

CIMMYT IN PAKISTAN

Over six decades of collaboration



At a glance

CIMMYT, the International Maize and Wheat Improvement Center, an international organization headquartered in Mexico (www.cimmyt.org), has a long history of collaboration with national agricultural research and extension systems (NARES) in Pakistan and has played a vital role in achieving food security since the Green Revolution. CIMMYT has continuously provided germplasm, financial as well as human resource support to Pakistan's agriculture research for development (R4D). The core of CIMMYT's work includes supplying elite germplasm of wheat and maize to Pakistan each year since the 1960s. CIMMYT Pakistan office is located at the National Agricultural Research Council (NARC) in Islamabad; while we also have

offices in Faisalabad, and in Pirsabak, Nowshera with altogether 12 staff. However, CIMMYT's work extends to all four provinces in Pakistan through cooperation with public and private partners.

Dr. Norman E. Borlaug, Nobel Peace laureate, kept a close relationship with Pakistani researchers and policymakers and introduced the high-yielding white grain wheat variety "Mexi-Pak" to help address the national food security crisis. Pakistan imported 50 tons of Mexi-Pak seed in 1966, the largest seed purchase of its time, and two years later became the first Asian country to achieve self-sufficiency in wheat. CIMMYT has had a significant impact in Pakistan starting with the Green Revolution. With a concerted effort in 2019, Pakistan harvested 26 million tons of wheat, which roughly matches its annual consumption of the crop.



Our core research competencies include: plant breeding, training, seed systems, markets, sustainable intensification, climate change, soil fertility, adoption and impact, social and behavioral science, geo-spatial analytics, communication and capacity development.

Wheat facts and accomplishments

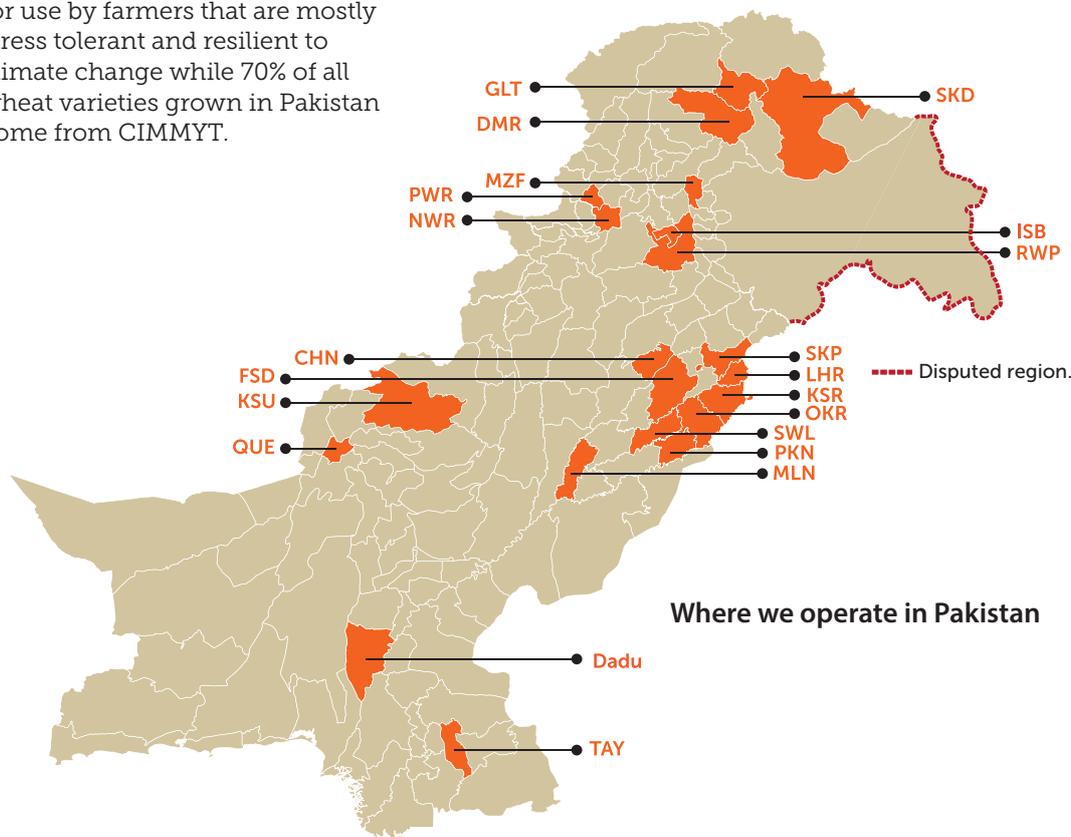
- Grown across 8.8 million ha with a productivity of 2.8 t/ha.
- CIMMYT supported the Government of Pakistan in human resource development of scientists. More than 1,000 Pakistani wheat scientists have received training provided by CIMMYT between 1961 and the present. About 14 scientists recently obtained their academic degrees (5 PhD and 9 MSc) from US universities.
- Since 1965, Pakistan has released over 150 improved wheat varieties for use by farmers that are mostly stress tolerant and resilient to climate change while 70% of all wheat varieties grown in Pakistan come from CIMMYT.

