under such circumstances are not necessarily downward—the benefits to be derived from reporting a large number may in turn lead to overstatement, though that is less frequent than the converse.

Another element that makes for difficulty in securing comparable statistics is the fact that the structure of a country's government exerts a profound effect on the statistical program which that country can develop. From the standpoint of an international statistical agency, it is difficult enough to deal with some 60–80 statistical offices in arriving at agreements on common standards and definitions. But it is an oversimplification to assume that such agreements can actually be worked out in that way. Central statistical offices do not uniformly have the power to impose standards and definitions on provincial or district offices. In a small country there may be a highly centralized form of organization, with the statistical operations for the local areas largely under the direct control of the central office. But in some of the larger and important agricultural countries the situation is quite different. Thus the Dominion Bureau of Statistics in Canada relies far more on persuasion than on compulsion to achieve comparability of provincial statistics. The United States, with its extensive system of Federal-State Agricultural Statisticians, combines central direction of standards and definitions for some items with a high degree of local autonomy for others. The Central

Statistical Offices for agriculture in India have been carrying on an extensive program of training of statistical workers in provincial offices as a necessary first step in working out agreements among them. In the Netherlands or in Denmark, both countries with a high degree of homogeneity in their agriculture, the central office makes the determinations. The gradations in this respect among the countries of the world are numerous, and the effect is not uniform in respect to all agricultural products.

The role of the government in economic affairs also has a bearing on the statistics produced. A government which exercises a minimum of control over the economy is likely to need less information about the affairs and activities of its citizens than does a government that exercises a high degree of supervision. Some governments place their major reliance for current statistics on information secured from individuals who are willing to volunteer the information, others may make the supplying of information a requisite to sharing in certain benefits, or require it as one of the civic obligations. In contrast to the mailing of questionnaires to be filled out by cooperative individuals, there is the requirement imposed in some countries that agricultural operators shall report to a specified place on a specified date in order to supply the necessary information to an enumerator there.

Of equal importance is the degree of a government's interest in a given agricultural product. An export crop, like cotton, may be under close governmental control, and therefore be a matter of interest at all stages from planting to export or manufacture. Thus in Egypt, the cotton statistics are generally believed to be exceptionally complete, but in respect to livestock, which is not a matter of such intensive governmental interest and control, the statistics are less adequate. Sugar and tobacco are generally of interest for fiscal reasons and therefore tend to be reported to a high degree of completeness. By way of contrast, the statistics for a crop such as sweet potatoes are far less complete.

Of primary importance to agricultural statistics is the fact that for most of the important agricultural or livestock products, production is distributed over a large number of holders, many of which make only a minute contribution to the total. There are few major products for which satisfactory production statistics could be secured by getting data from a few large operators, as might be the case in manufacturing statistics, where a given number of operators might contribute information for 85–90 per cent of the product. Insofar as the collection of statistical information is dependent upon direct contact with the holder, it will be affected by the resentment which small holders may feel against taxes, food collection, rationing, and many other forms of government control. Where the agricultural holders are illiterate, restricted to their small locality in their marketing activities, or operating on so small a scale that market and price considerations play only a minor role in their operations it may be extremely difficult to show them that any degree of self-interest attaches to their supplying accurate information promptly. For many products and in many areas, securing information from the market place rather than directly from the producer offers little or no improvement—marketing channels may be highly diverse, and the buyers may be essentially equal to the agriculturalists in the level of education, contact with the outside world or the awareness of the importance of statistics to day-by-day operations.

For the products that must be processed before they can be consumed, there may be a real possibility of securing the desired statistics at the processing stage. Cotton generally must be ginned before it can be used, rice and wheat must be milled, livestock must be slaughtered. Tobacco must be cured before it is a salable product, olives must be crushed, etc. But to mention these is to indicate at once the difficulties that may be encountered. Much of the processing can be done by the producer or the consumer himself without going through a centralized processing plant. And for some commodities a large proportion of the processing is done locally, by hand, or with

