The FAO agricultural production index

FAO Statistics Division

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FOREWORD

The purpose of this report is to present a description of the FAO's production index and its evolution, published regularly in the FAO Production Yearbook and in the FAO Monthly Bulletin of Statistics, as well as in The State of Food and Agriculture report. The production index is a measure of agricultural output changes, which is calculated at three levels: countries, regions (economic classes, continents), and global. Both the long-term trends and the short-term changes, indicated by the series of production index numbers, are regarded as important information by the data users, since they contribute to the assessment and monitoring of agricultural development. National governments, international organizations, commercial establishments and academic research institutions can be mentioned as the main users of this information.

FAO provides in the Production Yearbook a short methodological note together with the regularly published series. However, in view of the complex character of this statistic, there is a demand for a more detailed explanation and discussion of the methodology of index construction. The present report has been prepared to respond to this general demand, and to describe especially the last revision which was performed in 1986, concurrently with shifting the base period from 1974-76 to 1979-81.

This report is of technical character, addressed mainly to those data users who are interested in methodology. In addition to the technical description it contains results of calculations with different methods, including those, which are not adopted for the standard FAO publications. This information will hopefully assist in the understanding and interpretation of the index numbers.

This report was prepared in the Statistical Analysis Service by Dr. G. Parniczky who worked as a consultant. His service is gratefully acknowledged.

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CHAPTER 1

HISTORY OF THE PRODUCTION INDEX

This chapter provides a brief review of the FAO production index as it evolved from its conception in 1947. The description of the index numbers is supplemented by tables and charts showing the long-term development of world agricultural production, produced by reconstruction and linkage of the historical series.

1.1 Review of the development of the international agricultural production index

FAO's predecessor during the pre-war period, the International Institute of Agriculture compiled aggregate production values by continents, using standard world market prices as weights attached to each commodity. However, no attempt was made to compute indices, based on the aggregate value data, to measure changes of production at constant prices.

After the war FAO itself started to construct volume indices of agricultural production. The first results were published in the 1948 issue of the Yearbook of Food and Agricultural Statistics, Vol. I. Series for "food" and "all commodities" were presented, covering 50 countries and territories separately. No regional or global indices were presented. The formula adopted was Laspeyres, based on the average of 1934-38, or nearest available period, called "pre-war base". According to the short note on methods: "Uniform price-weights based on comparative international prices during the pre-war base period were used for all countries. Adjustments were made to avoid double-counting of feed and other crops used in livestock production". However, seed was not removed from the quantity produced.

Regional and global series of index numbers appeared first time in the 1956 issue of the Yearbook. Using the same base period and methodology as before, FAO published data for seven regions and the world. While China, Eastern Europe and USSR were excluded from the regional coverage because data were not available, the global series included estimates for the missing countries. In the 1956 Yearbook indices were published for the average of the crop-years 1948/49 - 1952/53 and separately for 1953/54, 1954/55 and 1955/56.

Shifting the base period, together with a major revision of the methodology, was performed a few years later and the first results of the new series were published in the July 1959 issue of the Monthly Bulletin of Agricultural Economics and Statistics and in "The State of Food and Agriculture 1959". The principal changes may be summarized as follows:

i) Refinement of the concept of production: allowances were made for feed and production losses, as well as for seed.
ii) A new set of regional price weights was adopted representing the averages of (national) wheat price relatives within a given region.
iii) A new post-war base was set (five year period: 1952/53-1956/57).

Starting with the 1966 issue of the Yearbook calendar-year time reference replaced the crop-years (split-years), and the base period was changed accordingly (1952-56). The Laspeyres formula was retained and the regional wheat-based price relatives were used for weighting.

A shift of the base period took place in 1971 when it was updated to 1961-65, replacing the previous base (1952-56). However, the methodology was not changed. An important revision was performed later, concurrently with the re-basing of the series to 1969-71. The first such results were presented in the 1977 issue (Vol.31) of the Production Yearbook. According to the note on methodology in the Yearbook "the most important change is the use of national average producer prices (1969-71) as weights for computation of aggregate production of each country instead of regional wheat-based price relatives (1961-65 averages) applied to each country of the region".

Indices for continents, regions and the world were computed by summing the country aggregates, which for that purpose were converted into US dollars. The exchange rates of national currencies for US dollars were those published by the International Monetary Fund.

The practice of removing feed and seed from the production data was continued. Removing the intra-agricultural inputs was justified as follows. "The reason for subtracting amounts of seed and feed from the production data is that the FAO index numbers, based on the concept of world agriculture as one farm, measure agricultural production by avoiding double counting of seed and feed (which are already counted in the production data) and the crops and livestock produced from them".

In 1983 the base period of the production index was up-dated to 1974-76, but the methodology was not revised. The revision was performed later, in 1986, together with shifting the base period to 1979-81. This last change involved the introduction of standard international commodity prices for computing the regional and global index numbers, according to the Geary-Khamis formula. A detailed description of this method and the reason for the last revision will be presented in Chapter 3.

During all the stages of development, described above, both commodity and country coverage of the production index has been gradually extended and the general accuracy has improved, as a result of the development of FAO's statistical data base, containing the quantity and price data series. The data base has been expanded as FAO established regular channels of data collection with more and more countries. In addition to the regular channels, FAO estimated the missing data and cross-checked the reported data by using all available information from national and international sources.

The expansion has been especially important concerning the data provided by developing countries. The 1977 issue of the Production Yearbook (Vol.31) e.g. contains index numbers for 145 countries and territories, which already corresponded to an almost complete coverage, together with over 20 international aggregates, such as continents, regions, economic classes. Quality of the basic data, on the other hand, has improved not only because the countries have provided more reliable information, but also as a result of the consistency checking procedures introduced by FAO.

Concurrently with the extension of geographical coverage, new features appeared in the volumes, such as per caput series in addition to the indices of total agricultural and food production, improved format of tabular presentation and more detailed commodity classification. Apart from the yearbooks, the index numbers are also available in various issues of the FAO Monthly Bulletin of Statistics, as special features. The FAO production index is recognized as the best available international measure of agricultural development and tables of the series are regularly reproduced in the United Nations' Statistical Yearbook.

1.2 FAO activities on index number methodology

Some of the methodological changes of index number construction, described above, were based on recommendations of expert groups meetings and consultants, commissioned to study the problems involved and to prepare recommendations for future developments. These activities included two meetings of experts on index numbers, the first in 1956 and the