

Farmers developing technology: the researcher's role revised

Gabino Lopez and Roland Bunch

In Central America farmer experimenters are taking over some of the roles conventionally associated with researchers. COSECHA has been facilitating farmer experimentation in the hope of finding profitable ways of using micro-catchments for water-harvesting. On the bases of these experiences the authors challenge researchers to support this trend and adapt their roles to the farmer experimenter situation.

As the number of Central American farmer experimenters gradually grows into the thousands, certain questions have emerged. These can also be expected to arise in the future in other parts of the world. Most important among these questions are: 'What will be the role of professional researchers in the future?' and 'How can farmer experimenters and professional researchers best work together?' Professional extensionists once feared they would lose their jobs if villagers became promoters. Now some researchers are also beginning to fear for their jobs because farmer experimenters are not only developing new technologies, but have proved themselves capable of both basic and adaptive research.

Experience shows, however, that in research and extension both villagers and professionals have unique contributions to make. Villagers are not learning how to experiment because they want to take over the job of the professional, but

because they want to supplement and complement what professionals can do best. In this process the role of the professionals will probably change. The experience of COSECHA, a Honduran NGO, gives some insight into how this process may work in the future. COSECHA has been involved in the development of new water harvesting technology for small farmers.

Micro-catchments for water harvesting

Since the early 1980s, COSECHA personnel have been aware that the greatest need of villagers in semi-arid areas is to overcome the problem of deficient or irregular rains. In 1997, COSECHA decided to try and develop an inexpensive technology with which farmers could capture rainwater and hold it on their fields for up to six months. The water could be used for supplementary irrigation during the growing season and to extend the growing season by a few weeks if necessary.

Through its previous work, COSECHA had discovered that it was possible to dig 0.5 cu.m micro-catchments in the ground that would hold water for a number of days. However, we did not know how water could be kept for longer periods or how to do this at little expense. Experiments were carried out to find the size and shape of catchment farmers would be like best and how they would like to use the water. It was also important to find out under what conditions this technology could be economically feasible.

Preparing the technology for farmer experimentation. With most technologies, farmer experimenters can begin work right away. However, some technologies are less attractive to farmers in the beginning: they are too complicated; they are based on laboratory findings; the initial investment is too high; or they do not produce immediate economic benefits.

COSECHA did not know whether micro-catchments would be cost-effective. We made a series of micro-catchments of varying sizes and lined them with different materials (burnt clay, plastic, cement, and the sap from a local tree) and then tried using them to irrigate crops. They made a cost-benefit analyses of each alternative. We concluded that although eventually cheaper materials might be needed, the cost-benefit ratio for the farmers was attractive even if cement were used to line the catchments. The cement could easily hold 90% of the water for six months or more. It was decided to try two methods of lining the micro-catchments with cement. One using a mixture of cement and sand and another using cement, lime, sand and stones.

A small group of known experimenters were selected to begin the experimentation. COSECHA selected a group of 12 farmer experimenters from those interested in the catchment idea. These farmers were known to have considerable creativity, to have taken great care with their experiments in the past and to have benefited significantly from COSECHA's past PTD efforts. They would be able to take small risks without endangering their family's food security and were generally considered good farmer experimenters. An attempt was made to ensure that farmer experimenters would try out a reasonable number of alternative approaches and would be prepared to put in enough effort to maintain the catchments. The farmers selected were considered capable of recognising and collecting the necessary and relevant information and of promoting the water harvesting idea if and when the experiments were successful.

At first, we exchanged materials for information. Still farmers were reluctant to invest the US\$15.00 to \$20.00 needed to line the micro-catchments while there was no proof that the technology worked. COSECHA wanted to get as much information as possible for these experiments. Therefore it gave the experimenters cement, sand, lime and rocks and in exchange it was agreed that COSECHA



Gabino Lopez convinced that water-harvesting in micro-catchments can make a return on costs.

would receive information on the problems, costs, benefits, and possible uses of the micro-catchments. In this way, COSECHA openly recognised the value of the farmer experimenters' research and the time they would have to spend recording information. Farmers felt more comfortable with the risk they were taking by participating in the experiments and the programme received a considerable amount of important information.

COSECHA maintained constant communication with the farmer experimenters. Constant communication with the farmer experimenters was very important. Discussions were held with farmers about aspects of the new technology and they were encouraged to try out potentially useful modifications. In doing so they were able to collect important data. It was found that farmers needed specific types of help. Some needed help to ensure they included all costs incurred in their reports while others needed help in keeping accurate records. Farmers also needed help in detecting sources of rainwater (eg from patios, footpaths, natural temporary waterways) and in recording how water was used. Sometimes estimating the size of the area that could be irrigated also presented difficulties..

COSECHA constantly promotes the cross-pollination of ideas, experiences and technological modifications among farmer experimenters. For example, one farmer experimenter tried using fill to support the downhill side of his catchment, but this caused the cement to crack. Another farmer experimenter found a very simple way of repairing small cracks. Many farmer experimenters decided they preferred 1-2 cu.m micro-catchments. More important still many farmer experimenters began to use water for their domestic needs and to fill backpack sprayers, for home construction and for watering animals and their perennial home gardens. These problems and ideas were immediately shared with the other farmer experimenters.

COSECHA is preparing to share the technology with farmer experimenters throughout Honduras. Now that micro-catchments have been found to be economically feasible for most crops and uses, several other NGOs in Honduras and El Salvador have begun promoting them. COSECHA has received a grant to maintain its work with farmer experimenters throughout the country, to organise conferences so farmer experimenters can share their new ideas with each other and document the results and to encourage water harvesting and other technologies being developed by farmer experimenters.

Juan Atz,
a farmer
experimenter,
lines a
micro-catchment
to prevent
seepage.



Photo: Roland Bunch

The future role of researchers

Because there are many potential farmer experimenters it is more than likely that they are carrying out most of the agricultural research in Guatemala and Nicaragua and that this will soon be the case throughout Central America. Nevertheless, this does not mean that professional researchers will have no work to do. On the contrary, farmer experimenters will be able to provide an important link with professional researchers and help ensure that their technology will be rapidly incorporated into the practices of village farmers.

As COSECHA's work with micro-catchments shows, professional researchers will still have plenty to do. Strategic activities include:

- Carrying out research that requires complicated theoretical understanding or laboratory equipment and research that farmer experimenters are not prepared to undertake eg research that is expensive or has doubtful or long-term paybacks,
- Organise groups of farmer experimenters to investigate different aspects or modifications of specific promising technologies, sometimes offering inputs in exchange for information,

- Carry out studies to explain the results and investigate the possible long-term impacts of farmer experimenter-developed technologies,
- Collect information and technologies developed by farmer experimenters and analyse them using systems such as "Modified Stability Analysis," computer software in order to establish the statistical value of the information collected
- Publish and disseminate information on particularly promising technologies developed by farmer experimenters through the traditional media as well as through events such as cross visits and conferences of farmer experimenters.

This brave new world of research has already arrived in Central America, at least as far as technologies such as green manures, natural pest control, and water harvesting are concerned. It will take some time before it reaches other parts of the world. But when it does, the chances of finding the technologies needed to maintain the multitude of low-input technologies desperately needed by the world's complex and diverse small-scale farms will increase substantially.

Gabino Lopez and Roland Bunch, COSECHA,
Apartado 3586, Tegucigalpa, Honduras.
Email: rolando@cosecha.sdnhon.org.hn