very simple machines that do not require a high degree of concentration of the product. To meet this difficulty it is frequently the practice to confine the statistics gathered to that portion of the total product which reaches the market or passes through specified processing channels. Thus prior to the war the major statistics for livestock slaughter in many countries were derived from those plants in which a system of inspection was in operation, and estimates of total non-farm slaughter were possible only by making an allowance for slaughter in plants not under such inspection. Except in the most commercialized vegetable growing areas, the statistics on vegetable production are generally highly inadequate, since production for home consumption and production for purely local consumption tend to be reported inadequately. The extent to which the product is consumed directly by the operator and his family has a direct and vital bearing on the completeness of the statistics for the product. In some cases the available statistics frankly seek to exclude home consumption, even though that may be a very considerable proportion of the total production of the country. In others, an effort is made to include all production, and special attention is given to that portion which remains on the farm. In some countries it is not known what contribution home consumed products make to the total volume of production. For many products the uncertainty on this score is one of the major difficulties encountered in comparing the data supplied by individual countries.

The volume of production of feed and forage crops is particularly difficult to estimate, because these products are quite generally the product of the holding on which they are consumed. Trade in these commodities is far less important than the trade in the crops intended for human consumption. Another difficulty in this connection is that the same product may be considered as food in one area or at one time period but be used primarily for livestock feed in another.

Not the least of the difficulties grows out of lack of agreement on what constitutes production. Is an animal intended

for slaughter to be accounted for in production statistics at any time other than when it is sold?

Since the majority of crops are annuals, there is no necessary relationship between the area grown and the total volume of production in a country reported in any one year. Production may fluctuate widely from year to year because of weather changes, insect infestations and the other hazards to which crops are subject. Annual fluctuations are of course less important for the larger livestock, because of the long period of time required to build up or replenish a herd, but the total volume of hog or sheep production or of poultry production may vary widely from year to year.

The conditions under which products are harvested also have a significant effect on the statistics available. In the case of crops there is often a recognized harvest period, to which the volume of the harvest can be related. But in the case of some crops and of products like milk or eggs, the harvest is continuous, though subject to seasonal fluctuations, and it becomes much more difficult to arrive at satisfactory results. Here sampling involves time as well as definition of the universe.

Technical progress entails certain difficulties in the comparability of statistics. Improvements in statistical techniques themselves generally involve difficulties in comparisons from time to time, for what appear to be increases in production may turn out to be simply improvements in the coverage of the statistical data. Technological improvements in agricultural production may introduce significant difficulties. In most countries estimates of yield are based on judgments rather than on objective methods, such as crop cutting. There is therefore a danger that the yield estimates may not fully reflect the changes in yield that occur. The rapid introduction of a new variety, comparable to the spread of hybrid corn in the United States could easily lead to an underestimate of yields. Failure to take into account the rapid increase in the acreage to which the new level of yields is applicable may also affect the validity of production figures.



Units of measure provide another source of difficulty. The metric system is generally accepted as the system of units in which measurements are to be reported in international tables. But the adoption of a single uniform system of weights and measures for reporting purposes does not assure comparability. There is first of all the need for converting from the units in which individual countries report: acres to hectares, bushels to metric tons, short or long tons to metric tons, gallons or barrels to hectoliters, and the like. While measures of weight provide more nearly comparable units for measuring grain than do measures of volume, it is nonetheless true that in many cases it is necessary to convert measures of volume into measures of weight. Finding the best applicable factors for conversion may require considerable research, as well as revision from time to time. Within many countries there is also considerable variation in units of measure. Standardization of weights and measures presupposes a high degree of integration within a country and a well-developed system of communication and trade. But in large areas of the world that presupposition is lacking, and the local reports are given in terms of local units of measure, which may themselves vary considerably from one area to another, or even within the same area. Undefined terms, such as load, basket, bunch, box, or measure become units for counting and there may be no felt need or real interest within the country in having them standardized. Even units for the measurement of land area are subject to many local variations, for here too the lack of specificity in the meaning of the terms used may create no difficulties for the people most directly concerned. The need for the expression of quantities in precise, defined terms is not felt in many cultures. A large proportion of the world's trade is carried on without such definition.

