

L A D I P L A N T A S
Comarapa, Santa Cruz, Bolivia

Community Plant Health Clinic

*An Original Concept for
Agriculture and Farm Families*



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www.globalplantclinic.org

The Global Plant Clinic is part of CABI *Bioscience* and funded by DFID. It provides an expert service from the UK, free of charge, for diagnosing all plant diseases. Within Bolivia it has established the Plant Health Services Initiative to improve delivery and access to advice and support in controlling plant diseases, particularly amongst the poorest farmers. CIAT Santa Cruz and PROINPA are the two main institutes working on the initiative.

► The Witch's Sample

“I’m going to find that old woman, and when I do I’m going to tie her to a tree and whip her with a strap of wet rawhide.” These are not the words one expects to hear from the gender-sensitised leader of a CIATⁱ, but he meant it, for the elderly neighbour had bewitched his potato crop. In 2001, Pedro Sánchez (pseudonym) harvested four hectares of beautiful potatoes, and made enough money to buy a used motorcycle.

But in 2002, his mother had a messy argument with a neighbour woman. Not long after that, Pedro noticed the old woman in his field, digging a hole. The woman had a reputation for witchcraft. Soon after that the potatoes became diseased. Pedro dug up a few of the tubers. They were twisted into odd shapes and covered with little bulges and appendages, unfit for market.

Not long after that, Pedro found a rag in his field, with a piece of paper wrapped in it. The paper had a sketch map of his field on it. That was all the evidence Pedro needed. He dug up some of the potatoes and took them to show to Ernesto Montellano, the friendly, hard-working agronomist who heads the small station for CIAT in Comarapa, in the warm Andean valleys of Santa Cruz, Bolivia.

Ernesto and Pedro were friends. So it was only a matter of time before Pedro stood in Ernesto’s office, raging about the old woman and the diseased potatoes. Ernesto said the potatoes “were so deformed they looked like *t’anta wawas*,” a Quechua phrase meaning ‘bread babies:’ pudgy dolls baked to celebrate the Day of the Dead in Bolivia.

CIAT & Ladiplantas

Ladiplantas is part of CIAT (the Tropical Agricultural Research Centre), the public agricultural institute for the department of Santa Cruz. It has its headquarters in the city of Santa Cruz, and offices in several other towns. CIAT has worked for years with conventional approaches (e.g. extension agents, experimental farmers, on-farm trials). LADIPLANTAS is a pilot project for CIAT, and the interaction is mutually beneficial. LADIPLANTAS derives credibility and technical support from being part of CIAT, while CIAT gains a valuable and original experience having a first-of-its-kind community plant health clinic.



SPOT THE DIFFERENCE

Right Potato with symptoms ‘like a bread baby.’

Left Bread baby, doll baked to celebrate the Day of the Dead.



Ernesto could have told Pedro “Don’t be a fool; there’s no such thing as witchcraft,” but he didn’t. Appreciating how grave the situation was for his friend, he took two colleagues from CIAT and they drove to the mountains near Comarapa to see the potatoes.

One who went was Olivia Antezana. She recalled how the field was full of classic rhizoctonia symptomsⁱⁱ. All the plants had it in such advanced stages that lesions of the fungus had formed on the skins of the plant stalks. The agronomists took some samples back to their small lab, where they isolated the fungus and showed it to Pedro under the microscope. He wasn’t easily convinced.

Olivia had to show him the illustration of rhizoctonia in a scientific book. Pedro studied the drawing and compared it with the image in the microscope until he was finally convinced. At last resigned, he said, “Well, if she bewitched me it would have been by causing the rhizoctonia to spore more.”



- The clinic is next to a busy weekly market, which helps. Farmers pass by regularly and can drop in easily with their queries

Witchcraft is an old topic in anthropology, but anthropologists have paid less attention to the fact that traditional people form and reject hypotheses. Pedro had two. One was witchcraft, punishable by a rawhide whipping. The other was infected seed. He had bought some seed potato from a stranger at a fair in the Quechua-speaking community of Llujta Pampa, higher up in the Andes. Pedro had wondered if that seed was diseased. Seeing the fungal structures under the microscope helped him reject the witchcraft hypotheses in favour of the seed-borne pathogen one.

