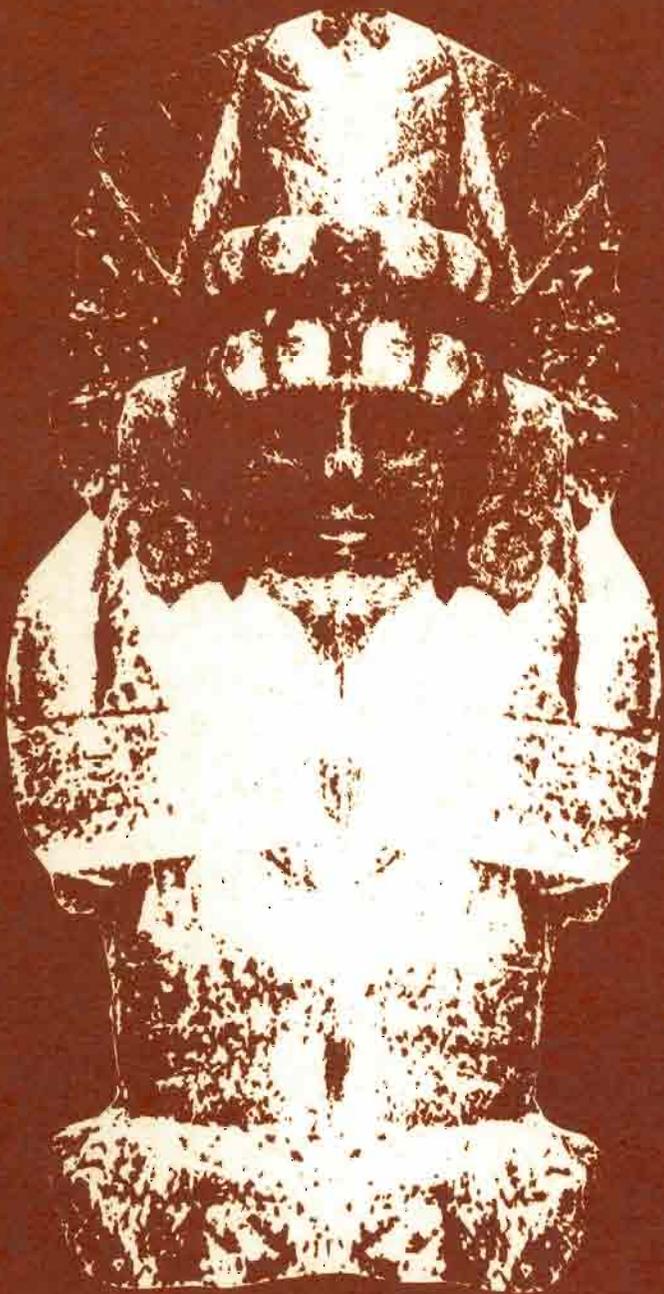
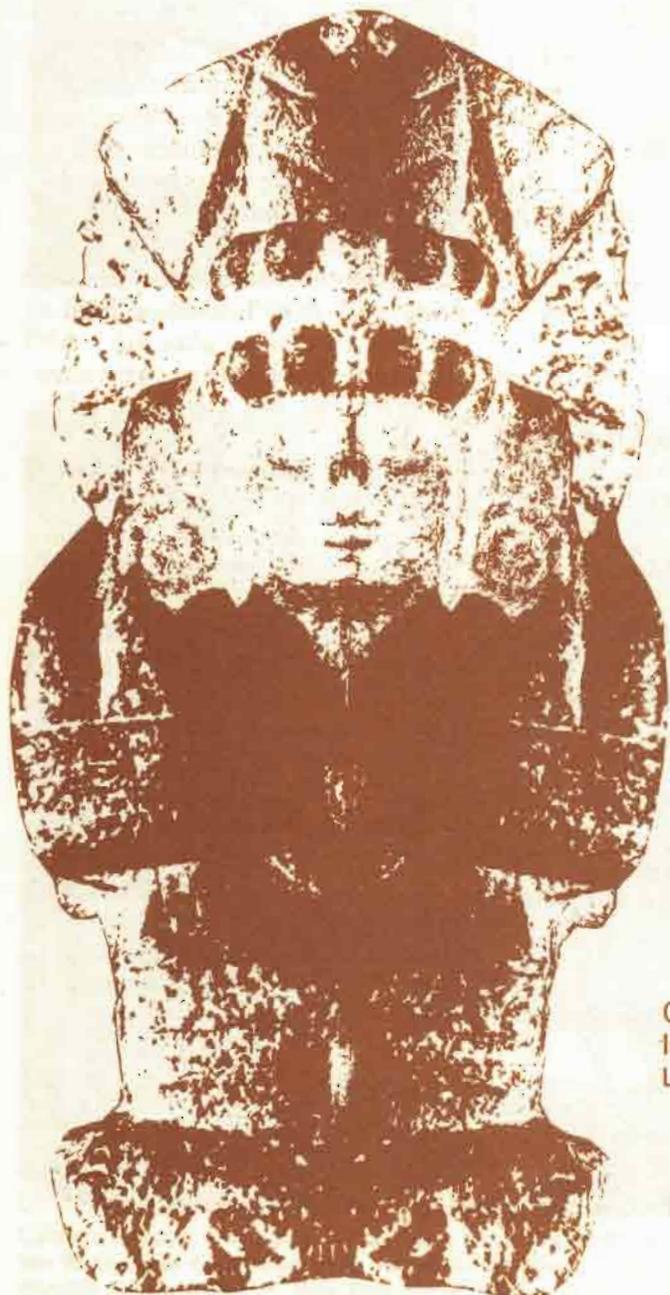


