AT LAST, A WAY TO INVOLVE SMALLHOLDER FARMERS IN IPM RESEARCH

Jeffery W. Bentley, Agricultural Anthropologist, Global Plant Clinic, Cochabamba, Bolivia describes how Farmer Field Schools and inventive extensions of this idea are bearing dividends in the less developed world
jefferywbentley@hotmail.com

Key words: participatory research , FFS (farmer field school), extension

To have an impact, extension has to get the message right; this is research. Then the message has to reach everyone who needs to know it, in a way they can understand: this is extension. In recent years, the IPM message has been linked with one particular extension style: farmer field schools (FFS), even though they are a better tool for research than for extension.

Evaluation of Farmer Field Schools

Evaluating FFS for extension is hardly straightforward. They were created by the FAO IPM in Asia program in the 1980s to teach Indonesian farmers to avoid needless insecticide applications on rice, especially for white rice stem borer (*Scirpophaga innotata*) and brown planthopper (*Nilaparvata lugens*). An FFS teaches about 25 farmers at a time. They meet once a week for half a day during the whole cropping cycle.

A study in Peru found that FFS graduates had higher potato yields than their neighbours (Ortiz, 2004). In the Central Philippines, a long-term village study showed that farmers learned to observe insects in the field school, and that each year fewer of them used insecticides, until some six years after training, all or nearly all of them had stopped spraying for insects in rice (Palis, 2006). A study of cotton farmers in Southern India showed that IPM adoption (following FFS) reduced pesticide use by 78% without affecting crop yields (Mancini, 2006).

However, quantitative studies of some of the original FFS cohorts by Feder and colleagues raise doubts. They found that the most prosperous farmers had been preferentially chosen for the field schools, biasing the results. There was little difference between FFS graduates and their neighbours; i.e. the FFS graduates were not getting better rice harvests, and were not using less pesticide. Trained farmers were not teaching their new IPM knowledge to their neighbours (Feder, 2004a; 2004b). Ricker-Gilbert (2005) in Bangladesh concluded that a visit from an extension agent was a more cost-effective method than FFS for teaching IPM technology. Rice farmers in Bangladesh who had taken FFS could not identify planthopper nymphs; most thought the nymphs were related to stem borers (which are lepidopterans, i.e. entirely different insects). After IPM training by various NGOs, few if any farmers practiced the new techniques that they were taught, because the technologies were perceived as being labour intensive or risky. Over time, farmers tended to forget much of what they were taught (Robinson *et al*., 2007).

No method is perfect, and I would forgive FFS some of the above problems; some of them could be fixed with quality control, but FFSs will never be a tool for mass extension because field school graduates do not or cannot teach what they have learned to their neighbours. This has been reconfirmed in Africa, Sri Lanka, the Philippines, Indonesia and elsewhere (Davis, 2006; Anandajayasekeram *et al*., 2007; Tripp *et al*., 2005; Rola *et al*. 2002). It was hard for farmers in Java to teach IPM to their neighbours, because the messages were complex, because the farmers did not have a convenient time and place to convey the information and because their neighbours were sceptical (Winarto, 2004).

Getting the Message Right

However, FFS is a great way to get the message right in the first place. For years, social scientists like me have been lecturing agricultural scientists to let farmers "participate" in research. Progress was slow; among other reasons, there was no protocol for actually doing "participatory" research. FFS may be just that protocol, because it gives scientists a chance to see how farmers react to scientific ideas, and because FFS lets farmers see the reasons behind a new technology, and suggest improvements (Paul Van Mele, personal communication).

In the 1990s, a Swiss-funded project by Zamorano in Nicaragua and El Salvador taught farmers using FFS. Farmers combined the new ideas creatively with their own knowledge, even though the program did not actively encourage them to do so. Some of the changes were especially useful. For example, twenty years earlier, in the 1980s, researchers had tried to develop "trash trap" (piles of leaves, where slugs would hide; farmers could turn the piles over and kill the slugs by hand). The original traps did not work very well, but over the years, and especially after the field schools, the farmer experiments improved them in several ways (e.g. combining the traps with commercial pellets, using old sacks as the traps), which made them more practical (Bentley, 2006).

Ooi (1998) also found that farmers experimented after taking an FFS, for example after learning that dragonflies are beneficial, farmers began to set sticks in the field as perches for them. During a two-year study of a village on Java, Winarto (2004) found that FFS graduates experimented with

DOI: 10.1564/20aug00

the new ideas, e.g. inventing early ploughing, and hand collecting egg masses to control white rice stem borers.