Why Local Government Support Is Important

Even if the cash contribution from the municipal governments are modest, e.g. funding a single, small salary, as in this case, such support means that the mayor’s office has a vested interest in being informed and in insisting on a certain quality. If constituents complain about the clinic, or charge that it is irrelevant, the local municipal government can relay that information on to Ladiplantas. The mayor’s office in Comarapa has other agronomists on the staff, and its generally friendly attitude towards agriculture is a reminder to everyone that small-scale commercial farming is the bedrock of the local economy.

Actually, a third hypothesis is more promising. Ernesto explained that rhizoctonia is everywhere. It is a very common fungus in the soil, and in much of the seed. But all the plots don’t break out in the disease. Ernesto thinks that the problem is that Pedro has been applying fungicides seven or eight times a year for late blight (*Phytophthora infestans*), and irrigating almost immediately afterwards with sprinklers, leaching the fungicide down into the soil, where it kills the beneficial fungi that normally keep *Phytophthora* in check.

The ‘bewitched’ harvest was lost, but the combination of irrigation and warm weather year-round means that farmers in Comarapa can plant potatoes three times a year. So immediately after the lost harvest, Ernesto and Pedro and the CIAT planted another field, a formal trial, to test two treatments of fungicide. They dug furrows, placed seed potatoes in them, sprayed the chemicals and then covered the seed with earth. I asked Pedro how it worked.

“Very well, the yield was 13 or 14 (kilos of yield per kilo of seed) in each of the treatments, but with the control group it was only 7.5 to one,” Pedro said matter-of-factly.

Pedro said he is thinking of using the technology in the future, and of applying it to peas, which he rotates with potatoes, and which also have rhizoctonia problems. So that one laboratory diagnosis is helping to adapt a technology locally and to spread it to other crops.

These are the moments that agronomists live for, so I hated to question it. “If the problem is caused by the over-use of chemicals, why not recommend using less?” I asked.

Ernesto explained that it wasn’t that simple. If they apply any less, Pedro will lose the crop to late blight, so the only solution is to apply more fungicide, different fungicide to the seed.

The above case shows that farmers do not all come in calmly and put a sample down on the receptionist’s desk. For an agronomist to get from a farmer’s tirade to a lab sample to a community experiment in a CIAL takes local knowledge, a lot of competence and tact. And a successful diagnosis can lead to testing new technology in communities. I was so impressed by Ernesto’s social skills that I assumed he was from Comarapa.

“No,” he said. “I’m from Camargo,” half way across the country. He came to Santa Cruz to go to university, and eventually stayed to work with CIAT, in its provincial station in Comarapa, 250 kilometres from the city of Santa Cruz. But Camargo is also a small town, at about 2,000 meters above sea level. Both towns have warm weather all year and are on the Spanish-Quechua linguistic frontier.

In his seven years in Comarapa, Ernesto seems to have met everyone and befriended most of them. “The advantage we have is that we live here,” Ernesto said. Then he paused, “and the lab,” he added as an afterthought. “The farmers are so comfortable with us that sometimes they take samples to Olivia’s house.”

Olivia smiled and nodded, “Some farmers have brought in 20 samples.”

► A Laboratory Evolves into a Plant Clinic

When the Comarapa lab first opened in the year 2000 it was part of a project by CABI & CIAT, called MIP Papa (integrated management of pests in potato). The lab was equipped for diagnosing potato pests and diseases. The idea was that tricky samples would be sent to the UK to ID, so there was no centrifuge for nematodes for example. Olivia extracted them on trays for (respected British nematologist) John Bridge to take back to England to sort out.

Problems showed up right away. For one thing “Comarapa is a small town. Everybody knows everything,” and the people who weren’t included in the 50 randomly sampled project farmers also had pest problems they wanted identified, and not just with potato. They started bringing things into the lab.

I asked, “Why didn’t you politely tell them to go to hell?”



● Andrea works hard behind the scenes to analyse samples brought in by the farmers

Olivia explained that she couldn't do that. She's from Comarapa and neither she nor Ernesto had the heart to turn people away. So about December, 2000 they started running samples for other people. At first Olivia wrote them out a recommendation in longhand, but soon she was typing them a form, signed by both her and Ernesto, with a written identification and suggestions for managing the health problems.