CIMMYT and Mexico



**CHICOMECOATL, "7 Serpents." Aztec goddess of ripe corn and all human sustenance. Also known as Chalchiucihuatl, "Precious Woman," in years of abundant harvest.
Courtesy of Sra. Carmen Aguilera, National Museum of History and Anthropology, Mexico City.**

CIMMYT and Mexico



Centro Internacional de Mejoramiento de Maíz y Trigo
International Maize and Wheat Improvement Center
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Introduction

This document describes the balance between Mexico's support for CIMMYT and the reciprocating flow from the Center to its host.

Organizational Phases.

CIMMYT's organizational development can be divided into three phases. The first of these is deeply rooted in Mexico's history of agricultural research, and begins with a pioneer project between Mexico's Department of Agriculture and the Rockefeller Foundation. Its goal was to improve the productivity of Mexican agriculture as part of the Government's overall strategy to promote greater domestic prosperity. For nearly two decades, Rockefeller Foundation staff worked with Mexican colleagues towards solving the agricultural problems of Mexico's farmers.

The second phase started in 1961 and was transitional to the creation of CIMMYT. In late 1960, Mexico established the National Institute for Agricultural Research (INIA), responsible for carrying out research on Mexican agriculture.

With this, the Rockefeller Foundation staff based in Mexico began to shift more attention to research issues outside of Mexico, toward developing improved maize and wheat varieties suited to the production conditions in other countries of Latin America and Asia.

It was thanks to Lic. Adolfo López Mateos, then President of Mexico, that CIMMYT was established as an independent institution with a full commitment to international agricultural research. In 1962, López Mateos visited the recently created International Rice Research Institute in the Philippines. IRRI had been modeled after the Mexican—Rockefeller cooperative program that was then concluding in Mexico. López Mateos also visited other countries that showed great advances in production through the implementation of wheat varieties developed in Mexico. Inspired by what he had seen, López Mateos proposed the creation in Mexico of an international center to further spread the results of the Mexican—Rockefeller program.

CIMMYT therefore began its third phase in 1966 as a legally chartered, non-profit agricultural research and training institution, responsible to an internationally elected Board of Trustees. By



Dr. Norman Borlaug: 1970 Nobel Peace Prize

1970, CIMMYT and IRRI had achieved major breakthroughs in the development of high yielding wheat and rice varieties. In recognition of this contribution to mankind, CIMMYT and IRRI shared the UNESCO Science Prize of 1970, and Dr. Norman Borlaug, one of CIMMYT's founding fathers, received the 1970 Nobel Peace Prize.

