CGIAR Annual Report 2012

Partnership for impact

CGIAR

Science for a food secure future

CGIAR is a global partnership that unites organizations engaged in research for a food secure future. CGIAR research is dedicated to reducing rural poverty, increasing food security, improving human health and nutrition, and ensuring more sustainable management of natural resources. It is carried out by the 15 centers who are members of the CGIAR Consortium in close collaboration with hundreds of partner organizations, including national and regional research institutes, civil society organizations, academia, and the private sector.

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CGIAR at a glance

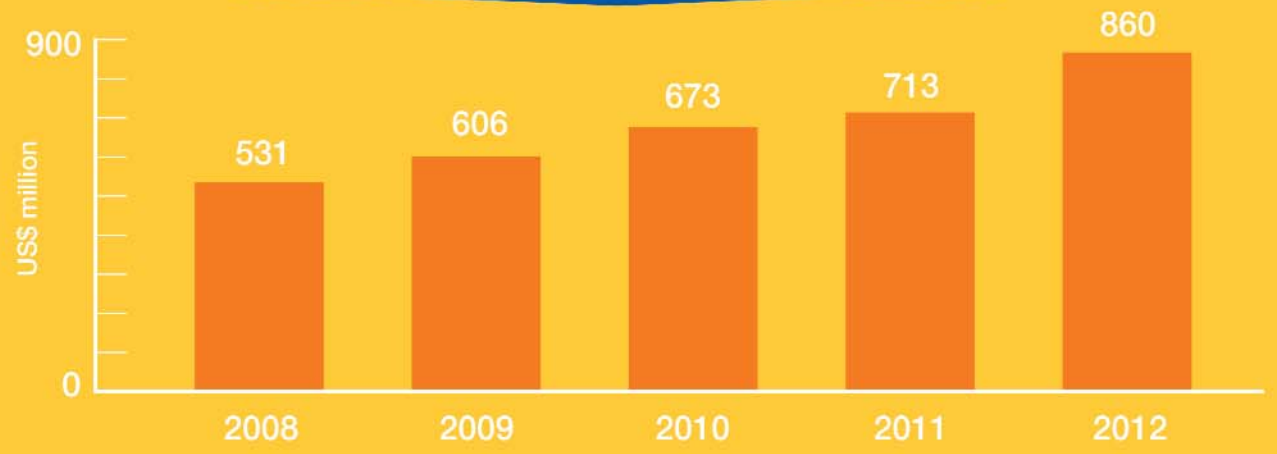
Our focus

- Rural poverty
- Food security
- Health and nutrition
- Natural resources

Number of Partners

- National institution for agricultural extension (0.1%)
- Financing institution (0.8%)
- Advisory services (1.6%)
- Foundation (1.7%)
- Development organization (2.0%)
- Farmers organization (2.5%)
- Regional organization (3.2%)
- International organization (3.8%)
- International agricultural research center (6.6%)
- Private company (7.5%)
- Government (10.3%)
- Non-governmental organization (11.8%)
- Academic institution (22.4%)
- National research institution (25.7%)

Funding trend 2008–2012 (See page 37.)



Number of CGIAR Research Programs (See page 3.)

16

CGIAR

Partners & Stakeholders
Work with us for a food secure future. Consulted through the **Global Conference on Agricultural Research for Development.**

Consortium
Integrates and coordinates researchers and funders. The Consortium consists of the **Consortium Board, Consortium Office** and **15 Research Centers.**

Independent Evaluation Arrangement
Evaluates the work of the **CGIAR Research Programs.**

Fund
Ensures funds for the research of the Consortium. The Fund consists of the **Funders Forum, Fund Council** and the **Fund Office.**

Independent Science & Partnership Council
Advises the **Fund** on research priorities and funding.

Number of CGIAR Research Centers (See page 48.) **15**

Contents

ANNUAL REPORT **2012**

Foreword

As CGIAR begins its fourth year of reform, it is important to take stock of our efforts, recognize the enormous progress we have made to date, as well as the challenges we still face, and ensure that we are making the most of new opportunities to optimize the impact of our research for the benefit of the poor. In this regard, CGIAR made strong progress in 2012, marked by critical milestones and important developments ranging from scientific breakthroughs, to historical gains in funding, to landmark achievements in how we conduct our business. We solidified our commitment to a programmatic approach to research with a fully approved portfolio of CGIAR Research Programs; launched initiatives to ensure that gender equality is a top priority in all aspects of our work; took steps to create a more performance-based system; and generated new knowledge, tools, and technologies, including agricultural innovations that are nutrition-sensitive and climate smart.

This year's Annual Report showcases how new ways of doing research are improving the incomes, food security, and health and wellbeing of poor smallholders and their families, and illustrates the importance of strategic partnerships in delivering that impact. Success stories range from linking small-scale producers of chili peppers in Bolivia and Peru with international markets, to blending traditional knowledge with modern technologies to sustainably increase the productivity of farmers, fishers, and livestock keepers in the Zambezi River basin in southern Africa.

As part of our work to exploit the potential of agriculture to improve nutrition and health, in 2012 CGIAR and its partners made available four new biofortified food crops to farmers in India, Nigeria, Rwanda, and Zambia. In addition to containing higher levels of critical nutrients, the crops – beans, cassava, maize, and pearl millet – are high yielding and drought or heat tolerant, offering the potential for significant nutritional benefits in regions that are increasingly affected by climate change. In India and Zambia, CGIAR is partnering with private seed companies to ensure that new varieties get into farmers' fields with greater speed and scale, with the ultimate goal of combating malnutrition.

Recognizing the importance of private–public partnerships to improve and accelerate access to the best technologies, knowledge, and innovation to achieve maximum impact for the poor, in 2012 CGIAR adopted its first ever system-wide Principles on the Management of Intellectual Assets. This groundbreaking policy will enable CGIAR to better harness the strengths of all partners so that the outcomes of CGIAR research can be used effectively by those who need them most. Ensuring that the results of our research move more quickly into the hands of small-scale farmers, fishers, and foresters will continue to be both a challenge and a priority in future.

Complementing this effort, during the second CGIAR Funders Forum, donors endorsed the Strategy and Results Framework Action Plan developed by the CGIAR Consortium in 2012. The Plan, which also defines a set of goals and targets for good partnerships, promises an increased focus on impact-driven research by identifying more precise intermediate development outcomes for each of the CGIAR Research Programs. Clearly defined indicators will improve and streamline reporting, facilitate transparent decision-making, and better ensure that donors know what to expect from their investments, making the entire system more accountable.

CGIAR also took a number of steps in 2012 to better meet the needs of poor rural women, reduce the gender gap in agriculture, and empower female farmers. In collaboration with the United States Agency for International Development (USAID) and the Oxford Poverty & Human Development Initiative (OPHI), CGIAR developed a first-of-its-kind tool that measures the empowerment and inclusion of women in agriculture to document obstacles and constraints, and ultimately overcome them. Research by other CGIAR scientists identified opportunities for increasing

women's earnings through the marketing of non-timber forestry products. And when women have more opportunities to flourish, everyone benefits. Food security increases, poverty drops, children are better nourished, and environmental stewardship improves.

The first step to transforming people's lives through the benefits of agricultural research, however, often starts in an office or laboratory. And on that front, CGIAR also registered major accomplishments in 2012. Using the latest biotechnology tools, for example, scientists discovered in CGIAR's extensive seed collections a gene that enables rice plants to produce 20% more grain by increasing uptake of phosphorus. This discovery will enable small-scale farmers who cannot afford fertilizers for their poor soils to grow more rice, improving food security and incomes while conserving the world's rapidly diminishing reserves of rock phosphate. In Southeast Asia, rice farmers are already benefiting from new CGIAR technologies, including a mobile phone application that enables them to receive advice on applying the right type of fertilizer in the correct amount at the optimum time.

None of these achievements, of course, would be possible without strong support from our valued investors. Despite fiscal difficulties and tight aid budgets among many of our donors, financial contributions to CGIAR continued to grow at a very robust rate, reflecting donors' confidence in CGIAR's ability to tackle some of the most pressing global development challenges. With more than a 20% increase in funding over the previous year, 2012 marked the single largest annual increase in funding in CGIAR's history, putting us well on track to reach our US$1 billion target in 2013.

As elaborated in the financial section of this Annual Report, the increase in overall funding is just one indicator that the reform process is bearing fruit. The growth in contributions to CGIAR's multi-donor trust fund is perhaps an even better indicator of donors' commitment to key aspects of the reform. From 2011 to 2012, contributions received through the Fund increased by 33%. Of that, nearly two-thirds was provided as harmonized funding, enabling CGIAR to pool resources to finance research priorities and reflecting increasing interest in a multilateral approach to funding.

Although CGIAR made considerable and noteworthy progress on many fronts in 2012, we are determined to do more and to do it better, so that every dollar received will deliver even greater benefits for poor rural communities in developing countries. CGIAR is committed to continually measuring and assessing the impact of our work to ensure that good intentions and best efforts consistently lead to tangible improvements in people's lives. But we certainly cannot do it alone. In order to fully reap the fruits of reform, we need to enhance and expand our collaboration – with civil society, national research partners, academia, development practitioners, new investors, and long-time donors. By working together, we are confident that we can ultimately achieve our mutual goals of eradicating poverty, conserving vital natural resources for future generations, and ensuring everyone's right to safe, nutritious, and sufficient food.

Rachel Kyte, *CGIAR Fund Council Chair*

Carlos Pérez del Castillo, *CGIAR Consortium Board Chair*

Strong progress

In 2012, CGIAR continued to deliver innovative, comprehensive, and sustainable development solutions while strengthening collaborative research through the new CGIAR Research Programs brought about by reform.

CGIAR's reform process was designed in large part to ensure that the knowledge generated by CGIAR scientists and their partners leads to results – for small-scale farmers, poor forest and fishing communities, national agricultural research systems, rural women, and policymakers. The changes brought about by reform – a Consortium to unite the Centers, a programmatic approach to research, a Fund to harmonize investments in that research, and a determined commitment to work inclusively with partner organizations to create synergies and maximize impact – are manifest in the new strategic focus and way in which CGIAR works. By the end of 2012, all 16 CGIAR Research Programs had been approved.

CGIAR Research Programs

- Agriculture for Nutrition and Health (A4NH)
- Aquatic Agricultural Systems (AAS)
- Climate Change, Agriculture and Food Security (CCAFS)
- Dryland Cereals
- Dryland Systems
- Forests, Trees and Agroforestry
- Grain Legumes
- Integrated Systems for the Humid Tropics (Humidtropics)
- Livestock and Fish
- Maize (MAIZE)
- Managing and Sustaining Crop Collections (Genebanks)
- Policies, Institutions and Markets (PIM)
- Rice (Global Rice Science Partnership – GRiSP)
- Roots, Tubers and Bananas (RTB)
- Water, Land and Ecosystems (WLE)
- Wheat (WHEAT)

Alleviating poverty, increasing food security, improving nutrition and health, and managing natural resources are all closely linked. The CGIAR Research Programs tackle these issues through a comprehensive strategy of research-for-development – the CGIAR Strategy and Results Framework (SRF). The SRF is an evidence-based, impact-oriented agenda that focuses explicitly on poor people in developing countries. The Programs position CGIAR to pursue innovative, comprehensive, and sustainable solutions – such as crops resilient to extreme weather, pests and disease, and more efficient ways to manage water, trees, soils, livestock, fisheries, and forests – and to deploy technologies now available.

INNOVATION

In 2012, although all 16 CGIAR Research Programs had been approved and some had been operating for a year or more, others were only just getting started. During the transition from 'old' projects and programs to the new integrated Programs, CGIAR scientists continued to develop new knowledge and technologies, improve practices, contribute to policymaking, build capacity, and empower scientists, poor smallholders, and rural women.

Alleviating poverty and food insecurity

As the global population increases to a predicted nine billion by 2050, pressure mounts to produce more food without destroying the planet. Research to empower poor rural communities and raise the productivity of crops and agricultural systems – including livestock, fish, and agroforestry – will be essential to alleviate poverty and ensure food security. CGIAR Research Programs are designed to address these interrelated issues.

New knowledge

In 2012, CGIAR scientists published 1,290 papers in peer-reviewed publications and produced many significant reports. In one key paper[1] scientists of the CGIAR Research Program on Climate Change, Agriculture and Food Security[2] (CCAFS) described the expected impacts of climate change on the production of cassava and six other staple crops in sub-Saharan Africa – potato, maize, bean, banana, millet, and sorghum. A news release based on the article generated major coverage in the international media. The coverage contributed to a key goal of CCAFS – promoting options for adapting to climate change.

The greatest burden of zoonotic diseases – diseases transmitted from animals to humans and vice versa – falls on one billion poor livestock keepers. In poor countries zoonoses affect one in seven livestock, leading to 2.3 million people becoming ill and 1.7 million dying each year. CGIAR researchers in the Dynamic Drivers of Disease in Africa Consortium published a report[3] showing the links between poverty and regions prone to zoonoses. The report attracted wide media coverage and drew attention to diseases associated with agriculture, one of the issues being addressed by the CGIAR Research Program on Agriculture for Nutrition and Health[4] (A4NH). The report and an accompanying UK Institute for Development Studies (IDS) rapid response briefing for policymakers went 'viral' across the internet and print media and attracted, for example, the attention of Indian policymakers to the potential threats associated with zoonoses.

CGIAR's International Rice Research Institute (IRRI) and its partners in the Global Rice Science Partnership[5] (GRiSP) reported the discovery of a new gene in rice, the culmination of 10 years of research. The gene, *PSTOL1*, makes it possible for rice roots to absorb more phosphorus from the soil or fertilizers, thereby producing up to 20% more grain. This is particularly important for smallholder farmers who cannot afford to buy fertilizers.

Sequencing the chickpea genome was also completed during the year. This groundbreaking research opens the door to much more efficient and effective improvement of the third most important grain legume in the world. The potential value of this is significant: grain legumes such as chickpea are the 'meat of the poor', providing protein and helping to meet other nutritional needs.

