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Watch and Learn

Video education for appropriate technology

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Summary

To improve seed quality on-farm, four videos were developed with village women on seed sorting, flotation, drying and storage. The video production is described in Chapter 5 of this volume. In this chapter, the effectiveness and impact of this adult education approach is assessed. Besides being more cost-effective than farmer-to-farmer extension, video has the power to better explain underlying biological or physical processes and allows learning about local innovations. The seed drying and storage programmes created new knowledge on evaporation and porosity and presented it alongside local innovations, resulting in a high level of experimentation. After seeing the videos about 40% of the women changed their seed drying practices. The use of botanicals such as neem, *bishkatali* and tobacco leaves in storage containers increased from 5 to 75% with video and from 25 to 55% with farmer-to-farmer extension. Presenting people with a wide range of new ideas stimulates experimentation. After watching the videos, 85% of the women tried out different storage containers, mainly smaller and more airtight ones. Most of the women already practiced seed flotation in some form, but after watching the video, a few women added salt or urea to the water, which helps remove more bad seed. Seed sorting, going through it one grain at a time and removing all spotted and discoloured seed, was not widely adopted. But those who watched the videos learnt about seed borne diseases. Seed sorting demands motor skill, the way typing or driving does. For technologies that rely on motor skills, video training sessions must be complemented by hands-on training.

ACTORS AND NETWORKS

CABI Bioscience is the scientific division of CAB International. Under the Women-to-Women Seed Health Video sub-project, which started in November 2002, CABI helped in assessing local knowledge, developing an impact assessment survey, and ensuring farmer participation in the development of the technologies and the script (see Box 7.1).

Box 7.1
How Video Can Make a Difference

To break down communication and adoption barriers, we learnt about local knowledge, and involved rural women in developing and validating both the technologies and the videos. Adoption of technologies was higher with women who saw the videos compared to face-to-face extension. See also Chapter 5 to learn about the video production process.

The Rural Development Academy (RDA) at Bogra coordinated the project locally, including the video production and impact study. RDA and CABI had a mutual understanding and shared vision as a result of collaboration under PETRRA since 2001.

TMSS is a national NGO that focuses entirely on women in rural development. Two of their staff, Rina Nasrin and Basanti Chakroborty, helped film the videos and do the impact surveys.

In May 2004, additional qualitative data were gathered by Dr. Jeffery Bentley, agricultural anthropologist, during two field visits, with help from Md. Mojaherul "Babu" Haque from RDA and Laila Arzumand Banu.

THE VIDEO EDUCATION METHOD

On four award-winning videos, village women show how to sort, float, dry and store seed (Van Mele and Zakaria, 2003). Each video covers a specific topic (Table 7.1) and lasts only about 6-8 minutes. In the village, an entire show and group discussion can be easily conducted within an hour.

We will describe how the same four technologies were conveyed using different methods in 11 villages in Bogra district:

1. Village video show followed by discussion.

2. Farmer-to-farmer extension.

3. Village video show followed by farmer-to-farmer extension.

Video plus discussion

In Husnabad village, 100 poor women were identified through well-being analysis and their knowledge, attitudes and practices assessed prior to the training. We

Table 7.1 Post-harvest innovations shown in video programmes

	SEED SORTING	SEED FLOTATION	DRYING	STORAGE
Brief description of technology	Manually remove diseased seed	Add salt or urea to a bucket of water until an egg floats; drop rice seed in the water and remove the bad ones that will float to the surface	Make a bamboo table or bench for drying rice; it can be quickly moved indoors in case of rain	Paint an earthen pot; fill it with rice seed and do not leave a dead air space; add leaves of neem or bishkatali; seal pot and place it off the ground
Learning messages	Spotted and discoloured seeds are unhealthy; these cannot be removed by winnowing or seed flotation; seed sorting improves yield	Winnowing does not remove all insect-damaged and partially filled seed	Seeds absorb moisture from soil; wind helps in drying seed; a drying table has many other uses than just drying rice seed	Pots absorb moisture, which paint prevents; completely filled pots are dryer than half empty ones; some kinds of leaves repel storage insects
Local knowledge and innovations	Women have little knowledge about seed - borne pathogens	Women already soak seed in water prior to sowing; flotation with salt or urea is a small modification of existing practice	Drying tables were designed with the full participation of local women and men	Traditionally some people sealed pores of earthen pots with used oil; only a few people use botanicals

divided them in small groups of 20-25 women and invited them to attend the video group learning sessions, held in one of their courtyards.