The Advent of the CGIAR.

Increasing concern for agriculture in the Third World, coupled with the impressive achievements of CIMMYT and IRRI, led to discussions within the United

Nations community about an expanded research system focused on the food production problems of the developing world.

In 1971, these discussions led to a plan to create a network of international agricultural research centers focused on the major food production problems of the Third World. Under the sponsorship of the Food and Agriculture Organization (FAO), the United Nations Development Programme (UNDP), and the World Bank (IBRD), a unique donor organization was formed: the Consultative Group for International Agricultural Research. The CGIAR provides a mechanism through which donors support research and training activities in 13 autonomous centers around the world. More than 40 governments and international organizations, including the Government of Mexico, provide these centers with funding each year.



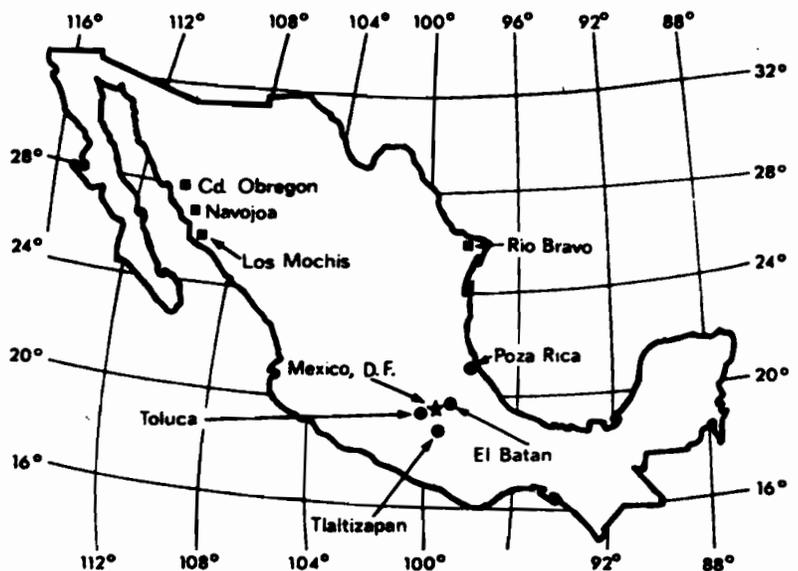
CIMMYT comes into being, 1963. From left to right: Dr. J.G. Harrar, President of the Rockefeller Foundation; Lic. Adolfo López Mateos, then President of Mexico; Dr. Nicolás Sánchez Durón, then Director of INIA, and Ing. Julián Rodríguez Adame, then Secretary of Agriculture and Livestock.

Scope of CIMMYT Activities.

Today, CIMMYT is a multifaceted research and training institution that serves as the hub for collaborative research with maize and wheat scientists in Mexico and in more than 125 other countries around the world. The Center strives to develop improved experimental germplasm and research procedures and to provide training for key research personnel from developing country institutions.

CIMMYT's plant breeding work relies heavily on a vast worldwide network of maize and wheat research collaborators. In Mexico, this work is centered on four CIMMYT experiment stations. In addition, four stations that belong to INIA play an important role.

CIMMYT's second major program is training; more than 2,500 scientists from over 85 countries are CIMMYT alumni. Every year, some 250 national program scientists spend from one month to a full year working alongside CIMMYT staff to strengthen their own crop research skills. The goal of CIMMYT training is to help collaborators, particularly promising young scientists, learn how to apply their theoretical knowledge to practical research problems. Instructional materials are developed to reinforce the in-service experiences acquired at CIMMYT and to help achieve a multiplier effect through these trainees when they return to their national institutions.



Experiment Stations in Mexico:

- INIA
- CIMMYT

Impact of CIMMYT's Work

Within international agricultural circles, CIMMYT is known as one of the world's most productive research institutes. The wealth of genetic materials developed and distributed through the international maize and wheat research network served by CIMMYT has been a critical factor in the acceleration and impact of plant breeding research wherever maize or wheat are important crops. As a result, over 400 high yielding maize and wheat varieties have been released by national programs in more than 60 developing countries.