Field schools are starting to be combined with CIALs (the Spanish acronym for "local agricultural research committees"), to fine tune technologies (Van Mele & Braun, 2005; Braun *et al*., 2000). Whenever I visit a field school I am impressed by how much farmers like it. They usually say they wish it could go on for more than one year. Researchers in Peru and Bolivia harnessed that goodwill, and invited FFS graduates to form CIALs to study cultural controls for bacterial wilt in potatoes. The farmers readily agreed. CIALs often have a pedestrian research agenda, limited to testing new technology; but when CIALs were formed from former FFS, they actually invented several new technologies, because the farmers and the scientists understood each other. They now had a common background. One interesting idea was a set of rotational crops for reducing the bacteria in the soil. This was investigated in formal trials, under the leadership of the researchers, with collaboration from the farmers. Some of the technologies emerged serendipitously. For example, researchers in the Andes taught farmers to clean their sandals with lime before entering a field, so as not to track in bacteria. CIP plant pathologist Sylvie Priou noticed that when farmers ran out of lime, they used wood ash instead. She tested the ash in her laboratory and found that it killed the Ralstonia bacteria effectively (Bentley *et al*., 2006).

FFS was one of the main inspirations for the PLAR (Participatory Learning and Action Research method) developed in West Africa for improving rice cultivation. Like the FFS, the PLAR uses weekly meetings with farmers, from soil preparation to harvest, and has respect for local knowledge and local creativity. Researchers encourage farmers to experiment with ideas; and the best ones are adopted by the group (Defoer *et al*., 2004). Groups stay organized for several years and the most successful ideas from the PLAR (such as transplanting rice) are taught to wide audiences through videos, made in the PLAR villages, starring the farmer-experimenters. The videos can be seen at http://www.warda.org/warda/guide-video.asp

Reaching Everyone Who Needs to Know

Following up an FFS with mass extension based on video is one way to get the message right and then take it to as many people as possible. Video is not the only way to reach a mass audience. Here are a few more examples. They can also be combined with each other.

Promoters are a kind of farmer extension agent, which are popular in Central America, due to World Neighbours and other institutions. They are a low cost, personal way of reaching many people, as explained in *Two Ears of Corn* (Bunch, 1982).

In Bangladesh, one innovative NGO, Shushilan, used "picture songs" (song and a very large painting on a scroll) as a kind of moving picture, to teach appropriate rice technology to thousands of people, especially about natural enemies and using organic fertilizer. As a performer sings out the message (and dances), the rest of the troupe accompanies her with music, and rolls out the illustrations on the scroll. Hundreds of people can see each memorable performance at one sitting, and as of 2005, some 25,000 people had seen and heard the message

Picture songs in Bangladesh: singing and dancing about IPM, while showing large illustrations

Videos have been used in Bangladesh, combined with farmer participatory research, and community meetings. Researchers at RDA (Rural Development Academy) developed appropriate rice seed technology with farmers (e.g. drying rice seed on a bamboo table, keeping seed dry in a painted pot). Then they made videos where farmers spoke on camera. Their honest words were convincing to other farmers, who could identify with them. Extension agents showed the videos in communities, and then answered questions from the audience, which allowed many people to be trained at once, in a relatively short time (Van Mele *et al*., 2005; Van Mele in press).

Plant health clinics are a new extension method being implemented in Nicaragua, Bolivia, Uganda, Bangladesh and elsewhere. They started in Bolivia in the 1990s, so farmers from distant areas could bring plant samples and get advice about plant health problems. Most of the clinics are only open one morning a week, e.g. on fair day, when the small town fills with farmers from many kilometres around. The plant clinics provide a place for personalized consultations between farmers and agronomists (Danielsen *et al*., 2006).

Plant health clinic in Bolivia: farmers consult the weekly clinic at a farmers' market

Going Public in Kenya: Nelson Wekulo tells a crowd how to vaccinate hens for Newcastle disease. IPM topics work equally well with this soap-box style of extension

Going Public is another face to face method for a mass audience. An extensionist goes to a market or another crowded place, and delivers a short message, and then repeats it. The audience comes and goes, but if the message is kept to five minutes, several hundred people can hear it in a few hours. It is especially well suited to rather simple messages that must show something (e.g. a disease symptom, a new tool). Going Public has been used in Bolivia, Bangladesh, Uganda and elsewhere (Bentley *et al*., 2003).

Written material, including fact sheets, journals and newspapers are also useful, especially when written for farmers and validated by farmers before distribution. In India, coffee farmers in Karnataka have journals and magazines in their homes. *Adike Pathrike* is a magazine that started as a newsletter in the 1980s and rapidly expanded. It is published entirely in the Kannada language. It has a colour cover and additional black and white photos inside. Almost all of the material is based on farmer experiences. The new technology described has to be validated by farmers, even though agricultural scientists write most of the material. The readers are solid commercial growers, family farmers who are literate and who can afford a magazine. Advertisers help keep the costs down, and a good postal system helps to move it. Journals would not be effective everywhere, but in this situation they are (Padre & Tripp, 2003).

