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ECOHEALTH IN LATIN AMERICA

PITTING RESEARCH AGAINST CHAGAS AND MALARIA

In September 2010, Peru's Ministry of Health officially signed a resolution approving the use of a new irrigation technique for the country's rice fields. The new system, which introduces dry periods throughout the growth cycle, reduces the number of malaria-transmitting mosquitoes while lowering the cost of irrigation and increasing yields.

IDRC: ARLYNE BEECHE

In Central America, the insect vector of Chagas disease—one of the world's most neglected diseases—is being challenged through simple means: re-plastering house walls and moving domestic animals outside. The technique was developed in Guatemala and is now being replicated in El Salvador, Honduras, and other Central American countries.

These are just two examples of how research, supported by Canada's International Development Research Centre in collaboration with other donors, is improving lives in Latin America. The research—following an ecohealth approach—focuses on restoring and using natural ecosystems in fighting disease and ensuring health. It brings together researchers from a variety of disciplines with communities and other stakeholders to address health and environmental challenges simultaneously.

This brief presents a small sample of the IDRC-supported ecohealth research that is improving human health and ecosystems in Latin America and the Caribbean.

Federico Burone
IDRC Regional Director for Latin America and the Caribbean

A NEW STRATEGY FOR A NEW CHALLENGE

In November 2008, the Inter-governmental Commission of the Central American Initiative for Chagas Disease Control confirmed that Guatemala was the first country in Central America to be certified for interrupting the transmission of Chagas disease by *Rhodnius prolixus*, one of the disease's two most important insect vectors. The means: spraying homes with insecticides. An estimated 10 million people in the Americas are infected with Chagas, which is often fatal.

After *R. prolixus* was eliminated, the second vector, the native triatome bug found new opportunities. It is a formidable foe because it can't be eradicated by spraying. Researchers funded by IDRC have now found the means to defeat it.

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FIGHTING CHAGAS IN THE GRAN CHACO

The Gran Chaco plain straddles parts of Argentina, Bolivia, Brazil, and Paraguay. Sparsely populated and poor, this hot, semi-arid lowland is an ideal environment for the triatome insect, carrier of Chagas disease.

The region's name—*Chaco*—comes from the Quechua word meaning *fighting land*. And a fight is definitely being waged in the plain against the insect, which thrives despite repeated efforts to contain it. In fact, strains of the insect have now become resistant to the pyrethoid insectides that are the main weapon against it.

In 2007, research teams from Argentina, Bolivia, and Paraguay joined forces to find out why the insect—and the disease—persisted in the region. There was no single—or simple—answer. In Argentina, for example, researchers from the

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A NEW STRATEGY *(continued)*

The research is led by entomologist Maria Carlota Monroy, founder and senior researcher at the Laboratory of Applied Entomology and Parasitology at San Carlos University in Guatemala. Her team includes researchers, engineers, architects, veterinarians, and the national Ministry of Public Health. Equally important, the communities themselves participate.

"We are looking for new ways of attacking a native vector of Chagas (*Triatoma dimidiata*) without using insecticides, by removing the factors that encourage these insects to live in houses," says Monroy. Working in collaboration with the community and the Ministry of Public Health, the research team developed ways to address three of the main transmission factors: improving house walls to make them impermeable to the insects; improving floors so they can be better washed since triatomes lay their eggs on the floor; and removing animals from the house. "We help them construct chicken coops, small pig houses," says Monroy. "With the two veterinarians, we tell them how to keep the animals in good health."

Other benefits have accrued as community members have gained project management skills. "While preventing Chagas disease, families also improve their quality of life," says Monroy. "The communities are very different from five years ago, in human capacity, in health, in knowledge—they've changed their lives."

The Guatemalan Ministry of Public Health is now extending the techniques to other communities. And the approach is being replicated in other countries, such as El Salvador and Honduras. That should continue as the Pan American Health Organization promotes the approach in its regional Chagas disease control program.

See also: Caderno Saúde Pública *vol.25, supl.1, Rio de Janeiro 2009*
http://bit.ly/csp_chagas

FIGHTING CHAGAS *(continued)*

University of Buenos Aires found that, as the indigenous Tobas people increasingly abandoned their migratory lifestyle and settled, they built homes hospitable to the insects. And it is one of these houses that the pyrethroid-resistant triatomes were found, says team leader Ricardo Gurtler.

In Bolivia, the migration of entire families from May to October out of the area in search of work (most of them go to harvest sugarcane in northern Santa Cruz department) means that 15 to 30% of houses are vacant for extended periods. Because these houses are not part of the spraying program during this time, they can shelter residual colonies of triatomes, which can spread to neighbouring houses. Team leader Francois Noireau from L'Institut de recherche pour le développement (IRD Bolivia) says that local employment opportunities would help in the fight against Chagas.

In Paraguay, infection rates are as high as 70% in some communities. As in Argentina and Bolivia, the limited effectiveness of the insecticides is a key reason, says team leader Antonieta Rojas de Arias, as are the large number of languages and cultures in the region, which makes communicating about the issue difficult.

There are common factors, however: poor housing, poverty, and limited access to health care. And as the research team has found, environmental, social, economic, and institutional conditions contribute to ensuring Chagas' foothold in the region.

See also:
www.nature.com/nature/journal/v465/n7301_supp/full/nature09226.html

IDRC: ARLYNE BEECHE

PREVENTING MALARIA IN PERU YIELDS LARGER RICE CROPS

In September 2010, Peru's Ministry of Health signed a resolution approving the use of a new irrigation technique for the country's rice fields. That technique, which introduces dry periods throughout the growth cycle, reduces the number of malaria-transmitting mosquitoes while reducing the cost of irrigation and increasing yields. It is the result of IDRC-funded research on how to prevent malaria in the Lambayeque region.

Malaria is endemic in Peru, particularly in the Amazon and along the north coast where rice is cultivated. The 350,000 hectares of flooded rice fields provide ideal breeding grounds for the mosquitoes that carry the malaria parasite.

A multidisciplinary Peruvian team, in collaboration with the Ministries of Health and Agriculture and cooperating regional and international agencies set out to solve the problem. Working in collaboration with the farmers, researchers from the Peruvian General Directorate of Environmental Health found that, if farmers modified the usual irrigation system and allowed their rice fields to dry for short periods in the growing cycle—8 days only—the mosquito population was reduced: the number of mosquito larvae dropped by 87%. In addition, water use was reduced by a third, reducing irrigation costs, and fewer chemicals were needed. The bonus: yields increased by 25%.

The area's regional council declared that applying the technique throughout the region is a priority, a move now supported by the federal government.

See also DIGESA, Peru:
http://www.digesa.minsa.gob.pe/DSB/Resumen2010.asp