To date, CIMMYT's best known contributions are in wheat. The high yielding varieties developed in cooperation with national collaborators are grown on 35,000,000 hectares and have had dramatic impacts on yields. The impact on developing-country maize production from the use of improved varieties is also becoming evident. We estimate that 3,000,000 hectares are now

planted to varieties and hybrids based on materials developed through the international maize testing network.

We are proud of the fact that in the 1970s, wheat and maize yields in the developing countries showed the greatest increase of all the cereals. The contributions of the CGIAR-supported international research and training efforts to world agriculture have vastly exceeded the hopes of its founding organizations.



The CGIAR-Supported Centers

CIAT:	Centro Internacional de Agricultura Tropical (International Center for Tropical Agriculture). Cali, Colombia
CIMMYT:	Centro Internacional de Mejoramiento de Maíz y Trigo (International Maize and Wheat Improvement Center). El Batán, Mexico
CIP:	Centro Internacional de la Papa (International Potato Center). Lima, Peru
IBPGR:	International Board for Plant Genetic Resources. Rome, Italy
ICARDA:	International Center for Agricultural Research in the Dry Areas. Aleppo, Syria
ICRISAT:	International Crops Research Institute for the Semi-Arid Tropics. Hyderabad, India
IFPRI:	International Food Policy Research Institute. Washington, D.C., United States
IITA:	International Institute of Tropical Agriculture. Ibadan, Nigeria
ILCA:	International Livestock Center for Africa. Addis Ababa, Ethiopia
ILRAD:	International Laboratory for Research on Animal Diseases. Nairobi, Kenya
IRRI:	International Rice Research Institute. Los Baños, Philippines
ISNAR:	International Service for National Agricultural Research. The Hague, Netherlands
WARDA:	West Africa Rice Development Association. Monrovia, Liberia

Mexico's Support and Contributions to CIMMYT. The Center has benefited in many ways from its location in Mexico. In addition to the land provided by the Government of Mexico for the Center's headquarters at El Batán, other land and logistical support for crop research is also provided by INIA to CIMMYT at various national experiment stations. CIMMYT's international testing network, which involves scientists in more than 125 countries, functions smoothly thanks to the excellent cooperation of Mexico's national plant quarantine service. This organization supervises and streamlines CIMMYT's handling of massive amounts of experimental seed which go in and out of Mexico each year, protecting the country from new, potentially damaging plant diseases and insects. INIA is the official channel for distribution of CIMMYT germplasm in Mexico generated through its international network of trials. Within this international germplasm development fraternity, Mexico has been a major contributor of maize and wheat germplasm, with Mexican scientists playing an important partnership role in the germplasm development process.

CIMMYT'S Contributions to Mexico

The special relationship between CIMMYT and Mexican agricultural institutions has resulted in contributions to the nation which fall into five categories: production, training, consulting, financial, and good will. Following is a description of each.

Production Benefits. Mexico has been a major beneficiary of CIMMYT's research and training as CIMMYT's headquarters are in Mexico, and given its genuine desire to focus special attention on the production problems of Mexican farmers. More importantly, Mexico's environment sets the biological framework for CIMMYT scientists in their selection of superior germplasm. A good proportion of this germplasm is therefore suitable to the needs of Mexican farmers. Moreover, because it is at the hub of the Center's coordinated international germplasm network, Mexico is among the first to have access to this tremendous stock of improved genetic materials.

Over the past two decades, all of the 45 wheat varieties released by Mexico have been developed through the Cooperative CIMMYT-INIA Wheat Improvement Program. Government statistics show that these wheats have occupied more than 90 percent of Mexico's wheat-growing area over the last 20 years.

A comparison among the increases in wheat yields over the past 20 years in Mexico and those of several other major developing countries will serve as further evidence of the benefits reaped by Mexico from the close CIMMYT-INIA ties. (Table 1).

The results of national efforts to increase productivity are of considerable importance to Mexico.