In early 2001, the municipal government decided to pay Olivia's student stipend. She was still working on her thesis. They did this as a public service, without expecting to have their political backs scratched. One reason they did was because agriculture is so important to Comarapa's economy that the mayor had fought over the lab with rival town Saipina. Saipina had more potato farmers, but Comarapa won because the staff was already there and they had lab space. So the lab was placed in Comarapa, but Saipina has continued to support it anyway, for example, by sponsoring the lab to come analyse seed potato when it is being trucked in. See above Box.

Why it is important to test seed potatoes

Saipina, Comarapa and other neighbouring areas in the warm valleys of Bolivia are too warm to store seed potato all year, but they produce a bumper crop in the winter, by trucking in tons of seed potato from the highlands and planting during the autumn months of March-April-May. Certified seed is expensive, and farmers buy 'common seed' from small-scale merchants, who bulk it from many smallholders all over the country. Much of the seed is excellent, but it can also be loaded with weevils, tuber moths, viruses, bacterial wilt, late blight, rhizoctonia and others. Farmers usually don't know what they're buying. With a lab handy, some farmers can buy a bag of seed and have it tested before buying a ton of it. Others who have already bought seed can have it tested so they know what problems to anticipate.



● The support of the mayor's office in Comarapa has been crucial to the success of LADIPLANTAS

So it was perhaps only natural that Comarapa's municipal government gave some support to the lab, after fighting over it with Saipina. This formalized what the lab was already doing—a public service beyond the project's original design. It also meant that the lab needed more equipment, more reagents.

That posed a slight problem. British aid projects are painstakingly planned in advance, and moving money to the lab means losing it from somewhere else. The British scientists could have responded by saying that a town lab was not in their mandate, but they didn't.

"They were happy to help," Olivia recalled. "They brought out equipment when they could and helped the lab get

discount prices on some reagents. I think they paid for some of it themselves."

Partly, the foreign scientists realized that it was in everyone's best interest to have a good, all-purpose lab. They were also responding to local enthusiasm.

At that point, CIAT, CABI and the municipal government of Comarapa had a cosy relationship, working at a leisurely pace with friendly farmers, but then Ernesto and colleagues decided that with more promotion, more people would use the lab. They began going to the annual farm fairs in neighbouring small towns: Saipina, San Isidro, Vallegrande, all over the warm valleys of Santa Cruz, setting up a booth for the day and telling farmers how to send in samples. They also brought along diseased crops preserved in jars of alcohol, sparking farmers to say "My crop has

that disease, what can I do for it?” Olivia would tell them about the lab and Ernesto would answer questions about managing diseases. In 2002 they started airing promotional radio and TV spots.

The municipality has continued to faithfully support the lab. Olivia finished her thesis in 2002 and CIAT hired her to continue working in the lab, which by now was a community plant health clinic, although it was still called a ‘laboratory’. The municipality then used Olivia’s student stipend for another young person, Andrea Porco, to be Olivia’s assistant. Another CIAT student, Rómel Salazar finished his thesis in 2003 and went to work as the municipal agronomist in the mayor’s office. He said the municipality appreciates the lab’s help identifying the new diseases now appearing on beans, now being grown locally for export to Spain, and a welcome addition to the area’s economy.



● This crop of tomatoes has at least eight different pests and diseases. The técnico has to sort them out and advise the farmer what to do

Rómel explained that one reason the local government supports the lab is because the municipal government has been holding workshops to learn about community demand, village by village, and they know that crop and livestock diseases are concerns everywhere in this heavily agricultural municipality.

There is so little overt political control over the lab that I asked, “Do you think people even realize that the municipal government helps support the lab?”

“I think they do,” Rómel answered, then he laughed and suggested only half in jest that maybe they should put a sign on the lab. Ernesto showed me the glossy pamphlet they made in 2002 to promote the lab. One picture shows CABI’s John Bridge in the lab with David Quiroz, the personable mayor, along with his vice-mayor and the president of the municipal council. Olivia and Ernesto put that picture in the flyer so people would know that the municipality backs the lab, and that it has support from prestigious, foreign experts.

Summary

The evolution from a lab doing potato samples for a project to a community plant clinic depended on local staff that cared, a supportive municipality and foreign experts who provided encouragement, new ideas and equipment. It’s a success, and an original concept.

