FUTURE HARVEST

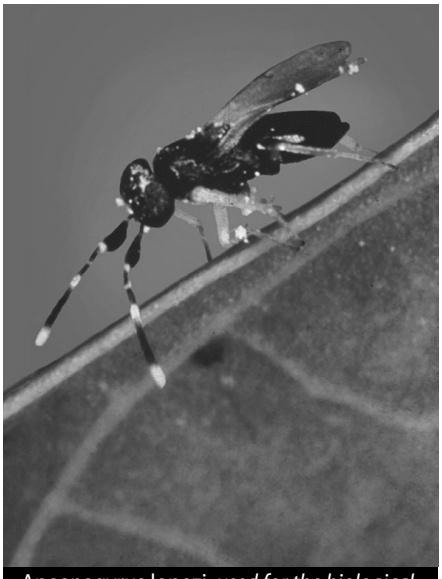
Contributions to global food security: the CGIAR helps the poorest farmers

THE FIGHT AGAINST PESTS AND DISEASES

Cassava is a major source of calories and income for about 200 million Africans. The International Institute of Tropical Agriculture (IITA), which is based in Ibadan, Nigeria, developed new varieties of cassava that are resistant to mosaic virus diseases and bacterial blight. These two diseases limit the production of cassava in Africa. IITA's varieties, developed as a public good, have doubled cassava production in Nigeria over the past 7 years. As a result, Nigeria has become the largest producer of cassava in the world.

Working together, IITA and CIAT (Centro Internacional de Agricultura Tropical), based in Cali, Colombia, set out to tackle cassava mealybug and cassava green mite, pests that threatened production across sub-Saharan Africa. CIAT helped to locate natural predators in South America, which IITA then tested and deployed in a very successful biological control campaign in Africa. The benefits of controlling the mealybug have been estimated at US$ 9–20 billion, and the value added to the crop is US$ 415 million a year. CIAT and IITA shared the King Baudouin Award in 1990 for this work.

IITA



Apoanagyrus lopezi, *used for the biological control of cassava mealybug.*

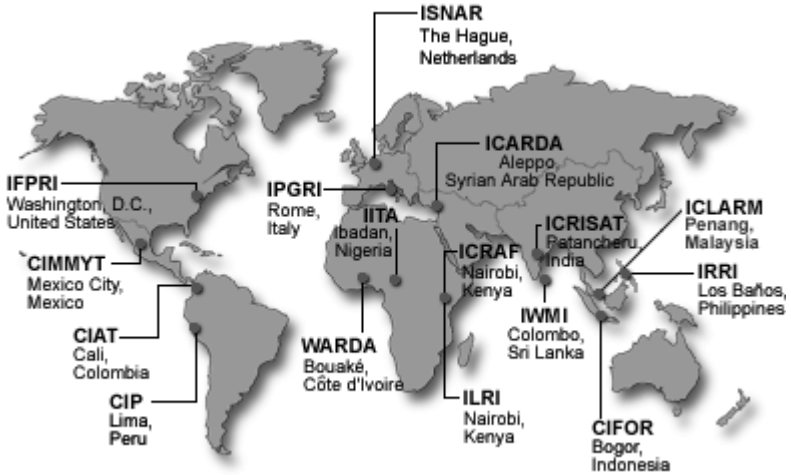
The Consultative Group on International Agricultural Research (CGIAR) supports a network of 16 Future Harvest centres that brings the best agricultural science to bear on problems faced by the poor and hungry of the world. Through this research, the CGIAR promotes sustainable agriculture for food security in developing countries. Each Future Harvest centre carries out multi-disciplinary research programmes that enhance food production and boost household incomes while at the same time protecting the environment and the resources on which future agricultural improvements depend. This fact sheet mentions just a few.

SECURING THE FOUNDATIONS FOR THE FUTURE

Every new and improved agricultural variety—plant and animal—depends on genetic resources from other varieties and wild relatives. No matter how locally self-sufficient a farming system might be, a global interdependency underlies all breeding work. IPGRI, the International Plant Genetic Resources Institute, and the System-wide Genetic Resources Programme (SGRP), both based in Rome, Italy, are charged with helping to manage the resources on which future improvements depend.

