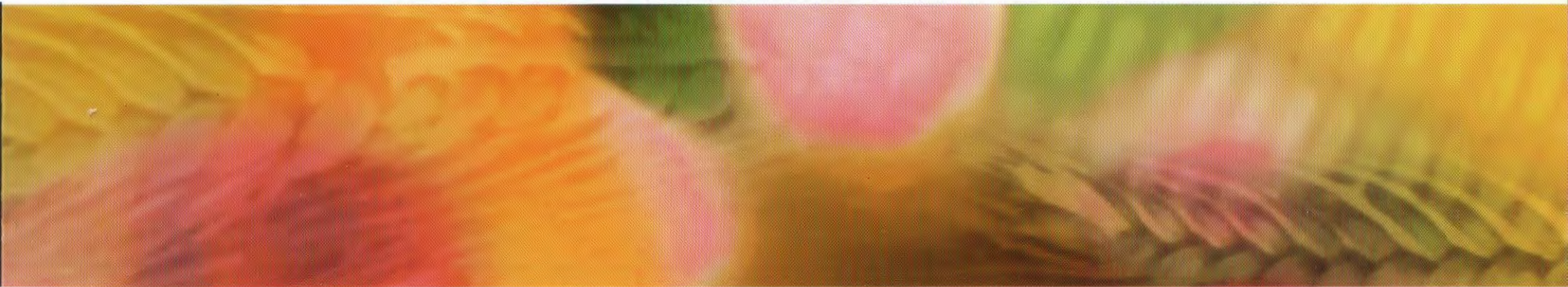


I n v e s t i n C I M M Y T



I n v e s t i n t h e F u t u r e



Invest in CIMMYT...

1960s

- CIMMYT founded, 1966, under a new charter with an international board of trustees
- First scientists come to CIMMYT for training
- First semidwarf wheats released in Mexico
- Large-scale demonstrations of semidwarf wheats in India
- Research on quality protein maize (QPM) begins
- Crossing of spring and winter wheats begins
- International wheat testing system expands
- CGIAR founded, 1969

1970s

- Norman Borlaug wins Nobel Peace Prize, 1970
- CIMMYT-Mexico research stations and headquarters facility established
- Training in maize and wheat agronomy and on-farm research begins
- Wide crosses research begins for maize and wheat
- Regional offices open
- International maize testing system established
- Work begins on breeding for drought tolerance in maize
- First economics studies in technology adoption/ commodity sector and policy analysis
- Innovative economics and on-farm research training manuals
- Slow rusting confirmed in CIMMYT wheats

1980s

- Veery wheats (spring x winter wheat cross) show 15% yield increase over other wheats
- Thailand-CIMMYT maize research on downy mildew resistance: variety Suwan-1 successful across Asia
- Genetic resource storage facilities established/improved
- CIMMYT mandated to maintain a global base collection of bread wheat and triticale
- *Facts and Trends* series launched
- First comprehensive categorization of wheat agroecological environments
- "Slow rusting" resistance incorporated into CIMMYT wheats
- Extensive project integrates a farmer perspective into African research systems
- First study on returns to on-farm research
- Research on hybrid maize begins
- King Baudouin Award for Veerys, 1988
- Intensification of winter wheat research (collaborative program with Turkey)
- First diagnostic surveys of rice-wheat cropping systems, Pakistan
- Importance of anthesis-silking interval for drought screening in maize is documented

1990s

- Biotechnology lab opens
- “Slow rusting” resistance limits disease epidemics in wheat
- Research on apomixis (asexual reproduction) in maize
- First broad studies of maize and wheat research impacts
- Nonradioactive methods developed for molecular marker research; marker-assisted selection (MAS) begins
- Bed planting of wheat raises productivity, conserves natural resources
- Tillage research addresses sustainability problems in South Asia’s rice-wheat systems
- First biotech training courses; Asian research/training network formed (AMBIONET)
- New genebank facility inaugurated; accessions held “in trust” for humanity
- QPM research revitalized; adoption moves ahead
- Geographic Information Systems (GIS) and Crop Modeling Lab opens
- New studies of genetic diversity at the molecular level
- Country Almanacs bring user-friendly GIS to developing countries
- Mapping of drought tolerance in CIMMYT maize
- Innovative analyses of economics of genetic diversity and genetic resource conservation
- New research compares efficiency of conventional breeding and MAS
- Project on farmers’ incentives for in situ conservation of maize landraces
- Poza Rica maize research station destroyed in flood
- Soil nutrient management strategies reduce risk for farmers in southern Africa
- Rise of partnerships with private sector; Apomixis Consortium formed
- Release of policy on intellectual property