► **Just like a doctor’s prescription**

20 August 2003 With CIAT’s Olivia Antezana and Berto Villarroel we went to see a young farmer named Remso Quiroz, who had turned in some samples to the lab (see photo). We wanted to see what he did with the recommendations. We drove to his farm in Purquina Arriba, a village strung along the bottomlands of the Pulquina River in the cactus forest at the edge of the large Amboró National Park. Remso wasn’t home, but his father, Víctor Quiroz was hoeing potatoes with some hired hands. We wondered if don Víctor knew about the samples his son had turned in.



Víctor Quiroz takes a rest break

We joined the small work party as they were about to sit in the shade for their mid-afternoon coca break.

The elder Mr. Quiroz remembered the samples clearly and rattled off their names, in a mix of scientific Latin, Quechua and colloquial Spanish: Verticillium; T'ojtu Negro (late blight); Arañuela en frutilla (mites in strawberry)

I asked about the results and don Víctor said slowly that “we get the prescription and we apply the remedy.” At first I thought he was just saying what he thought we wanted to hear, but as he continued, I realized that he meant what he said. He thought the lab’s one-page report and recommendation was “just like a doctor’s prescription.” He described in some detail how much he appreciated the lab’s recommendation for late blight.

“That time we planted in April and the weather was bad. I planted and went to Cochabamba to buy fertilizer, and when I came back it (the potato field) was black, in spots here and there. Acrobat [the fungicide that Ladiplantas prescribed] is good for thatⁱⁱⁱ.”

Then he repeated several times that the recommendation was like a doctor’s prescription, that he bought the remedy and saved his crop.

It would be easy to dismiss this as just more Green Revolution. It is that, but it also—perhaps ironically—meets a local demand. One reason farmers are so happy with the service is because the agronomists do recommend chemicals: immediate solutions to real problems.

Olivia and don Víctor communicate easily. He wasn’t condescending because she was a young woman, and she didn’t assume an air of pedantic superiority because she was from town and had been to university. In the box above, notice the easy banter. At one point Víctor even finishes a sentence for Olivia. It is a good example of how when smallholders get a chance to buttonhole a *técnico*, they usually ask “What can I spray on this?”

For Víctor Quiroz here, these small insects are what the jargon used to call ‘felt needs,’ what is now being called ‘local demand.’ For those of us who respect the needs of rural people, and who favour biological or alternative agriculture, it is easy to get into a dilemma. Farmers typically demand pesticides^{iv}. Farmers like pesticides because they are quick, easy, functional and cheap. These are the criteria that an alternative technology must meet.

Farmer and Agronomist Talk Like Colleagues about Insects

ORIGINAL (MORE OR LESS) AND TRANSLATION

Victor	Con 200 cc de Curacrón al turril aplicamos aquí, para la mosca blanca (en papa). La papa tiene Russelliana aquí. • <i>Here we use 200 cc of Curacrón per barrel for whitefly (in potato). The potato here has Russelliana.</i>
Olivia	(recomienda varios plaguicidas) y fumigando con Ace, lavandina, porque la Russelliana deja una ... • <i>(recommends several pesticides) and spraying with Ace (laundry detergent), and bleach, because Russelliana leaves a ...</i>
Victor	Mach’a, y seca la planta. • <i>Sticky thing and it dries out the plant.</i>
Olivia	Eche un sobre de Ace. • <i>Pour in a packet of Ace.</i>
Victor	¿Grande o pequeño? • <i>A big one or a small one?</i>
Olivia	De 250. • <i>A 250.</i>
Victor	¿Y lavandina? • <i>And bleach?</i>
Olivia	Una copa. • <i>A cup.</i>
Victor	Ah, una copa por mochila. • <i>Ah, one cup per backpack sprayer.</i>
Olivia	Sí y Teosulfán es bueno para Russelliana. • <i>Yes, and Teosulfán is good for Russelliana.</i>
Victor	El thrips ¿cómo se puede controlar? • <i>Thrips, how can it be controlled?</i>



- Row of wheat growing between potatoes in a trial the CIAT agronomists are doing on the Quiroz farm. The wheat may help to slow the spread of insect pests, and is an example of a non-chemical control which CIAT is studying as part of their long-term effort to offer alternatives to chemicals.

