ISNAR agricultural research indicators project

This volume represents the culmination of an effort, begun by ISNAR in late 1984, to compile a global set of commensurable statistics of basic national agricultural research system (NARS) indicators. The unavoidably disparate nature of the data sources and the subject itself, national agricultural research activity, means these statistics are likely to be subject to revision which, in some cases, may be substantial. However, this fully sourced and extensively documented series seeks to establish a basis for informed revision.

While ISNAR does not have a primary vocation for statistical publications or assistance, it is in a unique position, given its on-going contacts at the system level with the NARS of many developing countries, to compile such a series. The significant policy relevance of these statistics at the national, regional, and international level, when combined with the comparative advantage conferred on ISNAR by its mandate to assist developing countries through the provision of research-based services in the areas of agricultural research policy, organization, and management, points to ISNAR's continuing endeavors in this area.

Individuals or agencies with information to hand which may either correct existing inaccuracies or fill existing omissions are requested to forward correspondence on such matters to the following address. Your assistance will be gratefully received.

ISNAR Agricultural Research
Indicators Project
ISNAR
P.O. Box 93375
2509 AJ The Hague
The Netherlands
ISNAR AGRICULTURAL RESEARCH INDICATOR SERIES

A Global Data Base on National Agricultural Research Systems

PHILIP G. PARDEY
JOHANNE ROSEBOOM

Published for the International Service for National Agricultural Research

CAMBRIDGE UNIVERSITY PRESS
Cambridge
New York Port Chester
Melbourne Sydney
CONTENTS

Foreword vii
Acknowledgements viii
Abbreviations ix

PART I: TECHNICAL NOTES 3

1. Introduction 3

2. Basic Concepts, Definitions, and Measurement Issues 5
  2.1 Defining a NARS 5
    2.1.1 National 6
    2.1.2 Agriculture 6
    2.1.3 Research 8
  2.2 Measurement Issues 9
    2.2.1 Construction Methodology 9
    2.2.2 Personnel Indicators 10
    2.2.3 Expenditure Indicators 11

3. Data Sources 13
  3.1 Overview 13
  3.2 Global-Level Data Sources 15
    3.2.1 ISNAR Surveys 15
    3.2.2 International Agencies 15
    3.2.3 Scholars 19
    3.2.4 Additional Sources 19
  3.3 Region-Specific Data Sources 19
    3.3.1 Sub-Saharan Africa 19
    3.3.2 Asia and the Pacific 20
    3.3.3 Latin America and Caribbean 21
    3.3.4 West Asia and North Africa 21
    3.3.5 Western Europe, North America, and Oceania 21
    3.3.6 Eastern Europe 22

3.4 Country-Specific Data Sources 22
4. Agricultural Research Expenditure Deflators and Currency Converters 23
   4.1 Alternative Methods 23
      4.1.1 Specific Formulae 24
      4.1.2 Sensitivity Analysis 26
      4.1.3 Further Issues 32
   4.2 Summary 33

References for Part I 37

PART II: INDICATOR SERIES
   Country Listing 43
   Notes on Using the Statistical Tables 45
   Agricultural Research Indicator Series 49

References for Part II 495

Alphabetical Listing of Data Sources 531

Appendix A 531
   Table A.1 1980 Atlas, Purchasing Power Parity (PPP), and Average Annual (AAER) Exchange Rates 531
   Table A.2 Implicit GDP Deflators for 1960-1986; Base Year 1980=100 535
FOREWORD

Technological progress in agriculture is increasingly recognized as a key factor determining the overall economic development in developing countries.

To bring about the kind of technological progress required for promoting overall development, developing countries are investing heavily in the build-up of a national capability for the generation of technology. They are supported in their efforts by donors, development assistance agencies, the international research community, and others.

ISNAR’s role and mandate are to assist developing countries in their efforts of strengthening their national research capacities – of making their research systems more productive.

It is essential for successful work in system building and the enhancement of NARS productivity that all those involved in such efforts – the NARS themselves, donors, the international research community, and ISNAR – have access to good information on the policy environment of the NARS, on the organization and structure of NARS, and on the management of the NARS, including the mobilization, availability, and use of resources.

At ISNAR, we have taken up the challenge of providing a data base on NARS that will contribute to this purpose and stimulate analysis of relevant policy and management issues.

We were encouraged by others to take the lead in this important effort. But throughout the project, we collaborated with a broad range of institutions. We acknowledge their contributions.

Naturally, we are proud of the achievement. But we recognize that this was only a first round in what will have to be an ongoing effort – institutionalized at the national or regional level.

We look forward to continuing to play our role in that process, to work with others, to share our lessons, and – above all – to receive your feedback and suggestions.

Alexander von der Osten
Director General
International Service for National Agricultural Research
ACKNOWLEDGEMENTS

The genesis of this version of the Indicator Series was a survey of national agricultural research systems (NARS) in developing countries, initiated in 1984 by Howard Elliott, with the assistance of Eduardo Trigo and Peter Oram who, at the time, were both working for ISNAR. This ‘global’ survey, in conjunction with two additional regional surveys, which ISNAR undertook with the assistance of the International Federation of Agricultural Research Systems for Development, the Arab Organization for Agricultural Development, and the Asian Development Bank, respectively, provided a rare opportunity to generate new benchmark data of basic NARS indicators. These surveys were synthesized with data from nearly 900 additional sources to provide the statistical basis for the present series. Howard Elliott’s continued substantive and supportive contribution to the project has been invaluable.

