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CGIAR

RESEARCH
PROGRAM ON
Wheat

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Message from the WHEAT Director

WHEAT: At the front line of wheat agri-food systems

Reports of high global wheat grain stocks abounded in 2016, partly due to the long-term impacts of research programs such as WHEAT. In general, public and private agricultural research for development can claim significant credit for there being 200 million fewer undernourished people than in 1990, even as world population has risen dramatically.

Wheat grain stocks, though, are not freely or equitably available and grain markets are remarkably fragile. Extreme weather and perverse trade dynamics have destabilized wheat markets three times since 2000, causing great harm to the poor who spend large amounts of their

income on food. Wheat consuming countries in sub-Saharan Africa spend as much as \$12 billion each year on imports to satisfy the region's growing demand for the crop and China alone holds more than half of the world's wheat grain stocks.

At the same time, with rising temperatures, more intense cropping, global travel and grain trade, wheat farmers worldwide are facing the emergence and spread of new or modified strains of deadly crop diseases. One example is wheat blast, a little understood fungal disease first identified in Brazil in 1985 and constrained to South America for decades. In 2016, blast appeared suddenly and blighted wheat crops in southwestern Bangladesh. From there it threatens to spread quickly throughout South Asia's vast wheat lands.

WHEAT partners are at the front line, applying science to maintain a continuous flow of high-yielding, disease resistant, climate resilient wheat lines to national breeding programs.

The challenge for WHEAT is no less than to raise the crop's productivity and production and to keep wheat affordable for today's 2.5 billion resource-poor consumers in 89 countries, as well as satisfying rising demand as world population surpasses 9 billion around mid-century.

Following a successful initial period of 2011-16, WHEAT has received CGIAR and donor approval for an additional phase. We are grateful for this endorsement and funding, as for your continued comments and support.



Hans-Joachim Braun

Director, CGIAR Research Program on Wheat





Advice for India's farmers: Put aside the plow, save straw to fight pollution



**Rice-wheat rotations
in South Asia account
for nearly a quarter of
the world's food
production**

Farmers who deploy a sustainable agricultural technique known as “zero tillage” in the rice-wheat cropping rotations grown throughout northern India can significantly contribute to reduced air pollution in India’s capital, helping urban dwellers breathe more easily.

Traditional tillage to sow wheat in northern India involves removing or burning rice straw and driving tractor-drawn implements back and forth over fields to rebuild a soil bed from the rice paddy, a costly and protracted process.

Media reports in 2016 depicted the 19 million inhabitants of New Delhi under siege from a noxious haze generated by traffic, industries, cooking fires and the burning of over 30 million tons of rice straw on farms in the neighboring states of Haryana and Punjab.

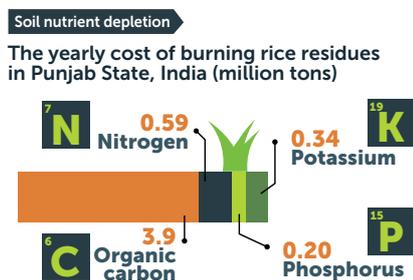
Since the 1990s, scientists at the [International Maize and Wheat Improvement Center \(CIMMYT\)](#) have worked with national agricultural partners and advanced research institutes in India, Nepal, and Pakistan to test and promote the resource-conserving approach of sowing wheat seed directly into untilled soil and rice residues in a single tractor pass, a method known as zero tillage.

Originally deemed foolish by many farmers and researchers, the practice or its adaptations are being used on as much as 1.8 million hectares in India. It has gained popularity because it allows farmers to save money and fuel through less work and tractor use, to reduce weather risks as well as to sow their wheat up to two weeks earlier; this means the grain fills before the withering heat of pre-Monsoon season.



Agricultural engineer H.S. Sidhu (left), of the Borlaug Institute for South Asia (BISA), who has helped test and refine the seeder, visits a zero tillage plot with Dr. B.S. Sidhu, agricultural commissioner of Punjab State. Photo: CIMMYT

Environmental benefits of zero tillage include healthier soils, significant water savings and a 90 kilogram-per-hectare reduction in greenhouse gas emissions, according to M.L. Jat, senior agronomist at CIMMYT.