Agricultural research-for-development takes place in the context of national, regional, and international agendas. In 2012, CGIAR's International Food Policy Research

1 Jarvis A, Ramirez-Villegas J, Herrera Campo BV, and Navarro-Racines C. 2012. Is cassava the answer to African climate change adaptation? *Tropical Plant Biology*, 5:1 (9–29). DOI: 10.1007/s12042-012-9096-7

2 *Annual progress report 2012: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)*, available at www.cgiar.org/CRP2012Reports

3 Grace D, Mutua F, Ochungo P, Kruska R, Jones K, Brierley L, Lapar L, Said M, Herrero M, Phuc PM, Thao NB, Akuku I, and Ogutu F. 2012. Mapping of poverty and likely zoonoses hotspots. Zoonoses Project 4. Report to the UK Department for International Development. Nairobi, Kenya: International Livestock Research Institute

4 *Annual progress report 2012: CGIAR Research Program on Agriculture for Nutrition and Health (A4NH)*, available at www.cgiar.org/CRP2012Reports

5 *Annual progress report 2012: CGIAR Research Program on Rice (GRiSP),* available at www.cgiar.org/CRP2012Reports

Institute (IFPRI), which leads the CGIAR Research Program on Policies, Institutions and Markets[6] (PIM), published the first of a new annual series covering major food policy developments. The *Global Food Policy Report 2011* spelled out the good and bad news on food security (see box on page 6). This first report, making the case for keeping food policy issues high on the global agenda, will serve as a reference for policymakers and stakeholders when discussing sustainable solutions for ending hunger and poverty.

Feedipedia, a groundbreaking new website, is the fruit of a partnership between CGIAR's International Livestock Research Institute (ILRI), which leads the CGIAR Research Program on Livestock and Fish,[7] the Food and Agriculture Organization of the United Nations (FAO), and others. Feedipedia is a mine of information on animal feeds. The website describes 1,400 different types – from the traditional to the lesser known and unconventional – for a wide variety of livestock and fish farming systems. The information, gathered together for the first time in one place and accessible to all, will help boost small-scale livestock farming, increasing smallholder productivity and thus making meat, milk, and fish more available and affordable to consumers across the developing world.

The first pan-African study of groundwater was also concluded, filling gaps in research on groundwater irrigation and water management. Arab Spatial was another important tool that was completed. This digital atlas contains maps and data for more than 150 food security and development-related indicators in the region. The atlas will provide researchers and policymakers with tools and information for strategic policy decisions at the subnational, national, and regional levels, based on the best and most up-to-date data and information available. Data sources include the World Bank's World Development Indicators databank, International Monetary Fund, World Health Organization, FAO, United States National Aeronautics and Space Administration, United States National Oceanic and Atmospheric Administration, CGIAR, and IFPRI among other regional, national, and subnational statistical bodies.

New technologies and improved practices

Work by CGIAR continues to change the lives of rural communities in developing countries. This has included developing a toolkit for rapidly assessing value chains, an index-based insurance to help Ethiopian pastoralists manage climate variability, and a new protocol for measuring and monitoring soil organic stocks to help advance understanding of their adaptation and mitigation potential.

Modern maize breeding programs use the doubled haploid method, a technique for dramatically cutting the time and effort required to produce hybrids compared with conventional breeding. However, few public breeding programs or small- and medium-size seed companies, especially in developing countries, use the procedure. The CGIAR Research Program on Maize[8]

[6] *Annual progress report 2012: CGIAR Research Program on Policies, Institutions and Markets (PIM)*, available at www.cgiar.org/CRP2012Reports

[7] *Annual progress report 2012: CGIAR Research Program on Livestock and Fish (Livestock and Fish),* available at www.cgiar.org/CRP2012Reports

[8] *Annual progress report 2012: CGIAR Research Program on Maize (MAIZE)*, available at www.cgiar.org/CRP2012Reports

Global Food Policy Report 2011

The good news

- Agriculture, nutrition, and health climbed to the top of national and global agendas, and the links between agriculture, food, land, water, and energy received more attention.
- The world's major political leaders made food policy a high priority, with the G20 agreement on an Action Plan on Food Price Volatility and Agriculture.
- At the World Economic Forum, the world's business and society leaders gave agriculture a boost when they initiated their New Vision for Agriculture.
- Encouraging progress was made at the climate change conference in Durban, acknowledging the role agriculture can play in the mitigation of and adaptation to climate change.
- China's focus on agricultural policy bore fruit as total grain production exceeded 570 million tons, a new record.
- India's parliament introduced a National Food Security Bill to provide affordable grains to more than half of its 1.2 billion people.
- New initiatives such as *Feed the Future*, the Global Agriculture and Food Security Program, and South–South cooperation boosted agriculture investments.
- Promoting mother and child nutrition gained momentum as it became widely accepted that the nutrition in the 1,000 days between conception and a child's second birthday are of crucial importance for the child's future.

The bad news

- High and extremely volatile food prices in the first half of the year threatened the food security of millions of people.
- Biofuel policies in the United States of America (USA) and the European Union (EU) have not been changed to take into account their impact on land-use change and food price volatility.
- The Doha Round of trade negotiations has still not been finalized, so countries continue to maintain domestic policies that undermine the trading prospects of developing countries and the sustainability of the global food system.
- Setting a clear international standard or 'code of conduct' for large-scale foreign investment in land has received too little attention.
- African countries are not meeting their target of allocating at least 10% of national budgetary resources to agriculture.
- The international community responded slowly and too late to the disaster that was unfolding in the Horn of Africa.
- Hunger still persists globally: nearly one billion people go hungry every day. The 2011 Global Hunger Index indicates that more than two dozen countries have 'alarming' or 'extremely alarming' hunger levels.

(MAIZE) organized training courses in Latin America, Africa, and Asia to help breeders in these regions apply the doubled haploid method and to encourage them to become proactive in producing hybrids adapted to local environments. Breeders trained in the doubled haploid method will help speed the delivery of improved maize varieties to small-scale farmers and cooperatives.

"The course was a very good experience for me. I'd read about [doubled haploids], but was able to practice all the steps."

Victor Moran Rosas, breeder, Semillas Berentsen, Mexico

"Mali has only five seed companies serving the country, thus it is imperative to build the skill base in breeding."

Ntji Coulibaly, Head, National Maize Program, Institute of Rural Economy, Mali

In western India, the CGIAR Research Program on Dryland Cereals[9] introduced techniques for growing improved varieties of sorghum, such as treating seed with thiamethoxam to control shoot fly, using seed drills to space plants favorably, applying fertilizer based on the results of soil tests, and managing water. The 25,000 farmers using the new techniques have harvested 40% more grain and 20% more fodder, and farm incomes have risen by 50% over 2 years.

Urbanization is putting pressure on water resources, especially in water-scarce areas. In these regions, introducing technologies to recover urban waste water and use it safely can help maintain sustainable food supplies. One notable success in reusing waste water is in the Near East where the CGIAR Research Program on Water, Land and

Technologies for making low-intensity tilapia–shrimp aquaculture profitable

In southern Bangladesh, the CGIAR Research Program on Aquatic Agricultural Systems[10] (AAS) organized training courses for 23,000 men and 23,000 women to introduce new aquaculture technologies. Low-intensity commercial tilapia–shrimp aquaculture has significantly expanded and is now practiced over 92,000 hectares, changing the lives of participants. Fish farmers who took part in training sessions on pond management and breeding in the USAID-funded Feed the Future Aquaculture project generated greater profits after the training than they did before.

Take Ensan Ali, owner of a fish nursery in Barisal, Bangladesh. He had no formal training in nursery management and his losses were so severe that he was going to close his nursery. Now that Ensan has been trained in preparing and managing ponds, planning, stocking, and harvesting, he expects to make a net annual profit of US$2,450 – up from US$500 the year before. "I used to work with risk before, but now I know how and what to do for successful fry production," he says. His pond serves as a demonstration for neighboring farmers, and Ensan plans to extend his business by opening two new ponds.

[9] *Annual progress report 2012: CGIAR Research Program on Dryland Cereals (Dryland Cereals)*, available at www.cgiar.org/CRP2012Reports

[10] *Annual progress report 2012: CGIAR Research Program on Aquatic Agricultural Systems (AAS),* available at www.cgiar.org/CRP2012Reports

Ecosystems[11] (WLE) worked with farmers in arid and semi-arid areas of Jordan, Lebanon, and Palestine to set up grey water treatment stations and show that urban waste water could safely be used for irrigation. Between 2010 and 2012, 24 treatment stations were set up. Farmers in Jordan successfully using treated waste water are encouraging others to follow suit. Following a visit by Palestinian farmers and technical staff from the West Bank and Gaza Strip to farms in Jordan where grey water was being used, the Palestinians have since repaired a neglected waste water treatment station in the City of Ateel, on the northern West Bank.

According to FAO, Ug99, a new race of stem rust, could cut global wheat production by 60 million tons and cause food prices to spike. The CGIAR Research Program on Wheat[12] (WHEAT) is part of the fight against stem rust, developing and releasing new varieties resistant to Ug99. In India, two new varieties derived from CGIAR germplasm that are resistant to Ug99 and yield 12–14% more than currently grown popular varieties were planted on 50,000 hectares. But for more farmers to be able to grow varieties resistant to Ug99, they need to be able to obtain seed. Wheat scientists at CGIAR's International Maize and Wheat Improvement Center (CIMMYT) foresaw the risk of not having enough seed in a crisis. They alerted donors who provided funds for seed production. Thanks to rapid methods of seed production introduced by CGIAR Research Programs, six countries – Afghanistan, Bangladesh, Egypt, Ethiopia, Nepal, and Pakistan – have produced sufficient seed of Ug99-resistant wheat to counter a potential outbreak.

Raising yields of root, tuber, and banana crops is cumbersome because of their biology. Increases in yields tend to lag compared to major cereals. Next-generation sequencing technologies and plant metabolite profiling (fingerprinting), however, can speed up and make breeding more efficient. To harness the potential of these technologies, the CGIAR Research Program on Roots, Tubers and Bananas[13] (RTB) is creating comprehensive maps of the genes and metabolic processes in the main RTB crops. The 'Omics approach' combines research in three key areas: genomics, the use of DNA sequencing to uncover and map thousands of single nucleotide polymorphism (SNP) markers; metabolomics, the study of chemical fingerprints of cellular processes; and phenomics, the evaluation of how genes determine phenotypes. Applying these new techniques will accelerate the development of more productive varieties and improve farmers' yields.

Improving nutrition and health

Six CGIAR Research Programs are working on enhancing the productivity, resilience, and the nutritional value of staple food crops. One is the CGIAR Research Program on Grain Legumes,[14] a partner in the Pan-Africa

> "Investments in agricultural research are vital to improve food security and nutrition in developing countries. Canada is a proud supporter of CGIAR, which develops scientific and policy innovations to improve both the quantity and quality of food produced, leading to healthier children and mothers, and reduced rural poverty."
>
> **Honorable Julian Fantino, Canadian Minister of International Cooperation**

[11] *Annual progress report 2012: CGIAR Research Program on Water, Land and Ecosystems (WLE),* available at www.cgiar.org/CRP2012Reports
[12] *Annual progress report 2012: CGIAR Research Program on Wheat (WHEAT),* available at www.cgiar.org/CRP2012Reports
[13] *Annual progress report 2012: CGIAR Research Program on Roots, Tubers and Bananas (RTB),* available at www.cgiar.org/CRP2012Reports
[14] *Annual progress report 2012: CGIAR Research Program on Grain Legumes (Grain Legumes)*, available at www.cgiar.org/CRP2012Reports

Bean Research Alliance (PABRA). PABRA partner organizations have together solved problems in bean production that few could handle individually. Members have released about 450 improved bean varieties since 1985, raising the incomes of eight million rural households – about 45 million people – and promising them a healthier future. Because the new varieties give higher yields and are more resistant to disease, they help rural households become more food secure and boost household incomes. According to a recent impact study, improved beans are expected to deliver economic benefits of US$200 million from 1986–2015.

Larger harvests and more nutritious crops from the same area of land are particularly important for improving nutrition and health where agricultural land is scarce. In 2012, the Government of Rwanda released five iron-rich bean varieties that were developed under the HarvestPlus Program in A4NH by the Rwanda Agriculture Board and CGIAR's International Center for Tropical Agriculture (CIAT). Thanks to partnerships with cooperatives, agro-dealers, and even churches, more than 136,000 Rwandan households received 'iron bean' seed packs in 2012. Because of their high iron content the new varieties help combat iron-deficiency anemia in Rwanda where per capita bean consumption is the highest in the world.

Also as part of the HarvestPlus Program, scientists at CGIAR's International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) developed new varieties of pearl millet that are rich in iron and zinc. Pearl millet is another crop with the potential to boost both nutrition and incomes, particularly as it is one of the few crops that thrives on poor land. Across large tracts of the poorer, less fertile parts of India, bread, chapatti, and porridge are made from millet flour. Improving the nutritional value of pearl millet could therefore make a big difference to people's health in these areas. In the states of Rajasthan, Maharashtra, Gujarat, and Uttar Pradesh where pearl millet is a staple food, an estimated 70% of children under five are anemic, mainly due to iron deficiency. HarvestPlus launched a partnership with an Indian company, Nirmal Seeds Pvt. Ltd, to distribute iron-rich millet seeds more quickly to farmers. Nirmal Seeds is arranging field demonstrations to promote ICTP-8203Fe – a variety that is not only higher in iron but also gives 15% higher yields – and selling seed through its network of distributors. In 2012, Nirmal Seeds sold 180 tons of ICTP-8203Fe seed. More than 35,000 farmers in Maharashtra adopted the high iron variety ICTP-8203Fe.

Pearl millet is just one of six crops being evaluated for their nutritional value – looking at Vitamin A, iron, or zinc levels – by the large cross-Center HarvestPlus Program, which breeds and develops biofortified crops. Once high-yielding varieties of staple foods with superior levels of micronutrients have been tested for their nutritional impact, the best will be rolled out on a large scale.

Managing natural resources sustainably

Agricultural landscapes provide a variety of benefits apart from food production, such as ecosystem and hydrological services. Balancing the different functions will be important for managing natural resources sustainably in the twenty-first century. In CGIAR, WLE leads crosscutting research on agriculture and ecosystem services, which involves nearly all CGIAR Centers, as well as major international organizations such as the Stockholm Environment Center, The Nature Conservancy, Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), and Ecoagriculture Partners. A working group on ecosystem functions in farming systems has developed a framework to integrate ecosystems services into agricultural land-use planning and decision-making as a way of sustainably increasing overall productivity. Other areas to be tackled include in situ agrobiodiversity as a way of increasing sustainability in diversified and intensified systems, managing ecosystem functions and agrobiodiversity, and methods to manage trade-offs between improving productivity and sustainably managing natural resources.