- Each year CIMMYT provides approximately 7,000 new wheat lines to strengthen national wheat breeding for disease resistance, drought and heat tolerance, higher yields, and biofortification.
- 36 high-yielding, heat and disease resistant varieties released recently have contributed to a 20% gain in farmers' wheat yields. Several genotypes are in the pipeline for commercial release.
- Years of biofortification research and breeding have resulted in the development of the wheat variety Zincol as well as other varieties that carry enhanced levels of zinc in the grain (>20 percent more zinc than conventional varieties) that are now grown across half a million hectares and contribute to better nutrition of people who cannot afford diverse diets.
- A 200% increase in the number of crosses has led to more varietal release and diversity.

- A state-of-art Wheat Rust Research Laboratory established at the Crop Disease Research Institute at Murree is contributing to wheat breeding for durable resistance to new rust pathogen races.
- A Wheat Rusts forecasting model is being developed.

Maize facts and accomplishments

- Maize is Pakistan's third most important cereal following rice and wheat with high production potential and grown across 1.4 million ha with a productivity of 5.1 t/ha.
- A network of public and private partners tested over 3,000 CIMMYT maize varieties and hybrids across 300 environments in Pakistan for adaptation.
- Partners evaluate more than 100 kernel Zinc enriched and provitamin A biofortified maize hybrids for adaptation.



Where we operate in Pakistan

CHN	Chiniot
DMR	Diamer
FSD	Faisalabad
GLT	Gilgit
KSR	Kasur
KSU	Killa Saif Ullah
LHR	Lahore
MLN	Multan
MZF	Muzafarabad
NWR	Nowshera
OKR	Okara
PKN	Pakpattan
PWR	Peshawar
QUE	Quetta
RWP	Rawalpindi
SWL	Sahiwal
SKD	Sakardu
SKP	Sheikhupura
TAY	Tando Alla Yar
ISB	Islamabad
Dadu	Dadu Sindh

- Between 2017-2020, partners released 19 CIMMYT derived maize varieties and hybrids which include climate resilient (drought and heat stress tolerant) and nutritious maize. More varieties are in Pipeline for release in 2021 and beyond.
- More than 3,500 Pakistani maize researchers, farmers, students, technicians and managers have received technical and business development training.
- The first national maize stem borer mass rearing facility has been established to help screen stem borer tolerant maize varieties.
- Using CIMMYT parental lines, Pakistan released two quality protein maize hybrids, whose grain contain enhanced levels of the essential amino acids, lysine and tryptophan. In addition, three Provitamin A-biofortified maize hybrids were licensed and shared with partners for further testing, variety registration and seed scale up.
- To accelerate the development and deployment of maize inbred lines and hybrids via Double Haploid (DH) methods, CIMMYT has shared tropically adapted haploid inducers to maize partners in Pakistan who recently started DH technology.