Farmer-to-farmer

In Telihara village, 100 poor households, also identified through well-being analysis, were trained by 30 families who had received training on seed health for the last four years, including some who had helped make the videos. These farmer trainers came from Maria village, in another union called Amrool.

Video plus farmer-to-farmer

In Narchi and eight other villages in Amrool union - including Maria village, where the techniques were invented or validated by farmers working with researchers - we tried a combination of both approaches. Large groups of people watched the videos followed by demonstrations by three male farmer trainers from Maria village.

Impact assessment

In Narchi village, we interviewed a small sample of the community. In Husnabad and Telihara villages, we organised a quantitative survey to assess knowledge, attitude and practices before and after the intervention.

Although the videos target women, they generally bring their children along, while men gather at the back out of curiosity.

Each of the approaches has given us new insights into strategies for adult education, i.e. for finding the best and cheapest way to change farmers' behaviour and decision-making capacities.

LEARNING

Almost everyone who saw the videos retained most of the key concepts. When we asked people to tell us what they had learnt in the video, they could all describe something. At first, one woman said she hadn't learnt anything, because she had watched through the window of the packed schoolroom, but then she reflected a minute and recalled learning about seed flotation. One man hesitated before answering, and then in a neat reversal of gender roles, his wife jumped in and answered for him; she remembered a great deal from the video.

In some cases, people learnt more from videos than from farmer-to-farmer extension (Table 7.2). For example most people who watched the video learnt that winnowing does not remove all insect damaged seed, but only few people who received farmer-to-farmer training remembered this. Women's attitudes towards certain practices such as seed sorting also improved more after they saw the video than in farmer-to-farmer training.

Box 7.2

Technologies That Are Easier to Adopt

- Address urgent needs.
- Build on local knowledge and capacities.
- Cost little and have low opportunity cost.
- Result in perceived high economic or social benefits.

Learning is all well and good, but our real question was if the new ideas helped the women to improve their post-harvest practices.

Factors enhancing adoption of technologies are summarised in Box 7.2. The level of adoption was

of the following order: seed sorting < seed flotation < seed drying < seed storing. We will now discuss each of these in the light of both the video and farmer-to-farmer extension.

Sorting seed is tedious

The local people already do a fair amount of sorting and cleaning seed before they put it up, but few understood that we meant 'sorting' to mean going through it one grain at a time and removing all spotted and discoloured seed. To clarify what we meant by seed sorting during the survey, we used a small sample and demonstrated it to the women before asking the question. After seeing the videos, all agreed this

Table 7.2 Changes in knowledge and attitude of women with farmer-to-farmer versus video-supported extension (percentage of correct answers)

SURVEY QUESTION	TARGET ANSWER	FARMER-TO-FARMER (N=100)		VIDEO (N=100)	
		Before	After	Before	After
Example where people learnt more with farmer-to-farmer extension					
Wind can dry seed?	Yes	8	27	0	4
Example where people learnt more with videos					
Winnowing removes all seed with holes? (i.e. insect damaged seed)	No	8	17	21	72
Manual seed sorting is tedious?[1]	No	5	10	11	33
Manual seed sorting takes too much time?	No	4	20	10	56
Seed placed on earthen floor can absorb water?	Yes	42	34	43	79
Example where people learnt about the same with each extension					
Do you know what causes holes in seed?	Yes[2]	88	97	84	97
Do you know what causes spots in seed?	Yes[2]	47	70	47	75
Winnowing removes all seed with spots?	No	91	99	99	100
Air can pass through earthen pot in other ways than via lid?	Yes	27	50	31	43
Keeping air from passing through my container is difficult?	No	78	96	69	97

[1]Actually, it is tedious. The question is intended to ask if people find sorting too tedious to do, in spite of its benefits.
[2]These were not yes-&-no questions on the questionnaire, but we have simplified them here.

practice would increase yield, and only half still stuck to their opinion that it was too tedious and time-consuming. The video proved to be a better means of changing attitude than the farmer-to-farmer extension. Nevertheless, for reasons we will see below hardly any women actually started sorting.