► The farmer who acts as if he owns the lab

21 August 2003 With Olivia Antezana and CIAT's liaison from PROINPA, Vladimir Lino, we went to the village of Chilón, also on a desert riverbank, to meet one of the farmers who has brought in the most samples, about 20. "He walks in like he owns the lab and says 'I want my results back,'" Olivia recalled fondly. He certainly seemed worth a visit. If anyone had done anything interesting with the recommendations it would be him, Ezequiel Céspedes.

"I only asked God for two things in my life," Mr. Céspedes explained. "One was for a nice family." He paused and added in a soft, kind voice "and I had that." Three of his four kids have left home, including the son in Spain and the daughter in medical school. "And the other thing I wanted was my own land, since I didn't have any. I was born with nothing, and I bought this farm about 10 years ago."

It was a comfortable farm, with a large house with a used motorcycle under the porch, several adobe storage buildings and a chicken coop, a tractor aging under a mesquite tree and several hectares of irrigated bottomland. It was quite a prize to have earned by a lifetime of hard work.

One key to his success seems to be that don Ezequiel is always trying new things. When we first walked up to him he and a hired boy were on the edge of a potato field, stirring a solution in a barrel. At first he was reluctant to tell us what it was, and he tried laughing it off. Then he said, "you won't believe it, it's Ace (a brand of powdered laundry detergent)."

Don Ezequiel had a way of talking where everything seemed rehearsed and delivered as deadpan comedy, like Bob Hope in Spanish. "You see, I was at this workshop on tomato, where a young fellow had the pleasure of meeting me—and he recommended Ace and soap."

From that brief description, Olivia recognized the young man as Eloy, one of Vladimir's thesis students—it's a small town; everybody knows everybody's business. Then don Ezequiel warmed



Seeing is understanding

Vladimir Lino loans Ezequiel Céspedes a large hand lens.

When the farmer saw the whitefly eggs through the agronomist's magnifying glass, he realized that the soap concoction he had sprayed on his tomato crop the day before had killed the adult whiteflies, but not their eggs.

to the topic and decided to take us to show us the field where he had killed all his whiteflies with laundry detergent.

When we got to the other potato field, actually just a section of one large field, divided into several plots of a convenient size to work, Vladimir got out his magnifying glass and looked at the leaves. Vladimir always brings a large magnifying glass because it makes it easier to show the insects to farmers. Vladimir magnified the underside of a potato leaf and showed Mr. Céspedes how it was coated with whitefly eggs.

Don Ezequiel asked, “Are those *itha* eggs?”

Vladimir said no, they were whitefly eggs and concisely explained the difference. (Whitefly eggs are green, and are found only on the underside of the leaf. Russelliana eggs are reddish and are on both sides).

Vladimir went on to explain that the laundry detergent the day before had killed the adult Whiteflies, but not the eggs. He encouraged Mr. Céspedes to mix up a barrel of soapy water and insecticide to kill the eggs. Mr. Céspedes agreed, but he kept talking about all the adult whiteflies he had killed the day before. So many dead whiteflies coated the leaves that

“It was as though the leaf was coated with flour. And it caused me great joy, because (laundry detergent) is not expensive.”



● Whiteflies and their eggs

It was don Ezequiel’s way of saying that he had been pleased with the results but now he understood that the day before he had only killed the adults. Now he would kill the eggs, too.

As we walked back, don Ezequiel asked me what this visit was for. I knew that several British scientists had visited him, and taken samples back to Britain of one of his unusual tomato diseases. So I said the visit was for CIAT, but that didn’t ring a bell.

So I said it was for the English (*los ingleses*) but that also drew a blank.

“You know, those big gringos,” I said.

“Oh they are big,” don Ezequiel said. “One of them slipped and fell here. It was like dynamite going off. I think he pulverized the Earth where he landed. What ever happened to those samples they took? If there’s one thing that bothers me, it’s when people come out here collecting things and taking data and don’t get me the results back.”

It was easy to picture don Ezequiel in the plant clinic in Comarapa, demanding the results of his samples. Olivia and I explained that his tomatoes had a phytoplasma, a difficult and not well-known group, and that the scientists were still working on getting the scientific name, that he should be patient.