Had the yield and production levels of the mid-1960s prevailed, Mexico would be compelled today to import an additional 2,600,000 tons of wheat (worth \$415,000,000 dollars a year at 1983 prices) to maintain current levels of wheat consumption.

Mexico has become an important seed exporter over the last 20 years, satisfying the increasing international demand for wheat varieties developed in Mexico. More than 300,000 tons of commercial wheat seed, worth \$90,000,000 dollars, has been exported to dozens of countries; India, Pakistan, Bangladesh, Turkey, China, Algeria, Iraq, Morocco, Brazil, Spain, and the USA have been major clients.

While CIMMYT's present fame rests largely on its collaborative research in wheat, the future may well belong to maize. Mexico is among the five largest developing-country producers of maize. Of these five, only China and Argentina have higher average national yield levels. In recent years, CIMMYT's collaborative research on tropical maize is resulting in greatly improved genetic materials. While progress in raising maize yield levels has been far less notable than in wheat, INIA scientists report that farmers who have tested the new maize varieties developed from international maize testing network materials see distinct advantages in their use. Government statistics show that one million hectares in Mexico are now planted to improved maize varieties based at least partially on germplasm developed through the

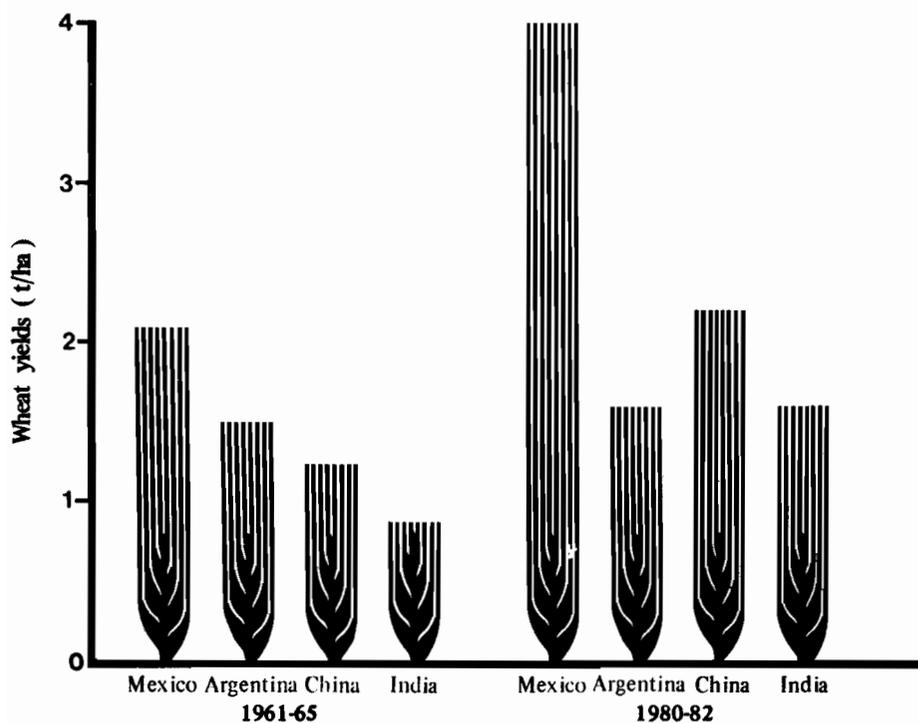


Table 1. Wheat Yields for Mexico and Selected Countries, 1961-65 and 1980-82

international testing network. Even if these new varieties add only 200 kg of extra yield per ha. (exclusive of that attributable to fertilizers and improved management), this still represents a yearly increase of 200,000 tons of maize, worth approximately \$28,000,000 dollars on today's markets.

Training. CIMMYT and its predecessor organization, the Rockefeller Foundation, have contributed in several ways to the improvement of Mexico's agricultural research capacity. Many of Mexico's current research leaders are former recipients of

Rockefeller and Ford Foundation graduate study grants. Even with Mexico's greatly expanded agricultural university system and the graduate study scholarship programs of CONACYT, CIMMYT has remained an active participant in strengthening Mexico's agricultural research base. Sixty young Mexican scientists have participated in CIMMYT's in-service training programs since 1966. In addition, over 100 young professionals have worked as CIMMYT research assistants for periods varying from one to several years; many of them did their thesis work using CIMMYT



research data. Twenty-nine went on for their Masters and/or Ph.D. degrees with financial support from, or arranged by, CIMMYT. Eight of these individuals also served as postdoctoral fellows at CIMMYT after completing advanced degrees.