Sorting seed is needed

Research in Bangladesh by PETRRA's Seed Health Improvement sub-project (SHIP) showed yield increases of 10-15% after proper seed sorting. But showing this technology through either video or farmer-to-farmer extension did not convince farmers to sort their seed. Because it takes a lot of time to sort seed, people will probably not sort it grain by grain, but may take the time to pick out the seed with the most conspicuous spots (Table 7.3).

Begum, the wife of Dulu Mia in Narchi village, proudly shows her rice seed storage pots she painted after watching the video. One is wrapped in plastic, and filled with seed, which she sorted. She is not sure how long it took her to sort, because she sorted it in between her other household tasks.

Golenur Begum, one of the women from Narchi, said that sorting thirty kg of seed took half a day with two people. However, she was probably doing a rough-&-ready seed sorting, and not exactly the seed sorting that the SHIP project recommends, because tests under SHIP indicate that a newly trained person requires up to eight hours to properly sort just one kg of seed, and as much as two hours after three seasons of training. Learning to quickly identify spots takes a keen eye and practice. Therefore adoption is higher if women watch the video and then have hands-on training, as was the case in Narchi village where at least two of the nine women interviewed actually went to some effort to manually sort their seed. However, Narchi village is also influenced by other seed health activities such as village contests organised by RDA and the Union Parishad in Amrool union. As confounding activities influences impact assessment in extension research, we will mainly draw lessons from work in Husnabad and Telihara villages, where no SHIP project activities took place.

Seed flotation

Of the 200 women interviewed in Husnabad and Telihara, more than 50% said they practiced seed flotation, but only four actually added salt to the water to float out more seed. Poor women think it is a waste to add salt, as they often cannot even afford to have salt with their meal. During the semi-formal interview a couple of months later, few people said they did seed flotation, but several women described it in detail, even mentioning putting salt in the water until an egg will float in it, so that the water will float out more of the partially filled and insect damaged seed. They said they would do it when they planted the rice they have stored now. This would indeed make sense, since most women already soak the seed just before planting it, to trigger pre-germination.

Table 7.3 Post-harvest innovations and their scaling-up potential

	SEED SORTING	SEED FLOTATION	DRYING	STORAGE
Required capacity building	Initial training following the video session is needed to teach motor and observation skills to recognise the spots	Slight, mainly the concept that adding salt to water floats out more of the bad seed	Idea that seed absorbs moisture from soil and some simple skills for building tables to help dry seed in the rainy season	Several related ideas on porosity and keeping storage pots dryer e.g. painting them
Monetary cost	None	Only salt or urea need to be bought	Low to high; a light drying table costs on average Tk 60 (US$ 1.1), and a heavy bamboo one about Tk 300 (US$ 5.3)	Low to high; a small pot of paint costs Tk 12, and a plastic drum costs around Tk 300; insecticidal leaves cost nothing
Opportunity cost[1]	High; a lot of time is required to properly sort seed	Low; activity can be easily done prior to soaking seed for pre-germination	Moderate; materials need to be collected and time is spent making the table	Low to moderate; used cooking oil and botanicals are readily available; paint or drum need to be purchased
Perceived need	Moderate; impact will mainly be high when seed quality is very poor	Low; women prevent storage pest outbreaks by improving drying and storage, and already remove bad seed when they soak them to pre-germinate	High; since irrigated rice was introduced, seed drying in the rainy season is a new and urgent need	High; women know that moist seed is more heavily attacked by insects, and women already spend much effort re-drying their seed monthly
Adoption	Low and partial adoption, i.e. only heavily infested seeds are removed	Moderate	High	High
Scaling-up potential	In areas with known poor quality seed	Throughout the country	Throughout the country wherever irrigated dry season or boro rice is grown	Throughout the country; more local innovations could be included

[1] I.e. the household's other options for spending the money and time needed to invest in this technology.