Written material in Bolivia: Gonzalo Sandoval (left) hands out fact sheets on onion diseases, and discusses them with farmers

Radio is a promising method, and has been used recently in Vietnam to teach people to avoid insecticide abuse in rice. A project using radio, leaflets and other media led to a 53% reduction in insecticide use and no loss in production in project sites, and the change eventually spread to more than a million rice farmers three years later (Escalada & Heong, 2004).

A study in Bolivia compared FFS to radio and community workshops, which are like FFS, but more people attend, as many as 80. Community workshops only meet three times during a cropping season instead of a dozen, saving time and expense. The community workshops were nearly as effective as FFS at getting a message across, and the radio made a respectable showing, but at a fraction of the cost (Bentley *et al*., in press).

Conclusion

FFS may not be the best extension method for teaching IPM, but it is a powerful way for scientists and farmers to work together to get the technology right. Farmers and scientists are rather different kinds of people, but FFS is a format that they can both relate to and they learn from each other to create appropriate technologies for IPM (and farming in general). FFS works best for sharing basic background ideas and for finishing techniques which are not yet ready for adoption. However, once the technologies are sound, it is not feasible to share them with the general public via FFS. There is simply not time, money or personnel to spend a whole cropping season with every group of 25 farmers, not if your country has ten million farmers. Once the message is right, take it everyone who needs it, using mass extension methods.

Acknowledgements

Thanks to Graham Thiele and Eric Boa for their comments on earlier versions.

This article is adapted from:
Bentley, J.W. 2009. Impact of IPM extension for smallholder farmers in the tropics. In: Peshin, R. & Dhawan, A.K. (eds.) *Integrated pest management. Vol. 2. Dissemination and impact*. Springer, New York, USA pp. 333–46. (Volume 1 is entitled: *Innovation-development process*).

References

Anandajayasekeram, P., Davis, K. & Workneh, S. 2007. Farmer field schools: An alternative to existing extension systems? Experience from Eastern and Southern Africa. *Journal of International Agricultural and Extension Education* **14** (**1**):81-93.

Bentley, J.W. 2006. Folk experiments. *Agriculture and Human Values* **23**(**4**):451-62.

Bentley, J.W., Boa, E., Van Mele, P. Almanza, J. Vasquez, D. & Eguino, S. 2003. Going Public: A New extension method. *International Journal of Agricultural Sustainability* **1**(**2**):108-23.

Bentley, J.W., Nuruzzaman, M., Nawaz, Q.W., Haque, M.R. 2005. Picture songs. In Van Mele, P., Salahuddin, A. & Magor, N.P. (eds.) *Innovations in Rural Extension: Case Studies from Bangladesh*. CABI and IRRI, Wallingford, UK: pp. 115-23.

Bentley, J.W., Priou, S., Aley, P., Correa, J., Torres, R., Equise, H., Quiruchi J.L. & Barea, O. 2006. Method, creativity and CIALs. *International Journal of Agricultural Resources, Governance and Ecology* **5**(**1**):90-105.

Bentley, J.W., Barea, O., Priou, S., Equise, H., & Thiele, G. 2007. Comparing farmer field schools, community workshops, and radio: Teaching Bolivian farmers about bacterial wilt of potato. *Journal of International Agricultural and Extension Education* **14**(**3**):45-61.

Braun, A.R, Thiele, G. & Fernández, M. 2000. Farmer field schools and local agricultural research committees: Complementary platforms for integrated decision-making in sustainable agriculture. ODI, London, UK. *AgREN Network Paper* No. 105.

Bunch, R. (1982) *Two Ears of Corn: A Guide to People-Centered Agricultural Improvement*. Oklahoma City: World Neighbors. 250 pp.

Danielsen, S., Boa, E. & Bentley, J.W. 2006. Puesto para Plantas: A Clinic Where You Can Bring Your Sick Plants. Funica, Managua. (available on-line at http://www.funica.org.ni/docs/Book-PPP-Eng.pdf, accessed 28 June 2009).

Davis, K. 2006. Farmer field schools: A boon or bust for extension in Africa? *Journal of International Agricultural and Extension Education* **13**(**1**):91-97.