We stopped at a tomato field that looked like it had been sprayed with herbicide. “What can I do for this?” don Ezequiel asked, and Vladimir promised to write it down for him later.

I asked don Ezequiel about the lab. He admitted that he had sent in a few samples and I asked if the results were useful. He said that yes, they were. The lab recommends a product “and if I can

find that product I always obey the recommendation. But sometimes the product is not in the store.”

Just like don Víctor the day before, don Ezequiel was using the word *receta*, which means ‘recipe’ or ‘prescription’, even though the Ladiplantas people call their reports ‘recommendations’. Don Ezequiel went on to make an explicit analogy between the Ladiplantas recommendations and a doctor’s prescription.

“I tell you, give the prescription in writing ... One must apply the prescription if it can be found. It is like when a mother’s child becomes ill, and in desperation she takes him to the doctor and she forgets the prescription. If (the pesticide) is (in the shop) it is obeyed^{vii}.”

His message is clear:

- 1) A diseased crop is as tragic as a sick child.
- 2) The recommendation must be written, or the upset farmer will forget the name of the pesticide.
- 3) If the recommended pesticide can be found in the shop, the farmer will use it.

Mr. Céspedes went on to say that CIAT should teach them courses in how to mix and spray pesticides. Olivia and Vladimir both ignored the remark, but it shows the tightrope that agronomists must walk in responding to farmers’ explicit demands. CIAT can’t do wholesale promotion of pesticides.

Back at the house we sat under the porch and drank lemonade. “Thanks for the visit,” don Ezequiel said, “and thanks for coming to teach me more things.”

“Thank *you* for teaching us things,” I said.

He looked back at me, surprised.

“Like a friend used to say, ‘No one knows everything, and everybody knows something,’” I said.

“That’s good. I should write that down,” don Ezequiel said. Then he interrupted himself. “Speaking of writing things down,” he turned to Vladimir and said, “come write me that prescription for whitefly and *itha*.”



Working together is good for both of us

At the other end of the farm, we saw a trial that don Ezequiel was doing with Ernesto: yellow, sticky flags to trap whitefly. CIAT puts a lot of effort into the search for alternatives to pesticides. Mr. Céspedes is involved in several ways: research collaborator, favourite farmer and demanding lab user.



Here's what to do

In a clear, neat hand, Vladimir Lino writes down a detailed recommendation for mixtures of soap and insecticide for Ezequiel Céspedes.

► A farmer and a gentleman

Land is more abundant around Comarapa than in the higher country. So much so that in some communities perhaps half or more of the people are Quechua-speakers from the higher Andes, who have moved down to buy or rent land. Having more land means that it is easier to produce for market than in the remote, high Andean villages.

The Comarapa farmers we met are smallish commercial growers who send popular food crops like potatoes and fresh vegetables to markets in the Bolivian cities. These farmers are the economic engine of the area and the political constituency. This makes them eminently worthy of attention by local elected officials.

In San Isidro, the next little town east of Comarapa, we met Máximo Vargas, a friendly, grey haired man with a grandfatherly expression. He was delighted that Olivia and I had come to see him, and suggested that we meet him in his field. Olivia knew where it was. “Just walk out there and I’ll catch up with you,” he said.

The plot was several hectares of land, a nice fat rectangle with one end on the blacktop and another on the river in the distance, several hundred meters away. It was gently sloping, deep valley bottomland. When we got there we saw a young man, sitting in the shade, wearing workman’s clothing, cutting up leaves and dropping them into vials of alcohol, and writing numbers on a form.

“You’re writing a thesis on agronomy,” I said.

“Yes,” he sighed, without looking up. He looked like a prisoner, chained to the spot. His topic was a quantitative study of whitefly on the weeds in potato fields.

Just when we wondered if Mr. Vargas had given us the slip, the old man glided in on his mountain bike, hopped off, shared a few kind words with the dejected thesis writer, and gave us a tour of his plot, divided into several ample commercial sized fields of potato, strawberry, broad beans and pasture.

Don Maxi told us that he works with Vladimir from PROINPA. Don Maxi and Vladimir have done so many experiments with laundry detergent that don Maxi even has his favourite brand. “Omo is better than Ace or Ariel, because it’s not as harsh on the plants.” They have also tried

using fresh lemon juice, “It kills everything!” (This example shows that farmers are willing to try ‘organic’ pesticides, but like them best when they kill all the insects in the field, which is not exactly a biological approach to agriculture. People often have little love for insects).