In Africa, farmers are putting the results of work combining local and scientific knowledge of native species into practice on the steep slopes of Lake Tanganyika. They have planted two million indigenous trees, greatly improving hydrological services – such as stream flow, control of sediment deposited into the lake, and water quality downstream – and boosting rural livelihoods. The CGIAR Research Program on Forests, Trees and Agroforestry[15] and the World Wildlife Fund are now scaling up practices and tools developed during this work – low-cost community nurseries for raising seedlings, tools to assist extension, and rural advisory services for farmers – as part of the Lake Tanganyika Regional Integrated Management Programme.

Translating the results of research into development outcomes often depends on influencing national governments to make changes to policies. CGIAR research – which showed that banana–coffee systems are not only profitable, but also resilient to climate shocks – has led several coffee-producing countries in East Africa and Central America that previously encouraged monocropping to change their recommendations. Based on the evidence, authorities are now advising farmers to intercrop coffee and banana. As well as reducing soil erosion, farmers not only earn more from intercropping but also spread risks, as crop failures seldom affect both coffee and banana simultaneously.

In Peru, a new law takes into account research by WLE on payments for ecosystem services (PES) in the Cañete

[15] *Annual progress report 2012: CGIAR Research Program on Forests, Trees and Agroforestry,* available at www.cgiar.org/CRP2012Reports

River basin. The research on innovative ways of sharing the benefits of protecting watersheds is part of an exploration of how agriculture fits within wider ecosystems. Projects undertaken by CIAT in partnership with the Peruvian Ministry of Environment in the Cañete watershed investigated and piloted benefit-sharing mechanisms. The results of the pilot projects will help the Ministry develop PES schemes for more than 30 other basins. In consultation with various research partners, including CIAT, which is part of the advisory group on national ecosystem services legislation, Peru's Ministry of Environment has drafted new legislation to catalyze PES schemes. The schemes could defuse potential conflict over the uneven distribution of benefits from ecosystem services. The Ministry is now engaged in public consultations to build support for the new law in the Peruvian Congress.

In Indonesia, CGIAR's Center for International Forestry Research (CIFOR) worked very closely with the President's REDD+ Task Force to develop a government strategy on reducing emissions from deforestation and forest degradation (REDD+). The strategy is part of a joint Indonesia–Norway effort to slow the pace of climate change by reducing the rate of deforestation, thereby bringing sustainable environmental, social, and economic benefits. As well as providing research findings to inform the strategy, CIFOR worked with the Indonesian Government to raise awareness nationally and globally on the challenges and opportunities associated with REDD+.

> "We are leaving the old paradigm of having trees cut and getting revenues from this, and entering a new era: the trees will stand, and at the same time revenues are received and people's welfare is improved."
>
> **Kuntoro Mangkusubroto, Indonesia Task Force for REDD+**

Agriculture is a major source of greenhouse gases; the potential to mitigate climate change by reducing emissions from agriculture is therefore huge. Much of this potential is in developing countries. Nationally appropriate mitigation actions (NAMAs) are a new mechanism of the United Nations Framework Convention on Climate Change (UNFCCC) for developing countries to establish mitigation plans and actions. An analysis by FAO and CCAFS of how agriculture was dealt with in 12 NAMAs has been used by five other countries while preparing their NAMAs. FAO and CCAFS also organized a workshop for experts in smallholder mitigation to help them understand how NAMAs can be a tool for national mitigation planning and climate-smart agriculture, and how to go about developing them.

A CGIAR study[16] that modeled land-use changes contributed to modifications in the EU biofuel policy proposed by the European Commission in 2012. The modified policy proposal reduces the share of biofuels to be derived from food crops and would remedy some of the unintended environmental consequences of regulations on biofuels.

On international climate change policy, CCAFS, with funding from the Global Donor Platform for Rural Development, set up the Commission on Sustainable Agriculture and Climate Change. The report of the Commission, published in 2012, made seven major recommendations and has influenced several governments. In Mexico, for example, Congress supported a draft climate change bill, which was subsequently passed as the General Climate Change Law 2012 – only the third such law in the world. In Bangladesh, Commissioner Mohammed Asaduzzaman used the findings in the report to validate Bangladesh's submission on agriculture to the UNFCCC's Subsidiary Body on Scientific and Technological Advice. In Kenya, the Commission's report was used as a reference when preparing Kenya's Agriculture Act 2012.

[16] Laborde D and Valin H. 2012. Modeling land use changes in a global CGE: assessing the EU biofuels mandate with the Mirage-BioF model. *Climate Change Economics*. DOI: 10.1142/S2010007812500170

An analysis of climate change and food systems[17] by CCAFS showed that agriculture and agricultural systems are highly vulnerable to climate change. The paper calculated emissions in all aspects of food production and distribution – direct emissions from crops and livestock, the indirect emissions of food production as a result of changes in land cover, emissions from manufacturing fertilizer, and from storing, transporting, and refrigerating food. A companion policy brief[18] concluded that a 'recalibration' of the food system will be required to ensure future food security and sustainable use of critical natural resources in a changing climate. In some contexts this may mean switching from major staples such as bananas to potatoes. The publications sparked debate in the media on the advantages and disadvantages of local as opposed to imported food, food waste, and the use of fertilizer, and influenced the climate change debate at the international level. The UN Committee on Food Security, for example, drew on the analysis to prepare its recommendations on climate change and food security.

Gender

Gender inequalities affect access to and use of technology, land, water, forests, livestock, fisheries, education, income, investment, and labor. The Consortium Gender Strategy, launched in 2010, covers both gender in research and gender in the workplace. Each CGIAR Research Program is developing a strategy for integrating gender into research. In 2012, there was concrete progress across Programs in incorporating gender issues into research and cooperating on crosscutting gender issues. By the end of the year, eight Programs had approved a gender strategy, six were already implementing their strategies, and two were working on drafts.

GRiSP's gender strategy, for example, aims to empower women and accelerate the delivery of development objectives by integrating women into designing, experimenting, and evaluating rice research-for-development. The strategy also seeks to improve women's access to resources such as production inputs, knowledge, and improved technologies; and control over outputs such as harvested rice, processed rice, and other products.

> "Providing opportunities for women in the agricultural sector is not only about gender empowerment. It is also about ensuring that the best minds, whether male or female, are given an equal chance to deploy their skills and energy as scientists, farmers, extension agents and others."
>
> **Mark Holderness, Executive Secretary, Global Forum on Agricultural Research (GFAR)**

The approach to gender taken by AAS similarly seeks to realize irreversible, deep, and enduring change for women. To create lasting change the AAS 'gender transformative approach' investigates the underlying causes of gender inequalities. Research addresses the unequal power dynamics that adversely affect household livelihoods. The Program works with men and women to reflect on and question existing norms, beliefs, practices, and structures. AAS also partners with organizations in the health and education sectors to learn from their approaches, methods, tools, and experience. In combination with strategies to develop the productivity of agricultural systems, the gender transformative approach will improve access to resources for production and control over life choices that affect development.

The CGIAR Research Program on Forests, Trees and Agroforestry embeds attention to gender and addresses imbalances in each research theme, taking a systematic

[17] Vermeulen SJ, Campbell BM, and Ingram JSI. 2012. Climate change and food systems. *Annual Review of Environment and Resources*, 37: 195–222. DOI: 10.1146/annurev-environ-020411-130608

[18] Thornton P. 2012. *Recalibrating Food Production in the Developing World: Global Warming Will Change More Than Just the Climate.* CCAFS Policy Brief no. 6. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

approach to designing and implementing gender-responsive research. Gender specialists guide and train Program scientists, managers, and partners in order to improve the quality and quantity of gender research. Recent gender research includes a study of non-timber forestry products which identified opportunities for increasing women's earnings, opportunities that the Program is investigating further.

Many Programs have adopted the recommendations of the CGIAR Gender and Agriculture Research Network, launched during 2012, on areas where joint monitoring and evaluation, common methods, and sharing data would add value. PIM is already developing methods for collecting and analyzing gender-disaggregated data that all Programs can use.

A study by A4NH assessed food safety in informal markets, where women's involvement predominates. CCAFS has integrated gender into climate-risk management in 22 climate-smart villages in West Africa, East Africa, and South Asia, and has collected data on gender inequality in 16 benchmark sites across 13 countries.

COLLABORATION

The emphasis on collaborative research brought about by CGIAR reform gained momentum throughout the year, notwithstanding delays in some Programs because of the security situation in Syria and disruption in some Arab Spring countries. More effective partnerships were forged to achieve greater impact – a key aspect of the reform – including among CGIAR Research Programs, national and regional programs, and global climate change and nutrition research groups.

A competitive grants scheme, for example, launched by MAIZE and WHEAT, and open to non-CGIAR researchers, aims to fill research gaps and thus achieve greater impact. In 2012, MAIZE and WHEAT awarded 55 Competitive Partner Grants. Of these, WHEAT approved grants for 19 projects in India, Uzbekistan, Turkey, China, UK, and USA. The Competitive Partner Grants extend MAIZE and WHEAT partnerships, harness a wider range of innovative ideas, and complement ongoing MAIZE and WHEAT research.

In Egypt, Livestock and Fish, CARE, and CGIAR's WorldFish joined forces to create jobs and improve incomes in aquaculture. AAS set up two women's fish-marketing groups to empower members and secure more equitable benefits. CARE Egypt and private sector hatcheries play key roles in disseminating and ensuring women have access to the highly productive Abbassa strain of tilapia. Also during 2012, Livestock and Fish helped bring together the Tanzania Dairy Board, Sokoine University of Agriculture, ILRI, Heifer Project International, SNV (The Netherlands Development Organisation), Land O'Lakes, Inc., and the Tanzania Ministry of Livestock and Fisheries Development to set up a multi-stakeholder Dairy Development Forum. This alliance, linking all stakeholders in the dairy value chain for the first time, will address bottlenecks and develop appropriate solutions for the dairy sector in Tanzania.

CCAFS partnered with the Common Market for Eastern and Southern Africa, the East Africa Community, and the Southern Africa Development Community, to organize two workshops – in Arusha, Tanzania, and Johannesburg, South Africa – to help African representatives in climate change negotiations articulate African perspectives on agriculture. This collaboration meant that, for the first time, African countries were able to provide a joint submission on agriculture to the UNFCCC, and make their views known to the Subsidiary Body for Scientific and Technical Advice and the Conference of Parties. The African submission to the UNFCCC process argued for agriculture to be included in any international agreement on climate change, and for African countries to be provided with access to research and technology.

In Vietnam, IRRI, CCAFS, and international, national, and local partners work together on the project Climate change affecting land use in the Mekong Delta: adaptation of rice cropping systems (CLUES). CLUES is the first project to focus specifically on rice production and climate change in a regional context. By November 2012, Vietnam had released 15 new climate-change-ready rice varieties, and CLUES partners had successfully promoted management techniques to help farmers lessen the impacts of climate change on rice production.

Common approaches and methodologies

The CGIAR Research Programs that focus on commodities are following the same value chain approach, a promising means to address market limitations faced by the poor. In 2012, researchers in Livestock and Fish, PIM, and A4NH joined forces to develop a practical toolkit for assessing value chains. The toolkit – covering the entire value chain from producers to consumers and bringing together scattered approaches and tools – will help CGIAR and partner researchers to rapidly analyze livestock and fish value chains. Scientists at CIAT, the International Center for Agricultural Research in the Dry Areas (ICARDA), IFPRI, and WorldFish developed the tools and tested them with the help of partners in Egypt, Ethiopia, Tanzania, Uganda, Vietnam, and Zambia. The toolkit can be used across all Programs.

A common methodology is also important for providing evidence on progress toward gender equity across empowerment schemes. Working with A4NH, all Programs will use the Women's Empowerment in Agriculture Index, recently launched at the United Nations, and in the UK and Indian parliaments. The Index will provide evidence that is unambiguous, quickly understood, and that decision makers can use. So far 19 countries have adopted the Index as part of the US Government Feed the Future initiative.

Sentinel landscapes, sites where scientists can track changes in forest cover over the long term and across national borders, also catalyze joint approaches and methods. The CGIAR Research Program on Forests, Trees and Agroforestry is developing a standard research framework to collect evidence across the network of sites on key indicators of change that affect

development. The sentinel landscapes initiative builds on and complements the work done by partners in target regions and is an excellent vehicle for partners to influence research that can bring about development outcomes. Long-term socio-ecological research at sentinel sites will track changes in how forests, agroforestry, and tree genetic resources are managed and used, and on the effects of these on livelihoods.

Scientists are also developing common approaches to studying the extent to which climate change could exacerbate the damage caused by crop pests and diseases. The RTB and CCAFS Programs, for example, are working together to identify which ones could become more serious or more widespread, and to help governments, international organizations, and farmers to protect crops. At a workshop in December 2012, the RTB–CCAFS group identified the most damaging pests and diseases, developed a framework for improving risk prediction, and planned for shared databanks.

Addressing crosscutting issues

CGIAR Research Programs made promising advances in jointly addressing crosscutting issues and sharing responsibilities. Three Programs working on agricultural systems – AAS, Dryland Systems,[19] and Integrated Systems for the Humid Tropics[20] – meet regularly to discuss common research approaches and tools for different agroecosystems.

Sustainable intensification is a crosscutting issue in CGIAR. Africa RISING, a Program to develop an integrated research-for-development model for sustainable intensification that is scalable and adaptable, aligns CGIAR work with Comprehensive Africa Agricultural Development Programme (CAADP) national and continent-wide priorities, and complements investments by USAID country missions. Africa RISING is part of the Feed the Future Global Food Security Research Strategy and assembles the expertise of 10 CGIAR and other international centers, local and US universities, national governments, national agricultural research institutes, non-governmental organizations (NGOs), and the private sector.

During 2012, Africa RISING's start-up year, 15 'early win' projects in West Africa, East and Southern Africa, and the Ethiopian

Tackling aflatoxin in maize and groundnuts

African economies lose a staggering US$450 million a year due to aflatoxin contamination, which affects staple crops such as maize and groundnuts.