Defoer, T., Wopereis, M.C.S., Idinoba, P., Kadisha, T.K.L., Diack, S. & Gaye, M. (2004). *Manuel du Facilitateur : Curriculum d'Apprentissage Participatif et Recherche Action (APRA) pour la Gestion Intégrée de la Culture de Riz de Bas-Fonds (GIR) en Afrique Sub-Saharienne*. Cotonou: WARDA, CTA, IFDC, CGRAI.

Escalada, M.M. & Heong K.L. 2004. The case of using mass media: Communication and behavior change in resource management. In *New Directions for a Diverse Planet. Proceedings of the Fourth International Crop Science Congress*. Brisbane, Australia.

Feder, G., Murgai, R. & Quizon, J. 2004a. Sending farmers back to school: The impact of farmer field schools in Indonesia. *Review of Agricultural Economics* **26**(**1**): 45-62.

Feder, G., Murgai, R. & Quizon, J. B. 2004b. The acquisition and diffusion of knowledge: The case of pest management training in farmer field schools, Indonesia. *Journal of Agricultural Economics* **55**(**2**): 221-43.

Mancini, F. 2006. Impact of integrated pest management farmer field schools on health, farming systems, the environment, and livelihoods of cotton growers in Southern India. Wageningen University, Netherlands dissertation no. 3936.

Ooi, P.A.C. 1998. Beyond the farmer field school: IPM and empowerment in Indonesia. IIED, London, UK. Gatekeeper Series, No. 78.

Ortiz, O., Garret, K. A., Heath, J. J., Orrego, R. & Nelson, R.J. 2004. Management of potato late blight in the Peruvian Highlands. Evaluating the benefits of farmer field schools and farmer participatory research. *Plant Disease* **88**: 565-71.

Padre, S., Sudarshana & Tripp, R. 2003. Reforming farm journalism: The experience of *Adike Pathrike* in India. Overseas Development Institute, London, UK. *Agricultural Research and Extension Network* Paper No. 128.

Palis, F. 2006. The role of culture in farmer learning and technology adoption: A case study of farmer field schools among rice farmers in Central Luzon, Philippines. *Agriculture and Human Values* **23**(**4**): 491-500.

Ricker-Gilbert, J. 2005. Cost-effectiveness evaluation of integrated pest management (IPM) extension methods and programs: The case of Bangladesh. Virginia Polytechnic Institute and State University, USA. M.Sc. thesis.

Robinson, E.J.Z., Das, S.R. & Chancellor T.B.C. 2007. Motivations behind farmers' pesticide use in Bangladesh rice farming. *Agriculture and Human Values* **24**(**3**): 323-32.

Rola, A.C., Jamias S.B. & Quizon, J.B. 2002. Do farmer field school graduates retain and share what they learn? An investigation in Iloilo, Philippines. *Journal of International Agricultural and Extension Education* **9**(**1**): 65-76.

Tripp, R., Wijeratne, M. & Piyadasa, V.H. 2005. What should we expect from farmer field schools? A Sri Lanka Case Study. *World Development* **33**(**10**): 1705-20.

Van Mele, P. in press. Zooming-in, zooming-out: A novel method to scale up local innovations and sustainable technologies. *International Journal of Agricultural Sustainability*. In press.

Van Mele, P. & Braun, A.R. 2005. Importance of methodological diversity in research and development innovation systems. In Gonsalves, J. Becker, T., Braun, A., Campilan, D., de Chavez, H., Fajber, E., Kapiriri, M., Rivaca-Caminade, J. & Vernooy, R. (eds.) *Participatory Research and Development for Sustainable Agriculture and Natural Resource Management: A Sourcebook*. Volume 1. *Understanding Participatory Research and Development*. CIP-Upward/IDRC, Manila, The Philippines. pp. 151-6

Van Mele, P. Zakaria, A. K. M. & Bentley, J.W. 2005. Watch and learn: Video education for appropriate technology. Van Mele, P., Salahuddin, A. and Magor, N.P. (Eds.) *Innovations in Rural Extension: Case Studies from Bangladesh*. CABI and IRRI, Wallingford, UK: pp. 77-88.

Winarto, Y.T. 2004. *Seeds of Knowledge: The Beginning of Integrated Pest Management in Java*. Yale Southeast Asia Studies, New Haven, Connecticut, USA.. 429 pp.

Jeffery Bentley is an agricultural anthropologist, an associate of the Global Plant Clinic and an international consultant. He was formerly with the Plant Protection Department at El Zamorano (agricultural university) in Honduras. He lives in Cochabamba, Bolivia and works with plant clinics, IPM, and agricultural development in Latin America, Asia and Africa. He has a Ph.D. in cultural anthropology from the University of Arizona.

Similar articles that appeared in *Outlooks on Pest Management* include –