2000-2001

- World Food Prize for QPM
- Strong adoption of zero-tillage in South Asia
- 800+ wheats from wide crossing offer outstanding disease resistance and stress tolerance
- New Agua Fria maize research station under development
- Growing achievements in international maize and wheat breeding research documented
- First drought-tolerant maize varieties released in Africa
- Advances in wheat drought tolerance
- Biotech researchers report unprecedented wheat transformation rates

Better Maize for Poor Households

Through CIMMYT's Southern African Drought and Low Soil Fertility (SADLF) Project, farmers can produce a better maize crop even in challenging conditions of drought and poor soils. Under farmer-managed conditions where grain yields typically average only 1.3 tons per hectare, outstanding experimental open-pollinated maize varieties and hybrids from CIMMYT, tested widely in 2000, gave farmers 30-50% more grain per hectare than the best commercially available maize. For a resource-poor farmer who may sow only two hectares of maize, the new hybrids would add over half a ton to household grain stores each year—a significant contribution to food security in areas where one failed harvest means hunger. The new varieties and hybrids also yield as well as their commercial counterparts under favorable treatment (i.e., adequate water and fertilizer). This year, southern and eastern African countries will release several of these new varieties.

Record Wheat Transformation Rates to Speed Biotech Breeding

Researchers throughout the world have used "Bobwhite" wheat lines, produced by CIMMYT, for transformation experiments. CIMMYT learned that some labs had low rates of transformation with Bobwhite, whereas others reported encouraging results. Did these different results arise from genetic diversity among the 129 lines that share the name "Bobwhite," or from the techniques and protocols used by the labs? To find out, CIMMYT researchers screened all lines three times using a marker gene to determine an average rate of successful transformation. Five lines had transformation rates around 60%, and one line—possibly CIMMYT's premier line for transformation—had a rate of about 70%. The newly identified lines, called MPB-Bobwhite26 and MPB-Bobwhite29, increased the transformation rate by six or sevenfold. Given that just two years ago wheat transformation rates of 5% were considered good and 10% exceptional, the "supertransformable" lines elicited great interest in CIMMYT and laboratories around the world. Higher transformation rates ultimately translate into more efficient breeding and lower costs.

...Invest in the Future

...Invest in the Future

Accessible Geographic Information Benefits Rural Poor

The Almanac Characterization Tool (ACT) is used in myriad ways throughout the developing world to benefit the rural poor. The ACT is a product on CD-ROM that takes GIS out of specialized labs and puts it into the hands (or more accurately, the computers) of researchers, extension workers, and others who serve farmers in developing countries. In addition to working with the installed maps and data, ACT users can upload their own data, manipulate and combine datasets, and create customized, exportable maps, tables, and figures. Users include agricultural researchers from the public sector in Asia, Africa, and Latin America; CGIAR centers; private seed companies; and NGOs. Documented uses include: grouping maize production regions in Nepal into research domains based on climate; choosing locations for testing maize hybrids and targeting the hybrids to production environments in Zimbabwe; and increasing the cost-effectiveness of farmer-participatory trials in several African countries.

New Wheats Thrive on Much Less Water

Each year, drought strikes more than half of the developing world's wheat area, and water scarcity is projected to become far worse.

New bread wheats designed at CIMMYT fit these tough circumstances. They are developed from crosses between different types of wheat and goat grass, one of wheat's wild relatives. The new wheats have produced up to 30% more grain for two years running in tests comparing them to one of their parents under tough dryland conditions. These wheats are grown using only a single irrigation that supplies 120 millimeters of water. (An additional 50 millimeters are probably available from the atmosphere and soil.) Drought tolerance genes inherited from their wild ancestor have made all the difference. Seedlings of the new wheats have deeper roots, longer coleoptiles, and vigorously force their way up from lower soil depths. After the plants emerge, they produce numerous leaves that quickly shade the ground and conserve moisture.

Valuing and Conserving Genetic Resources

Innovative studies on many aspects of genetic diversity and the value of genetic resources are transforming analysis of these issues. For example, CIMMYT and partners at the Center for Chinese Agricultural Policy and the University of California at Davis are using indices of spatial diversity (the amount of diversity in a geographical area) to examine how diversity influenced wheat productivity and production costs in China between 1982 and 1995. After controlling for other likely influences on productivity, they have found that spatial diversity had a positive, significant effect on aggregate total factor productivity for most of the diversity indices tested. Investment in research also played a significant role in increasing total factor productivity by improving the varieties available to farmers. Spatial diversity influenced wheat production costs mainly through reduced expenditures on pesticides and labor. Currently this project is exploring the variety choice and diversity maintained at the household level, as well as links between household diversity and diversity at aggregate levels.



International Maize and Wheat Improvement Center, 2001

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