Over the past 15 years, scientists at CGIAR's International Institute of Tropical Agriculture (IITA) have developed aflasafe™, a natural, low-cost biocontrol treatment that drastically cuts aflatoxin contamination in food crops. Used alongside other improved management practices, aflasafe™ could reduce aflatoxin contamination by more than 70% in maize and groundnuts, increase crop value by at least 5%, and improve the health of children and women. The World Bank estimates that in Senegal, reducing aflatoxin contamination would add US$281 million a year to the value of groundnut exports.

Three Programs coordinate efforts to close research gaps on aflatoxin risks and mitigation in maize and groundnuts. The MAIZE and Grain Legumes Programs focus on technologies to reduce and test aflatoxins in maize and groundnuts on-farm and in local value chains. A4NH focuses on assessing and lessening both market and health risks, and on policy advice. Working together on value chain interventions, the three Programs aim for a more robust overall approach to managing aflatoxin in the two crops.

[19] *Annual progress report 2012: CGIAR Research Program on Dryland Systems (Dryland Systems),* available at www.cgiar.org/CRP2012Reports

[20] *Annual progress report 2012: CGIAR Research Program on Integrated Systems for the Humid Tropics (Humidtropics),* available at www.cgiar.org/CRP2012Reports

highlands fast-tracked promising approaches to intensification with smallholder farmers, such as labor saving and water harvesting technologies, 'doubled-up legumes' intercropping (for example, pigeon pea with groundnut), and dual purpose crops. One project in Malawi, for example, led by CIMMYT, introduced members of two smallholder maize producer organizations to conservation agriculture practices such as no-till, residue management, and crop rotation. Applying methods like these will boost household incomes and improve nutrition, soil fertility, and resilience to climate change.

> "Ensuring that CGIAR research products reach large numbers of smallholder farmers is a key to transforming African farming systems and a high priority for Feed the Future research programs. For example, Africa RISING's CGIAR-led research on maize–pigeon pea systems in Malawi contributes to another USAID-supported nutrition project involving thousands of farmers."
>
> **Rob Bertram, USAID**

Synergies

Synergies between CGIAR Research Programs are already evident in countries and across regions, and in methods and approaches. Programs working in Bangladesh, for example, are now collaborating more closely. In Africa, PIM worked with several other Programs on aligning research with national priorities under the umbrella of CAADP. Much of the food safety work of A4NH supports Livestock and Fish value chain work and cross-program team work on assessing value chains, developing tools, and building national capacity.

Synergies with the Comprehensive Africa Agricultural Development Programme (CAADP)

In 2012, work continued on harmonizing CGIAR Research Program priorities with those of national investment strategies under the umbrella of CAADP. Several regional workshops and a conference in Dublin gathering all partners – including the World Bank, USAID, and Forum for Agricultural Research in Africa (FARA) – helped align their work. A team at IFPRI created a prototype mapping tool for organizing and providing access to national and regional spatial information on projects. The mapping tool will enable CAADP to coordinate investments by development partners, as well as technologies developed and released by national agricultural research organizations, regional organizations, and CGIAR Research Programs.

The RTB Program launched a strategic assessment of research priorities to identify areas where combining research efforts will benefit from synergies and have the greatest potential impact on poverty, food security, human nutrition and health, gender equity, and environmental sustainability. The survey on production constraints and research options for the main root, tuber, and banana crops drew more than 1,500 responses from experts ranging from potato breeders in Bolivia and plantain pathologists in East Africa, to extension staff in India.

In Central Africa, a pilot bioinformatics platform to manage and analyze sequencing data in plant breeding is a good example of the efficiencies made possible by Program synergies. Several Programs helped GRiSP develop the tools on the website that will help scientists breed new varieties of rice more rapidly. Impact assessments have shown that rice breeding research can improve productivity and deliver significant benefits to rice farmers. IRRI's improved rice varieties, for example, have increased farmers' returns by US$127 a hectare in southern Vietnam, US$76 a hectare in Indonesia, and US$52 a hectare in the Philippines. If new and improved rice

Capturing synergies between global supply chains and development

Synergies between the private sector, scientists, and NGOs are important in linking smallholder farmers into global supply chains. The seeds of the wild Allanblackia tree have been harvested for centuries by communities in equatorial Africa. Allanblackia fruit contains oil with a unique composition, structure, and melting properties. It is ideal for margarine and dairy cream alternatives, and can be used in developing new products and improving the quality of existing ones. After discovering the potential of Allanblackia in 2000, Unilever played a leading role in helping to set up a public–private partnership to establish supply chains for producing oil from wild harvested seeds. Partners include the International Union for Conservation of Nature, CGIAR's World Agroforestry Centre (ICRAF), and NGOs such as TechnoServe.

By 2011, it had become clear that the amount of Allanblackia fruit gathered from the wild – about 200 tons – was insufficient to meet an estimated demand of 100,000 tons from Unilever and other companies. Sustainable domestication was the answer. ICRAF worked with farmers to domesticate trees that grow quickly and produce large quantities of oil-rich quality seeds. Farmers are being trained to plant Allanblackia and are encouraged to join smallholder schemes so as to become part of the supply chain. Unilever helped co-fund and co-found local companies and is helping them towards independently owning and running the supply chain. So far, around 11,000 farmers, half of whom are women, are involved and have increased their earnings. The goal is to link 500,000 smallholder farmers into Unilever's supply network by helping farmers improve their agricultural practices and to supply the global market at competitive prices.

"We wanted to make Allanblackia a crop which would benefit large numbers of African farmers and biodiversity at the same time."

Harrie Hendrikx, Unilever

varieties can be delivered even more quickly and the benefits extended to Africa, this could have a significant global impact.

GRiSP has also designed cooperatives for rice growers, producers, processors, and marketers to commercialize quality rice products. The reach of the CGIAR Research Programs means that the synergies of combining efforts can widen the impact by delivering innovations, such as these cooperatives, to several locations simultaneously. Pilot rice cooperatives backed by microfinance in Cameroon, Chad, and the Central African Republic currently involve around 179,000 farmers.

Synergies along value chains that involve the private sector are a key feature of the Drought-Tolerant Maize for Africa (DTMA) project run by IITA and CIMMYT, as part of the MAIZE Program. In Mali, linking up with private sector partner Faso Kaba Seeds has been important for promoting improved varieties, training farmers to produce seed, and setting up a distribution network for six popular crops, including drought-tolerant maize.

> "Drought-tolerant maize beats conventional maize as the horse beats the donkey."
> **Lassana Diakite, Chair of a local farming cooperative in Mali**

In 2008, Faso Kaba Seeds contracted farmers to produce 100 tons of seed of drought-tolerant maize. By 2012, the company was producing 10-times more seed, employing 11 people, running its own seed cleaning and packing unit, and coordinating around 150 franchised stores. Without the collaboration between Faso Kaba Seeds and researchers, few farmers in Mali would be able to get hold of seed. The DTMA project is now developing drought-tolerant maize varieties and value chains for 13 countries in Africa.

Innovation networks and knowledge systems

As CGIAR takes on more responsibility for achieving development outcomes, CGIAR Research Programs increasingly engage with multi-stakeholder networks and platforms to scale up innovations and anchor CGIAR research in local realities. In the WLE Nile Basin Development Challenge in Ethiopia, for example, researchers benefit from wide interaction with a range of public and private organizations, and local and national decision makers through dedicated innovation platforms. Such cooperation leads to positive outcomes in terms of relevance to local contexts, uptake of innovations, community empowerment, and engagement in national policy processes. In the Blue Nile Basin, ILRI and International Water Management Institute (IWMI) researchers set up local innovation platforms to manage rainwater. Participants worked together to identify issues and design pilot projects that represented community and decision makers' concerns. Although the pilot interventions were largely unsuccessful, the lessons generated have been invaluable for those involved. Researchers worked with members of the innovation platforms to review their efforts, to encourage a sense of ownership, and to ensure that interventions take into account community concerns and meet the needs of different social groups.

In another project recognizing the importance of local context, CCAFS, ILRI, IDS, the International Institute for Environment and Development, the International Development Research Centre (IDRC), and other partners studied social learning and other participatory approaches to find ways to systematically embed research on climate change adaptation and mitigation in community knowledge systems. The work showed the power but also the challenges in social engagement at the local level. The findings point to a range of needs and opportunities that CCAFS could engage with at – and across – local, subnational, national, and international scales. They also raise questions regarding the internal functioning and strategy of the CCAFS network and how this might best support improved communications and social learning on climate change.

CGIAR Research Programs are also uniquely placed to tap expertise on innovation networks and knowledge systems at other levels. In determining how best to use innovation platforms to strengthen collaborative research in smallholder maize production, for example, the MAIZE Program linked up with the Netherlands Royal Tropical Institute (KIT). The Institute, which has a good understanding of innovation platforms in many development contexts, reviewed 11 projects that work through such platforms and helped MAIZE select pilot projects to promote learning among stakeholders along the value chain, from farmers and extension agents to representatives of seed companies and government departments. Through the pilot innovation platforms,

Biodiversity, food, and nutrition
In 2012, scientists at Bioversity International, with partners from Save the Children UK and the National Museum of Kenya, studied how five wild, neglected, and underutilized fruits and vegetables can lower food costs and improve nutrition. The research showed that by making the five wild foods part of a woman's diet, her food costs fall by around 40%.

The World Food Programme, FAO, UN Global Environment Fund, and Bioversity International are working to integrate biodiversity into school feeding projects in communities facing severe poverty and hunger. Research underway in Brazil, Turkey, Sri Lanka, and Kenya will offer long-term solutions to improve diets and dietary behaviors. School gardens and junior farmer field schools will show how young people can grow local, seasonal, nutritious foods and will raise awareness about the importance of these foods as part of a diverse and sustainable diet.

MAIZE and KIT will jointly coach and support researchers and local partners to help them understand farmers' needs and realities from a 'systems' perspective. The lessons learned will give all Programs a better understanding of innovation platforms as a means to scale up impact.

In addition to tapping into expertise, Programs also help partners in South–South alliances share their expertise. Much unique developing world knowledge, on the nutritional value of local agricultural biodiversity, for example, is undocumented. Programs provide technical backup and contacts through their extensive networks to strengthen South–South alliances. The A4NH Biodiversity for Food and Nutrition Project, for example, draws on CGIAR's Bioversity International and other international partners – the United Nations Environment Programme, FAO, World Food Programme, The World Vegetable Center, Crops for the Future, the Earth Institute at Columbia University, the World Bank, Brazil's agricultural research entity Embrapa, the Forum for Agricultural Research in Africa (FARA) and ICRAF– to support and foster the Africa–Brazil Agricultural Innovation Marketplace.

> "The Marketplace is an effort to move from retail South–South collaboration, where each time we are facilitating one arrangement at a time, to a wholesale approach, where we put in place a model that will allow many different collaborations to be effective."
> **Willem Janssen, Lead Agriculture Specialist, World Bank**

The lifeblood of crop improvement research

The CGIAR Research Program on Managing and Sustaining Crop Collections[21] (Genebanks) collects, conserves, and characterizes the diversity of the world's major food crops. Over the last 10 years, CGIAR genebanks have distributed more than one million samples to plant breeders and crop researchers – helping them develop new, resilient crop varieties which have saved millions of lives.

In 2012, CGIAR genebanks provided 131,181 samples to users in 105 countries. Often, CGIAR genebanks are the sole source of clean, healthy, documented material for national agricultural programs, universities, and farmers' groups in the developing world. Maintaining high standards is vital. During the year, the CIMMYT Maize and Wheat Germplasm Bank became the second CGIAR genebank to attain International Organization for Standardization (ISO) certification. The CGIAR's International Potato Center (CIP) genebank gained ISO accreditation in 2008. Work also progressed on developing a common web portal that will give breeders and researchers easier access to information on CGIAR genebank accessions.

CGIAR also partners with the Global Crop Diversity Trust to manage the CGIAR genebanks and to raise funds for a US$500 million endowment to ensure financing for the genebanks in the future.

By helping leverage expertise from the agricultural research-for-development community to strengthen platforms such as the Agricultural Innovation Marketplace, Programs will help widen the scope of South–South collaboration and multiply the value of their work many times over.

Responsiveness

The wide reach of CGIAR means that CGIAR Research Programs can quickly put together just-in-time responses to unexpected problems that span national borders, such as outbreaks of crop diseases. In 2011, a new disease – maize lethal necrosis – emerged in East Africa. Partners in the MAIZE Program were able to respond rapidly to requests from African countries to help contain the disease. In 2012, working with the Kenya Agricultural Research Institute and regulatory authorities, the Program drew on international networks to identify and speed up distribution of disease-resistant germplasm to replace susceptible varieties. Maize from the CIMMYT genebank was an important factor in the speed of the regional response.

LOOKING OUTWARD AND THINKING INCLUSIVELY

CGIAR Research Programs – though some had been underway for just a few months by the end of 2012 – have already clearly demonstrated how collaboration stimulates more outward-looking and inclusive thinking. In communicating and sharing knowledge, scientists have started to 'work out loud', connecting with colleagues and partners in more open research processes, and making known more of what they do. The Livestock and Fish Program, for example, plans and documents meetings on an open wiki and website, shares 'reports' and 'outputs' early in the research cycle, publishes and disseminates all documents as open access, and encourages scientists to blog about their research. Most other Programs have a similar approach.

Looking outward is not confined to researchers, or to the internet. CGIAR Research Programs and Centers also make use of the power of information and communication technologies and partnerships to put knowledge into the hands of many more who could benefit from it. Such outreach often involves re-purposing and re-packaging research findings for those beyond the reach of traditional research articles and books.

For instance, information for livestock farmers provided by Livestock and Fish

[21] *Annual progress report 2012: CGIAR Research Program on Managing and Sustaining Crop Collections (Genebanks),* available at www.cgiar.org/CRP2012Reports

reaches hundreds of thousands of Indian smallholders through a pilot mKisan mobile phone project. In Kenya, CCAFS and ICRAF work with the 'Shamba Shape Up' TV series to reach out to large audiences in an entertaining way. In Bangladesh and India, IRRI, CIMMYT, and partners in the Cereal Systems Initiative for South Asia project team up with Digital Green to disseminate information on a wide variety of agricultural technologies – new varieties and types of crops, better methods of planting seed, irrigating, managing soils and pests, and composting. ILRI and CIMMYT work with Farm Radio International on community radio programs for Ethiopian farmers.

