"Spotlights" is a series of individual and institutional interviews capturing the unique stories of our many volunteers and their journeys with AACCI.

Improving Livelihoods through Maize and Wheat Science

The International Maize and Wheat Improvement Center

Maize, wheat, and rice together provide 44% of calories in the human diet and 37% of the protein.

The International Maize and Wheat Improvement Center (CIMMYT, www.cimmyt.org) is a global leader in publicly funded maize and wheat research and related farming systems. Headquartered near Mexico City, with 1,500 staff from more than 50 countries in 15 offices throughout the developing world, CIMMYT works with hundreds of partners to sustainably increase the productivity of maize and wheat cropping systems, thereby improving global food security and reducing poverty. CIMMYT receives funding from national governments, foundations, development banks, and other public and private agencies.

The First and Only Nobel Prize for Agriculture

CIMMYT grew out of a pilot program sponsored by the Mexican government and the Rockefeller Foundation in the 1940s and 1950s that aimed to increase farm productivity in Mexico. The program's wheat specialist, Norman Borlaug, worked with Mexican researchers and farmers to develop hardier, short-stemmed wheat varieties that were resistant to devastating rust diseases and that could yield significantly more grain than traditional varieties. The new wheat lines were bred and selected at various locations in Mexico under diverse conditions, which meant they were adaptable to a range of farm environments.

The higher yielding varieties that were developed helped Mexico to attain self-sufficiency in wheat production in the 1950s. Additionally, the varieties were imported by India and Pakistan in the 1960s to stave off famine and soon brought those countries record harvests. This led to the widespread adoption of improved varieties and farming practices, which became known as the "Green Revolution." CIMMYT was formally launched as an international organization in 1966, and Norman Borlaug received the 1970 Nobel Peace Prize for his contributions to reducing world hunger.

50 Years of Global Impact

Started in the 1950s by Borlaug, the CIMMYT-led global wheat improvement pipeline is the main source of public breeding programs for new genetic variation focused on wheat yield, adaptation to climate change, resistance to crop pests and dis-

Dr. Norman E. Borlaug, Nobel Peace Prize laureate, worked at CIMMYT as a wheat scientist and research leader until 1979 and as a special consultant at the center until his death in 2009. (Photo: CIMMYT)

Rapidly emerging and evolving races of wheat stem rust and stripe rust disease—the crop's deadliest scourges worldwide—drove large-scale seed replacement by Ethiopia's farmers during 2009–2014, as the genetic resistance of widely grown wheat varieties no longer proved effective against novel pathogen strains. (Photo: CIMMYT/Apollo Habtamu)

eases, and grain quality. As documented in Impacts of International Wheat Improvement Research: 1994-2014, nearly half of the wheat varieties grown around the world, as well as 70–80% of all varieties grown in South Asia, Central and West Asia, and North Africa, are derived from CIMMYT breeding research. The CIMMYT Global Maize Program develops and delivers germplasm to public and private institutions in 108 tropical and subtropical countries, whose inhabitants include 98% of the poor (i.e., individuals who live on less than US$1.25 a day) who live in maize growing areas.

Grain and Food Quality Research for Better Diets

CIMMYT grain quality research dates back to the center's earliest days and during the 1980s contributed to the development of quality protein maize (QPM), that features grain with enhanced levels of lysine and tryptophan, fostering enhanced health and development in humans and farm animals. CIMMYT cereal chemist Evangelina Villegas was a corecipient of the 2000 World Food Prize for her role in creating QPM.

As part of its focus on agri-food systems, CIMMYT creates maize and wheat breeding lines that are nutritionally enriched and feature good end-use quality for its partners to refine and spread as productive and nutritious varieties. The CIMMYT maize and wheat quality labs explore and use genetic resources to develop healthier and more nutritious value-added foods and feeds. They also analyze physical and chemical grain characteristics to improve processing, provide strategic advice and messaging on nutritious and healthy diets, offer a shared platform for research with the food industry, and help foster sustainable value chains. Finally, CIMMYT researchers develop and refine high-throughput methodologies to include additional quality traits in breeding by studying environmental and genetic effects on grain quality.

Biofortifying Maize and Wheat

In conjunction with HarvestPlus (www.harvestplus.org) and to improve the nutrition and health of the poor who cannot afford dietary supplements or diverse foods, CIMMYT develops high-yielding, biofortified versions of maize and wheat, drawing upon landraces and other sources in the crop gene pools and applying innovative breeding. In recent years, the national research programs of Bangladesh, India, and Pakistan have released six zinc-biofortified wheat varieties derived from this research. Similarly, pro-vitamin A–enhanced maize varieties are available in Africa and South America, and QPM is grown by farmers on 1.2 million ha in Africa, Asia, and Latin America.

