

Manual  
on agricultural  
price index numbers

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## FOREWORD

Price observations of individual agricultural commodities and input items represent important information for data users in government, business management, or in other areas, conducting economic analysis. However, individual commodity price data alone do not always provide sufficient guidance for studying general price trends. The means serving this purpose are price indexes.

Although commodity price data constitute the basis for the construction of price indices, many countries do not benefit from this source. Indeed, only about half of the countries collecting producer price data use them to compute the corresponding index numbers. This fact was revealed in FAO's report: "National Methods of Agricultural Price Data Collection" (FAO 1986/a, p. 10).

The main objective of this manual is to help countries in starting the construction of agricultural price indices, or improving the methodology of existing ones, if needed. It complements the manual: "Farm and Input Prices: Collection and Compilation" (FAO 1980), therefore the description of the collection, compilation, treatment and dissemination of price data are not repeated here. However, definitions of the basic categories of agricultural price statistics are provided, where appropriate, for convenience. In addition to the discussion of price indices, the text covers the concepts, computation and interpretation of certain derived indicators, such as the parity ratio and the terms of trade.

It is hoped that this publication will be a useful instrument for developing countries in the training of national staff as well as a practical reference for the statisticians in charge of index construction. It may also assist the data users in the interpretation and application of index numbers. For the purpose of revising and improving this first edition all comments and suggestions will be greatly appreciated.

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## CHAPTER 1. INTRODUCTION

The analysis of price data implies comparison of past and current prices. Comparison over time is required to study the price movements in order to understand the history and to indicate future outlook. While price relatives of single commodities can be studied in isolation, general conclusions can only be derived from averages, covering a given set or class of commodities. The indicators of average price changes are the price indices.

### 1.1 Organization of this manual

Apart from the foreword and the introduction, this publication is composed of four chapters.

The chapter following the introduction is devoted to price and quantity observations, i.e. the fundamental data required for index construction. It provides explanation and guidelines for the compilation and processing of primary data.

The next chapter provides a review of index number theory. Terms, definitions, symbols and formulae are presented here, together with methodological guidance about the construction of price and quantity indices. Background information, complementing this chapter, is presented in the Appendix, for the interested reader. It contains a short historical review, as well as description of the properties of various index formulae.

Chapter 4 deals with practical problems encountered in the process of computing indices; they concern comparability over time, such as quality changes, new products appearing on the market or old ones disappearing from it. Techniques dealing with comparability problems are presented, such as adjustment and imputation.

The last chapter is devoted to the analytical uses of the agricultural price indices. Parity ratios, domestic and external terms of trade, and other measures are presented here. Application of the indices as deflators for converting agricultural accounts at current prices into accounts at constant prices is covered, among other uses.

### 1.2 Uses and users of agricultural price indices

The construction of agricultural price index numbers may serve various purposes. An exhaustive list cannot be provided, but some of the important goals are listed below:

- i) Economic analysis, in particular the estimation of general price trends and their relationship with other pertinent variables, e.g. the study of domestic price changes in relation to prices observed in external markets, or the movement of agricultural commodity prices compared with the purchase prices of the means of agricultural production.
- ii) Monitoring the implementation of agricultural price policy decisions, such as the introduction or modification of support prices, intervention prices, etc.
- iii) Forecasting price movements in connection with market studies, or business cycle research. Many econometric models feature equations which contain price indices as variables.
- iv) Compilation of national accounts at constant prices. In order to estimate the growth of the real product of the agricultural sector, deflator indices are needed. They are appropriately weighted price indices of agricultural commodities or input items.

The basic categories of data users can be identified with reference to the purposes listed above. Government might be mentioned as the prime user, especially ministries or departments in charge of development planning and policy formulation in the agricultural sector. Monitoring of price trends, economic analysis and national accounting are the main applications in this context.

Various business organizations and enterprises are certainly among the data users, including public marketing boards, private or cooperative trading establishments, banks operating in the rural areas, etc. Index numbers are needed for planning trade flows, stock levels, investment and related credit demand. Individual farmers and farmers' cooperatives need the indices for planning the structure of production, investment, etc. in view of the price trends and outlook.

National and international economic research organizations, other academic establishments need the indices for time series analysis, forecasting, model building at national, regional or global level, and related activities.

The government service entrusted with the task of making the index numbers should be aware of the various uses and users of this information. Indeed, it is recommended to establish regular contact with the main users in order to identify the specific needs concerning data dissemination, such as frequency, commodity classification, geographic breakdown, etc. Existing national standards should be of course respected, in particular if the agricultural price indices constitute a component of an interrelated system of price and quantity index numbers within the general national accounting framework (see United Nations 1977).

### 1.3 Types of agricultural price indices

Since index numbers are based on elementary price data, a typology of the agricultural price indices must follow the price categories. They are defined with reference to the stages of distribution on the one hand, and to the product on the other. According to the stages of distribution producer, wholesale and retail prices can be distinguished on the domestic market. Export and import prices may be recorded in addition. Regarding the product two classes are identified: agricultural commodities and agricultural requisites (means of production). They are also referred to as output and input prices respectively.

A combination of these two aspects yields a number of price subsets, all of which are susceptible for statistical observation and index construction. However, two price categories have special importance:

- i) **Prices received by farmers** represent the producer prices of agricultural products (output prices).
- ii) **Prices paid by farmers** are the purchase prices of agricultural requisites (input prices).

The two classes of prices mentioned above are considered important in the context of economic analysis and agricultural policy decisions. Index numbers based on them show the average changes of these prices and constitute, therefore, information primarily demanded by the data users identified above. Their construction is especially recommended.

It is, of course, desirable to exploit the other agricultural price data sets for making index numbers, such as export prices of agricultural commodities, import prices of agricultural inputs, etc. Indices of this kind usefully complement the main series and serve as basis for comparison (e.g. producer price index versus import price index).

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