



CGIAR Impact

The 2008 independent review of the CGIAR System finds strong, cost-effective impact

The Consultative Group on International Agricultural Research (CGIAR) implemented in 2008 an independent review of its governance, scientific work and partnerships. The review concluded that CGIAR research has produced high returns since its inception, with overall benefits far exceeding costs. Estimates of the benefits from CGIAR research since 1989 range from nearly US\$14 billion to more than \$120 billion. Even under the most conservative assumptions, they far outweigh total research expenditures of \$7.1 billion since 1960 (expressed in 1990 dollars). This demonstrates that investments in the CGIAR pay high rates of return that the world could ill afford to do without (see Box 1).

CROP GENETIC IMPROVEMENT

With regard to crop genetic improvement, 65% of the cultivated area under the world's 10 most important food crops is planted with improved varieties, and 60% of that area grows varieties with CGIAR ancestry. CGIAR genetic improvement research has particularly benefited wheat, rice and maize, fueling yield growth of 0.7-1.0% annually. The average annual economic benefit from CGIAR research on these three crops has been estimated at \$2.5 billion for wheat, \$10.8 billion for rice in Asia only, and \$0.6-0.8 billion for maize. The annual value of benefits from improved yield stability in maize as a result of CGIAR work is estimated at \$149 million, and for wheat it is \$143 million.

■ Drought Tolerant Maize

Drought reduces global maize yields by as much as 15% each year, causing crop losses of more than 20 million tons of grain. More than 50 new drought-tolerant maize varieties developed by the International Maize and Wheat Improvement Center and its partners are grown on 1 million hectares in

BOX 1

What if there were no CGIAR?

Independent reviewers used a global model of food supply and demand to develop the counterfactual scenario of world food production without CGIAR contributions, finding the following differences:

- World food production would be 4-5% lower, and developing countries would produce 7-8% less.
- World grain prices would be 18-21% higher, adversely affecting poor consumers in particular.
- The cultivated area in developing countries would be 11-13 million hectares larger, having expanded at the expense of primary forests and marginal lands that are fragile and harbor high biodiversity.
- Per capita food consumption in developing countries would be 5% lower on average and up to 7% lower in the poorest regions.
- Some 13-15 million more children would be malnourished, most of them in South Asia, where the incidence of hunger is highest.

Africa, producing average yield gains of 20% over the varieties they replaced.

■ Flood Tolerant Rice

Rice losses in Southeast Asia from flooding have an estimated value of \$1 billion annually, and the problem is expected to worsen with climate change. Most rice varieties can survive complete submergence for only 3 days. To overcome this limitation, the International Rice Research Institute, working in collaboration with



the University of California at Davis, identified a gene called *Sub1A* that allows rice plants to survive complete submergence for more than 2 weeks. This trait has been bred into popular rice varieties grown in several Asian countries.

■ **New Rices for Africa**

New rices for Africa (NERICA) varieties developed by the Africa Rice Center combine the high productivity of Asian rice with the acclimation of African rice varieties to African drought, weeds and pests. NERICA lines have been tested in 31 countries, with 16 lines released in 15 countries and adopted on 200,000 hectares.

■ **Biofortified Crops**

Biofortified crops, bred to be rich in nutrients, are helping to reduce the prevalence of malnutrition, including vitamin A deficiency, which leaves people susceptible to blindness and deadly diseases. The International Potato Center has developed improved sweet potato varieties high in beta-carotene, the precursor to vitamin A, that are benefiting over 6 million people in East and Southern Africa.

NATURAL RESOURCE MANAGEMENT AND CONSERVATION

CGIAR research on the management of the natural resources soil, fisheries, water and forests — as well as on pest management — shows substantial benefits and positive internal rates of return on investment. However, much of the impact is on a small geographic scale because of a complex of factors such as the effectiveness of local collective action and extension services and how property rights are assigned.

■ **Cassava Mealybug**

Control of the cassava mealybug in 20 sub-Saharan African countries through the introduction of a wasp has reaped high returns. Under the most conservative assumptions, the research investment has a net present value estimated at \$9 billion.

■ **Conservation Tillage**

Reduced- and zero-tillage technology conserves soil and water and reduces carbon emissions. Its rapid introduction and spread in South Asian rice-wheat rotations has cut farmers' production costs by 10% and raised crop productivity by the same percentage. Close to half a million farmers in India, Pakistan, and other countries in the region now apply this resource-conserving technology on more than 3.2 million hectares, with economic benefits so far estimated at \$147 million.

RESEARCH FOR POLICY

A 2008 analysis of policy-oriented research by the CGIAR found the total measured benefits of seven case studies to be in the tens or hundreds of millions of dollars. Some examples are shown here:

■ **Access to Genetic Resources**

The CGIAR influenced a decision by the governing body of the International Treaty on Plant Genetic Resources for Food and Agriculture to extend the range of crops CGIAR Centers distribute through the Standard Material Transfer Agreement. The result is that more species will be subject to the treaty's benefit-sharing provisions and therefore freely available to smallholder farmers.

■ **Sustainable Forest Policy**

CGIAR research stimulated the reform in Indonesia of ineffective policies and corrupt practices that encouraged deforestation. The research exposed the political economy of pulp and paper production and documented the links between fiber-sourcing practices and deforestation. The result was a ministerial decree requiring mills to source all wood from plantations by 2009.

■ **Pro-poor Policy**

Policy and institutional reform advocated by the CGIAR allowed small, heretofore illegal milk vendors in Kenya to become licensed suppliers of affordable milk. This significantly improved both the livelihoods of the vendors and the diets of poor consumers.