

## Daily bread from a deep-rooted partnership



Turkey is the center of origin of wheat and even today farmers cultivate “landraces” – local varieties selected over centuries by farmers. The country produces around 18 million tons of wheat each year from 7.5 million hectares. The regional and national staple crop, wheat is the basis for popular foods such as bazlama, bulgur, pasta, semolina and many more products.

Among CIMMYT’s earliest locations outside of Mexico, Turkey has hosted the center’s scientists since 1971 and more than 250 Turkish scientists have attended training courses at CIMMYT headquarters in Mexico or visited the center. Many subsequently joined the ranks of research and policy leaders in Turkey. Shared research with Turkey’s General Directorate of Agricultural Research and Policies ([TAGEM](#)) and other national entities has benefitted many winter wheat growing farmers in Turkey and worldwide.

Launched in 1986, IWWIP develops improved winter and “facultative” wheat (the latter can be grown either in winter or spring) for Central Asia and West Asia. Based in Turkey and with ICARDA as partner since 1991, this program has become the most important supplier of winter wheat breeding lines to the developing world. As of 2023, 135 improved wheat cultivars derived from IWWIP research had been released in 11 countries and grown on 3 million hectares.

The Green Revolution is generally associated with India and Pakistan but also had major impacts in the 1960s in Turkey, which imported 22,000 tons of the first semi-dwarf spring wheat varieties from Mexico, dramatically increasing national wheat production. Around the same time, winter wheat production also increased significantly due to the introduction of the Russian cultivar Bezostaya and new fallow management practices from the University of Oregon, USA. In 1986, the International Winter Wheat Improvement Program ([IWWIP](#)) was formed in Turkey as a partnership between the Turkish Ministry of Agriculture, CIMMYT, and ICARDA. In 2000, a joint Turkey-CIMMYT soil-borne disease program began.

In the early 1990s, wheat with severe zinc deficiency symptoms were observed at the Transition Agricultural Research Institute in Eskisehir. In follow up research, scientists from TAGEM, Cukurova and Sabanci University, and CIMMYT confirmed that zinc deficient soils were affecting domestic wheat yields and quality on several million hectares. By 2003, Turkish wheat farmers were applying zinc-enriched fertilizer and CIMMYT and partners developed wheat lines tolerant to Zn-deficient soils.

IWWIP breeding lines are evaluated in international observation nurseries and yield trials, particularly in West and Central Asia, typically showing high yield potential and good disease resistance, compared to local varieties. Wheat breeding institutions, including TAGEM, CIMMYT and ICARDA preserve, study, share, and use enormous seed collections encompassing the crop’s genetic diversity and including improved varieties, wheat wild relatives,



and landraces – all potential sources for genes for high yields, resistance to wheat diseases, tolerance to heat or dry conditions, and better quality and nutrition. Important IWWIP impacts include national inventories of wheat landraces in Turkey, Tajikistan and Uzbekistan, as well as their collection, study, and use. As one outcome of a recent 5-year mission to collect Central Asian wheat landraces, TAGEM, CIMMYT, ICARDA, and FAO specialists have multiplied and returned landrace seed to over 1,500 farmers in communities across Afghanistan, Turkey, and other countries in the region, as well as supplying over 500 farmers with improved landrace seed during 2018-19. They were described, characterized, and evaluated using phenotypic and genomic tools and deposited in the Turkish Seed Gene Bank in Ankara.



Sample spikes of wheat landraces grown in Turkey.

At the Aegean Agricultural Research Institute at Izmir IWWIP established in 2018 a speed-breeding facility with the capacity to grow 25,000 plants in one cycle.

This facility allows for greater genetic gain by allowing three generations of selection per year, thereby significantly reducing the time it takes to incorporate new traits into elite germplasm.



**Soil-borne pathogens** seriously threaten world wheat harvests and can reduce wheat crops in Turkey by 50-75%. The CIMMYT-Turkey program on soil-borne pathogens has long contributed to the study and control of these pests and, with strong support from CGIAR and TAGEM, helped create [the International Soil-Borne Pathogens Research & Development Center \(ISBPRDC\)](#), based in Turkey and the first of its kind in CWANA. The ISBPRDC has state-of-the-art facilities and equipment and hosts a team of 35 scientists and technicians. The ISBPRDC also acts as a platform for knowledge exchange and technology transfer among CIMMYT and its partners and supports joint research and development activities aimed at finding novel sources of resistance and developing integrated pest management strategies for SBPs.

Another major accomplishment of CIMMYT's soil-borne pathogen research is the organization of the VIII International Cereal Nematode Symposium in Bolu, Turkey, in 2022, which brought together 150 delegates from 25 countries, representing academia, research institutes, government agencies,



and the private sector to share the latest knowledge and experience on cereal nematodes.

A [unique study by CIMMYT scientists in Turkey, in collaboration with scientists from the Bolu Abant İzzet Baysal University](#), has showed the prevalence of wheat disease-causing fungi in Kazakhstan, helping scientists to prevent associated losses in wheat quality and yield in this country's large wheat harvests.

In 2022, scientists from the All India Coordinated Research Project (AICRP) on Wheat and Barley, part of the Indian Council of Agricultural Research (ICAR), and the Mountain Research Centre for Field Crops at Sher-e-Kashmir University of Agricultural Sciences and Technology, [visited CIMMYT's facility in Turkey](#) to devise ways of improving production on the 0.8 million hectare wheatlands of the Northern Hill zone of India.