“This emission savings figure considers only soil respiration,” said Jat, “but if we talk about carbon sequestration based on life cycle analysis, the greenhouse gas savings range from 500 to 1,000 kilograms of carbon dioxide equivalent per hectare, each crop cycle.”

The seeder drives adoption

Zero tillage requires the use of a special, tractor-mounted implement, which, in a single pass, chops rice residues, opens a rut in the soil, and precisely deposits and covers the seed.

Development of this special seeder was first funded by the [Australian Centre for International Agricultural Research \(ACIAR\)](#) and led by [Punjab Agricultural University](#), with contributions from CIMMYT and other organizations. The latest version, the Turbo Happy Seeder, costs \$1,900 – an investment that many farmers still struggle to make.

“As an alternative, we’ve been saying that not all farmers need to own a seeder,” according to Jat. “Many farmers can simply hire local service providers who have purchased the seeder and will sow on contract.”



The Turbo Happy Seeder sows a rotation crop directly into the residues of a previous crop. Photo: Mandeep Singh/CIMMYT

In Bihar and the neighboring state of Uttar Pradesh, the number of zero-tillage service providers rose from only 17 in 2012 to more than 1,900 in 2015, according to Jat, who leads CIMMYT’s contributions to “climate-smart” villages in South Asia, as part of the [CGIAR Research Program on Climate Change, Agriculture and Food Security \(CCAFS\)](#).

Given New Delhi’s smog troubles, Haryana and Punjab policymakers are providing limited subsidies for purchases of the seeder and other policy support for burn-free, climate-smart agricultural practices.

Work on the Turbo Happy Seeder has been funded by the [ACIAR](#) and the [CGIAR Consortium and Fund Council](#). Zero tillage for rice-wheat rotations is one of the technologies studied and promoted by the CIMMYT-led [Cereal Systems Initiative for South Asia](#), a project implemented jointly with the [International Food Policy Research Institute \(IFPRI\)](#) and the [International Rice Research Institute \(IRRI\)](#) and funded by the [Bill & Melinda Gates Foundation](#) and the [United States Agency for International Development \(USAID\)](#). The [Borlaug Institute for South Asia \(BISA\)](#) is funded by the [Indian Council of Agricultural Research](#) and, for the work described, by the government of Punjab state, India.



Understanding wheat-based livelihoods: GENNOVATE

By 2050, demand for wheat is predicted to increase by 70 percent due to population growth, climate change and dietary changes. Agricultural research and development must enhance the productivity of wheat-based systems and expand the uptake of improved wheat technologies.

One key challenge is to foster the access of women—who often play a large if uncredited role in agriculture—to new technologies and technical support, as well as to opportunities to contribute their ideas and experience in their households and communities. To begin to address these issues, in 2013 a small team of CGIAR gender specialists proposed an unprecedented study on gender norms, agency and innovation.

The GENNOVATE study, which completed data collection in 2016, explored how gender norms affected agricultural innovation and technology uptake. “What sets GENNOVATE apart is that it is qualitative, comparative and very large-

scale,” said Lone Badstue, strategic leader for gender research at the International Maize and Wheat Improvement Center (CIMMYT) and chair of GENNOVATE’s executive committee. “This allows us to identify and compare broad patterns across contexts, while acknowledging and giving weight to local circumstances.”

The full GENNOVATE study was composed of 137 case studies on more than 7,500 rural men

and women in 26 countries, involving 11 CGIAR Research Programs. WHEAT-supported research focused on 43 villages in Afghanistan (4), Bangladesh (6), Ethiopia (4), India (12), Morocco (3), Nepal (3), Pakistan (12) and Uzbekistan (4). With support from the Bill & Melinda Gates Foundation, GENNOVATE has also fostered capacity building and knowledge sharing across a diverse community of gender researchers of different backgrounds and experience.



