

Recognizing and Enhancing Processes of Local Innovation

*Ann Waters-Bayer, Laurens van Veldhuizen,
Mariana Wongtschowski and Chesha Wettasinha*

INTRODUCTION

Agricultural development is driven by innovation at all levels. At the farmers' level, the term 'innovation' is often used in literature and in practice to refer to farmers' adoption of introduced technologies, in line with Rogers's (1962) theory on diffusion of innovations. Until recently, little attention was given to the new technologies, management practices and institutions that local people have developed themselves – to 'local innovation'. This refers to the *dynamics* of indigenous knowledge (IK) – the knowledge that has developed over time within a group, incorporating both learning from the experience of earlier generations and other knowledge that has been gained from whatever source and fully internalized within local ways of thinking and doing. Local innovation in agriculture and natural resource management (NRM) is the process through which individuals or groups in a locality develop and apply new and better ways of managing the available resources – building on and expanding the boundaries of their IK. The process of local innovation leads to technical, socio-economic and institutional innovations (with an 's').

Farmers – a term used here also to denote other natural resource users, such as pastoralists, forest users and fisherfolk – have been doing most of the experimentation, innovation and adaptation in agriculture and NRM since time immemorial. Before formal research and extension services existed, farmers' own experimentation allowed them to adapt to new situations and, thus, to survive. Sometimes because of sheer necessity, sometimes out of curiosity, sometimes by accident or through serendipity, farmers have found their own ways of improving their farming (e.g. Johnson, 1972; Biggs, 1980; Richards, 1985; Chambers et al, 1989; Kotschi et al, 1989; Reijntjes et al, 1992). Although local innovation has always been happening, it has seldom been recognized even by people who specialize in documenting IK, many of whom regard IK as a treasure that must be documented for posterity – before it is lost – rather than seeing the dynamics in the knowledge of local people.

Already several decades ago, agricultural researchers did recognize that farmers' knowledge – particularly of local conditions – could be valuable for formal research. This realization led to various forms of farming systems research (FSR) or farmer participatory research (FPR), usually involving on-farm trials in which scientists asked farmers to test and possibly adapt the scientists' ideas. Successful technologies were then 'extended' to other farmers. The scientists who developed the technology packages seldom realized how farmers were experimenting informally with package components. For example, when extension promoted new cereal varieties in a package of seed, fertilizer and instructions, many smallholders planted local varieties using the fertilizer intended for the new seed, and some carried out small informal trials to explore (e.g., the best timing and amount of fertilizer to apply to the local varieties) (see, for example, Hansen, 1986). It can probably be said that even after the advent of formal research and extension, most of the original ideas and successful local adaptations of introduced ideas have been developed by farmers without direct support from research. Yet it is often the less creative 'model' farmers who merely demonstrate introduced technologies who are called the 'innovators'.

There is, however, a growing recognition that innovation is not a linear process from formal science through extension to farmer adopters, and that scientists are not the sole and are seldom the most important generators of knowledge (see, for example, Bebbington, 1989; Biggs, 1990; Schreiber, 2002). It is becoming more widely accepted that innovation is a social process involving a multitude of different actors, and that innovation processes can be enhanced by creating more possibilities for actors to interact (Röling, 1996; Engel, 1997; Douthwaite, 2002; World Bank, 2006). This involves many social and psychological processes and requires many personal and institutional changes.

Here we describe how actors in the Prolinnova (Promoting Local Innovation in Ecologically Oriented Agriculture and Natural Resource Management) programme¹ in several countries in Africa and Asia have found practical ways of enhancing the innovation systems in which they are involved. Through joint reflection and analysis of their experiences, facilitated by staff from local non-governmental organizations (NGOs), they are building their own capacities to engage more effectively in innovation processes. The partners in Prolinnova regard themselves as an international community of practice, learning and advocacy. They have formed nested multi-stakeholder platforms at sub-national, national and international level, involving a defined group of Prolinnova members engaged in electronic and face-to-face exchange, and a much larger electronic learning platform open to all interested individuals and institutions.

The initial premise – and the growing experience – in Prolinnova is that a very effective entry point into engaging in participatory research and development is to identify local innovation. Recognizing local creativity

and initiative can lead to changes in behaviour and attitudes of all actors in the innovation system and can stimulate institutional change to enhance innovation processes. Here we explain why and how this approach is taken, the gradual changes observed as a result and the challenges faced.