In the science policy arena, the Global Futures project – aiming to improve agricultural productivity and environmental sustainability in developing countries by evaluating promising technologies, investments, and policy reforms – integrates efforts across six Centers and is building a Consortium-wide research program. The project uses a set of biophysical and socioeconomic models, including the International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT), hydrology and water supply–demand models, and crop models to assess the potential returns to a range of possible investments in new technologies and policy and programs. In 2012, project scientists evaluated 150 promising technologies, and integrated biophysical crop and climate models with the geospatial work of HarvestChoice, a program that generates knowledge products to help guide strategic investments to improve the wellbeing of poor people in sub-Saharan Africa through more productive and profitable farming. The Global Futures project helps leaders understand priorities for development and apply appropriate technologies, for example in designing the Science Agenda for Africa under the leadership of FARA.

Collaborative work among Programs is, in many cases, already promising to have an impact greater than the sum of its parts. There are several reasons for this. Many partners, both within and outside CGIAR, are involved in planning work, bringing their diverse perspectives and helping set relevant priorities. Research can be carried out in more regions and in more countries, and along value chains. Tools and methods contributed by upstream research partners can speed up research by downstream partners. The right partners in the right places working together can produce relevant results more rapidly. And the basic principles underlying collaboration – open sharing of knowledge, teamwork, and innovation – together power a relentless drive for results.

Focus: Partnership for impact

At the heart of reform within CGIAR is a change in the way that we work with our network of partners to capture and respond to needs, and deliver results.

In establishing the CGIAR Research Programs we are changing the way we work in order to meet the challenges of the twenty-first century. These changes acknowledge that the impact of our work will depend not only on the quality of our science and its relevance to people's needs, but on how we collaborate with partners. In this section of the Annual Report, we spotlight partnerships within our four areas of focus – reducing poverty, increasing food security, improving health and nutrition, and managing natural resources sustainably. More detail on these and other partnerships across CGIAR can be found on our website at www.cgiar.org/AR2012.

Working in partnerships is not always straightforward. It often brings together partners with different interests, different ways of doing things, different time frames, and different views and values. Competition over agendas, resources, and who does what are ever present, albeit sometimes in a subtle or disguised manner. As collaboration is crucial for sustainable development, it is important to improve our understanding of how partnerships work, what their limitations are, and how they can be made to be more effective, efficient, and equitable.

Over the years, CGIAR Research Centers have built up an extensive array of partnerships with diverse players. These are not just hands-off, long-distance arrangements. Many projects, often in remote locations, involve side-by-side teamwork in the field to make new technologies and practices available to farmers. National and civil society institutions have proved indispensable in translating the results of research into development outcomes. Active collaboration with the private sector has extended the reach and impact of CGIAR research on both crop and livestock production. The CGIAR Research Programs are a concerted effort to build and broaden partnerships for greater development impact.

> "The problems we are trying to address are complex change processes and no one organization can tackle them alone."
>
> **Andrea Rodericks, Executive Director, Program Quality and Learning, CARE India**

Making research partnerships on roots, tubers, and bananas stronger

The RTB Program asked the Institutional Learning and Change Initiative (ILAC), a CGIAR program hosted at Bioversity International, to analyze its partnerships and suggest ways to improve them. ILAC reviewed RTB's network, gathering information from scientists on issues ranging from the kind of research they do to the number and nature of their partnerships. The responses are being used to map and analyze how 578 researchers in 315 organizations interact, to understand how the network evolved, to explore new models for sharing knowledge, developing capacity, and learning collectively, and to recommend how Programs can strengthen their partnerships.

Reducing poverty

WARMING CHILI MARKETS

Agricultural growth has often been held back by inappropriate laws, ineffective organizations, and undeveloped value chains. Partners in the CGIAR Research Program on Policies, Institutions and Markets (PIM) are working to establish how these barriers can be overcome to reduce poverty, improve food security, and increase the incomes of smallholder producers.

Peru has the highest cultivated chili pepper (*Capsicum*) diversity in the world, and Bolivia is the origin of several cultivated and wild chili peppers. Yet much of this diversity is untapped, although consumers are becoming more and more interested in exotic and spicy tastes, as well as in healthy and nutritious foods. Food companies and gourmet chefs are looking for new flavors, while pharmaceutical companies are searching for chili varieties high in capsaicin – used in making pain relievers – and other products based on the valuable biochemical traits of chili, such as antioxidants. New value-added chili products made from hitherto little-used native chilies are appearing in response to this interest; some are already being sold in supermarkets in Peru.

What does this mean for a smallholder farmer in the Ucayali region of Peru such as Esaú Hidalgo del Águila? He has always had chili peppers on his table, but now his chilies are being exported around the world. Hidalgo, who grows organic produce and who is a member of APE-Pimental – a farmers' ecological organization – has been able to capitalize on the growing interest in chilies because he is involved in a project led by PIM. The project links smallholder producers of native chilies to markets, providing them with opportunities to earn more from the chilies they grow. Over the border in Bolivia, farmers are working with the Fundación Instituto de Tecnología de Alimentos, which is developing new chili products using native chili peppers. So far, chilies have been bottled, canned, dried, made into jam, and used as an ingredient in specialty cheeses.

"The project has provided the opportunity to develop new processed chili products for the market and has opened our eyes to the diversity of chili we have in the country. So far we have developed 15 products from 15 ecotypes, but there is plenty of diversity left for us to develop more products."

Edwin Serrano, Instituto de Tecnología de Alimentos, Bolivia

Tackling the value chain

Partnerships are at the heart of the project. Researchers, farmers, farmer associations, NGOs, foundations, private companies, universities, development agencies, national and international research institutions,

"The *Capsicum* project is a pioneer effort in trying to link the different actors of the value chain of a native Andean species with great genetic variability and great potential for the development of agribusinesses."

Manuel Sigueñas, Director, Genetic Resources and Biotechnology, Instituto Nacional de Innovación Agraria, Peru

regional government officials, restaurants, and food processors are just some of the players working together to develop the chili market. Most of the chilies native to Peru and Bolivia are grown on small farms and have never been put to commercial use. Partners are working to characterize the useful and commercially interesting traits of chilies in these countries, map the *Capsicum* value chain, identify bottlenecks, and develop strategies to overcome challenges in developing and taking products to market.

Filling the knowledge gap

Smallholder farmers, producers, and exporters along the value chain can see positive changes. Take Stefan Bederski, Chief Executive Officer of Agro Export Topará, a company that produces, processes, and exports organic certified chili products to the USA and EU. Twenty years ago, Stefan was stumped when clients asked about the attributes of the chili varieties he offered. Research is now providing him with the answers and helping Stefan fulfill his dream of promoting native Peruvian chilies in international markets. Originally, Agro Export Topará worked with commercial chili varieties, but after partnering in the research project, it has started using various native chilies.

Commercializing native species has promise but needs to be done sustainably. This means conserving precious biodiversity. To do this, Peru has set up a genebank of 700 accessions – the most diverse national collection of native chili pepper varieties in the world – at the Instituto Nacional de Innovación Agraria, where accessions with commercially valuable traits are available. In Bolivia, a NGO, Centro de Investigaciones Fitoecogenéticas Pairumani, maintains a unique collection of 600 chili landraces and wild species.

Overcoming barriers

The chili research project is an example of why partners are so important. Partnering to tackle failures in markets will raise incomes, make farming livelihoods more resilient, and prepare farmers to face future challenges, such as climate change.

"I am very excited because I have access to a market that I did not have years ago. The Peruvian market has reacted in a very positive manner to the native chilies, a very encouraging change."
Stefan Bederski, Chief Executive Officer, Agro Export Topará

"This case can be replicated and expanded around the world to help farmers who are struggling with declining commodity prices, and are looking for opportunities to increase their incomes through high-value, high-quality markets."
Stefano Padulosi, Bioversity International

Increasing food security

RICE ADVICE

The CGIAR Research Program on Rice, known as the Global Rice Science Partnership (GRiSP), is a unique collaboration for impact-oriented rice research-for-development. GRiSP streamlines CGIAR rice research and aligns it to complement research by more than 900 partners worldwide.

Rice is and will remain the most important crop in Asia, and is becoming significant in Latin America and Africa too. In all locations, fertilizers have a huge impact in boosting rice yields. But fertilizer is an expense that subsistence farmers cannot usually afford. When they can invest in fertilizers, most farmers do not have enough accurate information to know what type and combination to use, or how much or when to apply it to optimize productivity. One of the objectives of GRiSP is to bring down costs and increase profits for smallholder rice farmers – and one way to do this is by helping farmers make effective use of fertilizer. For production systems such as irrigated rice, where using fertilizer correctly can make a big difference in productivity and profitability, information and communications technology can provide farmers with timely site-specific advice on managing their crop.

For free

One such innovation is 'Nutrient Manager', a simple software package that gives farmers or extension workers pre-season and location-specific fertilizer recommendations that can be run on a mobile phone. Since its debut in the Philippines in 2011 and subsequent release in Indonesia in 2012, the Nutrient Manager for Rice Mobile has been providing rice farmers with specific advice on fertilizer for a particular rice field either by mobile phone or smartphone, or by internet. In 2012, a smartphone app, NMRiceApp, was also released in the Philippines.

"The Nutrient Manager is so fast and easy to understand."
Mamerto Jimenez, Filipino farmer

NMRiceMobile and NMRiceApp help farmers optimize their rice production. Farmers who have a simple mobile phone (widely used in both countries) can use NMRiceMobile by making a toll-free call. They then use the keypad to answer 15–20 simple questions about the location of their field, the variety of rice, when it was sown, the availability of irrigation water, how they manage crop residues, and the yield history of the field. Based on the replies, the program provides fertilizer recommendations – when, how much, and what sort of fertilizer to apply to maximize yield and profit, and cut down on waste – as a text message.

NMRiceApp, the smartphone equivalent, tends to be used more by extension workers with access to such phones – but it asks the same questions and gives the same result.

NMRiceMobile and NMRiceApp put into practice the principles of site-specific nutrient management for rice that have been well established after more than a decade of research in Asia's major rice-

"It marks the realization of one concrete step towards giving farmers better access to proven, easy-to-use and cost-effective rice technologies."
Proceso Alcala, Philippine Agriculture Secretary

growing areas. The knowledge that underpins them is also available in an online decision-making tool named Nutrient Manager for Rice, which is tailored to the rice-growing conditions of the specific country.

In Indonesia, farmers in all provinces increased their rice yields and net income when switching from their current fertilizer practice to the practice recommended by NMRiceMobile. In most cases, the increase in net income for farmers exceeded US$100 per hectare per season. Indonesia has about 15 million rice farmers. If just a small proportion of these farmers adopt the recommendations it would correspond with a significant overall rise in farmer incomes, food security, and considerable national economic benefits.

Heading to Africa

Farmers in Africa will soon have access to similar advice. CGIAR's Africa Rice Center (AfricaRice) and its partners have conducted more than 300 fertilizer management trials since the 1990s, and have developed decision support systems for fertilizer recommendations. Databases drawing on this work and updated rice 'passport' data – the standard descriptors that characterize rice cultivars – as well as recent field observations, have been used to adapt the Nutrient Manager to West Africa.

The Nutrient Manager has been calibrated for Senegal, and the application is currently being developed for other countries. In small-scale evaluations, Senegalese farmers who followed the recommendations of Nutrient Manager registered a yield increase of 1.9 tons per hectare or 35% compared to farmers' own practices, translating into an increase in net profitability of US$600 per hectare per year.

However, the Nutrient Manager is not an end product, and requires further improvement including adding other crop management practices apart from nutrient management and choice of fertilizer types. Looking ahead, AfricaRice and its national partners will develop new decision support systems beyond the Nutrient Manager to address other concerns of farmers, in collaboration with partners in GRiSP.

> "The application is highly adaptable. We already have the web-based version in advanced testing. We can adapt that for a tablet or a smartphone, and we can move toward a cellphone-based short message service (SMS), like the one that already works well in the Philippines."
>
> **Dr Stephan Haefele, IRRI**

Improving nutrition and health

GROWING HEALTHY

Helen Keller – founder of one of CGIAR's partner organizations, Helen Keller International (HKI) – would have approved of leveraging and enhancing the synergies between agriculture, nutrition, and health to improve the wellbeing of poor people, especially women and young children. The idea jells with her philosophy that joint efforts can achieve much more than individual efforts.

The CGIAR Research Program on Agriculture for Nutrition and Health (A4NH), which is led by CGIAR's International Food Policy Research Institute (IFPRI), works with key players in three areas that will make a difference to the nutrition and health of poor people, particularly women and children: making more nutritious and safer foods accessible to the underprivileged; integrating agriculture, nutrition, and health in development programs; and promoting, enabling, and supporting cross-sectoral policies and investment in health and nutrition. The research issues in the three areas are complex and span value chains, crops, diseases associated with agriculture, and development policies and programs. This means partnering across sectors and with a variety of players with different expertise.

"Alone we can do so little; together we can do so much."
Helen Keller (1880–1968), Founder Helen Keller International

Teaming up

The partnership between IFPRI and HKI is a model of successful cooperation between researchers and an international NGO heavily involved in development programs on the ground. The collaboration between IFPRI and HKI, set to strengthen as A4NH gets fully under way, represents the kind of relationship that is critical to improving the nutrition and health of poor people and, more broadly, to reducing poverty, increasing food security, and managing natural resources more sustainably.

"For programs like this to thrive, different sectors must come together and share resources and knowledge. The time for silos is past. Those working in nutrition, food security, agriculture, water, and health must join together to conquer the cause of one-third of child deaths worldwide – undernutrition."
Kathy Spahn, President and Chief Executive Officer, Helen Keller International

IFPRI, bringing its research expertise to the partnership, evaluated HKI homestead food production programs in Cambodia and Burkina Faso. Looking at the findings together, IFPRI and HKI were able to work out what programs might need to do – what kind of training or capacity building might be needed, and what processes might need to be put in place – for programs to achieve their objective of improving the health and

nutrition of mothers and children. The resulting 'program impact pathways', as they are called, show where and how programs could be modified or strengthened for a greater impact, and what might be helping or hindering their success. They also help IFPRI to design better ways to evaluate programs. In 2012, A4NH and CARE evaluated processes and undertook endline surveys to measure program impact in Burkina Faso. The evaluations over the next 2–5 years will provide the evidence needed to jointly develop the impact pathways and theory of change.