Photo: Martin Ranak/CIMMYT

“Across the wheat study contexts, gender norms underpin power relations and privilege men’s agency, authority, and resource control,” said Badstue. “Yet, these norms are evolving and, in six villages where circumstances foster the participation and agency of both women and men in agricultural innovation, the evidence points to more rapid and gender-inclusive rural development.”

In those villages, normative shifts towards more equitable gender relations drove significantly higher empowerment and poverty reduction than in the other 37 communities studied and, in several cases, men recognized that women’s participation had raised household food security and the quality of life.

More empowerment for both genders is beneficial

A GENNOVATE case study in Gabado, Ethiopia, found that training and other interventions of the external entity, “Community Conversations,” led husbands to discuss important business more with their wives, driven by a perception that, as a result, the overall quality of life and food security in their homes had improved. According to the study, although many men in various countries are now seeing the advantages of involving women in farm decisions, women of all ages still lack equal access to education or training.



Photo: Peter Lowe/CIMMYT

Highest-rated agricultural innovation by women and men: Improved wheat varieties

As part of the GENNOVATE project, facilitators discussed new agricultural technologies with focus groups. Amid diverse innovations identified, improved wheat varieties emerged overwhelmingly as the most favored, followed by conservation agriculture-based improved practices. Across all wheat studies 61 percent of men and 32 percent of women ranked improved wheat varieties among the top two, citing benefits such as increased yield, profitability, collaboration with external partners and decreased work burden.



Photo: S. Mojumder/Drik/CIMMYT

Men's temporary migration can open space for women's development

GENNOVATE found that men's increasing out-migration from rural areas to find work opens rural women's access to training and education opportunities, as well as encouraging them to adopt more assertive household and community roles. The report gives the example of Pekadi, a community in southern Nepal, with a high male out-migration and where more than half the women own land and lead their households, while over 80 percent do most of the farm work.

Action research raises women's profile in wheat farming in Nigeria and Sudan

In addition to research done through GENNOVATE, an ICARDA-led Support for Agricultural Research for Development of Strategic Crops in Africa (SARD-SC) project showed agricultural feminization in Sub-Saharan Africa is growing, in particular in low-income countries. Action research to integrate women beneficiaries into the project in Sudan and Nigeria has helped to identify actions and approaches for more widespread application in wheat production systems.

With WHEAT support, the initiative employed context-specific interventions to grow wheat, demonstrate technologies, add value and improve access to microcredit. Women's involvement was facilitated by gaining the trust and approval of family members and better institutional support. The incomes of women participating in value addition (1,143 in Sudan and 84 in Nigeria) have increased by up to 50 percent. Through adopting improved wheat varieties, 24 women in Sudan and 300 women in Nigeria increased their wheat yields by 62 percent and 28 percent.

Workloads and drudgery have diminished due to mechanization and improved access to key inputs such as pesticides. Women's decision-making power increased through participation in training and field days. 2,500 women in Nigeria and 783 women in Sudan gained access to microcredit, providing them more sustained control over income-generating activities. To scale up, the project is linking with policy makers and gender progressive institutions. Similar activities are under way in Ethiopia.

"This shows how enhancing women's involvement in agricultural development generates positive impacts beyond the lives of individual, women with benefits felt across entire communities and nations," said Dina Najjar, Social and Gender Specialist, Social, Economics and Policy Research Theme, Sustainable Intensification and Resilient Production Systems Program (SIRPS), ICARDA, who has led the work described.



Photo: ICARDA



Scientists harness genetics to develop more “solar” and structurally-productive wheat

In early outcomes, partners in the [International Wheat Yield Partnership \(IWYP\)](#) are finding evidence that increased photosynthesis, through high biomass, improvements in photosynthetic efficiency and improved plant architecture, can help make wheat more productive, as the Partnership progresses toward meeting its aim of raising the crop’s genetic yield potential by up to 50 percent over the next 20 years.

This and other work, and particularly partners’ roles and operating arrangements, were considered at the first official annual IWYP Program

Conference. This was held at the Norman E. Borlaug Experiment Station near Ciudad Obregón, Mexico, in March 2016, following the funding and commencement of the Partnership’s first eight projects, according to Jeff Gwyn, IWYP Program Director.

