Short and to the Point:
FFS, Community Workshops and Radio in Bolivia

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FFS (farmer field schools) are of high quality, but will people learn as much in fewer sessions, with quicker methods, and lower costs? In the Andean valleys of Chuquisaca, Bolivia, we measured the difference between FFSs, radio and a new extension method: community workshops. The workshop was similar to a FFS: it lasted half a day, like a FFS (van de Fliert 2000), but the each workshop met three times per crop cycle, while the FFS met ten times.

During the 2002-2003 season we held FFSs or workshops in over 30 communities, on bacterial wilt of potato. The local name for the disease is *q'awi*; it is caused by the bacteria *Ralstonia solanacearum*. It is a serious disease, introduced to Bolivia in the mid 1980s.

Before doing the study, we formed two hypotheses.

Hypothesis 1. The participants will learn more in a FFS than in a workshop, and more in a workshop than from the radio.

Hypothesis 2. The FFS will encourage people to do more experiments on their own than people who listen to the radio or attend workshops.

Geography

The Andes harbor many micro-environments, but simplifying a little, there are two great agro-zones in the study area: pampas and cordillera.

The Pampas of Padilla are a rolling plain around the town of Padilla, at some 2300 meters above sea level, with 630 mm of annual rainfall (Cortez 1993). People grow peanuts to sell, maize to fatten hogs (to sell) and for making *mote* (hominy) to eat at home. They tend a parcel or two of potatoes, mostly to eat at home.

The Cordillera of El Rosal is higher, reaching 2800 meters, and wetter: 800 mm of annual rainfall (Cortez 1993). Crops can be planted three times a year. Some families plant up to a hectare of potatoes, and so they have enough to sell.

For bacterial wilt, there are three main differences between the pampa and the cordillera.

- The pampa is warmer, and is better habitat for *q'awi*.
- By having three planting seasons, it is much easier to renew one's own seed in the cordillera.
- There is more fallow land in the cordillera.

However, *q'awi* is a problem in both areas, and the management is about the same.

Extension methods

FFS. Each FFS had an agro-ecosystem analysis and a learning field. In order for participants to see how healthy seed manages bacterial wilt, each plot was divided in two, like a demonstration plot, where a local farmer planted certified seed in half of the plot and local seed in the rest (both with the same rates of fertilizer and fungicides).

Workshops. The workshops included:

- An IPM (integrated pest management) focus.
- *Dinámicas* (sometimes called "energizers," little ice-breaking games).
- Information on the bio-ecology of the bacteria.
- Discovery: for example, seeing evidence of the bacteria with a test developed by CIP (the flow test). One puts a section of stalk from a diseased plant in a glass of water to see the smoke-like fluid flow from the bottom end of the stalk.
- A learning plot, like in the FFS, designed to show the importance of healthy seed.

We don't have space to describe everything that we did in the workshops. A few vignettes will have to do. We used some energizers with technical content (not just to stretch our legs). In one of them, the extensionist José Luis Quiruchi went with people to the football field, to show how the *q'awi* inoculum enters the potato plant, and a weed, but not maize. This is because maize is "closed" (the bacteria cannot rise through its vascular tissue). People like the game, and it explains clearly that maize is resistant to the disease.

Three men play the role of *q'awi*. They get ready to enter the groups of people who represent different plants.

The other people hold hands. One group represents potato and one a weed. The *q'awi* easily enters those groups because there is a lot of space between each person.

But when the *q'awi* tries to enter the "maize" it fails, because the maize is tightly closed. The game has technical content: the potato and some weeds are susceptible to *q'awi*, but maize is resistant, therefore rotation with crops like maize helps to eliminate the disease.

The workshop also used demonstrations with plants and seeds. In one of them, agronomist Róger Rioja showed people how to cut potatoes to inspect them for pus, which is a symptom of *q'awi.* If people do not recognize diseased seed, they may plant it and contaminate their future crop. Mr. Rioja handed a cut potato to each of them so they could observe and discover.

Each participant has a cut potato, to observe the symptoms of *q'awi.*

Discussing seed quality with community members in Monte Canto.