WHY DO LOCAL INNOVATION PROCESSES NEED TO BE ENHANCED?

In order to improve the livelihoods of small-scale farmers in Africa, it is important to enhance local innovation processes for the following reasons:

- *Diversity requires site-specific practices.* Farmers in Africa live and work under a wide range of ecological, climatic, economic and socio-cultural conditions, and the range of farming systems is similarly diverse, not just across regions or countries, but also within districts and even localities. Each farming system has its own dynamics, strengths, challenges and opportunities. It is not possible for scientists to generate the infinite variety of innovations and adaptations required. In the face of this farming diversity, it is wasted effort for them to develop 'perfected' technology to be applied in a blanket-like manner. Local adaptation and locally specific development of options must be key elements in any agricultural research and development (ARD) strategy to alleviate poverty in Africa (IAC, 2004). If scientists accept this, they need not expend so much effort on perfecting technologies and can give more attention to enhancing farmers' efforts to experiment and adapt technologies to fit local realities.
- *Rapidly changing conditions require local capacities to adapt quickly.* No innovation is permanent. A solution to any one problem does not remain valid from now until eternity. Conditions for farmers – including smallholders in resource-poor areas of Africa – are constantly changing. This is especially so for those who try to link with markets, but also for everyone affected by the emergence of new pests and diseases (not only in plants and animals, but also in humans, such as HIV/AIDS), changes in laws and regulations such as in land administration, and climate change. The key to sustainability in farming lies in farmers' capacities to adapt. Recognizing local innovation and then linking local innovators with other actors in the wider innovation system is a way of strengthening farmers' capacities to adapt more quickly to changing conditions.

If many different actors have the opportunity to bring in their different ideas and skills, innovation processes can be accelerated (see, for example, Douthwaite, 2002). If this type of interaction is happening in many different

places at the same time, local innovation processes will be widespread. It is to this that Prolinnova aspires. However, good collaboration will develop only if all actors feel that their capacities and potential contributions are valued by the others. The other actors' recognition of farmers' innovativeness stimulates farmers' interest in collaborating in innovation systems.

APPLYING THE THEORY IN PRACTICE

How can diverse actors at local level enter into equitable and effective partnerships for innovation? In many parts of the world, efforts are under way to build multi-stakeholder partnerships in ARD by taking the entry point of recognizing local innovation. Here we describe mainly the experience of the Prolinnova programme, which builds on the experience of the earlier projects Promoting Farmer Innovation (Critchley et al, 1999) and Indigenous Soil and Water Conservation in Africa (Reij and Waters-Bayer, 2001). In Africa, there are established Prolinnova programmes in Ethiopia, Ghana, Niger, South Africa, Sudan, Tanzania and Uganda, and new programmes are being initiated in Burkina Faso, Kenya, Mali, Mozambique and Senegal. Similar work is under way in several countries of Asia, Latin America and the Pacific.

In each country, a national NGO brings together different groups of stakeholders wanting to promote participatory ARD, taking local innovations as starting points. The country programmes share common values and concepts, but are autonomous. Each designs its own plan of action. The essence of this work consists of:

- identifying and giving recognition to innovations developed by local people;
- participatory innovation development (PID): entering into partnerships at field level that combine different types of knowledge, ideas and skills, focused on joint exploration or experimentation that is farmer led and starts from the local innovations identified;
- joining forces of the different stakeholders involved to bring about policy and institutional change in order to open up more space for PID processes.

Capacity-building activities accompany and strengthen all of these, and mainly take the form of learning through action and reflection. The learning takes place within each country programme, facilitated by the national NGO, and between country programmes at annual face-to-face meetings, facilitated by an international support team² and with a strong 'open-space' character. This all forms part of the participatory monitoring and evaluation system within the international programme.

WHY START WITH IDENTIFYING LOCAL INNOVATIONS?

There are four main reasons for making the identification of local innovations the first step in enhancing agricultural innovation systems:

- 1 First and foremost, it changes the way in which potential partners in an agricultural innovation system regard each other, serves as a tool for learning to understand what farmers are already trying to do, builds mutual respect, and, thus, lays a basis for partnership on a more equal footing.
- 2 It provides a point of departure for joint exploration and learning (i.e. PID) firmly embedded in local realities.
- 3 It provides concrete examples for raising wider awareness within formal ARD institutions and for stimulating institutional and policy change.
- 4 This activity can be fairly quickly and simply introduced into the ongoing work of people involved in ARD. No earthshaking paradigm shift is needed to start this – but it can lead to big changes.