“The aim of the conference was for participants to learn about everyone else’s work and to integrate efforts to realize synergies and added value.”

“The aim of the conference was for participants to learn about everyone else’s work and to integrate efforts to realize synergies and added value” said Gwyn, noting that some 35 specialists from nearly 20 public and private organizations of the Americas, Europe, Oceania, and South Asia took part.

“Upgrading wheat productivity is a bit like building a race car,” Gwyn explained. “One person is working on the tires and suspension, another team is putting together the motor, and someone else is designing and assembling the interiors. Instead of working in isolation, how about if everyone coordinates to make sure the pieces fit and function together at high performance when the car is finished?”



Jeff Gwyn (right), IWYP Program Director, was excited by conference participants' enthusiasm and commitment. "Everyone embraced this unique opportunity to link and do things together from the start," said Gwyn, pictured here with Richard Trethowan, University of Sydney wheat researcher and former CIMMYT breeder. Photo: Mike Listman/CIMMYT

Wheat's time has come

IWYP was launched in 2014 by UK's [Biotechnology and Biological Sciences Research Council \(BBSRC\)](#), the [International Maize and Wheat Improvement Center \(CIMMYT\)](#), Mexico's [Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food \(SAGARPA\)](#), and the [United States Agency for International Development \(USAID\)](#). Its launch was in response to the urgent need to boost world wheat output by between 30 and 60 percent to meet expanding global demand for wheat-based foods

by mid-century — particularly in developing countries, whose populations are rapidly rising and urbanizing.

Involving research teams from Argentina, Australia, India, Mexico, Spain, the United Kingdom, the first IWYP projects were chosen from research proposals submitted in 2015. They are on track to find and use traits and genes that enhance photosynthesis and increase its efficiency, boost spike development, optimize wheat's canopy architecture and increase wheat's biomass and harvest index—that is, the ratio of grain to other plant parts.

According to Richard B. Flavell, Chair of the IWYP Science and Impact Executive Board, the time for advanced science to boost wheat's genetic yield potential has arrived. "It's timely for real," Flavell said, crediting hundreds of biotech companies and bioinformatics entrepreneurs worldwide with laying critical groundwork. "The molecular genetics of plants, including wheat, started in the 1970s and people knew it would be applicable to plant breeding one day, but because breeding involves thousands of genes located over the whole genome, it's taken this long to develop

gene detection tools that can be used genome-wide and that are cheap enough to deploy at scale to aid breeding directly.”

Vital grain of civilization and food security

Gwyn said that IWYP has partnered with CIMMYT to lead the IWYP development platform (IWYP Hub), designed to deliver research findings and outputs to breeding programs worldwide as quickly as possible, and that public-private partnerships are a key feature of the IWYP Program.

“Private sector experts are advising and providing valuable strategic guidance and can carry out projects if they choose and also help with delivery,” Gwyn added. “Their

participation is helping to keep IWYP relevant and they gain early insights on results.”

Wheat provides approximately 20 percent of humanity’s protein and calories. The rate of yearly genetic gain for yield has slowed in recent decades to less than 1 percent, according to Hans-Joachim Braun, director of WHEAT and CIMMYT’s global wheat program. “To avoid grain shortages and price hikes that most sorely hurt poor consumers, who spend a large portion of their income just to eat each day, we need to achieve an annual yield growth rate of at least 1.7 percent,” said Braun.

IWYP research outputs are building on and will amplify physiological breeding approaches, according to Matthew Reynolds, CIMMYT wheat physiologist. “We’ve implemented these approaches recently in our wheat breeding

programs and results from international trials already show a boost in genetic yield gains,” he said.