Raising Awareness about Cereal Grains and Health

With gracious permission from AACC International, in 2017 CIMMYT published "The Wheat and Nutrition Series: A Compilation of Studies on Wheat and Health," which includes 12 papers from a special series published in *Cereal Foods World* on wheat and health. The detailed reviews cite the best scientific knowledge to show that consumption of whole grains is associated with a lower risk of coronary disease, diabetes, hypertension, obesity, and overall mortality and that eating whole and refined grains is beneficial for brain health and associated with reduced risk for certain cancers. The publication has been widely promoted in CIMMYT efforts to raise awareness about the importance of wheat as part of a nutritious and healthy diet.

Maize is the preferred staple food for 900 million people worldwide who live on less than US$2 a day, is the number one food crop in sub-Saharan Africa, and is in rising demand in Asia as a feed crop. A farmer in Nepal is shown preparing to shell ears of corn. (Photo: CIMMYT/Peter Lowe)

In March 2018, CIMMYT hosted the 4th Latin American Cereals Conference, which was co-organized with the International Association for Cereal Science and Technology (ICC, www.icc.or.at), and the 13th International Gluten Workshop. The events drew more than 250 participants from 46 countries, including professionals in agricultural science and production, the food industry, regulatory agencies, and trade associations.

For more information or to inquire about working with CIMMYT, please contact Natalia Palacios for maize and Carlos Guzmán for wheat.

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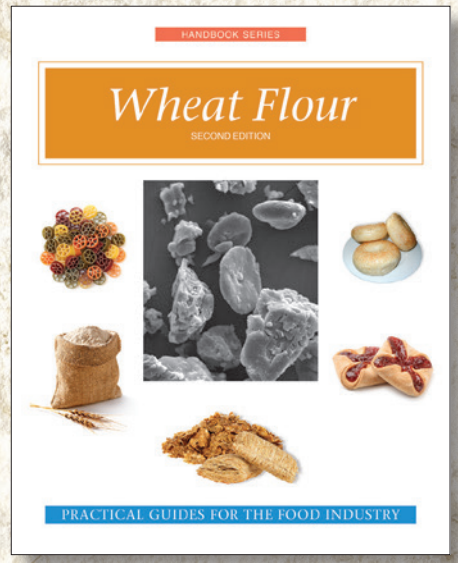

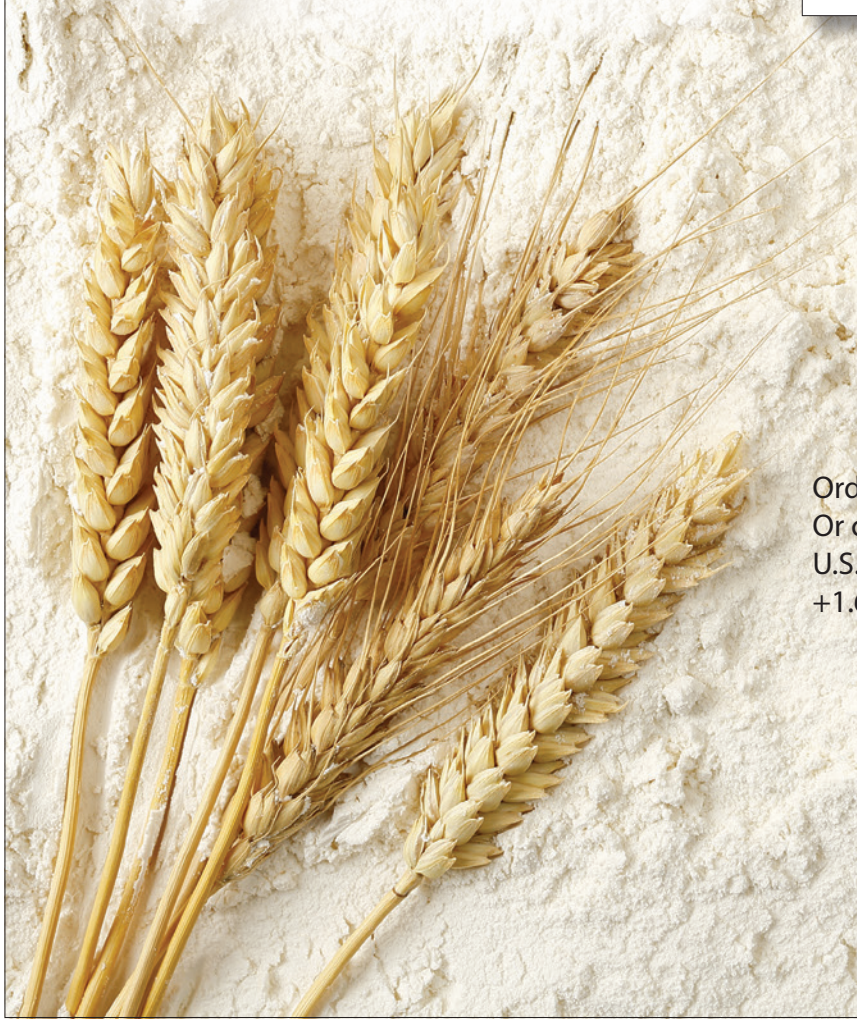

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