



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Impact of Public- and Private-Sector Maize Breeding Research in Asia, 1966-1997/98

Roberta V. Gerpacio, Technical Editor



CIMMYT^{MR}

Impact of Public- and
Private- Sector Maize Breeding
Research in Asia,
1966-1997/98

Roberta V. Gerpacio, Technical Editor



CIMMYT[®] (www.cimmyt.org) is an internationally funded, nonprofit, scientific research and training organization. Headquartered in Mexico, CIMMYT works with agricultural research institutions worldwide to improve the productivity, profitability, and sustainability of maize and wheat systems for poor farmers in developing countries. It is one of 16 food and environmental organizations known as the Future Harvest Centers. Located around the world, the Future Harvest Centers conduct research in partnership with farmers, scientists, and policymakers to help alleviate poverty and increase food security while protecting natural resources. The centers are supported by the Consultative Group on International Agricultural Research (CGIAR) (www.cgiar.org), whose members include nearly 60 countries, private foundations, and regional and international organizations. Financial support for CIMMYT's research agenda also comes from many other sources, including foundations, development banks, and public and private agencies.

F U T U R E[®] HARVEST Future Harvest[®] builds awareness and support for food and environmental research for a world with less poverty, a healthier human family, well-nourished children, and a better environment. It supports research, promotes partnerships, and sponsors projects that bring the results of research to rural communities, farmers, and families in Africa, Asia, and Latin America (www.futureharvest.org).

© International Maize and Wheat Improvement Center (CIMMYT) 2001. All rights reserved. The opinions expressed in this publication are the sole responsibility of the authors. The designations employed in the presentation of materials in this publication do not imply the expression of any opinion whatsoever on the part of CIMMYT or its contributory organizations concerning the legal status of any country, territory, city, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. CIMMYT encourages fair use of this material. Proper citation is requested.

Correct citation: Gerpacio, R.V. (ed.). 2001. *Impact of Public- and Private-Sector Maize Breeding Research in Asia, 1966-1997/98*. Mexico, D.F.: International Maize and Wheat Improvement Center (CIMMYT).

Abstract: This book presents results of a study of the impacts of international maize breeding research in seven developing countries of Asia (China, India, Indonesia, Nepal, the Philippines, Thailand, and Vietnam). It provides comprehensive, updated documentation of the status of Asia's national maize seed industries, including information on the roles of the public and private sectors in maize R&D, descriptions of the germplasm products developed by public and private breeding programs, data on the extent of farmers' adoption of modern maize varieties, and analysis of varietal adoption patterns and trends. Information on emerging trends in maize research and maize seed industries is also provided. An introductory chapter on the maize economy of Asia is followed by a chapter synthesizing results of the study for Asia as a whole. More detailed, country-level studies are presented in the remaining six chapters.

ISBN: 970-648-083-8

AGROVOC Descriptors: Agricultural development; Economic analysis; Private sector; Public sector; Seed industry; *Zea mays*; Maize; Germplasm; Plant breeding; Research projects; Developing countries; China; India; Indonesia; Nepal; Philippines; Thailand; Viet Nam; Asia

AGRIS Category Codes: E14 Development Economics and Policies
F30 Plant Genetics and Breeding

Dewey Decimal Classification: 338.165 GER

Design and Layout: Marcelo Ortiz S., and Miguel Mellado E.

Contents

iv	Foreword
vi	Contributors
vii	Acronyms and Abbreviations
1	Chapter 1: The Maize Economy of Asia Roberta V. Gerpacio
12	Chapter 2: Impact of Public and Private Maize Breeding Research in Asia, 1966-1997/98 Roberta V. Gerpacio
44	Chapter 3: An Interface in Public and Private Maize Research in India R.P. Singh
53	Chapter 4: Impact of Breeding Research on Maize Production and Distribution in Indonesia M.Y. Maamun, O. Suherman, Dj. Baco, M. Dahlan and Subandi
66	Chapter 5: Impact of Public- and Private-Sector Maize Research in Nepal K.R. Paudyal and S.K. Poudel
81	Chapter 6: The Impact of Public- and Private-Sector Maize Research in the Philippines A.C. Costales
95	Chapter 7: Impact of Maize Breeding Research in Thailand: Public- and Private-Sector Collaboration Benchaphun Ekasingh, Phrek Gypmantasiri and Kuson Thong-Ngam
105	Chapter 8: The Maize Industry in Vietnam Roberta V. Gerpacio and Nguyen Tri Khiem

Foreword

In 1992, the International Maize and Wheat Improvement Center (CIMMYT) began documenting the impacts of international maize breeding research in the developing world. CIMMYT's first global maize impact study, published in 1994, provided detailed information about the extent of adoption of improved maize varieties and discussed how maize could be further improved to better meet the needs of end-users.