A long-term, global collaboration, IWYP brings together funding from public and private research organizations of many countries. Currently, this includes [Agriculture and Agri-Food Canada \(AAFC\)](#), [BBSRC](#), [CIMMYT](#), the [Department of Biotechnology of India \(DBT\)](#), the [Grains Research and Development Corporation of Australia \(GRDC\)](#), the [Institut National de la Recherche Agronomique of France \(INRA\)](#), [SAGARPA](#), the [Syngenta Foundation for Sustainable Agriculture \(SFSA\)](#), the [United States Department of Agriculture \(USDA\)](#), and [USAID](#). Over the first five years, the growing list of partners aims to invest up to US \$100 million. [Further details about IWYP can be found here.](#)



Photo: Mike Listman/CIMMYT



Strong partnerships and a quick response to a drought-caused seed shortage in Ethiopia

Dry conditions are common in Ethiopia, but the 2015-2016 El Niño – the strongest on record – led to the worst drought in over a decade. Bad harvests across Ethiopia left 10.2 million people – more than 1 in 10 Ethiopians – in need of emergency food assistance. But nearly as calamitous was the loss of seed---the basis of farming and food security---by more than 1.35 million people, due to the lack of rains.

Wheat and maize are strategic food crops in Ethiopia, grown on more than 3 million hectares by nearly 14 million households.

High-yielding, resilient wheat varieties from the [International Maize and Wheat Improvement](#)

[Center \(CIMMYT\)](#) and the [International Center for Agricultural Research in the Dry Areas \(ICARDA\)](#), along with supportive government policies and better cropping practices, have caused Ethiopia's wheat production to more than double in just over a decade, rising from 1.6 million tons during 2003-04 to around 3.9 million tons over the last few years.

While the government of Ethiopia and international organizations worked to provide food aid for people facing immediate shortages, Bekele Abeyo, senior wheat breeder and pathologist at CIMMYT for sub-Saharan Africa and leader of the emergency seed project, focused on a more sustainable future.



Photo: Emma Quilligan/CIMMYT

“We hope that this provision of emergency seed will enable Ethiopian smallholder farmers to quickly recover from the devastating drought of 2015,” said Abeyo. “Our unique and strong links with the Ethiopian government, the formal seed sector, farmers’ cooperatives, and partners such as the [Agricultural Transformation Agency \(ATA\)](#) have allowed CIMMYT to quickly respond to farmers’ needs and provide more than 2,700 tons of seed to help ensure Ethiopia’s future food security.”

Generous funding for this work was provided by the American people through the [U.S. Agency for International Development \(USAID\)](#).

The wheat seed for distribution is of high-yielding varieties able to resist Ethiopia’s rapidly-evolving wheat disease strains. Needy farmers will receive enough seed to sow from $\frac{1}{4}$ to $\frac{1}{2}$ hectare of land — a quarter or more of the typical farmer’s landholding— along with instructional materials about the varieties and best farming practices.

“Working with local enterprises and partners enables us to procure and deliver seed to drought-affected farmers as quickly as possible,” said Abeyo. “In combination with CIMMYT’s longer-term efforts in the region, we hope that we can foster a more robust seed system and increase food security for 2016 and beyond.”

“Relief efforts provide sustenance for today, but we need to ensure there is also food on plates tomorrow,” said Abeyo. “With the large crop losses experienced in 2015, farmers were not able to save seed for planting in 2016 and did not have sufficient income to purchase more. Unless these farmers are able to access seed, we may face further shortages in 2017.”

Through the emergency seed project implemented by CIMMYT, more than 226,000 households will benefit from the provision of maize, wheat and sorghum seed.



Photo: Emma Quilligan/CIMMYT

Protecting wheat genetic diversity across the globe



Outside Mexico City, at the headquarters of the [International Maize and Wheat Improvement Center \(CIMMYT\)](#), a vast “seed library” holds the world’s most important collection of maize and wheat seeds.

The enormous genetic diversity embodied in these seed collections, which number 180,000, includes original races of maize and wheat that were domesticated over millennia by farmers. The seed is conserved, studied, shared by CIMMYT with breeders, specialists and farmers worldwide. In 2016, 41 tons of wheat and maize seeds were shipped from the CIMMYT germplasm bank to 100 countries.