- Máximo Vargas receives visits from this thesis student, and from two other agronomists, Vladimir Lino, who does experiments with him, and a man named Eloy from the Onion Project, who comes every other day. Both of these agronomists take samples to Ladiplantas for don Maxi, and he is happy to buy and apply the prescription.

Don Maxi said the main thing to do with whitefly is to spray with a different insecticide mixed with oil every week, to make the whiteflies stick to the leaves, and to use a motorized sprayer to really force the oily insecticide into the field and all over the surface of the plants.

That morning I had talked to Olivia about the recommendations they were giving farmers. I suggested that they were responding to felt needs. She knew what I meant.

“We’re not just recommending chemicals,” she said. “We recommend crop rotation for nematodes, even though it won’t save this year’s crop. And often there are problems like virus, where we tell farmers that there is no cure. Even though, it is so sad when they come in to pick up a recommendation like that, telling them that they are going to lose their crop.”

As we left, don Maxi asked Olivia to come see him more often. He could have been any elderly gentleman, talking to his favourite grandniece.

Amongst the broad beans

Olivia Antezana and Máximo Vargas talk about leaf miners. Don Maxi showed Olivia a leaf.
 “What’s this?” he asked.
 “Leaf miner.”
 “What can I do for it?”
 “Systematic insecticide,” she said.
 Then she smiled and added,
 “if it’s a bug, it’s with insecticide.”



DISCUSSION

Quality vs. quantity is the constant dilemma in extension. It's a wonderful thing for a farmer to get a visit from a competent agronomist, who thoughtfully brings along a large magnifying glass, because he knows from experience that the small ones are hard for some farmers to use. But there aren't enough agronomists to go around. The Comarapa plant clinic in some ways does answer this dilemma, in that people who most want individual attention can get it on demand by dropping into the lab while they're in town on market day.

Incidence Even seeing a whole plant in the lab tells you little about the incidence in the field. Is that plant the worst case or a typical case? Is it a common problem in that field or in that area? Perhaps we should think twice about making a recommendation based on a single plant, or a part of a plant.

CIAT and PROINPA are doing valuable research on alternatives to chemical control and these should be encouraged. As the cases in this paper show, farmers who use chemicals are delighted to try soap, detergent, lemon juice, anything that is quick and effective. They are also willing to test wheat intercropped with potatoes, and yellow traps for whitefly. But the solutions must be effective or farmers will not adopt them.

Rich or poor?

The home of a farm family with a few hectares of decent land.

The farmers of Comarapa are not the poorest of the poor, but neither are they the richest of the rich. They produce food and jobs that poor people need. They are a good example of endogenous development^{viii}.



Responding to explicit local demand quickly and efficiently often leads to recommending pesticides, at least in the short run. In veterinary community work, chemical solutions are more widely accepted. One recent book repeatedly recommends setting up community animal health care workers who are motivated to work with neighbours' animals because they receive a small commission from the drugs sold^x. This may be more appropriate with animals, where medicines and vaccinations are standard practice. Like community veterinary workers, pesticide dealers in Latin America and much of the tropics also offer free advice, because they earn their money by selling the chemicals they recommend. Although the problem is that vendors are more eager to recommend pesticides than alternatives^x. The plant clinic at Comarapa is different, in that it charges a small fee for the recommendation, but the clinic does not make money by selling chemicals or drugs. Perhaps one day research will develop pesticides that are safe, that do not induce resistance in pests, which do not decimate beneficial organisms (recall the soap and lemon juice), in which case the doctor-prescription analogy may work even better for a plant health clinic.

The lab really works It is staffed by and for community members, open to the public, and it provides quick, accurate diagnoses of plant health problems, in ways that are culturally appropriate, which local people appreciate enough to pay a few pesos for the service. CIAT has a formal rate of fees, depending on the complexity and cost of the diagnosis. They explain to people that the goal is to recover the costs of the materials, and they charge 65 Bolivianos (\$8.50) for the most complex tests of virus, and one Boliviano (\$0.13) for certain insects and diseases which can be identified on the spot, without a lab test. Even for those tests, Olivia and Ernesto give people a written report on the results.