Radio programs. We wrote six scripts of three minutes each, to convey the same agro-ecological information that we gave in the FFS and workshops. As in the workshops and FFS, the radio programs emphasized cultural control (healthy seed, healthy soil). They were short messages, and to the point. The programs were written in plain Spanish by the same agronomists who carried out the FFS and workshops. They were edited and read on the air (three to four times a day for a month, each message) by professional broadcasters at

Radio Mauro Núñez, a community, non-profit radio station, with years of experience broadcasting health and agricultural information in the study area.

Short questionnaire

In February 2003 we did a short questionnaire in nine communities. As often as possible, we held the interviews in the potato fields. The questions were open. For example "how does *q'awi* get to the field?" The people responded in their own words, and did not have to check off pre-fabricated answers. (For a copy of the instrument, please request one from the senior author.)

Table 1. Communities interviewed

Community	***Extension style***	***Agro-ecozone***
Sillani	Workshop	Pampa
San José	FFS	Pampa
La Ciénega	Workshop	Pampa
San Mauro	Radio	Pampa
T'ola Q'asa	FFS	Cordillera
Punilla	Radio	Pampa
Recalde	FFS	Pampa
Tres Pozas	Radio	Cordillera
Campo Redondo	Workshop	Pampa

In each community we interviewed about six people.

Results of the short questionnaire

Seed is the source of inoculum. Almost everyone understood that infected seed is the main source of the disease, even people who had only listened to the radio. Everyone said that they were careful to use seed from an area they knew, preferably grown by people they trusted.

Table 2. How many understood that *q'awi* is spread by seed

	FFS	***Workshop***	***Radio***
Understands that *q'awi* is transmitted in seed	19 (100%)	18 (100%)	15 (83%)
Does not understand (thinks it just appears)			1 (6%)
Does not know or is not sure			2 (11%)

Also, 70 to 80% of the people do something to find out if their seed is healthy, even those who only listen to the radio.

Table 3. How many people did something to see if their seed was healthy

Method of diagnosis	***FFS***	***Workshop***	***Radio***
Used at least one method to see if their seed was healthy	**16 (84%)**	**13 (72%)**	**16 (88%)**
Did ***nothing*** to see if their seed was healthy	3 (16%)	5 (28%)	2 (11%)

Recognizing symptoms. Most of the people could describe at least some of the symptoms of diseased tubers. However, people who attended FFS and workshops knew more than people who only listened to the radio programs.

Observing symptoms. Many people could explain the symptoms of bacterial wilt in their own words.

> When it starts to *q'awi*, when the plant is filling out, even the roots can rot.
>
> Ricardo Flores, La Ciénega (workshop)

> The leaves look cooked. The other plants are healthy, and some are as though we had thrown boiling water on them. We pull them up and the roots are rotten. Inside the potato we see it clearly, like rays, as though the potato were cooked.
>
> Gregoria González, San Mauro (radio)

Q'awi habitat. Many people knew that bacterial wilt needs warmth and humidity. People who attended FFS and workshops understood this point more than the radio audience did.

Table 5. Where does *q'awi* multiply more rapidly?

	Response	***FFS***	***Workshop***	***Radio***
Correct answers	Humidity and warmth	10 (53%)	4 (22%)	2 (11 %)
	Warmth	1 (5%)	2 (11%)	
	Humidity	2 (11 %)	3 (16%)	1 (6%)
	In the valleys or in temperate climates	1 (5 %)	3 (16%)	4 (22%)
	In volunteer potato plants			1 (6%)
	In weeds and wild plants		2 (11%)	1 (6%)
	In contaminated potato plots	1 (5 %)	1 (6%)	1 (6%)
	Humidity and weeds	1 (5%)		
Total of correct answers		**15 (83%)**	**15 (83%)**	**10 (56%)**
Ambiguous answers	In all plants except beans, and in the fields	1 (5%)		
	Tired soil			1 (6%)
	Sandy soil			1 (6%)
	Drought; and clayey soil		1 (6%)	
Total of ambiguous answers		**1 (5%)**	**1 (6%)**	**2 (11%)**
Does not know or no response	Does not know	2 (11%)	1 (6%)	6 (33%)
	No response		1 (6%)	
Total does not know or no response		**2 (11%)**	**2 (11%)**	**6 (33%)**

Almost everyone gets his or her seed from the high country. It's possible that they do so in part not just because they have learned to do so from the project, but also because they realized that they should because of their own observation and from earlier projects.