What is true about mere measurement of the total quantity of a commodity corresponding to a general name, is even more true if the attempt is made to become more precise in terms of grades or quality. Standardization of grades is a concept of limited applicability at the present time, and such considera-

tions as moisture content, or the inclusion of extraneous matter with the product are not generally recognized as useful.

The fact that a product may be marketed or stored at various stages of processing also creates difficulties, for it is not always easy to convert the reported units into some standard base, such as the conversion of wheat flour to wheat equivalent when milling ratios are subject to rapid fluctuations and wide variations among countries. The recent efforts to achieve uniformity in the use of the term "paddy rice" illustrates the difficulties that are to be encountered there.

Product names vary widely and it is not always clear how a given product is to be classified. The problem of definition in the face of widely different practices is illustrated also with regard to the definition of terms to be used in reporting livestock, for instance the definition of the word "cow." Though virtually everyone would recognize an animal as a cow if he saw a specimen of the proper species, such identification is not sufficient for statistical purposes. For a comparison of yield figures, or of potentials for the expansion of milk production it is important that there be precise answers to such questions as, is an animal of the proper species and sex to be designated as a cow when she achieves a given age, *e.g.* two years in the temperate zones, or is it necessary that she have produced a calf, or should she be classified as a cow if she has been bred? Here the national statisticians encounter difficulty in accepting a definition in terms of agreed-upon standards, for their usage must remain consistent with the generally accepted usage within the country, and they may find considerable difficulty in flaunting common usage with a concept which may be statistically more acceptable, but violates "common sense."

The difficulties encountered in developing internationally comparable agricultural statistics are compounded in the case of food statistics. Information on the amount of food consumed in a country is only rarely the result of direct inquiry. In recent years, it has been possible to arrive at some estimates through a knowledge of the rationing allowances, with some

estimates for the consumption of the specified commodities without benefit of ration coupons. In a few cases, notably in the United Kingdom, and in postwar Japan, dietary surveys are conducted currently as an aid in knowing what food consumption is. But dietary surveys, repeated at short time intervals, and sufficiently extensive to provide a sample of broad population groups are not general. Therefore the usual method is to estimate food supplies available at the retail level and assume that this approximates consumption. This means that total supplies resulting from production, foreign trade, changes in stocks and waste are estimated; then the other uses, such as industrial uses, feed, and seed are subtracted, and the remainder is assumed to be available for human consumption. That there are many uncertainties in such computations is evident. And the conversion of the quantities so estimated into nutrients involves a further hazard in that the nutritive contents of foods vary from area to area and may vary even more widely with the methods of storage and preparation.

This account of some of the problems encountered in the development of internationally comparable food and agricultural statistics has so far overlooked one of the major sources of difficulty at the present time. That grows out of the fact that sometimes these statistics are clearly instruments of national policy. With the existing internal weaknesses in the statistical system there is relatively little safeguard against the pressures that arise if it appears to be to the advantage of the country to have its figures show high or low production. If a large portion of a total must be estimated on admittedly inadequate bases, the statistician, concerned with the national welfare, would find it difficult to resist the conscious or subconscious desire to have the results be "right," even when there is not deliberate manipulation of the results. An international agency may know what these factors are, and for operating purposes it may assume that certain corrections are needed, but it generally lacks the facilities to determine with any precision what the corrections should be. In one recent instance the

early production estimates of a country indicated that the harvest would be quite large, the weather reports issued during the season indicated that the season was an exceptionally favorable one for the maturing of that crop. However, without any explanation, the final estimate of the crop shows a sharp reduction from the earlier figures. It was known that at that time the country involved was conducting negotiations in which it might find it advantageous to have the reported figure on the low side. Therefore, to some persons using these figures it seemed perfectly obvious that this was the case. But in the absence of more precise information as to what happened, the course of action for an international office dealing with statistics is not at all clear, for by what process could it substitute its own figures for that produced by the government? And despite the circumstantial evidence, it may well be that in this case the final estimates were far sounder statistically than the earlier ones. Such situations are not uncommon.

World-wide coverage of agricultural statistics is still a goal for the future. Large land areas, and large populations are included in the countries for which there are virtually no agricultural statistics. And in some other cases in which statistics are known to exist, national policy now decrees that they may not be made available to the world outside.