Finding the keys

Partnerships between researchers and those running development programs to provide evidence of what works and what does not are important because little has been done to date in this regard. In Burkina Faso, IFPRI and HKI did the first rigorous evaluation of a homestead food production program. HKI put some of the recommendations into practice straight away. The findings of a census of social networks, part of the evaluation, will also be helpful. They will provide information on how HKI's behavior change communications strategy has influenced women's health, improved their knowledge, and made a difference to children's nutrition. Documenting the success of these programs is critical to establish a body of scientific proof that small-scale agricultural programs improve nutrition, economic growth, and health. HKI is working with IFPRI in a number of countries to help build this evidence base.

The findings of evaluations will be used to help plan further HKI homestead food production programs in Cambodia, Burkina Faso, and elsewhere. This type of partnership is an example of how development programs and researchers can work together to improve program design and implementation, and to optimize the potential for impact. Each contributes, according to their own area of expertise, to collecting rigorous evidence about the impact of programs, and explaining how and why impacts were achieved or not achieved.

Sustainably managing natural resources

ZAMBEZI FOOD BASKET

The Zambezi River basin is a food basket for the landlocked southern African nation of Zambia. The river and surrounding floodplains support agriculture, fisheries, and livestock. Around three million people – a quarter of Zambia's population – directly rely on the Barotse Floodplain aquatic agricultural system for their livelihoods.

Despite the natural potential of this dynamic wetland system, life for its inhabitants is beset with poverty and hardship. More than four out of five people live below the poverty line, over half of children under the age of 5 years are stunted, and HIV prevalence has risen by 2% over the past 5 years while the national rate has declined in the same period.

The Barotse Floodplain exemplifies the challenges and opportunities faced by communities dependent on Africa's inland wetlands. Low agricultural productivity, poor infrastructure, and poorly developed agricultural value chains mean that Barotse communities are unable to tap into the growing market for rice, fish, and livestock products in the region.

The CGIAR Research Program on Aquatic Agricultural Systems (AAS) aims to tackle these issues head-on through research that accelerates learning and brings together the combined knowledge of users, government, and civil society organizations. Since 2011, the AAS Program has been working in five countries across Africa, Asia, and the Pacific to raise agricultural and fish production, and expand the markets for produce in the regions. Zambia's Barotse Floodplain was selected early in the planning stage of the Program as one of three areas to focus on, along with Cambodia and the Solomon Islands.

A traditional–modern mix

WorldFish, which leads the AAS Program, is fostering productive partnerships with research, government, and community sectors. WorldFish is garnering technical know-how from international and national research institutions like CGIAR's IWMI and the University of Zambia, which bring expertise on farm water management that improves productivity and increases understanding of flooding regimes in the region. National and international development NGOs that focus on development issues are valuable to the Program. Concern Worldwide, for example, contributes knowledge and experience of community-based canal management and gender mainstreaming. Similarly, Catholic Relief Services brings development expertise on community-based microfinancing, which helps small-scale producers predict the profitability of their business before they start production and marketing. Valuable policy support in the elaboration and development of agricultural and natural resource value chains is

> "WorldFish has…managed to bring us on board from stage to stage… Our partnership is overwhelming, because we have come to realize that we agree in almost all our key areas of operation, these being the livelihood of people in the Barotse, and our common goal of realizing the potential of the Barotse Floodplain."
>
> **Fines Nasilele, Program Coordinator, People's Participation Service**

provided by local and central government agencies. These partnerships are helping to blend traditional knowledge with modern agricultural innovations to sustainably improve productivity for the people of the Barotse Floodplain.

Local communities and organizations are partners in the Program and have contributed valuable input from the outset. In the early stages, Barotse community groups came together to map out their goals and plans for the region. This resulted in an Action Plan, which included goals such as value chain development, crop diversity, and canal management. Three partner organizations in the Barotse Floodplain have been instrumental in this process, bringing an essential local perspective to the Program: the People's Participation Service, Caritas Mongu – a partner to Catholic Relief Services – and the Barotse Royal Establishment.

"We are working as a team and we have prioritized team work from the onset of the partnership. Our partnership has a bright future."

Albert Mulanda, Program Coordinator, Caritas Mongu

Respect and understanding

Working directly with local communities ensures that the Program fully considers community concerns and culture when designing and implementing activities. This participatory approach helps communities become custodians and beneficiaries of the natural resources on which they rely. As part of this ongoing process, the Program has empowered community members to tell their stories through a series of short films. These films provide a unique insight into the varied and interconnected issues that face the people of the Barotse Floodplain; their testimonies reinforce the need for a systems-based approach to development in the region.

"We already have the indigenous way of preserving our natural resources, hence we believe that the partnership with WorldFish and the [CGIAR Research Program on] Aquatic Agricultural Systems will help us to revive and improve the lost value of our traditional know-how of natural resource preservation."

Mr. Mwangelwa Akapelwa Silumbu, a senior leader in the Barotse Royal Establishment

Moving CGIAR forward

Committed donors, good management, clear accountability, effective evaluation, transparency, and strong research programs are the building blocks of continued success. CGIAR is moving forward on all these fronts to enable scientists to deliver research that has an impact.

Progress continued throughout CGIAR in 2012, and we are grateful to all of our funders, who ultimately make our work possible. In addition to ongoing efforts to ensure that research meets the needs and gets into the hands of smallholder farmers, CGIAR persisted in implementing reforms. In many ways 2012 may be seen as a year of consolidation, marked by healthy financial growth, shaping research for the benefit of some of the world's poorest people, and attention to improving efficiency and effectiveness across CGIAR.

2012 was the third and final year of the inaugural CGIAR Fund Council, which governs the CGIAR Fund. The Fund Council, made up of representatives of Fund donors and other stakeholders, sets overall priorities on the use of Fund resources, and appoints the Independent Science and Partnership Council (ISPC), a panel of world-class scientific experts that advises CGIAR Fund donors. In March 2012, the Fund Council held its spring meeting at the Bill & Melinda Gates Foundation in Seattle, as well as a forum with Bill Gates, who called for the use of report cards that would enable players in the international agricultural system to set goals and be measured against them – a proposal in direct alignment with CGIAR's new policy of producing scorecards to measure performance and efficiency. Noting CGIAR's unique role in generating world-class science for the benefit of poor smallholder farmers, Gates added that "if the CGIAR system didn't already exist, we'd need to invent it."

"The Netherlands is proud to be a long-standing partner of the CGIAR, given that sustained investment in high-level research is an important first step in generating innovations that improve the livelihoods of poor smallholder farmers, fishers, and foresters. With current reforms and diverse partnerships, the CGIAR, a proven contributor to public knowledge on agricultural science and technology, is strongly positioned to continue to be relevant."

Rob Swartbol, Director General for International Cooperation, Ministry for Foreign Affairs, the Netherlands

"Spending on agriculture is a wise investment; long after you contribute, the benefit continues,"

said Bill Gates, pictured here with Rachel Kyte, during his dialogue with the CGIAR Fund Council on March 8, 2012

Immediately following the Fund Council's fall meeting in Punta del Este, Uruguay, the Fund Office held the second biennial Funders Forum on November 2. Donors had the opportunity to share their Fund experiences and planned future contributions; they also discussed common goals, issues, and concerns; and received updates on the Fund and the impact of CGIAR research. The Funders Forum

endorsed the CGIAR Strategy and Results Framework (SRF) Action Plan, which had been developed by the CGIAR Consortium with support from the ISPC. The Action Plan sets out the new performance management system that will link priorities and targets across CGIAR Research Programs and provide a clear statement of the overall impact of CGIAR work.

"Australia, as a long-standing investor and partner in CGIAR, places great importance on research that is specifically designed to tackle major global development challenges for the benefit of some of the world's poorest people. As host of the G20 summit in 2014, Australia hopes to highlight the critical role of agricultural research-for-development and to shape the international agenda accordingly on issues related to food security and economic growth."

Nick Austin, Chief Executive Officer, Australian Centre for International Agricultural Research

SHAPING THE RESEARCH AGENDA

For CGIAR to do research as effectively as possible, our research priorities need to align with those of global, regional, and national partners and stakeholders. This means involving them in shaping the research agenda. The second Global Conference on Agricultural Research for Development (GCARD2), held in Punta del Este, Uruguay, October 29–November 1, was an opportunity to advance alignment. The event brought together more than 1,000 representatives from across the agricultural sector – farmers, NGOs, researchers, donors, policymakers, and development experts – to explore ways to partner better and more effectively, and deliver impact.

"The level of discussions and results achieved over the entire event were remarkable. I am also particularly glad to notice that GCARD's [Global Conference on Agricultural Research for Development's] conclusive remarks focused on farmers, women, youth, and extension as main partners to work with for the future challenges and activities of GCARD."

Robert Carlson, President, World Farmers' Organisation

Delegates convened around the global themes that CGIAR Research Programs address, which helped program leaders shape their programs to meet the needs and expectations of partners and stakeholders. The discussions led to new commitments by CGIAR – on partnerships, capacity development, gender strategies, and long-term planning.

CGIAR is committed to reducing the gender gap in agriculture and ensuring that research benefits and empowers rural women and meets the needs of poor female farmers. As part of recent reforms, we have redoubled efforts in this respect, knowing that we will not achieve lasting impact unless we take gender disparities into account in all aspects of our work. 2012 saw important steps forward in ensuring that research outputs and evidence have positive impacts on gender outcomes. The Women's Empowerment in Agriculture Index, launched in 2012, measures the empowerment, agency, and inclusion of women in the agriculture sector in developing countries, helping to identify ways to overcome those obstacles and constraints. The Index is a significant innovation in its field and aims to increase understanding of the connections between women's empowerment, food security, and agricultural growth. The Index is a partnership between the US Government's Feed the Future initiative, USAID, IFPRI, and OPHI of Oxford University.

> "An empowered person is someone who has the power to decide – to say, if they have land, 'well, I can go farm, I can grow crops, I can plant seeds' – or if they have animals, to say, 'I can sell them without going to ask permission.' This is a person who has the power to decide about their things, their life, their actions."
>
> **39-year-old Guatemalan woman**

IMPROVING EFFICIENCY AND EFFECTIVENESS

CGIAR is one of the largest research-for-development organizations in the world and the only global agricultural research body that is dedicated to generating world-class science for the specific benefit and needs of poor smallholders. There is tremendous potential for scientists and practitioners around the globe to leverage CGIAR research. In 2012, CGIAR adopted Principles on the Management of Intellectual Assets (IA), a landmark achievement. This first ever system-wide policy on IA will harness the strengths of all partners, including those in the private sector, to disseminate research outcomes with greater speed and scale on behalf of the poor. The IA Principles – which promote collaboration, open innovation, knowledge dissemination, and benefit sharing – were approved for a trial period of 2 years, so that the CGIAR can assess and learn from the experience. The next steps, already underway, are to develop an annual CGIAR Intellectual Asset Report, and a detailed Open Access Policy and corresponding guidelines.

The CGIAR Consortium energized leadership with the hiring of a new Chief Executive Officer in May, and several other key staff appointments. Other important developments were the approval of the CGIAR Policy for Independent External Evaluation and the appointment of a new head of the Independent Evaluation Arrangement (IEA). Evaluations, including of the CGIAR Research Programs, will assess the comparative advantage of CGIAR in efficiently contributing to the achievement of development results, and the value-for-money proposition that CGIAR represents. The ISPC Standing Panel on Impact Assessment will also assess the impact of CGIAR work in priority research areas. Evaluations will help CGIAR demonstrate benefits from its research, improve cost-effectiveness, and promote a results-based culture.

Complementing these developments, the Fund Office worked with other parts of the system to develop scorecards to measure

the performance of system entities. The scorecards incorporate goals, performance indicators, and targets in a number of areas: plans and results, client services, financial measures, internal business processes, staff learning and growth, and risks. The scorecards will be used in reporting to the Fund Council in 2013. The objective is to develop a robust scorecard for showing impact – on poverty, food security, nutrition and health, and natural resources – across CGIAR.

The ability of CGIAR to contribute to improving farmers' lives and livelihoods, and to ensure food security, ultimately depends on the strength of its partnerships. To ensure that we are being good partners ourselves, in 2012 we conducted an extensive stakeholder perception survey. The survey was sent to approximately 4,000 past, current, and potential partners; 1,071 responses were received from more than 115 countries. Respondents rated CGIAR in a number of categories on a seven-point scale ranging from 'very poor' to 'excellent'. The good news is that the results showed that stakeholders are generally positive about their partnerships with CGIAR, with an overall satisfaction rate of 75% expressed by current and former partners. CGIAR performed well in core areas of expertise – research outputs and research outcomes – especially in food security and sustainability. But the survey showed that these factors have a relatively weak impact on perceptions of satisfactory partnerships. The survey identified two major areas where CGIAR needs to improve its stakeholder engagement: transparency and collaboration. The full results of the report are available on the CGIAR website (www.cgiar.org), and a Partnership Action Plan is planned for 2013.

In response to significant gaps and challenges in governance that came to light in 2012, the CGIAR Consortium and Fund Council jointly commissioned a review of corporate governance, to be undertaken in 2013, seizing the opportunity to strengthen management and leadership across the entire system. Improving governance is an issue of great strategic importance for CGIAR and is critical to reaping the promises of reform, a more effective and efficient system, high-quality scientific work, and CGIAR's ability to achieve impact on the ground.

Tribute to CGIAR donors

Poor rural communities in developing countries face mounting challenges to agricultural development and food security. Tackling these challenges requires significant resources and long-term financing for sophisticated programs. Thanks to the support and contributions from our valued investors, who share our commitment to eradicating poverty, hunger, and malnutrition, CGIAR is making progress with new initiatives and innovations for the benefit of smallholder farmers, fishers, and foresters. We are extremely grateful to all of our funders, who make this work possible, and we will continue to strive to be more efficient, collaborative, and impact-oriented so that together we can truly transform the lives of the poor.

Donors contributing to the CGIAR Fund in 2012

- Australia
- Bangladesh
- Belgium
- Bill & Melinda Gates Foundation
- Canada
- China
- Denmark
- European Commission
- Finland
- France
- India
- International Development Research Centre
- International Fund for Agricultural Development
- Iran
- Ireland
- Japan
- Korea
- Luxembourg
- Mexico
- Netherlands
- New Zealand
- Nigeria
- Norway
- Portugal
- Russia
- Spain
- Sweden
- Switzerland
- Thailand
- Turkey
- United Kingdom
- United States of America
- World Bank

Investment in CGIAR: Financial summary

STRONG FINANCIAL GROWTH

In 2012, financial support for CGIAR continued to grow at a strong rate, reflecting donors' confidence in CGIAR's ability to tackle global food-security challenges and develop a range of innovations in agriculture on behalf of the world's poorest people. Despite global economic distress, funding for CGIAR increased dramatically between 2008 and the end of 2012, from US$531 million to US$860 million (see Figure 1). With a 21% increase in funding of US$147 million, 2012 also marked the single largest annual increase in funding in CGIAR's history. This level of growth is particularly noteworthy considering the continuing fiscal difficulties experienced by many of our donors.