Changing images of others and self

The main reason to start by identifying local innovativeness is a psychological one. In many cases, IK and local innovation are not valued by scientists, and sometimes not even by the farmers themselves. Despite the intellectual discussions about innovation systems, the practice in most African countries still follows the linear model of technology transfer. Researchers, extensionists and farmers see 'innovations' as things coming from outside ('modern' farming) and see farmers as mere receivers of the new technologies and accompanying instructions.

When formally educated agricultural professionals discover farmers' own innovations and informal experiments, they are confronted with the creativity of so-called resource-poor farmers. They begin to see farmers in a different light – as people with something valuable to offer – and see IK and local innovation as being complementary to their own knowledge and skills. Encouraging these professionals to recognize and reflect on farmers' creativity leads them to re-examine their own identity and roles, and changes the way in which they behave towards farmers (De Leener, 2001a, 2001b). Scientists' realization that formal research is not the only source of knowledge and innovation need not demoralize them: on the contrary, it can generate their excitement at the unexpected ideas and energies of the farmers (Kibwana et al, 2001; Tchawa, 2001). Thus, identifying local innovations is a means of changing the attitudes of extensionists and scientists, and of helping them to recognize how they can complement and strengthen the creativity of farmers.

At the same time, the farmers gain in self-esteem. They begin to see themselves not as poor people who need help to solve their problems, but rather as people rich in knowledge, ideas and ingenuity in surviving under difficult conditions – as people to be admired. The recognition that formally educated agricultural professionals give to local innovation generates pride in local knowledge and creativity. Buoyed up with the self-confidence that outside professionals recognize them as researchers in their own right, the farmers are more likely to regard their admirers as potential partners in development. For example, as Kibwana (2001) noted in Tanzania, for farmer innovators and experimenters, ‘the most gratifying part of the experience was that they had been treated, at long last, as partners and as equal to the “educated elite”.’

Thus, for all actors, identifying local innovativeness changes their images of others and of themselves. It sets the stage and creates enthusiasm for generating new knowledge through equal partnership.

Entering participatory innovation development

The intention in Prolinnova is not to focus exclusively on farmer innovators as independent, isolated individuals, but rather to understand and enhance their links within an innovation system of diverse individuals (e.g. other farmers, traders, craftspeople), institutions and organizations both inside and outside the farming community. All of these actors can play different roles: each of them can be – at different times – a source of new ideas, a channel for communication, a partner in exploration or implementation, or a user of the outputs of an innovation process. By better understanding the complex innovation system in which they are involved, the actors can pinpoint linkages that need to be made or strengthened and information gaps that need to be filled.

Identifying local innovations can bring together holders of local and scientific knowledge in PID around a concrete activity already initiated by the local people. Here again, psychology plays a key role. PID does not start with analysing problems and dwelling on farmers’ weaknesses and failures. Instead, it takes a positive approach that starts from local strengths and opportunities that local people can already see. Entering into joint research based on questions that farmers are seeking to answer builds up a spirit of collaboration and a readiness to explore, in addition, options for improvement based on ideas from outside.

PID aims primarily to strengthen the capacities of farmers, extensionists and scientists to collaborate in developing site-appropriate improvements. It may include research by individual farmers or groups of farmers supported by extensionists and/or scientists, as well as work by scientists on research stations or in laboratories to provide experimenting farmers with answers to the questions they raise (Hien and Ouedraogo, 2001; Tchawa, 2001). ARD thus becomes a ‘social learning process’ (Röling and Jiggins, 1998) in which farmers play the central role, while formally

educated professionals strengthen the dynamics that are already under way.

The greatest enthusiasm for recognizing local innovation and venturing into PID with farmers has been observed among the field-based development workers – particularly the ‘frontline’ extension staff – who see this as a more satisfying approach than trying to convince farmers to accept locally untested technologies (Berhanu and Mitiku, 2001). Where their managers allow them to work in this way, extension workers can encourage farmers to try out and improve new ways of managing agricultural and natural resources (Hocdé and Chacón, 2000). Thus, PID becomes an approach to extension, often without direct involvement of research scientists (Veldhuizen et al, 2005).