Assisting in the improvement of agricultural statistics is one of the assignments given by its member governments to the Food and Agriculture Organization.

One of the efforts currently carried on is the promotion of a world-wide Census of Agriculture in 1950. The census itself will in each instance be carried out by the nation concerned, in accordance with the laws and administrative organization within the country. The role of FAO is to encourage governments to agree to such an undertaking, both to improve their national statistics and to contribute to the internationally comparable picture of the world's agriculture which such a venture would afford. FAO has developed a list of items proposed for inclusion by all governments in their census programs, and has

developed a set of concepts and definitions on which it is hoped to develop comparable statistics. A set of standard tables has also been proposed and it is planned to issue the major statistics gathered through this project in comparable form. In addition, staff members are assisting governments, on their request, in working out the problems incident to the planning and organization for a census.

Current publications, especially monthly and annual publications are an important stimulant to improvement in the statistics supplied by governments. Even in the short period of time that the FAO statistical publications have been under way there has been a marked improvement in the statistics that become currently available.

Another tool that is proving effective is the computation of food balance sheets, a set of standard procedures for converting the information on production, trade and utilization of agricultural products into information on the quantity of calories, vitamins, and nutrients available to a country's population during a consumption year. Although this work is still in its early stages, it has been possible to develop such balance sheets for some fifty-seven countries, and work in this field is going forward cooperatively with governments.

Consultation on current statistical problems between qualified staff members and the technical and administrative members of governments is currently under way. This involves a range of activities, such as advising a government on a program of agricultural statistics which might be best adapted to its needs and resources, advising on the best techniques for meeting a specific problem that has arisen, or working out a regional program for developing comparable statistics in a given field. At a meeting of representatives of governments interested in rice which was held early in 1948, FAO was requested to take steps to improve the comparability of the statistics relating to rice. That work is going forward.

A major problem is the need for more well-trained personnel. Improvements in national statistics must be the result of the

work of individuals within each country who are able and willing to work out methods for making their statistical products most useful to their own country. Short term and specialized training programs can be of some use to them in providing better tools for their work and a greater appreciation of the methods which are available. Such a training school for Near East countries was held in Baghdad early in 1948. A training school for prospective provincial census officers was conducted in Nanking earlier this year as a cooperative effort by the Chinese Government and FAO. A program for training statistical workers in Latin American countries is currently in operation in Mexico City, oriented to the proposed censuses of agriculture and population. This school, which has a student body of fifty-five persons from sixteen countries, combines classroom work with an experimental census to be carried out in an area near Mexico City. This is a cooperative undertaking between the Government of Mexico, the Food and Agriculture Organization, the United Nations, and the Inter American Statistical Institute. In addition, technicians from the United States, Cuba, and Panama are participating in the work. Other training centers are contemplated, utilizing resources available in a region, and utilizing the cooperation of other international agencies, as they become available.

Such a training program, lasting for about four months, cannot be a substitute for the longer term training programs and the basic education that are needed if the level of personnel assigned to statistical activities is to be raised to the levels necessary to do the jobs that await them. This is of course an activity that goes far beyond the field of agricultural statistics, and includes all of the official statistical activities. In this field there is need for expansion of educational facilities and a real effort to make the facilities that exist available to persons in all countries. Exchange of technical personnel and short term loans of workers are additional methods that are available for use. In such activities it is essential to recognize that no country has a monopoly on the technical knowledge

and skills that are needed, and that the training that is carried on should be related to the circumstances in which the individual worker will find himself. Unless the statistical worker can demonstrate that he has a reliable product which is highly useful to his government his endeavors to secure increased support and facilities are likely to meet with obstacles. This is a matter of concern to such agencies as the IASI and the ISI, as well as to the governmental statistical agencies. It is a long range problem calling for long range action. Neither the problem nor the solution are new. They do however have a new urgency about them, for in recent years there has been a rapid expansion of statistical services related to agriculture, without a corresponding increase in the numbers of persons technically qualified for such work. Given a base of well-qualified persons in national statistical offices, some of the problems that now loom large in the development of agricultural statistics will become much easier of solution.