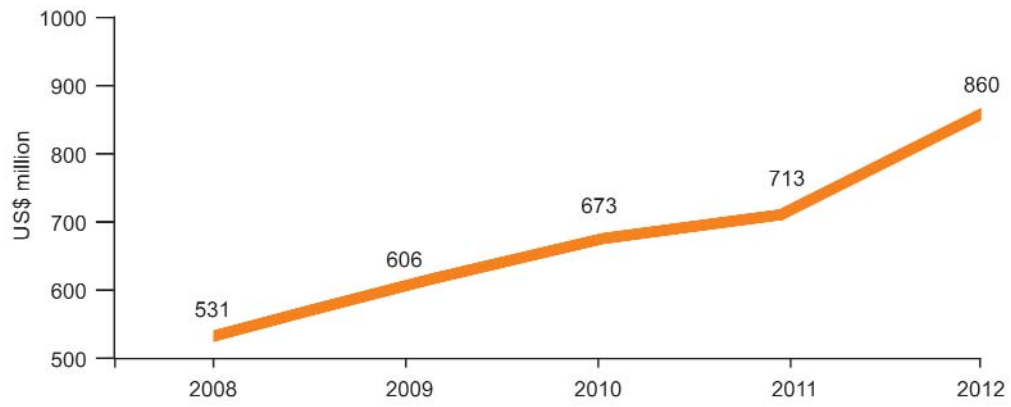
Since 2008, total funding has increased by almost 62% (US$329 million), an average annual increase of over 15%. In the decade prior to reform (1998–2007), the average growth rate in funding was 4.8%. This growth demonstrates sustained donor confidence in and support for the reforms, including CGIAR's commitment to a results-oriented approach to research. It also contributes to steady progress toward the goal of reaching funding of US$1 billion in 2013 in order to strengthen the portfolio of CGIAR Research Programs and further advance CGIAR's mission.

CGIAR FUND

The increase in overall funding is just one indicator that the reform process is bearing fruit. The growth in contributions to CGIAR's multi-donor trust fund is perhaps an even better indicator of donors' commitment to key aspects of the reform. Launched in December 2010, the CGIAR Fund was established to provide reliable and predictable multi-year funding and thereby enable research planning over the long term, resource allocation based on agreed priorities, and the timely and predictable disbursement of funds.

To maximize funding coordination and harmonization, reduce transaction costs, and avoid funding and research fragmentation, donors to CGIAR are encouraged to channel their resources through the Fund. Donors may designate their contributions to one or more of three funding windows. Contributions to Window 1 of the Fund are the least restricted, leaving the CGIAR Fund Council to decide how these funds are allocated to CGIAR Research Programs, used to pay system costs, or otherwise applied to achieving the CGIAR mission. Contributions to Window 2 are designated by Fund donors to specific research programs. Contributions to Window 3 are allocated by Fund donors to specific CGIAR Centers.

Figure 1. Total CGIAR funding, 2008–2012



From 2011 to 2012, contributions received through the Fund increased by 33%, growing from US$384 million to US$512 million. That, together with US$127 million carried over from 2011, resulted in a total of US$639 million available for distribution, as indicated in Table 1 below. US$458 million was disbursed during the year, so the Fund had a balance of US$181 million at the end of 2012. The high balance remained because many grants were received by the Fund late in 2012 and, consequently, could not be disbursed before the end of the year. Of the total US$458 disbursed, US$325 million was via Windows 1 and 2, and US$133 million was via Window 3.

Figure 2 illustrates the monthly cash flow and Fund balance during 2012, indicating how the disbursements are affected by the pace of receipts in the Fund during the year. The Fund is able to attenuate the effects of the pattern of donor contributions, the majority of which are received in the last quarter of the year, through carrying over funds from the previous year to support funding requests during the first 6 months of the current year.

CGIAR FUND DONORS

Just as contributions to the CGIAR Fund increased from 2011 to 2012, so did the number of Fund donors, growing from 26 in 2011 to 33 in 2012. Table 2 shows donor contributions by Window. Of the US$514 million committed to the Fund in 2012, nearly two-thirds was provided as harmonized funding, meaning via Windows 1 and 2, enabling CGIAR to pool resources from different donors to finance research priorities.

Based on agreed priorities, the CGIAR Fund Council allocates funding to CGIAR Research Programs as well as to other system operations. Before receiving funding, Programs set out their expected achievements and provide verifiable targets against which progress can be measured and monitored. Streamlining the funding process, linking funding to results, and legally binding performance agreements give donors better value for money, and ensure the cost-effective use of resources and that research translates into tangible benefits for the poor.

Table 1: CGIAR Fund statement of receipts, disbursements, and Fund balance as of December 31, 2012 (US$ million)

	Window 1	Window 2	Window 3	Provisional	Total CGIAR Fund
Balance b/f from 2011	93	21	1	12	**127**
2011 contributions received in 2012	1	2	3		**6**
2012 contributions received in 2012*	184	116	185	20	**505**
Cost-sharing percentage	1				**1**
Sub-total receipts in 2012	**186**	**118**	**188**	**20**	**512**
Total available in 2012	279	139	189	32	**639**
Transfers	8	3	(5)	(6)	**0**
Less: disbursements	219	106	133	0	**458**
Fund balance	**68**	**36**	**52**	**25**	**181**

*See Table 2

Figure 2. Monthly CGIAR Fund balance in 2012

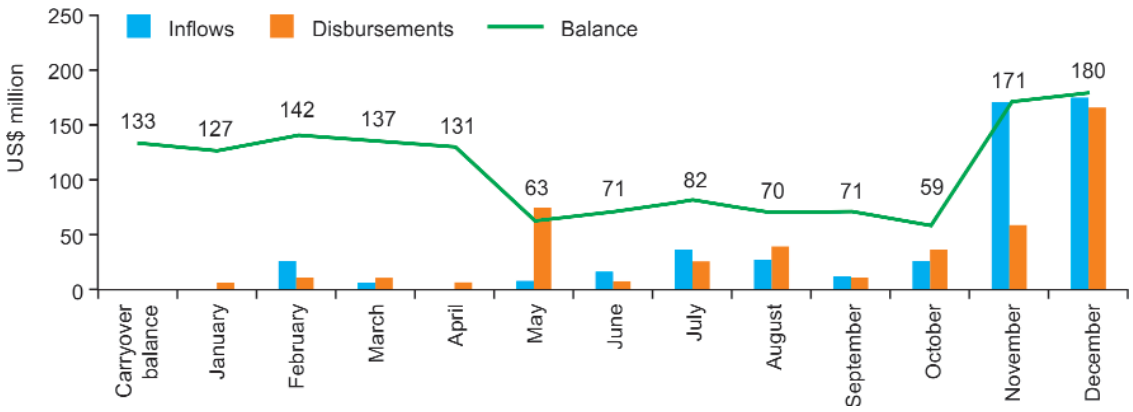


Table 2: CGIAR Fund 2012 donor contributions (US$ million)

Receipts	Window 1	Window 2	Window 3	Provisional	Total CGIAR Fund
Australia	8.8	20.5	11.3		**40.6**
Bangladesh**			0.1		**0.1**
Bill & Melinda Gates Foundation		1.5	24.3		**25.8**
Canada	15.6				**15.6**
China		0.1	2.7		**2.8**
Denmark	3.1	3.0			**6.1**
European Commission			21.0		**21.0**
Finland	1.3	1.3	1.3		**3.9**
France	1.2				**1.2**
IDRC		8.0			**8.0**
IFAD			2.6		**2.6**
India	0.7	0.5	1.8	0.1	**3.1**
Iran			0.5		**0.5**
Ireland		1.9	3.4		**5.3**
Japan	0.1	0.7	1.0		**1.8**
Korea	0.3				**0.3**
Luxembourg	0.3		0.4		**0.6**
Mexico		0.5	0.5		**1.0**
Netherlands	5.8	30.0	2.0		**37.8**
New Zealand	2.0				**2.0**
Nigeria	0.1		0.1		**0.1**
Norway	18.5				**18.5**
Portugal			0.6		**0.6**
Russia				3.8	**3.8**
Spain			0.5		**0.5**
Sweden	17.6	20.6			**38.2**
Switzerland	6.5	6.7	1.9		**15.0**
Thailand			0.1		**0.1**
Turkey			0.5		**0.5**
United Kingdom	51.4		22.6		**74.1**
Unites States of America	0.5	21.0	85.5	16.1	**123.1**
World Bank	50.0				**50.0**
Sub-total 2012 receipts	**183.7**	**116.3**	**184.6**	**20.0**	**504.5**
Belgium*		7.1	1.3		**8.4**
Nigeria*	0.5				**0.5**
Iran*			0.5		**0.5**
Total 2012 contributions	**184.2**	**123.4**	**186.4**	**20.0**	**514.0**

*Contributions that are supported by a signed contribution agreement but for which the money was not yet received by December 31, 2012.
**Includes contributions that have been received but for which the contribution agreement is still in process.

MULTI-YEAR CONTRIBUTION AGREEMENTS

Supporting a core objective of CGIAR reform – to foster financial stability, predictable funding for long-term research, and timely disbursement of funds – by the end of 2012, nine donors had made multi-year funding commitments: Australia, the Bill & Melinda Gates Foundation, Denmark, IDRC, Luxembourg, Netherlands, Russia, Spain, and the United Kingdom. The largest multi-year contribution to the CGIAR Fund was more than US$165 million over 4 years (2012–2015) from the Netherlands.

"The Netherlands has demonstrated tremendous leadership not only in making the most significant multi-year contribution to the CGIAR Fund to date, but also in choosing to provide its support in the form of unrestricted aid, evidence of the multilateral approach in action. … Contributions like this enable the CGIAR to invest in big ideas for big impact. We hope that other partners are inspired by the Netherlands' example."

Rachel Kyte, CGIAR Fund Council Chair

OVERALL 2012 FINANCIAL RESULTS

In 2012, the CGIAR Fund was the major donor to the system, financing US$316 million or 45% of total CGIAR Research Program activities during the year. As indicated in Table 3, US$260 million in funding was provided by Windows 1 and 2, while US$56 million came from Window 3. Bilateral grant income accounted for US$384 million (55%) of CGIAR system activities.

Total system revenue in 2012 was US$887 million (which comprises US$860 million in funding and US$27 million in Center-generated income), up from US$735 million in 2011, which represents a 21% increase. Expenditures in 2012 were US$876 million – an increase of US$169 million (24%) over 2011 – resulting in an operating surplus of US$11 million, which was added to accumulated reserves.

Table 3: CGIAR financial results (US$ million)

	Total 2012	CRPs 2012	Non-CRPs 2012	Total 2011	CRPs 2011	Non-CRPs 2011
Revenue						
CGIAR Fund Windows 1 and 2	**284**	260	24	**187**	95	92
CGIAR Fund Window 3	**78**	56	22	**16**	2	14
Bilateral	**498**	384	114	**510**	124	386
Sub-total funding	**860**	**700**	**160**	**713**	**221**	**492**
Center own income	**27**			**22**		
Total revenue	**887**			**735**		
Expenditure						
CRPs	**700**			**221**		
Center own programs	**162**			**477**		
Systems entities	**14**			**9**		
Total expenditure	**876**			**707**		
Net result	**11**			**28**		

CRP: CGIAR Research Program

Table 4: Summary of CGIAR Research Program funding 2012 (US$ million)

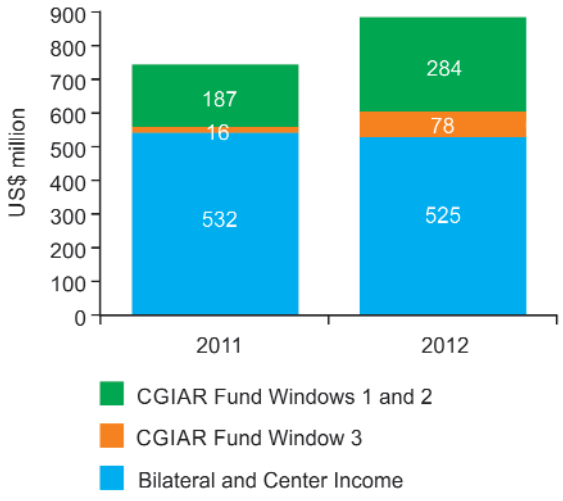
	From financial statements of individual centers				% of individual CRP funding			
	W1/2	W3	Bilateral	Total	W1/2	W3	Bilateral	Total (% of total)
Dryland Systems	9.1	2.8	18.6	**30.5**	30	9	61	**4**
Humidtropics	7.2	2.9	9.9	**20.0**	36	11	53	**3**
AAS	7.5	1.0	11.6	**20.1**	36	5	59	**3**
PIM	15.2	9.5	50.4	**75.1**	21	13	66	**11**
WHEAT	11.4	2.3	27.0	**40.7**	28	5	67	**6**
MAIZE	13.5	9.2	51.5	**74.2**	18	12	69	**11**
GRiSP	35.4	12.7	50.9	**99.0**	35	13	52	**14**
RTB	22.3	2.6	26.3	**51.2**	44	7	49	**7**
Grain Legumes	7.5	3.8	11.1	**22.4**	33	19	47	**3**
Dryland Cereals	3.2	0.1	4.1	**7.4**	43	2	55	**1**
Livestock and Fish	7.7	0.3	7.9	**15.9**	47	2	51	**2**
A4NH	9.1	1.2	27.1	**37.4**	24	3	73	**5**
WLE	22.4	5.1	28.4	**55.9**	38	10	51	**8**
Forests, Trees and Agroforestry	29.4	1.3	40.5	**71.2**	41	1	58	**10**
CCAFS	46.4	0.5	16.0	**62.9**	73	1	26	**9**
Genebanks	12.6	–	3.3	**15.9**	79	0	21	**2**
	260	**56**	**384**	**700**	**37%**	**8%**	**55%**	**100%**

CRP: CGIAR Research Program

SOURCES OF CGIAR REVENUE

As illustrated in Figure 3, the increase in CGIAR revenue is clearly driven by the increase in contributions through the CGIAR Fund. From 2011 to 2012, the Fund's share of total CGIAR revenue grew from 28 to 41%, evidence of increasing interest in a multilateral approach to funding. In terms of untied aid, Windows 1 and 2 together accounted for 25% of total revenue in 2011 and 32% of the total in 2012, indicating slow but steady progress towards one of the important goals of reform. In terms of percentage change, Windows 1 and 2 combined grew by 52% from 2011 to 2012, while Window 3 saw a dramatic increase of 388%.