The right people. The people at CIAT's Ladiplantas lab work long hours on short pay. They come in to the office on Sundays. They sincerely like farmers and like working with them and they are very good at what they do. To stretch the medical analogy just a little more, they have the right bedside manner (or fieldside manner). The technical people in Comarapa are excellent, and they have nothing but respect and affection for the British scientists from CABI who helped them set up this plant clinic.

Is Ladiplantas replicable? Probably, with money and good people. Pilot projects are creative by definition, and are invariably staffed by hard-working, thoughtful people like Ernesto and Olivia. The limitations of the Ladiplantas model will become clear when a lot of under-motivated people try to use it on a grand scale. What we hope the readers will do, rather than replicating this experience, is to take the concept of community plant clinics, and adapt it to their own circumstances. In the same way that the rural poor everywhere deserve public services for education, health, drinking water and communication, farm families in the tropics also need public services to diagnose and manage their crop diseases. When public schools, hospitals, water systems, roads and telephones are in poor condition, it only serves to highlight even more how necessary those services are. In the same way, we still have details to work out as to how to run a system of community plant health clinics, but the need is definitely there.



End Notes

ⁱ CIAL: Local Agricultural Research Committee, a popular format for organising smallholder farmers to do adaptive trials of new crop varieties and technologies. See: Ashby, Jacqueline, Ann R. Braun, Teresa García, María del Pilar Guerrero, Luis Alfredo Hernández, Carlos Arturo Quirós, & José Ignacio Roa 2000 *Investing in Farmers as Researchers: Experience with Local Agricultural Committees in Latin America*. Cali: CIAT. 199 pp.

ⁱⁱ It is a fungal disease caused by *Rhizoctonia solani*. In this paper, I use “rhizoctonia” as the common name, which is the way the Bolivian *técnicos* use the word.

ⁱⁱⁱ “Hay un tiempo que sembramos en abril, y había mal tiempo, sembré y fui a Cochabamba a comprar abono y volví y estaba negro, mancha mancha. El Acrobat es bueno para eso.”

^{iv} See: Bentley, Jeffery W. & Keith L. Andrews 1996 *Through the Roadblocks: IPM and Central American Smallholders*. IED Sustainable Agriculture Programme, Gatekeeper Series, No. 56. London: International Institute for Environment and Development. 18 pp.

^v PROINPA (Promotion and Research of Andean Products) is a private agricultural R&D institution headquartered in Cochabamba, Bolivia. It evolved out of a Swiss-funded project originally housed in the public-sector Bolivian Institute of Agricultural Technology.

^{vi} *Itha* is a loan word from Quechua, originally meaning ‘louse’. Here they are using it in Bolivian Spanish to refer to a small sucking insect pest, a Homoptera that Vladimir Lino identified as *Ruselliana solanicola*. The ‘th’ is not pronounced as in ‘Ithaca;’ it is a breathy (aspirated) ‘t’ as found in many languages native to the Americas and South Asia.

^{vii} “Por eso le digo que lo den por escrito... Uno tiene que aplicar la receta si es que hay. Es como cuando a la madre se le enferma su hijo y a la desesperación lo lleva al doctor y se le olvida la receta. Si hay (el producto recomendado en el mercado) se obedece.”

^{viii} As Rob Tripp points out, endogenous development, i.e. the growth of a country’s own firms and farms, is by far more effective than induced development (e.g. foreign projects) in strengthening a country’s economy. See: Tripp R, 2001 *Seed Provision & Agricultural Development: The Institutions of Rural Change*. London: Overseas Development Institute. 174 pp.

^{ix} See: Catley, Andy, Stephen Blakeway & Tim Leyland 2002 *Community-Based Animal Healthcare: A Practical Guide to Improving Primary Veterinary Services*. London: ITDG Publishing. 360 pp.

^x See: Davidson AP., Munir Ahmad & Tanvir Ali, 2001 Dilemmas of Agricultural Extension in Pakistan: Food for Thought. *AgREN Network Paper* No. 105. *See also*:

Williamson S, 2003 Pesticide Provision in Liberalised Africa: Out of Control? *AgREN Network Paper* No. 126.