In 1997, CIMMYT initiated a project designed to update and extend the results of the earlier global impact study. Separate studies of the impacts of maize research and development (R&D) were conducted in three developing regions: Latin America, sub-Saharan Africa and Asia. This book presents the results of the Asia regional study. It provides comprehensive, updated documentation of the status of Asia's national maize seed industries, including information on the roles of the public and private sectors in maize R&D, descriptions of the germplasm products developed by public and private breeding programs, data on the extent of farmers' adoption of modern maize varieties, and analysis of varietal adoption patterns and trends.

An initial chapter on the maize economy of Asia focuses on the importance of maize in the region, the range of maize production environments, and major trends in maize production and utilization. Chapter 2 describes the objectives of the study, specifies the geographical coverage, and explains the data used as well as their sources. The greater share of the chapter consists of an Asia-wide overview of the impact of maize breeding research. Chapters 3 to 8 are detailed reports from six of the seven countries that participated in the study. These chapters provide in-depth information about the maize economy, maize R&D, the impact of research, and the national maize seed industry in each country.

This study appears at a critical time, when demand for maize in Asia is projected to increase faster than demand for any other cereal, including rice. Rising demand for maize is being spurred by several factors, among which the most important is the region's rapidly expanding livestock industry, which requires an increasing amount of maize for use as feed.

The expanding opportunities in maize production for commercially oriented farmers, and perhaps also for non-commercial farmers in marginal areas where maize traditionally has been grown as a staple food crop, present many challenges for the region's maize seed industries. These challenges come at a time when many national research systems are in transition. Historically, maize research in Asia was built on a strong foundation of public research organizations; for many years, these organizations were the only sources of improved maize varieties and commercial maize seed. In the years since the first CIMMYT impact study was undertaken, many Asian countries have enacted legislation that encourages the private sector to

participate more fully in maize breeding research and commercial seed production. With the notable exception of China, where maize R&D and seed production remain the domain of publicly funded organizations, throughout Asia the private sector has come to dominate national seed industries.

This book presents information about the changes that are rapidly transforming national maize seed industries throughout Asia and in seven important maize-producing countries. This information should help policy makers and research managers address vital questions about the consequences of recent policy changes, the answers to which are certain to influence future directions in Asian maize R&D. How effectively has the private sector been able to assume key functions formerly performed by the public sector? What kinds of research are being emphasized by private seed companies, and are these different from the kinds of research that traditionally have been carried out by public organizations? Are there impediments to further increasing participation by the private sector? Is there evidence that more farmers are growing improved varieties as the private sector has increased its presence? What types of farmers have been able to reap the benefits of an increasingly privatized seed industry? Have any types of farmers been bypassed? What role, if any, is being played by international and regional research organizations to facilitate the transition from mainly public to mainly privatized national seed industries? While it may still be too early to answer all of these questions definitively, the information and analysis presented in this volume provide important insights that will be useful in designing strategies for the future.

Prabhu L. Pingali

Director, CIMMYT Economics Program
October 2001

Contributors

Djafar Baco, Director/Entomologist, Research Institute for Maize and Other Cereals, South Sulawesi, Indonesia

Achilles C. Costales, Associate Dean/Associate Professor, College of Economics and Management, University of the Philippines-Los Baños, Laguna, Philippines

Benchaphun Ekasingh, Associate Professor and Head, Department of Agricultural Economics, Faculty of Agriculture, Chiang Mai University, Chiang Mai, Thailand

Roberta V. Gerpacio, Research Associate, International Maize and Wheat Improvement Center (corresponding address: c/o International Rice Research Institute, Philippines)

Phrek Gypmantasiri, Deputy Director, Multiple Cropping Center, Faculty of Agriculture, Chiang Mai University, Chiang Mai, Thailand

Nguyen Tri Khiem, Dean, Faculty of Economics and Management, An Giang University, Long Xuyen City, Vietnam

