

# Intercountry comparisons of agricultural output and productivity

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## FOREWORD

A number of international organizations are currently involved in comparisons of real gross domestic product across countries, and across different regions in the world. Much of the work has been carried out under the auspices of the International Comparisons Project (ICP), which was initially a project of the United Nations Statistical Office and the World Bank, jointly undertaken by the Statistical Offices of the United Nations and the European Economic Community and the O.E.C.D. Results from the ICP concern the expenditure side of the gross domestic product which are useful in comparative analysis of relative well-being of inhabitants of different countries.

However, the ICP results are of limited value if the production side of the national accounts and gross domestic product is of interest. Results concerning the contributions of various sectors to any given economy is of considerable importance. Comparisons of productivity of different sectors within an economy, and across different countries are crucial for any analysis of the ongoing process of restructuring undertaken in different countries. In addition, measurement of per capita production of food and trends of agricultural production over time has been a prime concern of the Food and Agricultural Organization of the United Nations.

The Statistics Division has pioneered efforts in obtaining inter-country comparisons of agricultural output aggregates and the agricultural GDP. Preliminary results of the efforts of the Division are documented in an earlier publication, Social and Economic Development series No. 61, in 1986. Since the publication of the report there has been a very encouraging response from many organizations and research workers around the world and enthusiasm for an update of the previous exercise.

In response to the growing demand for further results, the Statistics Division has initiated a project covering the period 1970 to 1990 and this report documents some of the results of the current effort. The present project is still limited by the availability of reliable data on the inputs. The Division believes that over time this deficiency will be attended to. However the coverage of countries and commodities in the exercise is extensive and it is made possible by the large data bank at the FAO.

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Director  
Statistics Division



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## **Chapter 1**

### **Introduction**

#### **1.1 *General Background***

Inter-country comparisons of sectoral output and productivity have grown in importance, and the work of the Food and Agriculture Organization (FAO) in deriving comparisons of agricultural production aggregates across countries is a forerunner in this field. The FAO comparisons are based on a wealth of statistical data collected, checked and stored by the Statistics Division. The availability of such detailed data covering a large number of countries and an exhaustive list of agricultural commodities has facilitated active research in this area. The methodology employed in these comparisons and the results derived provide the foundation for the construction of the FAO production index numbers which are used widely around the world by agricultural economists.

Historically, inter-country comparisons of economic aggregates have been undertaken by economists since the time of Adam Smith. More specifically, the interest of the Statistics Division on inter-country comparisons of agricultural output aggregates dates back to the early fifties when Professor R.C. Geary, then hired as a consultant, produced a report on suitable aggregation methods for inter-country comparisons. The basic ideas and the conceptual framework outlined in that report led to the formulation of the Geary-Khamis aggregation method which is currently used as the principal aggregation procedure in most of the inter-country comparisons.

The importance of comparisons of the level of GDP and its components can hardly be overemphasized. Comparisons of GDP from the expenditure side date back to the work of Milton Gilbert and Irving Kravis (1954) and have led to the work of Kravis and his associates (1982) at the University of Pennsylvania and the International Comparisons Project (ICP). Comparisons from the production side of the national accounts date back to the work of Rostas (1948) and Paige and Bombach (1959). Over the last decade, Angus Maddison and his associates have been involved in such comparisons. This has led to the International Comparisons of Output and Productivity

(ICOP) project. In addition comparisons of agricultural output and productivity have been undertaken in a number of studies by Hayami and Inagi (1969), Hayami and Ruttan (1985) and Terluin (1990). Such comparisons are essential for proper understanding of the agricultural sector and for the formulation of agricultural policies.

The results from the Food and Agriculture Organization work on international comparisons are used for temporal comparisons in the form of production index numbers published in the FAO Production Yearbook. Comparisons underlying such work are confronted with formidable index number problems. These problems arise from the fact that each country produces a range of agricultural commodities, valued at prices prevailing in each country and expressed in each national currency unit. Consequently, over the last three decades, a number of alternative strategies have been employed in obtaining meaningful comparisons. Initially, the aggregated values of agricultural output for different countries, in national currency units, were converted using the official exchange rates into US dollars<sup>1</sup>. The converted values were then used in computing regional and world agricultural output aggregates, and in the construction of regional and global production index numbers. Though simple to apply, this procedure was fraught with difficulties. Fluctuations in exchange rates result in fluctuations of regional and global output values, even without any appreciable change in the actual agricultural production levels. Further, even in ideal conditions, official exchange rates, theoretically, reflect the relative price levels of only those commodities that are freely traded internationally.

The problems associated with the use of exchange rates prompted the use of

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