This highly trained personnel has added to the technological strength of Mexican institutions engaged in research, education, and production services.

Consulting. CIMMYT maintains an active consulting program with Mexican researchers, government officials, and agricultural leaders from the food production and manufacturing sectors. More than 500 individuals and institutions

from every state are included on CIMMYT's mailing lists and receive complimentary copies of the Center's publications. Each year, over 1,500 students from agricultural schools and universities attend orientation programs at CIMMYT headquarters and at research stations throughout the country.

Employment and Financial Contributions. In Mexico, CIMMYT directly employs about 700 support staff and some 70 international scientists. Through direct and indirect expenditures, CIMMYT currently brings in about

\$13,500,000 dollars a year to Mexico, approximately 50 percent of the total annual budget. In addition, the Center's many visitors—scientists and agricultural leaders from other countries—spend another \$500,000 dollars a year in Mexico.

Mexico's Image. Mexico is unique to the thousands of former trainees and visitors who have been associated with CIMMYT. The vast majority of these alumni retain a special appreciation for Mexico when they return home, where they act as unofficial ambassadors of goodwill for Mexico.



CIMMYT in the Agricultural Future of Mexico

Over the next decade CIMMYT will continue concentrating on important problems affecting maize and wheat in developing countries. Many of these activities will offer direct benefits to Mexican agriculture.

One of nature's perpetual challenges to wheat scientists is that given sufficient time, rapidly mutating pathogens will evolve strains capable of severely attacking formerly resistant varieties. This fact makes it imperative that superior new wheat varieties always be available, ready to be brought into play when currently used varieties fall prey to changing disease races.

A second major CIMMYT research area is small grains production problems in unfavorable environments, and offers the possibility of developing new varieties for rainfed maize and wheat production areas.

CIMMYT's intensified collaboration with INIA and other national research institutions on drought resistance, early maturity, and cold tolerance for small grains is beginning to show considerable promise. Wheat, barley and triticale varieties that incorporate these characteristics can offer improved germplasm capable of considerably higher and more stable yield potential. This can substantially reduce economic production risks, especially for the resource-poor farmer.

A new research project to develop wheat varieties for warmer subtropical areas characterized by a short growing season, heat stresses, and heavy disease pressure may also offer improved varieties and more profitable wheat production in certain areas of Mexico. Southern Sinaloa, Nayarit, Tamaulipas and the southeast have a hot, humid climate that constitutes a considerable risk for current wheat production.

Recent efforts to improve the salt tolerance of wheat may lead to the development of cultivars which could play an important role in many irrigated areas characterized by increasing levels of salinity due to poor drainage.

More research involving wide crosses between wheat and related wild species also stands to increase the environmental stability of wheat in difficult production areas.

In 1980, closer cooperative ties were established with the maize research program of INIA. This began with extensive yield trials around Mexico to evaluate the best available experimental materials. Trial results show that a number of them offer considerable promise for Mexican farmers; several varieties are being released and multiplied for rapid distribution. One of them, V-524 (Tuxpeñito), has been sown to one million hectares in the tropical maize production area during each of the last three years (1979-1982). Other superior maize materials, particularly earlier-

maturing germplasm and materials with considerably higher levels of environmental stability, are now in the research pipeline.

Another important maize production possibility for Mexico in the near future lies in quality protein maize. Possessing physical characteristics similar to those of ordinary maize, but with far greater amounts of critical amino acids, QPM will make it possible to substitute maize for costly protein supplements in the feeding of swine. The savings—for example, in the importation of soybeans—could be significant. High-yielding quality protein maize varieties are now being developed which will fit well into several of Mexico's maize production regions.