A recent study investigated the pedigree of varieties of cooking banana developed by Fundación Hondureña de Investigación Agricola (FHIA) in Honduras. These hybrids count no fewer than 11 different types of banana from at least six countries among their ancestors. IPGRI's International Network for the Improvement of Banana and Plantain co-ordinated trials of these hybrids, which indicated that they could amply restore yields lost to the devastating black Sigatoka disease. IITA has also developed disease-resistant varieties, which with the new hybrids will improve the livelihoods of smallholders in the tropics, where banana and plantain represent a vital source of food and income.

Eleven of the 16 Future Harvest centres hold between them more than half a million accessions of crop, forest and forage germplasm. These samples of the world's crop diversity are held in trust for the global community under agreements between the centres and FAO. The centres are committed to the long-term conservation of this material and to make it freely available to users. SINGER, the System-wide Information Network for Genetic Resources, offers a single entry point to anyone interested in any aspect of the genetic resources held in trust by the centres. It reveals that each year the centres distribute nearly 150 000 germplasm samples and 500 000 improved lines, mostly to developing countries.



WISE USE OF WATER

Water is an increasingly scarce resource. More than two-thirds of the water used worldwide goes to agriculture, and an increase of 15–20% will be needed to meet future production goals. More water is not likely to be found, so the shortfall will have to be met from two sources: more effective management of existing water supplies, and crops that are not as thirsty. Given currently increasing populations, farmers will have to grow more food with less water.

The International Center for Agricultural Research in the Dry Areas (ICARDA, in Syria) is using modern technology such as remote sensing as well as updating ancient techniques to harvest water. Channelling rain that falls over a wide area onto smaller cultivated plots improves yields and stabilizes them from year to year. Working with partners in West Asia ICARDA has helped farmers to install water-harvesting systems appropriate to their local conditions.

Even where water is abundant, the poorest farmers may not have access to it. A study by the International Water Management Institute (IWMI) in Sri Lanka has shown that a simple and inexpensive technology—the treadle pump—has the potential to boost yields and put more than US$ 1 000 million of new revenue into the hands of the poorest farmers in South Asia. In India and Nepal, farmers with treadle pumps were able to grow higher-value crops and reaped elevated yields. Many increased their income by a quarter or more.

On the plains of the Indus and Ganges rivers around half the current population of 600 million people depends on wheat and rice grown in a joint cropping system. Evidence is accumulating that yield gains, about 2% a year between 1960 and 1990, have slowed considerably. The Rice-Wheat Consortium brings together four Future Harvest centres—CIMMYT (International Maize and Wheat Improvement Center, Mexico), ICRISAT (International Crops Research Institute for the Semi-Arid Tropics), IWMI and IRRI (International Rice Research Institute, Philippines)—and partners to boost productivity. Water management is a key aspect of the multi-disciplinary systems approach, which also involves breeding better varieties, more effective tillage, efficient use of inputs, and a myriad other approaches. Together, these practices can allow much earlier sowing of wheat after the rice harvest, which in turn boosts the wheat yield by as much as 1% per day.

IWMI

The treadle pump offers farmers a simple and inexpensive way to make better use of available water, which in turn improves their lives.

ANIMALS ENHANCE FOOD SECURITY FOR MANY

Livestock play an important part in securing the livelihoods of poor farmers around the world. Integrating the production of animals and plants can enhance yields of both and improve overall food security and income.

ILRI, the International Livestock Research Institute in Nairobi, Kenya, is collaborating with The Institute for Genomic Research (TIGR) in Maryland, USA, to read the genetic code of important diseases. In June 2001 TIGR released the first information about the sequence of *Theileria parva*, the parasite that causes East Coast Fever. This disease, transmitted by ticks, kills an estimated one million cows in Africa each year. Treatment is beyond the reach of most poor farmers, and the loss of their cows not only robs them of food and the power to plough, but also of an income that can help buy healthcare and schooling for their children. The sequence, which should be completed before the end of 2001, will make it easier, quicker and cheaper to develop a vaccine.

In Malawi, smallholders have been participating in work by ICLARM, the World Fish Centre, which is based in Malaysia, to incorporate fishponds into their farming systems. These ponds serve several functions. They store water to irrigate field crops. They enable farmers to grow high-quality vegetables, which need careful watering, on the banks of the ponds. And they support populations of fish that improve the nutrition and health of the family while providing much-needed income. Elsewhere, for example in the Philippines, ICLARM's participatory approach, suitably modified to fit different conditions, has had a similar impact.

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