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Where theory and practice meet: Innovation, communication and extension among smallholder farmers

Introduction

When Everett Rogers wrote the first edition of 'Diffusion of Innovations' 47 years ago, the idea of innovation was straightforward: it was something – a technology or a way of doing things – that was new to the people who were faced with the decision of whether or not to use it, or 'adopt' (Rogers 1962). Adoption and diffusion of innovations became an accepted way of thinking about the way in which change in agriculture took place at farm level and



within a geographical area. Many of us are familiar with his five adopter categories, from the 'innovators' and 'early adopter' to the 'laggards', and the S-shaped diffusion curve.

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The latest edition of Rogers' book, published a year before his death in 2004, refers to several hundred research studies that have used this basic model for exploring changes in behaviour in agriculture, health, information technology and many other spheres. All along, however, there's been a problem: the model doesn't really describe what actually happens in most farming situations. To be fair to Rogers, he did acknowledge this in a famous critique – 'The passing of the dominant paradigm' – in 1976; but the passing of the paradigm has taken some time to work its way through and still dominates thinking in some quarters. It has dominated not just theorising about change, but also the design of extension and advisory services for promoting change: think of the ill-fated 'Training and Visit' system popularised – with the help of very large, low-interest loans from the World Bank in the 1980s and 1990s – before finally being discarded in the 1990s. T&V still lives on in 'modified' form in some public sector advisory services. More recently, though, theory has been catching up with what happens on the ground, and this is leading reflexively to change also in practice.

Tales from the tropics and beyond

I'd like to share three stories, from research visits to three Asian countries earlier this year. The first two relate to holes in the ground – holes which offer windows through which we can see processes of innovation at work.

In China, in the semi-arid Gansu Province, holes are appearing in concrete floors outside the houses of many farmers. They are the visible sign of a major change in the way that rainwater is managed and used. Discussion with farmers in ten locations in Huining County in September about the changes they had seen in ecosystems and farming systems during their lifetime led to the construction of a set of timelines. Common features in these timelines include the perception that rainfall patterns have changed, prompting changes in cropping patterns; how the decrease in rainfall has stimulated the use of plastic film mulch; and how, with the support of government grants, households have been digging underground storage tanks into which rainwater falling on newly constructed cement floors is channelled through those holes in the ground (Fig. 1).

Fig.1. Drawing water from an underground storage tank, Gansu Province, China



So far, this sounds like a Rogerian model of adoption and diffusion: government promotes a new technology – the one-two-one system (one cement floor, two underground storage tanks, one irrigated vegetable plot) – through technical advice and subsidised inputs – which is taken up by a few people and then spreads rapidly to others. But what this interpretation fails to point out is that the technology has been modified by many households. In particular, the recommended practice of lining the tank walls with cement to prevent loss of water has been dropped in favour of packed soil walls. The reason? The water tastes better. What we see here is a *process* of innovation that doesn't stop with the introduction of a new technology to the population of an area. People adapt the technology, they continue to innovate. Innovation is not a thing, a fixed

technology, but the moulding of that technology by that population to their needs, circumstances, preference and ingenuity. And of course, they were only interested in the technology in the first place because it provided a solution to a problem that had been growing more and more serious – the shortage of domestic water as groundwater sources dried up and surface sources became increasingly unreliable.

I came across a second hole in the ground a couple of weeks later in Mindanao in The Philippines. This is a hole through which pig slurry vanishes into a gas plant. It is in the backyard of the home of Domingo Lopez and his family. He had a problem: his neighbours were complaining about the smell. Rearing pigs in a suburban setting (Fig. 2) is an anti-social activity in any society, no matter how much pork is celebrated as part of the food culture. He set out to look for a solution, before his neighbours' complaints forced the municipal authorities to close his pig unit down. He had heard, perhaps on the radio, in the newspaper or through conversation with friends in the town, of a man who knew about turning animal slurry into gas that could be used for cooking. He found out how to contact him and invited him to visit. One thing led to another, and with the encouragement of the municipal agricultural office, a seminar was arranged for pig producers to discuss the possibility of converting their pig slurry to gas. After a lot of trial and error, Domingo now has a functioning gas plant, which is providing fuel for the family kitchen (Fig. 3); he is also supplying gas to his neighbours, whose quality of life has improved considerably; another eight pig producers in the municipality – including a local religious community – have installed gas plants with adaptations to suit the layout and scale of their pig operation; and the producers now function as a group that meets to discuss problems and possible further development of their units. They are discussing with various people ways in which they might bottle the surplus gas for sale.

In discussing with Domingo and other gas plant innovators, a whole network of people and institutions was identified that together had created the conditions in which this successful process of innovation was able to happen. Joan Gervacio, a PhD student at University of Reading, is exploring this as one of several case studies of innovation in farming systems in The Philippines, to understand the communication and interaction that inform and support farmers' innovation processes. To me, one of the key lessons from the gas plants in Mindanao's pig

Fig. 2. Domingo's pigs are now clean and smell sweet



Fig. 3. Gas in the kitchen from the pig slurry



units is that farmers were taking the initiative; it was their search for a solution to a problem that was the starting point of a complex process. Another was the reminder that innovation is a social process: the local social context is the environment that shapes the perception of the problem and the opportunities, and ultimately shapes the technology that emerges from the process of innovation.