Crop rotation. The people from the FFS understand better than the others that crop rotation helps to lower the amount of inoculum in the soil.

Table 6: Understanding that the inoculum of bacterial wilt survives in the soil

	FFS	***Workshop***	***Radio***
Understands that *q'awi* survives in the soil	19 (100%)	8 (80%)	14 (74%)
Doesn't know or is not sure	0	2 (20%)	4 (22%)

People's own experiments and experiences

Farmers test hypotheses based on their observations and experiences. For example, Timoteo Andrade, in T'ola Q'asa (FFS) explained how

> We cleared a plot from the forest and the *q'awi* wiped out half the crop. And there is no runoff of water from higher up. It was in virgin land and not even weeds grow in new land. And the seed was (certified). In warm places there is (bacterial wilt).

His statement is extremely logical.

1. One field had a lot of *q'awi*
2. But it was newly cleared from the forest
3. It did not receive runoff water
4. It did not have weeds
5. The seed was certified
6. It was in high country

Therefore the inoculum could not have come from:

1. the soil
2. or water
3. or weeds
4. or from seed
5. and it was not in the lower, warmer areas.

In other words, either the certified seed was contaminated, or there was yet another mechanism which contaminated the field.

***Experimentation with* q'awi**. There was not a lot of farmer experimentation with the management of *q'awi*. Liberato Carvallo (radio) tried insecticide to see if it would control *q'awi*, and it didn't. Fructoso García (FFS) did a flow test, as he learned in FFS (putting a plant stem in a glass of water to see the bacterial fluid oozing out of the stem). But Mr. García did the test with beans, not with potato (to see if he could detect bacterial wilt in beans), in collaboration with the extensionist from another project.

In Campo Redondo (workshop), we documented two experiments with *q'awi*: Eleuterio Plata used ash to disinfect a plot after planting potato, to kill the bacteria. He also applied maize husks to the furrow, so the "bacteria would die with the cold."

We still do not know if these practices work, but some of them are worth validating. The amount of experimentation with *q'awi* was more or less the same in the communities that only had workshops as in the ones with FFS. We had expected to see more experimentation inspired by the field schools than by the workshops. But that was not the case.

Table 7. Farmer research on *q'awi*

	FFS	***Workshop***	***Radio***
Hypothesis on the role of weeds and seeds in *q'awi*	✓		
Flow test, in beans, with an extension agent	✓		
Ash to kill bacteria in the field, after harvesting potatoes		✓	
Maize husks to kill bacteria in furrow		✓	
Urine to kill the q'awi bacteria		✓	
Proved that insecticide does not cure *q'awi*			✓[1]

[1] Mr. Carvallo is in a radio-listening community, but he himself does not listen to the radio much. He did his experiment in response to a suggestion from his brother "to use pure chemicals" to control *q'awi*.

Conclusions

This is a preliminary experience, which will have to be reconfirmed in other, longer studies and with more interviews. Nevertheless, perhaps FFS can be accelerated, obviously while still teaching agro-ecological principles through discovery, without losing much value of the message. As Roland Bunch says, it is better to give one idea to 100 people, than to give 100 ideas to one person (Bunch 1982). In this article we compared FFS with workshops and radio for only one problem and along a few dimensions (learning and adoption of technology a few months later, and farmers' own experiments.) In the future, researchers could compare themes such as learning in the long run, permanent technical change and empowerment. It might be useful to see FFS, radio and workshops not as alternatives, but as complements. FFS could be useful when it is necessary to go into an agro-ecological theme, to do collegial research, and the radio and workshops could disseminate specific information on a wider scale.

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Photos

All photos by Jeff Bentley.

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