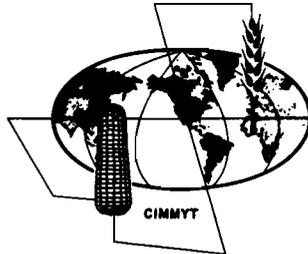
Population growth and rising incomes dictate the future increases needed in Mexican food production. Demographic projections indicate that, even with slowing growth rates, Mexico's population will surpass 125 million people by the beginning of the 21st century—over a 50 percent increase. This population growth will place ever-increasing pressures on the nation's food production capacity just to maintain current per capita consumption levels. Raising crop production in the more difficult agricultural areas, such as those of the high plateau and lowland tropics of Mexico, is an especially important consideration in feeding future generations.



The dramatic yield increases in Mexican wheat production between 1965-82, as well as the gains achieved in other continents, are the result of a sustained and continuous wheat breeding effort which began in 1943. It is important to note that it took 20 years from the initiation of this program for the results to be applied on a worldwide scale; such is the nature of plant breeding.

Many of CIMMYT's research projects started in the 1970s stand to offer tangible new productivity improvements during the 1980s for Third World farmers, particularly those in marginal production areas. As in the past, Mexican agriculture, through cooperative research work with the appropriate Mexican institutions, can continue to be among the first to benefit from future accomplishments in plant breeding and crop production research of the worldwide network with which CIMMYT is associated.





En la Ciudad de México, el día diecinueve de Septiembre de mil novecientos sesenta y seis, celebró su Primera Reunión el Consejo Directivo del Centro Internacional de Mejoramiento de Maíz y Trigo, Organismo que, al haberse reestructurado el doce de Abril de ese mismo año, extenderá sus actividades, en cuanto ello resulte indicado, al mejoramiento de la producción del Arroz y del Sorgo, atendiendo así los cuatro cereales básicos que alimentan a la población del Mundo.

En conmemoración del solemne acto, se da forma al presente documento que firman los que en él intervinieron.

Presidente

Juan Gil Preciado

Vice-Presidente

J. George Harrar

Secretario y Director

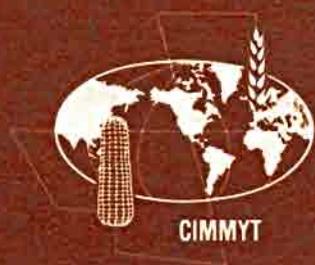
Eduin J. Wellhausen

Brasil	Carlos A. Krug	
Chile	Manuel Elgueta S.	
Colombia	Virgilio Barco	
Ecuador	Galo Plaza	
Estados Unidos	Lowell Hardin	
Filipinas	Carlos P. Romulo	
India	C.V. Subramaniam	
México	Emilio Gutiérrez Roldán Nicolás Sánchez Durón	
Tailandia	M. C. Chakraborty	

The International Maize and Wheat Improvement Center (CIMMYT) is an internationally funded, nonprofit scientific research and training organization. Headquartered in Mexico, CIMMYT is engaged in a worldwide research program for maize, wheat and triticale, with emphasis on food production in developing countries. CIMMYT is one of 13 nonprofit international agricultural research and training centers supported by the Consultative Group for International Agricultural Research (CGIAR). The CGIAR is sponsored by the Food and Agriculture Organization (FAO) of the United Nations, the International Bank for Reconstruction and Development (World Bank), and the United Nations Development Programme (UNDP). The CGIAR consists of 45 donor countries, international and regional organizations, and private foundations.

CIMMYT receives support through the CGIAR from a number of sources, including the international aid agencies of Australia, Brazil, Canada, China, Denmark, Federal Republic of Germany, France, India, Ireland, Italy, Japan, Mexico, the Netherlands, Norway, the Philippines, Spain, Switzerland, United Kingdom and the USA, and from the European Economic Commission, Ford Foundation, Inter-American Development Bank, International Bank for Reconstruction and Development, International Development Research Centre, OPEC Fund for International Development, Rockefeller Foundation, and the United Nations Development Programme. Responsibility for this publication rests solely with CIMMYT.

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