Hundreds of individuals, in either a personal or institutional capacity, provided assistance to this project. Many go unnamed here but certainly not unthanked. In most cases their contributions are cited where appropriate. The published work of Bob Evenson and his colleagues provided a solid point of departure for the present effort. We were also most grateful for the large box full of primary data which Bob forwarded to us. ISNAR colleagues tolerated persistent calls for assistance in checking the plausibility of various data sources and clarifying apparent inconsistencies in others. One of our ISNAR colleagues, Paul Bennell, warrants a special mention for supervising the 1987 ISNAR/ADB survey of the South Pacific NARS. University of Minnesota colleagues from the Center for International Food and Agricultural Policy, in particular Ed Schub, gave freely of their time and expertise to improve the quality of the manuscript. John Dillon also gave valuable comments on an earlier draft of the manuscript.

Alison Young, John Dryden, and their associates from the Scientific, Technological, and Industrial Indicators Division of the Organization for Economic Cooperation and Development provided more assistance than we had a right to expect, to ensure the series for the industrial market economies was as complete as possible. The Comparative Analysis and Data Division of the World Bank also responded generously to our requests for various exchange rate and deflator series as did Robert Summers of the University of Pennsylvania.

The ISNAR library staff, past and present, not once complained about our repeated requests for obscure documents, and more than once drew our attention to valuable data sources. Sandra Kang, Bonnie Folger, Bob Solinger, Christine Roumagère, and Craig Miller provided accurate and highly competent research and computing assistance throughout the project. Kathleen Sheridan and John Norton undertook a painstaking final check for textual plus numeric accuracy and consistency, while Viviana Galleno and Bob Martin proofed the non-English text. Special thanks go to Arlene Slik-Holden who typed innumerable drafts of the entire manuscript with dispatch and good cheer.

The Italian government generously provided financial assistance to supplement ISNAR’s continuing commitment to this project. We hope the series does justice to their support.

Phil Pardey
Han Roseboom
The Hague
ACRONYMS AND ABBREVIATIONS

Institutional:
AARINENA  Association of Agricultural Research Institutions in the Near East and North Africa
ACIAR  Australian Centre for International Agricultural Research
ADB  Asian Development Bank
AID  Agency for International Development
AOAD  Arab Organization for Agricultural Development
BID  Banco Interamericano de Desarrollo
CAB  Commonwealth Agricultural Bureaux
CARDI  Caribbean Agricultural Research and Development Institute
CARIS  Current Agricultural Research Information System
CGIAR  Consultative Group on International Agricultural Research
CIAT  Centro Internacional de Agricultura Tropical
CIMMYT  Centro Internacional de Mejoramiento de Maíz y Trigo
CIP  Centro Internacional de la Papa
CIRAD  Centre de Coopération Internationale en Recherche Agronomique pour le Développement
DEVRES  Development Research
DSE  Deutsche Stiftung für internationale Entwicklung
ECLAC  Economic Commission for Latin America and Caribbean
ECWA  Economic Commission for Western Asia
EEC  European Economic Community
FAO  Food and Agriculture Organization of the United Nations
GERDAT  Groupe d'Études et de Recherches pour le Développement de l'Agronomie Tropicale
IADS  International Agricultural Development Service
IBPGR  International Board for Plant Genetic Resources
IBRD  International Bank for Reconstruction and Development (World Bank)
ICARDA  International Center for Agricultural Research in the Dry Areas
ICRISAT  International Crops Research Institute for the Semi-Arid Tropics
IDRC  International Development Research Centre
IFARD  International Federation of Agricultural Research Systems for Development
IFPRI  International Food Policy Research Institute
IICA  Instituto Interamericano de Cooperación para la Agricultura
IITA  International Institute of Tropical Agriculture
ILCA  International Livestock Center for Africa
ILO  International Labor Organization
ILRAD  International Laboratory for Research on Animal Diseases
IMF  International Monetary Fund
INTERPAKS  International Program for Agricultural Knowledge Systems
IRRI  International Rice Research Institute
ISNAR  International Service for National Agricultural Research
OECD  Organization for Economic Cooperation and Development
ORSTOM  Office de la Recherche Scientifique et Technique Outre-Mer
PCARRD  Philippine Council for Agriculture and Resources Research and Development
SACCAR  Southern African Centre for Cooperation in Agricultural Research
SADCC  Southern African Development Coordination Conference
SAREC  Swedish Agency for Research Cooperation
SOEC   Statistical Office of the European Communities (EUROSTAT)
STIID  Scientific, Technological, and Industrial Indicators Division (OECD)
TAC    Technical Advisory Committee
UNDP   United Nations Development Program
UNESCO United Nations Educational, Scientific and Cultural Organization
USAID  United States Agency for International Development
USDA   United States Department of Agriculture
WARDA  West Africa Rice Development Association

Other:
AgGDP  Agricultural Gross Domestic Product
CRIS   Current Research Information System
FTE    Full-Time Equivalents
GDP    Gross Domestic Product
ISCED  International Standard Classification of Education
LCU    Local Currency Unit
NARS   National Agricultural Research System
PPP    Purchasing Power Parity
R&D    Research and Development
STI    Science and Technology Indicators
WANA   West Asia and North Africa