Sustainable intensification of farming systems accomplishments

- Maize and wheat varieties are selected through considering cropping system suitability.
- Agricultural machineries such as the zero tillage "Happy Seeder" and DSR (direct dry seeded rice) are being promoted to enhance productivity, profitability and sustainability. Local manufactures and local service providers (LSPs) are thus encouraged to expand their businesses around resource conserving machineries and service business, respectively.
- Low cost optical sensors are being used to help wheat and rice farmers to apply nitrogen fertilizer precisely.



Gender mainstreaming

- A targeted approach has been promoted for professional training, ensuring that at least 25% female scientists attend each training event.
- CIMMYT has introduced technologies that ensure equal access for male and female farmers to innovations such as new seeds and mechanized based crop management practices.
- Since 2014, over 26,000 women farmers have been trained in various agricultural disciplines.
- Female scientists have enhanced their skills in wheat breeding and biometrics.
- Developing advanced tools for genomic selection and heat plus rust tolerance germplasm (CIAT/IFPRI).
- Development of micronutrient-dense wheat varieties for improved human nutrition.
- Wheat Productivity Enhancement Project (WPEP) (USDA).
- Accelerating the Mainstreaming of Elevated Zinc in Global Wheat Breeding: A "Fluoride in the Water" (BMGF/FCDO).
- Breeding and yield phenotyping capacity in Pakistan.
- Heat Stress Tolerant Maize for Asia (HTMA), USAID.

Current collaborative research projects and funders

- Accelerating Genetic Gains in Maize and Wheat (FCDO-DF).
- Accelerating Genetic Gains in Maize and Wheat (AGG) (USAID).
- Agriculture Innovation Program for Pakistan (AIP), USAID.
- Rapid development of climate resilient wheat varieties for South Asia using genomic selection (USAID).

CIMMYT managed projects are aligned with Pakistan Vision 2025, Food Security Policy 2018 and Vision for Agriculture 2030 of the Government of Pakistan, contributing to the national food, nutrition, livelihood and environmental agenda.

CIMMYT's major partners in Pakistan

- Ministry of National Food Security and Research.
- Pakistan Agricultural Research Council (PARC).
- National Agricultural Research Center (NARC).

Country Profile

- Provincial Governments (Panjab, KP, Baluchistan and Sindh).
- Department of Agriculture Extension (DoA).
- Maize and Millet Research Institute (MMRI).
- Cereal Crops Research Institute (CCRI), Nowshera.
- Agricultural Universities in Pakistan and United States of America.
- Private Seed Companies
- National Rural Support Program (NRSP).
- Food Security and Agriculture Center of Excellence (FACE).
- Bangladesh Wheat and Maize Research Institute (BWMRI) for Blast Screening.
- Kenya Agricultural and Livestock Research Organization/CIMMYT-Kenya for Ug-99 screening.
- Borlaug Global Rust Initiative (BGRI).
- CG Centers and FAO in Pakistan.

Focus across research themes

- Maize and wheat variety improvement and seed systems (promoting fast-track seed multiplication and delivery, village level seed bank).
- Raising system productivity and profitability, sustainable intensification, diversification and closing the yield gap.
- Addressing the labor shortage through scale appropriate mechanization, pre- and post-harvest.



- Improving nutrition and reducing losses of food and feed in cereal-based systems.
- Innovations in scaling and monitoring evaluation and learning (MEL) systems, building digital agricultural intelligence systems.
- Enabling change in institutions and policies to speed and maximize impact.
- Access to new technologies and attitudinal change.
- Promotion of a competitive, market oriented and inclusive seed systems.
- Convergence and synergies.
- Publication and communication.
- Lobbying to address policy issues that constrain the adoption of new and high impact technologies.

Pathways to impact have been designed around

- Capacity Development – NARES will take lead and ownership.
- Gender mainstreaming – targeted approach (at least 25% women headed HHs).
- Private sector development and engagement.

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