When we asked 'Do you know what causes holes in the seed?' people said: insects, poor seed drying and air in the container. People are well aware that there will be less insect damage if the seed is dried properly and the container is airtight. Their understanding comes from experience rather than from learning the underlying principles of insect ecology. No wonder women adopted drying and storage to

prevent insect damage more readily than floating out insect damaged seed with salt water: proper drying is easier to do, it is consistent with what they already do and know, and if done well may save them the tedium of drying seed each month.

Drying is a new need

In the past 30 years, Bangladesh has grown much more irrigated rice during the dry or *boro* season (November - May). This means that there was little existing technology for drying rice in the wet season. "During the rainy season, after the rain is over, we will dry. But if it continues to rain, there is nothing to do but put our seeds on the floor and stir them with our legs, to remove excess moisture," sighs Kancham, one of the women in Husnabad village who has not seen the video yet.

Before seeing the videos, 43% of the women interviewed agreed to the statement that 'seeds placed on the earthen floor can absorb water', but that went up to 79% after they watched the video. Fifteen had made a seed drying table and 28 dried on thatch or jute bags instead of drying directly on the ground. We were surprised to observe no changes in the village where farmer-to-farmer extension had taken place. The education approach clearly influences the extent people start experimenting (see Box 7.3).

Box 7.3
Igniting Experimentation

People experiment more readily when they are provided with information that helps them understand the underlying principles of that technology.

Video gives you the guarantee that the learning content you intend to get across will be conveyed in the same way over and over. When farmers have to train others on several topics, as in this case, you lose control about what will be taught. Although the farmer-extensionists showed several seed drying tables, they were mostly covered up, used to display other materials, so farmers could not see what they were for. Similar observations were made when the tables were used in Going Public sessions (see Chapter 9 by Nash and Van Mele).

Storing seed airtight is important

After watching the video, Rabeya from Husnabad village speaks out in the group: "Every time I dry my seed very well and keep it in an earthen pot, but after I open

Spot the difference. Video can easily show how a technology is used in its natural environment (left). The function of the drying table is entirely masked during demonstrations when cluttered with displays of other materials (right).

the pot some months later I always find mouldy seeds and insects. Now I understand why it happened." People know from experience that airtight seed storage is important, but often do not have the money to buy a plastic or steel drum. Most poor households store their rice seed in jute bags or earthen pots and spend considerable time re-drying it every two to six weeks. While watching the storage video some women were surprised to learn that earthen pots can absorb moisture through their bottom and sides (although a fourth of them already knew that).

Video allows presenting people with a wide range of new ideas to stimulate innovation. After watching the videos, 85% tried out different storage pots the next season, mainly smaller and more airtight structures.

Several people mentioned painting their earthen storage pots. They find the idea not just practical, but a charming way to add a bit of colour to the home, since the pots are stored on bamboo platforms right inside the house. It was easy to find people who had sealed the pots with clay, and who had put bags in the pots to fill up the dead air space. This technology seems well on its way to adoption.

The use of botanicals such as neem, *bishkatali* and tobacco leaves in storage containers increased from 5 to 75% with video and from 25 to 55% with farmer-to-farmer extension.

Saiphal Islam inspects his drum filled with rice seed. Note the blue pot, neatly sealed with clay and covered with a sheet of clear plastic. After learning about seed health technologies, Mr. Islam decided to try painting an earthen pot to store rice seed. He will carefully plant the seed from the pot and from the drum, and compare the yield from each one.

KEYS FOR SUCCESS

Seeing is believing

In 1938, thousands of people in the U.S. believed they were being attacked by Martians, after hearing H.G. Wells' novel *War of the Worlds* in a radio broadcast. For many people, media are more convincing than being told by a person. When invited to give feedback on the first rough edit of the video programmes, one of the women of Magurgary village in Bogra district mentioned: "If you talk by mouth, people in our village will not be convinced, but we have a lot of faith when we see it on TV."