Figure 3. Total CGIAR revenue by source, 2011 and 2012



CGIAR RESEARCH PROGRAM FINANCIAL SUMMARY

CGIAR Research Program expenditures in 2012 amounted to US$700 million, or 80% of the total US$876 million, compared to US$221 million (31%) in 2011. This change reflects the significant shift from Center-focused research to system-wide research programming as the full portfolio of CGIAR Research Programs came online. The breakdown of CGIAR Research Program funding by source is shown in Table 4.

EXPENDITURE BY REGION

CGIAR expenditures in sub-Saharan Africa have increased from an average of 43% of the total during the period 1972–2008 to 53% in 2012. During this same period, CGIAR investment has decreased in Asia from 31% to 27% of total expenditures; in Latin America from 15% to 13%; and in the Central and West Asia and North Africa (CWANA) region from 11% to 7%. The 2012 expenditures are shown in Figure 4.

EXPENDITURE BY COST CATEGORY

Personnel costs as a percentage of total CGIAR costs have decreased significantly from 43% in 2011 to 36% in 2012, while supplies and services have increased from 30 to 35%. From 2011 to 2012, partnership expenditures only increased by 1%, from 16 to 17%. However, the share of partnership expenditures relative to total costs is noticeably up from a historical average of 4%, clearly demonstrating a change in the modus operandi of CGIAR. Expenditures in 2012 are shown in Figure 5.

Figure 4. CGIAR expenditure by region, 2012

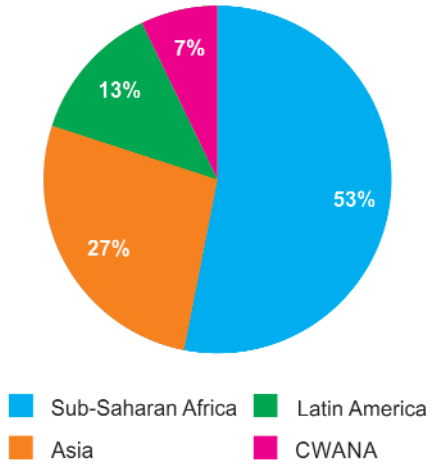
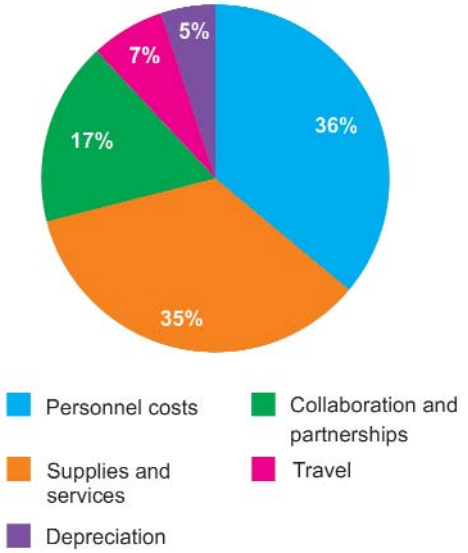


Figure 5. CGIAR expenditure by cost category, 2012



FINANCIAL SUMMARY OF CENTERS

In 2012, the Centers' total revenue was US$844.4 million, of which they implemented or spent US$833.9 million, leaving a surplus of US$11 million. A breakdown of individual Centers' surplus and deficits is shown in Table 5.

Table 5: 2012 financial results by Center (US$ million)

	Revenue				Expenditure			
Center	CRP	Non-CRP	Other	Total	CRP	Non-CRP	Total	Surplus/(deficit)
AfricaRice	20.7	1.8	0.2	**22.7**	20.7	1.5	**22.2**	0.5
Bioversity	30.4	5.2	1.7	**37.3**	30.4	6.3	**36.7**	0.6
CIAT	51.9	17.4	4.3	**73.5**	51.9	16.2	**68.1**	5.5
CIFOR	34.0	6.8	0.3	**41.1**	34.0	(0.1)	**33.8**	7.2
CIMMYT	108.5	6.4	1.1	**116.0**	108.5	1.6	**110.1**	5.9
CIP	39.4	3.9	0.8	**44.0**	39.4	4.4	**43.8**	0.2
ICARDA	32.7	5.8	1.5	**39.9**	32.7	12.9	**45.6**	(5.7)
ICRISAT	39.6	15.7	4.8	**60.1**	39.6	16.8	**56.3**	3.8
IFPRI	80.6	3.1	0.4	**84.0**	80.6	3.7	**84.3**	(0.2)
IITA	47.5	14.7	1.0	**63.2**	47.5	27.9	**75.4**	(12.2)
ILRI	30.0	20.6	5.2	**55.7**	30.0	24.1	**54.0**	1.7
IRRI	77.3	7.3	2.0	**86.5**	77.3	7.9	**85.1**	1.4
IWMI	37.2	2.2	1.4	**40.7**	37.2	2.4	**39.6**	1.1
ICRAF	45.4	5.6	1.7	**52.7**	45.4	7.1	**52.5**	0.2
WorldFish	25.9	0.7	0.7	**27.3**	25.9	0.9	**26.8**	0.5
Sub-total	**700.4**	**117.0**	**27.1**	**844.4**	**700.4**	**133.6**	**833.4**	**10.5**
System-level activities		13.9		**13.9**		13.9	**13.9**	0.0
	700.4	**130.9**	**27.1**	**858.3**	**700.4**	**147.5**	**847.3**	**10.5**
Challenge Program partners		29.1		**29.1**		29.1	**29.1**	0.0
	700	**160**	**27**	**887**	**700**	**177**	**876**	**11**

CRP: CGIAR Research Program

CONCLUSION

The 2012 finances confirm strong and sustained donor commitment to the CGIAR system, with an increasing amount of funding being channeled through the Fund and targeted at CGIAR Research Programs. This increased financial commitment by investors reflects confidence in key elements of the reform, including a more efficient and effective approach to both governance and research, with a focus on results, and clear lines of accountability across the system. Through the reform process, CGIAR has embraced a new approach that is centered on innovative ways to pursue scientific work and the funding it requires. It is bringing donors together for better results and enabling scientists to concentrate more on the research through which they develop and deliver big ideas for big impact. As a result, CGIAR is well on course to reach its US$1 billion goal in 2013 and achieve greater impact in the lives of the poor in developing countries.

CGIAR 2012

CGIAR FUND

The CGIAR Fund is a multi-donor trust fund that, guided by the Strategy and Results Framework (SRF), finances CGIAR research. The CGIAR Fund is administered by the World Bank, as Trustee, and governed by the Fund Council.

CGIAR FUND TRUSTEE

The World Bank, as trustee, provides the following functions: it holds in trust the funds transferred by Fund donors under Trust Fund Administration Agreements; it serves as an agent of the Fund Council in disbursing Fund resources based on specific instructions from the Fund Council and through Fund Transfer Agreements between the World Bank and the Consortium; and it provides regular reports on its Trustee activities to the Fund Council, Fund donors, and the Consortium.

Trustee
Pamela Crivelli

CGIAR FUND OFFICE

The Fund Office is the support unit of the Fund Council, the Funders Forum, and their respective Chairs. In support of the Fund Council, the Fund Office assists the Fund Council and its Chair in the conduct of the Fund Council's business, including: managing relations with Fund donors; analyzing the Consortium's compliance with performance agreements based on information submitted by the Consortium; and supporting the Fund Council in resource mobilization efforts, in close collaboration with the Consortium.

Head of the CGIAR Fund Office
Jonathan Wadsworth

CGIAR FUND COUNCIL

The CGIAR Fund Council, a representative body of Fund donors and other stakeholders, is the decision-making body of the CGIAR Fund. It also appoints the Independent Science and Partnership Council (ISPC), a panel of leading scientific experts who provide independent advice and expertise to all Fund donors.

Chair of the CGIAR Fund Council
Rachel Kyte

Executive Secretary of the CGIAR Fund Council
Jonathan Wadsworth

CGIAR Fund Council members
Association of Agricultural Research Institutions in the Near East and North Africa
Australia
Bill & Melinda Gates Foundation
Brazil
Canada
China
Egypt
European Commission
Food and Agriculture Organization of the United Nations
Global Forum on Agricultural Research
India
International Development Research Centre
International Fund for Agricultural Development
Japan
Kenya
Nigeria
Papua New Guinea
Sweden
Switzerland
United Kingdom
United States of America
World Bank

INDEPENDENT SCIENCE AND PARTNERSHIP COUNCIL

The ISPC advises Fund donors on major science issues. The ISPC is a panel of world-class scientific experts chosen by the Fund Council to provide independent advice. Where there is no conflict of interest, the ISPC also responds to requests for advice from the Consortium. As the ISPC reports to the Fund Council, it is also an important link between donors and the Consortium on scientific issues.

Council Chair
Kenneth Cassman

Secretariat Executive Director
Peter Gardiner

INDEPENDENT EVALUATION ARRANGEMENT

The IEA is the totality of the provisions of the CGIAR Policy for Independent External Evaluation which was adopted by the Fund Council and became effective in February 2012. The policy addresses the independent external evaluation of the CGIAR as a whole, and of its ongoing and completed policies, programs, and institutional entities, in particular the CGIAR Research Programs.

Head, Independent Evaluation Arrangement
Rachel Bedouin

CGIAR CONSORTIUM

The CGIAR Consortium is an international organization that, together with the CGIAR Fund, advances international agricultural research for a food-secure future by integrating and coordinating the efforts of those who fund research and those who do the research. The CGIAR Consortium is made up of: the Consortium Board; the Consortium Office; and the 15 Research Centers that are members of the CGIAR Consortium. The CGIAR Consortium develops and carries out research programs to address complex development issues related to agriculture.

Chief Executive Officer, CGIAR Consortium
Frank Rijsberman (since May 2012)

CGIAR CONSORTIUM BOARD

The Consortium Board leads the CGIAR Consortium, sets policies, and is responsible for the attainment of the CGIAR Consortium's purpose. The Consortium Board has 10 members, including an ex officio member, the Chief Executive Officer of the CGIAR Consortium.

Chair
Carlos Pérez del Castillo

Vice Chair
Carl Hausmann

Members
Tom Arnold (retired from the Board December 31, 2012)
Mohamed Ait-Kadi
Ganesan Balachander
Gebisa Ejeta
Ian Goldin (retired from the Board December 31, 2012)
Lynn Haight
Agnes Mwang'ombe

Ex officio member
Frank Rijsberman, Chief Executive Officer

Observer
Pamela Anderson, Director General, CIP, Consortium Research Centers' Representative to the CGIAR Consortium Board

Observer
Alan Tollervey, DFID, CGIAR Fund Council's Representative to the CGIAR Consortium Board

CGIAR CONSORTIUM OFFICE

The CGIAR Consortium set up its Consortium Office Headquarters in Montpellier, France, in March 2011. The Consortium Office: supports the Consortium Board and helps it carry out its responsibilities; helps Research Centers that are members of the CGIAR Consortium communicate and collaborate among themselves and with the Consortium Board; positions the Consortium globally, advocates for international agricultural research and mobilizes resources; explores opportunities to improve efficiency, adopt best practices, and share knowledge; develops, in cooperation with the Research Centers that are members of the CGIAR Consortium, donors, and partners, the CGIAR Strategy and Results Framework for approval by the Funders Forum; approves and manages the performance of CGIAR Research Programs; reviews the efficiency and structure of the Research Centers that are members of the CGIAR Consortium and decides on appropriate action in accordance with the Constitution; and develops, manages, and operates shared services to boost efficiency.

CGIAR Consortium Research Centers

	Center	Board Chair	Director General
	Africa Rice Center (AfricaRice) www.africarice.org	Peter Matlon	Papa Abdoulaye Seck
	Bioversity International (Bioversity) www.bioversityinternational.org	Paul Zuckerman	Emile Frison
	International Center for Tropical Agriculture (known by its Spanish acronym CIAT for Centro Internacional de Agricultura Tropical) www.ciat.cgiar.org	Wanda Collins	Ruben Echeverría
	Center for International Forestry Research (CIFOR) www.cifor.org	Hosny El-Lakany	Frances Seymour; Peter Holmgren (since September 2012)
	International Maize and Wheat Improvement Center (known by its Spanish acronym CIMMYT for Centro Internacional de Mejoramiento de Maíz y Trigo) www.cimmyt.org	Sara Boettiger	Thomas Lumpkin
	International Potato Center (known by its Spanish acronym CIP for Centro Internacional de la Papa) www.cipotato.org	Peter VanderZaag	Pamela Anderson
	International Center for Agricultural Research in the Dry Areas (ICARDA) www.icarda.org	Henri Carsalade; Camilla Toulmin (since November 2012)	Mahmoud Sohl
	International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) www.icrisat.org	Nigel Poole	William Dar

	Center	Board Chair	Director General
	International Food Policy Research Institute (IFPRI) www.ifpri.org	Fawzi Al-Sultan	Shenggen Fan
	International Institute of Tropical Agriculture (IITA) www.iita.org	Bruce Coulman	Nteranya Sanginga
	International Livestock Research Institute (ILRI) www.ilri.org	Knut Hove	Jimmy Smith
	International Rice Research Institute (IRRI) www.irri.org	Emerlinda Roman	Robert Zeigler
	International Water Management Institute (IWMI) www.iwmi.cgiar.org	John Skerritt	Colin Chartres; Jeremy Bird (since October 2012)
	World Agroforestry Centre (previously known as the International Centre for Research in Agroforestry, ICRAF) www.worldagroforestrycentre.org	Eric Tollens	Tony Simons
	WorldFish www.worldfishcenter.org	Remo Gautschi	Stephen Hall

Science for a food secure future

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