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## Escape From a Toxic “Catch-22”

**IDRC-supported research is turning the tide against the use of highly toxic pesticides that have increased potato yields at the expense of people’s health in the poverty-stricken highlands of Ecuador.**

“You cannot find solutions sitting behind a desk. You have to start at the base, in the community. It’s our job to open a road. But this road will belong to the farmers, not to us. So we have to work with the farmers.”

Fadya Orozco, International Potato Center

# RESEARCH THAT MATTERS

## The Development Challenge: Open a path to a win-win solution

Highly toxic pesticides that are banned in many developed countries are being widely used by potato farmers in Ecuador. Pesticides containing carbofuran (used to control the Andean weevil) and methamidophos (used to combat foliage pests) are the cheapest products on the market in the South American country. Agrochemical companies can make



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Researchers studied the economic impacts of pesticide use. good profits while undercutting the price of safer pesticides because the patents on these early generation pesticides ran out years ago. The chemical formulas are freely available.

For farmers earning \$5 a day in the province of Carchi, the low price of these “red label” pesticides makes them attractive. Without

pest control, crop yields are likely to be cut in half and they won't be able to provide for their families. But the pesticides are taking a terrible toll on farmers' health. They affect the brain, for example, gradually fogging thinking to disabling levels. Decreased mental capacity makes it harder for farmers to make good decisions about how to run their farms productively.

Researchers at the Southern-based International Potato Center (CIP) wanted to find a path out of this “Catch-22.” Mental capacity and other neurobehavioural functions will return if exposure to the toxic chemicals is reduced. However, when faced with a choice between their health and their immediate need to earn a livelihood, poverty-stricken farmers would trade off their health.

With support from Canada's International Development Research Centre (IDRC), CIP researchers undertook to find a win-win solution. However, toxic pesticides had been heavily, and unsafely, used since the 1960s. Farmers thought they couldn't do without them and that they weren't so harmful. Researchers would have to go up against a belief system that had been reinforced for decades.

## The Idea: Start a journey of discovery

Researchers wanted to ensure people understood how pesticides were affecting their health so they could get across messages about how to use toxic chemicals safely. They administered simple, but effective, neurological tests and made sure the results were clearly communicated to the community. Researchers also thought that integrated pest management (IPM) could provide new directions. IPM does not rely exclusively on pesticides. By using other techniques, such as pest traps, farmers are able to use safer pesticides in lower quantities — an affordable option. Researchers used a sophisticated computer model to predict that

IPM would help keep costs low and production high. But for farmers, “seeing is believing.” So researchers set up farmer’s field schools to teach IPM. That way, farmers could experiment with the approach — without taking risks with their own potato crop. Policymakers were informed of all that was learned.

### **The Research: Mapping the social and physical environment**

Researchers took an ecosystems approach, examining health and the social and environmental factors that affect it. This was key to developing interventions that could effectively create change. Researchers tested farmers’ health and studied their attitudes, knowledge, and practices. They looked at the economic impacts of pesticide use, and the contamination of ground and surface water, as well as of home areas. Farmers’ field schools were set up in three communities and a range of public education activities were launched. Researchers from a range of disciplines worked together on the project.



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**More Carchi farmers are wearing protective clothing when spraying pesticides.**

### **On the Ground: Shifting perspectives and opening new directions**

- Researchers took a health history of farmers who volunteered to participate in the research, did a focused medical exam, and administered a series of tests recommended by the World Health Organization (WHO).
- Researchers found two-thirds of those tested were suffering neurological damage.
- Phosphorescent dye was used so farmers could see how pesticide residue could be tracked into homes, and passed between family members.
- At farmers’ field schools, farmers learned how to use weevil traps, various strains of blight-resistant potatoes, and lower-toxicity pesticides.
- Women’s groups were informed about the safe use of toxic pesticides and children’s awareness was raised through such means as puppet shows.
- A 1999 workshop on pesticide use, involving representatives from government, industry, and communities resulted in a Declaration for Life, the Environment, and Production in Carchi.
- A 2001 national forum on pesticides brought together representatives from many government ministries, farmers’ organizations, and the pesticide industry. Farmers delivered a presentation on the impact of pesticide use on their health.



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# RESEARCH THAT MATTERS

**Farmers using IPM grew as many or more potatoes as farmers using toxic pesticides.**

## **The Impact: A new movement begins**

Farmers using IPM grew as many or more potatoes as farmers using toxic pesticides, and spent less money to do so. The production costs in IPM test fields were US\$80 per tonne, compared to US\$140 per tonne. Significantly, the mental capacity of farmers using IPM returned to normal — likely one pivotal but hidden factor in the increased yields. The use of IPM has consequently shot up in Carchi and the use of toxic pesticides dropped. Among participating farmers, the amount of fungicide used for light blight decreased by 50%, while the quantities of insecticide used to control the Andean weevil and leaf miner declined by 75% and 40%, respectively.

More Carchi farmers are wearing protective clothing when spraying pesticides. Two-thirds of the families participating in the project purchased protective equipment — made available through the project. They had previously thought it was too expensive and inconvenient, but learning of the impact of toxic pesticides on their health shifted their perspective. Farmers are also voicing their concerns about pesticides to their government and the pesticide industry itself.

## **Future Challenges: Create greater momentum**

While farmers' field schools are effective they are too few to reach the entire farming population of Carchi. There is also strong pressure by commercial interests to do things as they have always been done. The early innovators who have adopted IPM can create change by influencing neighbours to also use these techniques — especially as their income and health improve. However, this movement



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needs support to grow. There is a role for various levels of government and the pesticide industry. Ultimately, researchers believe pesticides classified as highly toxic by the WHO need to be restricted or banned but barring that, they recommend that pesticides be taxed in order to raise their price.

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