M.Yusuf Maamun, Agricultural Economist, Research Center for Maize and Other Cereals, South Sulawesi, Indonesia

Kamal Raj Paudyal, Post-Doctoral Fellow, CIMMYT-South Asia Regional Program, Kathmandu, Nepal

Shyam K. Poudel, Agricultural Economist, Agricultural Projects Services Center (APROSC), Kathmandu, Nepal

R.P. Singh, Principal Scientist/Professor, Division of Agricultural Economics, Indian Agricultural Research Institute, New Delhi-110012, India

Subandi, Maize Breeder (retired), Central Research Institute for Food Crops, Bogor, Indonesia

Oman Suherman, Maize Breeder, Research Institute for Maize and Other Cereals, South Sulawesi, Indonesia

Kuson Thong-Ngam, Researcher, Multiple Cropping Center, Faculty of Agriculture, Chiang Mai University, Chiang Mai, Thailand

Acronyms and Abbreviations

AF&F	Agricultural, forestry and fisheries
AIC	Agricultural Inputs Corporation (Nepal)
APP	Agricultural Perspective Plan
ARS	Agricultural Research Station
BAR	Bureau of Agricultural Research (Philippines)
BAS	Bureau of Agricultural Statistics (Philippines)
BBI	Balai Benih Induk (Indonesia)
BBU	Balai Benih Pembantu (Indonesia)
BPS	Badan Pusat Statistik (Indonesia)
CGIAR	Consultative Group on International Agricultural Research
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo (International Maize and Wheat Improvement Center)
CRIFC	Central Research Institute for Food Crops (Indonesia)
DA-BPI	Department of Agriculture–Bureau of Plant Industry (Philippines)
DADO	District Agricultural Development Office (Nepal)
DGFC	Directorate General for Food Crops (Indonesia)
DMR	Directorate of Maize Research (India)
DOA	Department of Agriculture
DOAD	Department of Agricultural Development (Nepal)
DOAE	Department of Agricultural Extension (Thailand)
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization of the United Nations
FNRI	Food and Nutrition Research Institute (Philippines)
FTE	Full-time equivalent
FYM	Farm yard manure
GVA	Gross value added
ha	Hectares
HYV	High yielding variety
IAS	Institute for Agricultural Science (Vietnam)
ICAR	Indian Council of Agricultural Research
INGO	International non-governmental organization
IPB	Institute of Plant Breeding (Philippines)
IUCN	World Conservation Union (International Union for the Conservation of Nature)
kg	Kilogram

KUD	Koperasi Unit Desa
MARD	Ministry of Agriculture and Rural Development (Vietnam)
masl	Meters above sea level
m ha	Million hectares
m t	Million tons
MAV	Minimum access volumes
mm	Millimeters
MOA	Ministry of Agriculture
NARC	Nepal Agricultural Research Council
NCSRC	National Corn and Sorghum Research Center (Thailand)
NFA	National Food Authority (Philippines)
NGO	Non-governmental organization
NMDP	National Maize Development Project (Nepal)
NMRI	National Maize Research Institute (Vietnam)
NMRP	National Maize Research Program (Nepal)
NRs	Nepali rupees
NSB	National Seed Board (Indonesia, Nepal)
NSC	National Seed Company (Vietnam)
NSC	National Seeds Corporation (India)
NSIC	National Seed Industry Council (Philippines)
OED	Office of Executive Director
OPV	Open-pollinated variety
PhP	Philippine pesos
PVP	Plant variety protection
R&D	Research and development
RIARCS	Regional Integrated Agricultural Research Centers (Philippines)
RIMOC	Research Institute for Maize and Other Cereals (Indonesia)
Rp	Rupiahs
Rs	Rupees
SAU	State Agricultural University (India)
SCCS	Seed Certification and Control Services (Indonesia)
SEAN	Seed Entrepreneurs' Association of Nepal
SSC	Southern Seed Company (Vietnam)
SSC	State Seed Corporation (India)
SIDA	Seed Industry Development Act (Philippines)
t	tons (metric)
UPOV	International Convention for the Protection of New Varieties of Plants
US\$	US dollars
USMARC	University of Southern Mindanao Agricultural Research Center
VAT	Value-added tax
VND	Vietnamese dong
WTO	World Trade Organization
yr	Year