My third story is from India – no holes in the ground this time, but a groundswell of interest among members of women self-help groups (WSHGs) in dairying as an income generating activity. One of the things dairy cattle owners are encouraged to do is make sure their animals get as much green fodder as they need, which in most cases, particularly in the drier areas, means as much green fodder as they can get. In one part of Andhra Pradesh, women were complaining that after rain when green fodder was readily available, yields did indeed go up – but the fat content went down. In an area where buffalo milk is prized (and priced) for its high fat content, this was not a good result. Income from sale of milk went down. Farmers, as we all know, do not always think like scientists; or, more importantly, do not think like scientists assume that farmers think.

In the same area, a group of women were concerned about the advice they had been given about straining milk before selling it, to remove solid particles that shouldn't be there. They wondered if this would further reduce the fat content. The veterinary and animal husbandry extension staff who were advising the group did not know the answer; an obvious opportunity for a bit of local experimentation to see if the fat content was affected by straining the milk, resulting in the co-production of knowledge. As in many (or most?) situations, the attempt to 'transfer technology' or recommend 'improved practices' raises questions that can best be answered by 'let's try it and see'.

Theory meets practice

What do these three stories tell or remind us about innovation processes? And how can these lessons inform the theory of innovation in smallholder farming contexts? Here are four lessons, among the several that we could draw.

Communication is not just telling people, advising people, passing on messages. It is equally – or more importantly – about asking, listening, exchanging, learning together. Status and assumptions often get in the way of good communication. Extension staff, who are afraid to admit they don't know, are not going to be very supportive of the idea of co-production of knowledge. And yet there is a growing body of evidence of the effectiveness of approaches akin to Farmer Field Schools, which have themselves spread or diffused from their original home in Indonesian rice fields, to a diverse set of agro-ecosystems and enterprise contexts. Not as a fixed way of doing things, but as a set of principles which are continually being adapted to new situations. Yes, innovation in the diffusion of innovations is itself a process. Cees Leeuwis at Wageningen University has suggested a set of communication roles for professionals who support rural innovation: not transferring messages, knowledge and technology, but networking, negotiation, conflict resolution and platform building.

There is a thirst for knowledge, for new ideas, for solutions to problems, for information about opportunities among farmers and farming households. The development and spread of mobile phones has demonstrated this very clearly; there is now a communication technology that allows farmers to search, to ask, to connect; a technology that can be harnessed to make outside expertise more accessible. And one of the many lessons of the mobile phone as innovation is that people do not always use it in the way that experts expect. WSHGs in Kerala, who have been given the opportunity to interact with external sources of

information and advice through a mobile phone connected to a roving microphone and a loudspeaker, have chosen their own preferred sources – perhaps calling up the bank manager, or a paediatrician, rather than the veterinarian who was expecting their call. Farmers do not have to be persuaded to take up innovations; they need to be listened to, to have opportunities to find out what they want to know, to interact with people who they think can help them find out, learn, adapt.

New ideas come from many sources. Steven Biggs has been telling us about ‘multiple sources of innovations’ for years. Andy Hall and others more recently have taught us the language of ‘innovation systems’ – systems with a mix of planned and unplanned elements which we find in the real world if we look for them, and which we can seek to strengthen and ‘feed’ with knowledge interventions. The DFID-funded Research Into Use programme has adopted – or should I say adapted and developed for its own programme purposes and contexts – the idea of ‘innovation platforms’ as a means of supporting innovation processes around the farm-level application of agricultural research, an idea that is now being adapted to Nigerian contexts by public sector R&D organisations.

Learning is a social activity. We all learn with and from those around us. The social context of learning gives us the opportunity and confidence to explore new ideas, bounce them around, try them out, find out about others’ experience in using them, positive reinforcement for when things work out and encouragement when they don’t. Smallholder farming is a risky and visible activity that takes place within strong social settings. Albert Bandura’s theory of social learning, first published in 1977, has been picked up by communication scholars as highly relevant to the smallholder farming context. Just about every survey that has ever been done about how farmers are exposed to new ideas and where they go to for advice highlights the fact that other farmers are their primary source. Farmer Field Schools and farmer-to-farmer

extension initiatives build on this idea and give the interaction among farmers a sharper focus on learning and innovation processes.

Conclusion

Social learning, innovation systems, building innovation platforms, co-production of knowledge, interactive communication – is this simply a new set of jargon to replace stages of adoption, diffusion, innovators and laggards, transfer of knowledge? Perhaps; but I sense that we now have a set of theoretical concepts and tools that are a closer match with the real world of dynamic change in agricultural practices and systems that TAA members know from their own professional work. We have a body of theory that allows us to explore and understand the process of farming systems change, and through which we can build more effective ways of supporting innovation processes at farm and system levels.

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