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Why eco-efficient agriculture can beat the downturn

A message from our Director General Ruben Echeverría



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Then, the financial crisis hit. The resulting fall in global economic growth is expected to reduce investments in agriculture in general, and in agricultural research in particular.

[More information](#)

In this issue:

- [Why eco-efficient agriculture can beat the downturn](#)
- [Minister of Agriculture of Colombia visits CIAT](#)
- [Colombia prepares for coconut "disease squeeze"](#)
- [Wasp "sting operation" could help Cambodian farmers too](#)
- [CIAT's gene bank manager "honored" by international award](#)

Why eco-efficient agriculture can beat the downturn

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In the last 2 years there has been great expectation about increases in funding for agricultural development to help step up the global fight against hunger.

Rising food prices and uncertainty over both energy supplies and the climate justified a global consensus: agriculture was back where it should be, at the heart of the international development agenda.

Then, the financial crisis hit. The resulting fall in global economic growth is expected to reduce investments in agriculture in general, and in agricultural research in particular.

We must ensure that this does not cause our drive to improve smallholder food production to flounder. In other words, the development community must redouble its efforts to ensure that every dollar invested in research has the greatest possible impact on livelihoods and sustainability.

At CIAT, one of the ways we're doing this is by continuing to build strong research alliances that involve both the public and private sectors, and members of civil society.

These partnerships also allow us to continue to focus on improving food production in Latin America, Africa, and Asia, while benefitting from economies of scale through the sharing of scientific expertise. We work with partners who share our vision of building firm foundations for long-term, sustainable development based on agricultural innovation and the principle of eco-efficiency.

This also helps us ensure our research has the widest possible reach. As you will read in this latest edition of our e-newsletter, our work to find an effective natural predator for the cassava mealybug has just been applied in Thailand, helping potentially hundreds of thousands of small farmers tackle a devastating pest outbreak. The same predator—a parasitic wasp collected by CIAT scientists from Latin America—was also used to control mealybugs in East Africa in the 1980s, helping to avert almost certain famine.

These are just two powerful examples of the impact of CIAT's research, and how investment in research in one region can result in significant benefits further afield.

CIAT has been at the heart of many of these "south-south" technology exchanges, for example:

- Improved climbing bean varieties developed by CIAT and our partners in Latin America are now helping thousands of small producers in land-scarce Rwanda quadruple their yields of this essential food crop.

- High-starch cassava varieties developed from native Latin American cassava are now the lifeblood of hundreds of thousands of farming families in Southeast Asia.
- The Quesungual Slash and Mulch Agroforestry system, pioneered by [FAO](#) and CIAT in Central America, could help farmers in Asia and sub-Saharan Africa develop sustainable cropping systems that preserve soil fertility and drastically improve food security.

You can learn more about the impact of CIAT's research across the tropics [here](#).

So while the international development community faces a challenging time, CIAT's donors, partners, and beneficiaries can rest assured that we will continue to strive for the widest possible, long-term impact across the tropics through cutting edge scientific research to produce eco-efficient solutions that cross countries and continents.

To achieve such impacts, both sustainable strategic funding and research partnerships are needed.

Minister of Agriculture of Colombia visits CIAT



The day-long visit carried out by Colombia's Minister of Agriculture and Rural Development, Juan Camilo Restrepo, to CIAT's headquarters in Palmira, Colombia, last 25 August, was quite productive. The Minister was able to become acquainted with several of the Center's programs that could be of special importance to our host country.

The high government official spent the day learning about projects related to new pest- and disease-resistant varieties of rice, beans, fruits, cassava, and tropical grasses, some

of which have enhanced nutritional content and improved resilience to face climate change.

The Minister highlighted CIAT's scientific expertise in Colombia's well-drained savannas or *altillanura*, located in the Orinoquía region, indicating that this will prove highly useful to recover this immense region working together with other national entities.

"The transformation of this vast Colombian territory into a promising region for agriculture, as occurred in Brazil with the *cerrados* region, is at the top of the Ministry's agenda and CIAT's scientific memory will prove valuable in this endeavor," underlined Minister Restrepo.