Photo: Hedilberto Velazquez/CIMMYT

For decades, CIMMYT maize and wheat breeders have drawn on this diversity for genes to strengthen the disease resistance and climate resilience of modern, improved varieties.

The [CIMMYT genebank](#) also safeguards and restores seed collections lost or threatened by conflicts. Genebank staff are working with peers from the [International Center for Agricultural Research in the Dry Areas \(ICARDA\)](#) to preserve and genetically analyze ICARDA wheat seed collections that were relocated from Syria with the outbreak of civil war.

Under the Seeds of Discovery project, a joint initiative of CIMMYT and the [Mexican Ministry of Agriculture \(SAGARPA\)](#) through the [MasAgro project](#), scientists have genetically analyzed approximately 60,000 CIMMYT seed collections from more than 100 countries and nearly 30,000 wheat and wheat wild relative samples from ICARDA.



Photo: Hedilberto Velazquez/CIMMYT



High-power regional breeding collaboration delivers varieties and results to farmers

As of 2016 a unique breeding partnership to improve wheat harvests in Central and West Asia has contributed to the development and release of 72 wheat varieties sown on more than 2.5 million hectares.

Wheat is a major crop in the region but food insecurity remains widespread, despite major social and economic advances since the early 1990s. To address this, in 1990 Turkey's Ministry of Food, Agriculture and Livestock, along with CIMMYT and ICARDA, formed the International Winter Wheat Improvement Program (IWWIP) to develop high-yielding lines and varieties of winter and facultative wheat, which requires a shorter exposure to winter temperatures to develop.

"Among the world's largest winter wheat programs, IWWIP distributes breeding lines to around 100 partners in more than 50 countries," said Alex Morgounov, wheat breeder at CIMMYT and IWWIP co-coordinator. "This program also facilitates the exchange of elite germplasm among winter wheat breeding programs worldwide and provides programs in emerging and developing nations with access to materials from breeding programs in Europe and the USA."

Based on a 2014 survey, around 40 percent of all breeding crosses made in Central and

West Asia have involved IWWIP parents and the program is a source of improved traits for winter wheat breeding.

"IWWIP uses the diverse agro-climatic conditions of Turkey to develop varieties suitable for the entire region, including both irrigated and rainfed farm settings," Morgounov explained.

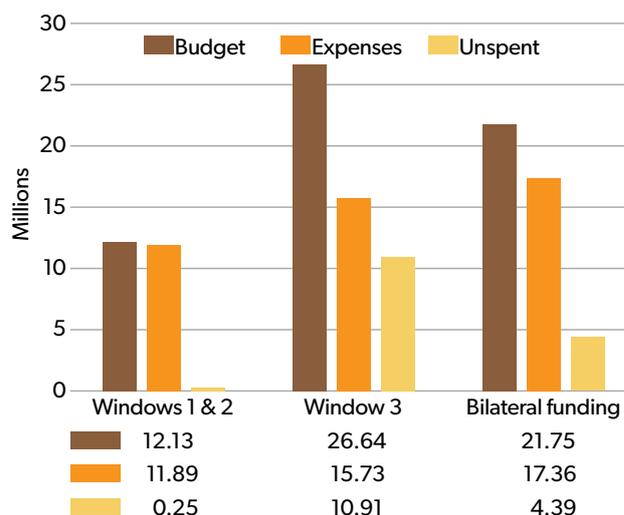
Varieties that carry IWWIP breeding contributions have been released in Afghanistan, Armenia, Azerbaijan, Georgia, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkey, Turkmenistan and Uzbekistan.