Using appropriate language and symbols

Preparing and storing seed is largely women's work in Bangladesh (Hartmann and Boyce, 1983). The women from Maria village who appeared on-camera were

authentic. The fact that they had worked with rice seed all their lives no doubt helped win the sympathy of their audience.

When the NGO Agricultural Advisory Society later used the video in more than 30 villages in Sylhet district, none of the participants complained they couldn't understand the accent of the women from Bogra district. However, a fifth video, showing a local troupe from Bogra performing songs specifically designed around seed health issues, was hard to understand when shown in Sylhet. Many things influence whether or not people understand the dialect of another region. It helps if they are motivated in an interesting topic, if the speech is clear, and if there are visual clues like painted pots and drying tables. These factors need to be considered when assessing the scaling-up potential of both education and entertainment videos, which involved local communities in the production process.

Training or education videos can easily show how, for instance, a drying table is made, as in the Do-It-Yourself programmes shown on European and American TV. Images can be more universal than language. Video can bring messages across in a visual way that is hard to achieve through face-to-face extension. How can one teach that seed absorbs moisture when dried on the floor? Having one of the farmers sit on the earthen floor and showing his wet *lungi* was a memorable image and provoked hilarious laughter. Surely this is something people will talk about.

Hatem shows his wet lungi after sitting on the earthen floor. This powerful image in the video evokes laughter, and opens up the discussion on drying seed on tables instead of on the floor during the rainy season.

DIFFICULTIES, RISKS AND ASSUMPTIONS

It is difficult to measure how much people learnt. A survey may be too long, ask leading questions that give the answers away, and yield spurious results. For example, in the quantitative survey when we asked villagers if seeds with spots reduce yield, the number of correct answers actually went *down* after the video. The more abstract the learning topic, the harder to assess impact.

A qualitative study is often more revealing, but it also takes time, and some practice to analyse the answers. But the qualitative study helped us to understand the reasons why some things were being adopted, for example we could see the proud look on people's faces when they showed us the painted pots; they clearly liked to paint the pots because they thought they were pretty. People often chose a sky blue, instead of a dark or drab colour.

SHIP suggested that farmers sort seed to remove diseased ones, which would raise yields by 15%. All well and good, except that it may take eight hours to clean a kilo of seed, especially if one goes through it rice-grain-by-rice-grain looking for the ones with little spots on them. From the semi-structured interview we learnt that at least some farmers are modifying the technology, e.g. by cleaning rice seed more quickly just to remove the really bad grains, or cleaning a small amount of seed and planting it to verify that the harvest really is better.

Scaling up

A challenge of any participatory method is to maintain high quality when scaling-up. Feder *et al*. (1999) suggested that the generic problem of scaling-up in extension could be partly overcome through mobilising other players in extension, empowering farmers and their organisations, decentralisation and use of appropriate media.

Videos allow one to demonstrate underlying biological and physical processes. Video animation could be used in the future to explain insect and disease life cycles and be used, for instance, in farmer field schools or Going Public. However, for techniques based on motor skills, like seed sorting, video must be complemented by practical sessions.

Videos are an excellent means of showing how technologies, such as seed drying tables, have been developed locally, and presenting many local innovations in an orderly way. For technologies that are newly introduced and perceived as time consuming, such as seed sorting, a prior selection of areas where they may have the highest impact could be part of developing the communication strategy.

Video allows one to bring together and draw on a broad range of training modules to develop locally appropriate training curricula. By adding a short, locally made entertainment video, local ownership could be increased.

Conclusion

We were surprised that adoption of technologies and experimentation was as high or higher among people who watched the videos as it was among people who had been trained by other farmers. For example, people only adopted drying tables if they had seen the video, but not after getting training from other farmers. The farmer trainers were, by the way, excellent; they were often the same farmers who had invented the technologies and appeared on the videos.

What we did see suggests that a well-made video, showing functional technologies and their underlying principles, can help a good part of the audience to adopt these technologies, and it can do so much easier and cheaper than face-to-face extension. A good video gets its ideas into the heads of some community members, who will

experiment with them. By then, the video has already played its role, and adoption will depend on how functional and profitable the technologies are.

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