CIAT has a long history of scientific work in the Eastern Plains region or *Llanos Orientales*, especially in the area of Carimagua, located in the Department of Meta, where significant advances were made in soil recovery and cultivation of locally adapted rice, grass, and maize varieties.

"I'm quite impressed with both the Center's staff and the programs being carried out," said Restrepo. "They are highly pertinent to the current situation of world agriculture and offer a very promising platform to join efforts with other research centers in Colombia."

CIAT Director General Ruben Echeverría, when assessing the outcome of the visit, said it was much better than expected, and highlighted the commitment shown by the high government official. "Until the last minute we discussed matters of general interest," said Echeverría. "We had thought that because it was his first visit that it would be a protocol visit and that we would just inform him about the Center's situation; however, it went much beyond this and we talked business." Minister Restrepo said that this was the first of a series of visits he plans to make to CIAT.

Colombia prepares for coconut "disease squeeze"



CIAT has joined forces with several major partners to help Colombian coconut farmers prepare for a worrying "disease squeeze".

Coconut is an essential food source and cash crop in Colombia, especially in remote jungle areas on the country's Pacific coast, where poor soils and year-round heavy rains mean farmers have very few options to switch crops.

But the spread of the devastating red ring disease in the south of the country and in neighboring

Ecuador, combined with the threat on Colombia's northern Atlantic coast from the southward spread of the virulent lethal yellowing disease from Central America, means coconut producers are facing an assault on two fronts.

Double trouble

Red ring disease has already killed up to 80% of coconut palms in parts of the Colombia's southwestern departments of Nariño and Cauca. The disease, caused by a nematode (*Bursaphelenchus cocophilus* L.) carried by the palm weevil (*Rhynchophorus palmarum* L.) or palm-munching *picudo*, causes the trees to wither and die. When the dead trees are felled, the stumps display a distinctive red ring inside, following one or more of the trees' growth rings.

"The large numbers of *picudos* is worrying enough," said Alonso González, leader of CIAT's Tropical Fruits Program. "But the spread of the nematodes is making the problem significantly worse. In some of these areas you can see field after field of palm stumps.

"It can take up to 7 years for a coconut palm to bear fruit, so many producers are abandoning the crop altogether."

Now experts fear that it is only a matter of time before lethal yellowing disease, which has already killed millions of coconut palms across Mexico, Honduras, and Jamaica, reaches South America. Caused by pathogens spread by planthopper insects, infection results in the loss of flowers, fruits, and leaves, and it can kill the palm in a matter of months.

The search for solutions

Now CIAT, in collaboration with [USAID](#) and the Yucatan Center for Scientific Research ([CICY](#)), in Mexico, and national organizations in Colombia, has developed a research agenda that aims to help scientists to quickly find sustainable, eco-efficient solutions to both problems.

CIAT and CICY are mass propagating coconut germplasm, and using tissue culture techniques to dramatically speed up the research process. They are also developing methods for rapid testing of these samples for resistance to red ring disease.

Researchers are also investigating possible genetic resistance to lethal yellowing disease in the tall-trunked "high palms" native to Mexico.

"We must take these kinds of disease threats extremely seriously and act as a matter of urgency to help small farmers," continued González. "The good news is we have some very promising possibilities, but funds are required to expand the international collaboration, test a broad base of coconut genetic resources, and facilitate the exchange of germplasm among countries."

"Coconut is a crop with great industrial potential: coconut husks, for example, have an enormous number of very profitable uses, many of which are completely unexploited in Colombia. Losing this opportunity would be a disaster for local communities."

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Wasp "sting operation" could help Cambodian farmers too



CIAT scientists are investigating low-cost options for rearing a parasitic wasp in Cambodia to tackle outbreaks of cassava mealybug. The move follows the release of thousands of the tiny insects by the Thai Department of Agriculture (DoA) and the Thai Tapioca Development Institute (TTDI) in July, in an attempt to tackle the devastating outbreaks there.