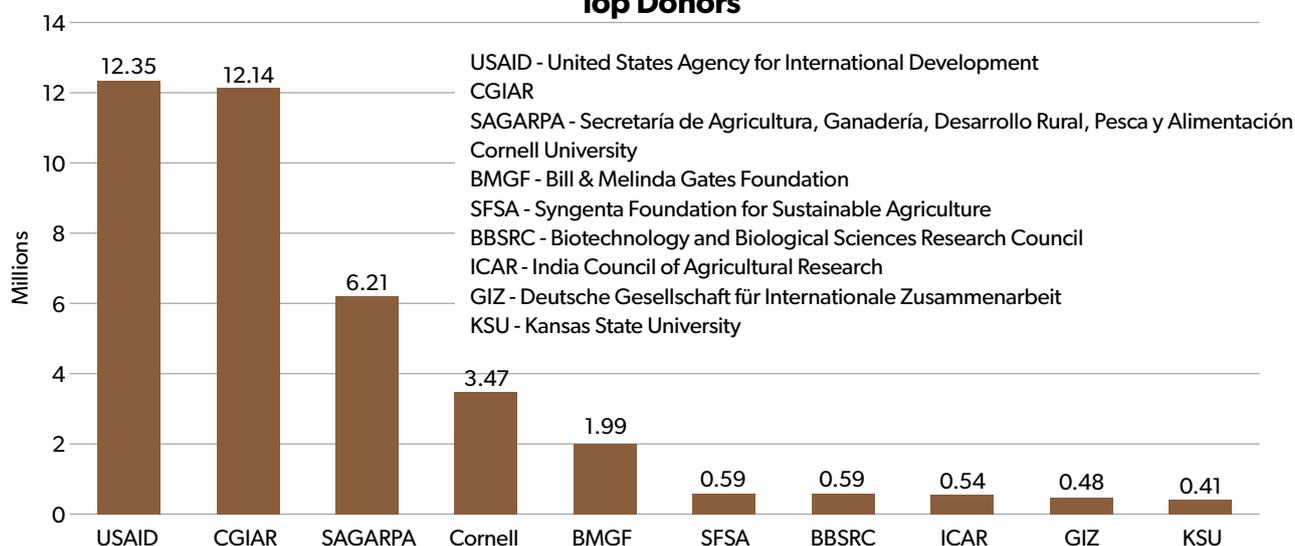
Financial Highlights

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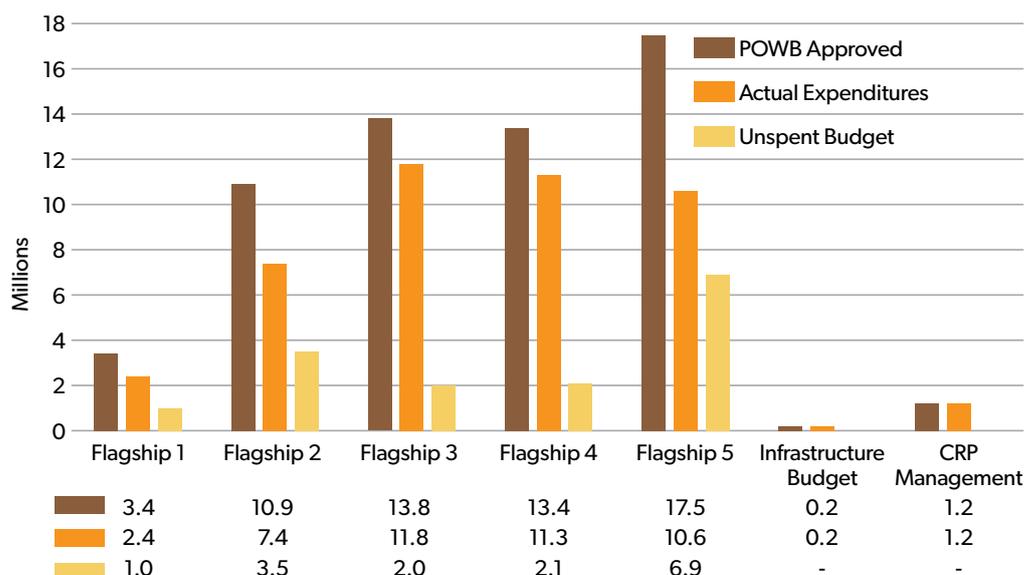
Financial Summary by natural Classification



Top Donors



Summary by Flagship Project



Flagship project 1 - Maximizing value for money, and social inclusivity thru prioritizing WHEAT R4D investments.