The wasps, originally discovered in Paraguay by scientists from CIAT and CGIAR sister center the International Institute of Tropical Agriculture (IITA),

hunt down mealybugs, injecting them with their larvae. The larvae then kill the hosts by eating them from the inside out. The Thai DoA and TTDI quickly and successfully raised their own wasps from a colony imported to Thailand from IITA in Benin, West Africa. You can see CIAT's official press release [here](#), together with an article on the CIAT blog about the release ceremony in Thailand [here](#).

Now, as Thailand continues its well-coordinated campaign to rid its own plantations of the pest, outbreaks have been confirmed in northeastern Cambodia, a country with significantly lower scientific research capacity, but a high number of smallholders who depend on the crop.

"Cassava is the second most important crop after rice, but the country has significantly fewer agricultural research resources," said CIAT entomologist Tony Bellotti, recently returned from a mission to Cambodia to assess the scale of the mealybug problem there. "A huge number of small farmers are in very real danger if the mealybug sweeps across their cassava fields at the kind of rate that it spread in Thailand.

"The response of the Thai DoA to their mealybug outbreak has been exemplary. They were quick, organized, and well-supported, and they have some top scientists working for them. In Cambodia the solution is to develop very low-cost technologies so that the Ministry of Agriculture and farmers associations can begin breeding and rearing their own wasps as quickly as possible.

"We're expecting a surge in mealybug numbers but the time the next dry season starts in November, so time really is of the essence."

Bellotti hopes these low-cost wasp rearing facilities will also be useful in other countries in SE Asia currently under threat from cassava mealybug. Reports are being investigated in Laos, Vietnam, and Burma and Southern China.

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CIAT's gene bank manager "honored" by international award



CIAT's Daniel Debouck is to be awarded the Frank N Meyer Medal for Plant Genetic Resources, for his tireless work to collect and conserve crop plant diversity.

The award, given by the Crop Science Society of America ([CSSA](#)), recognizes dedication and service to humanity through collecting, evaluating, or conserving plant genetic material. It is named after agricultural explorer Frank Nicholas Meyer, who worked for the US Department of Agriculture in the early 1900s, and who lost his life in the

waters of China's Yangtze River while on a collection mission.

"It's an honour," said Dr Debouck. "I hope it sends a positive signal to the younger generation that there are still a lot of crop variants and relatives to be studied in the field."

Dr Debouck, who has worked for CIAT since 1977, heads the Center's Genetic Resources Program and is responsible for running one of the largest gene banks in Latin America, with over 65,000 different samples of beans, forages, and cassava. At CIAT he has undertaken no fewer than 29 explorations to 14 Latin American countries to collect and conserve wild, undocumented bean varieties, and he is responsible for introducing over 3,000 new, previously unknown samples to the CIAT gene bank. He also led the CGIAR's successful legal challenge to overturn the infamous "[Enola](#)" yellow bean patent.

As well as a passion for scientific discovery, Debouck continues to be driven by the need to conserve. "I found a new wild bean relative in Guatemala in 1985," he explained, "and when I returned 2 years later, the site has been completely destroyed. It was particularly sad to discover that a species so recently discovered was probably already extinct in the wild."

"Many people think that if we can collect a particular variety today we can collect it tomorrow", he continued, "but this is not the case due to the advance of agriculture and urbanization. Some species may have taken one million years or more to evolve, and landraces thousands of years, but they can be lost completely in a single generation, or less.

"It's not just the physical increase of the plant collections that is important," he continued. "What comes with it is new knowledge and a new understanding. As you're filling in the gaps in the gene bank and gaps in our knowledge, the pieces of the puzzle come together to help you to see the bigger picture.

"If we want to cope with climate change and feeding ourselves, it's better to understand that picture sooner rather than later."

Dr Debouck will receive the award at a ceremony in California, United States, in November 2010, during the CSSA's 2010 annual meeting.

"Of course, it's going to mean lot more work," said Dr Debouck. "But I'm excited about the prospect!"

** Follow the link to read the "[Guardian of Biodiversity](#)" profile of Dr Debouck in the 2010 edition of *Geneflow*, produced by CIAT's CGIAR sister center [Bioversity International](#).

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