Flagship project 2 - Novel diversity and tools to adapt to climate change and resource constraints.

Flagship project 3 - Global partnerships to accelerate genetic gains in farmers' fields.

Flagship project 4 - Sustainable intensification of wheat-based cropping systems.

Flagship project 5 - Human and institutional capacities for seed systems and scaling-out; a new generation of wheat scientists.

Acronyms and abbreviations

ACIAR	Australian Centre for International Agricultural Research	IMPACT	International Model for Policy Analysis of Agricultural Commodities and Trade
ANEP	Agriculture, Nutrition and Extension Project	INAT	National Agronomy Institute of Tunisia
BARI	Bangladesh Agriculture Research Institute	INIAF	Bolivia National Institute for Innovation in Agriculture and Forestry
BGRI	Borlaug Global Rust Initiative	ISPC	CGIAR Independent Science and Partnership Council
BISA	Borlaug Institute for South Asia	IWIN	International wheat improvement network
BMGF	Bill & Melinda Gates Foundation	IWYP	International Wheat Yield Partnership
BMZ	Federal Ministry for Economic Cooperation and Development, Germany	JIRCAS	Japan International Research Center for Agricultural Sciences
BTF	Borlaug Training Foundation	KALRO	Kenya Agricultural & Livestock Research Organization
CA	Conservation agriculture	KASIB	Kazakhstan-Siberian Network on Wheat Improvement
CCAFS	CGIAR research program on Climate Change, Agriculture and Food Security	KSU	Kansas State University
CENEB	Norman E Borlaug Experimental Station	MC	Management committee
CIAT	International Center for Tropical Agriculture	MEL	Monitoring, Evaluation, and Learning
CIMMYT	International Maize and Wheat Improvement Center	PEP	Partnership for Economic Policy
CRP	CGIAR Research Program	PIM	CGIAR Research Program on Policies, Institutes and Markets
CSISA	Cereal Systems Initiative for South Asia	R4D	Research for development
DARtseq	Diversity Arrays Technology	SAGA	Genetic Analysis Service for Agriculture
DGGW	Delivering Genetic Gains in Wheat	SAGARPA	Mexico's Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food
DFID	Department for International Development, UK	SARD-SC	Support to Agricultural Research for Development on Strategic Commodities of the African Development Bank
EIAR	Ethiopian Institute of Agricultural Research	SeeD	Seeds of Discovery
FACASI	Farm Mechanization and Conservation Agriculture for Sustainable Intensification project	USAID	U.S. Agency for International Development
FAO	Food and Agricultural Organization of the United Nations	USDA-ARS	United States Department of Agriculture - Agricultural Research Service
FP	Flagship projects	WIT	Jeanie Borlaug Laube Women in Triticum Early Career Award
GFSF	Global Futures and Strategic Foresight Project	WHEAT	CGIAR Research Program on Wheat
ha	hectares	W-ISC	WHEAT-Independent Steering Committee
ICAR	Indian Council of Agricultural Research	ZT	Zero tillage
ICARDA	International Center for Agricultural Research in the Dry Areas		
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics		
IDOs	Intermediate development outcomes		
IFPRI	International Food Policy Research Institute		

WHEAT is a CGIAR Research Program launched in 2012 and led by the International Maize and Wheat Improvement Center (CIMMYT). Coupling advanced science with field-level research and extension in lower- and middle-income countries, WHEAT works to raise wheat productivity, production and affordable availability for 2.5 billion resource-poor consumers who depend on the crop as a staple food. Partners include the Australian Centre for International Agricultural Research (ACIAR), the British Biotechnology and Biological Sciences Research Council (BBSRC), the International Center for Agricultural Research in the Dry Areas (ICARDA), the Indian Council of Agricultural Research (ICAR), and a community of more than 200 public and private organizations worldwide, among them national governments, companies, international centers, regional and local agencies and farmers. Funding for WHEAT comes from CGIAR and generous donors including national governments, foundations, development banks and other public and private agencies.

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