Development workers can encourage farmer-led research and development in several ways by (Veldhuizen et al, 1997):

- creating opportunities for farmers to share their innovations as these provide ideas for other farmers to try out;
- offering alternatives to compare with current practices or local innovations;
- improving farmers’ experimental design: stimulating farmers to examine how they do their informal experimentation and helping them to explore more systematic methods;
- filling local knowledge gaps: increasing farmers’ awareness of resource management principles and providing information on phenomena that they cannot observe on their own in order to help them interpret the results of their experimentation;
- facilitating mutual learning: creating opportunities for farmers to analyse local and external ideas for improving agriculture and NRM, and to assess the results of farmer-led PID (e.g. through farmer learning groups or exchange visits).

Raising awareness and stimulating institutional change

The personal change described above – ‘to make the flip’, as Chambers (1991) expressed it – is the first step towards institutional change (i.e. changes in the way that people in organizations think and behave and organize themselves for interaction with others). When scientists and extensionists and their managers examine how the structures and procedures in their institutions help or hinder efforts to support local innovation processes, they begin to see what needs to be changed. In the national multi-stakeholder ProInnova platforms, people from government institutions and NGOs find space for learning together and for devising strategies for policy influence and institutional change.

A particular concern of ProInnova partners is that this approach to promoting local innovation becomes integrated within institutions of

higher learning so that the next generations of scientists, extensionists and educationists regard and use it as an accepted 'mainstream' approach.

Incorporating ongoing activities of research and extension

Rather than operating as a separate 'project', each Prolinnova country programme is a multi-stakeholder initiative that seeks to incorporate a farmer-led participatory innovation approach into ongoing ARD work. In order to do so, they have undertaken the following activities.³

A core team of keen like-minded people from government organizations of research, extension and education and from local NGOs made an inventory of in-country experiences related to promoting local innovation and PID. In a national workshop, all major stakeholders jointly analysed these experiences and considered whether and how they wanted to collaborate in order to scale them up.

In different regions of the country, members of the core team arranged brief (one- or two-day) workshops involving extensionists, scientists and university staff to introduce the concepts of local innovation and PID in an innovation systems perspective. They drew out the participants' own experiences and observations about this and included local examples of farmer- or community-led innovation. The participants were then given follow-up assignments to identify and document local innovation, informal experimentation or participatory research processes in their working areas.

The participants completed these assignments during their regular work. The extensionists often documented cases that they had previously observed but had never mentioned because they were only supposed to extend technologies coming from research, not to inform researchers about technologies being developed by farmers.

In a follow-up workshop, the original participants brought farmer innovators to explain what they had developed or were trying out. All workshop participants reviewed the local innovations and selected those to be explored further in farmer-led joint research. This workshop was usually combined with further training in PID.

At different sites, small research groups composed of one or more local innovators and other nearby interested farmers, extensionists and – wherever possible – one or two scientists from a nearby research centre or university planned and implemented farmer-led joint research (see Box 15.1).

Such PID processes are under way in several countries. Partners in these processes are reflecting jointly on their experiences and identifying what factors help and hinder the experimentation and innovation processes and what can be done to improve them. In this way, the process of institutional change begins from below.

Box 15.1 *Participatory innovation development in beekeeping in Tigray, Ethiopia*

The Northern Typical Highlands team of Prolinnova-Ethiopia brought together farmer innovators at an Innovative Farmers Workshop held in Axum in central Tigray in April 2005. Here, the farmers explained their innovations to each other and to formal researchers and technical experts. The workshop participants selected beehive modification and queen-rearing innovations by a woman beekeeper, Gidey Aregay, and a male beekeeper, Gebrehiwot Mehari, to be explored further in joint research.

Each of these two innovators served as a nucleus in her/his village, working together with three to four local farmers with similar interests. They looked into:

- the optimal ratio of mud, dung and other materials for constructing beehives with a view to durability, regulation of temperature and insulation against noise;
- estimating colony size and assessing the quality and quantity of honey production;
- understanding the seasonal aspects in the life cycle of the queen in order to improve the queen-rearing business.

Each group met every second weekend to assess what was happening in their experiments and to plan next steps. They met without facilitation by outsiders. Sometimes, other local farmers joined to observe and comment. Occasionally, the local development agents and district-level subject matter specialist joined the meetings and helped to document the farmer-led research.

Source: Hailu and Abera (2006)

At the same time, at national or regional (provincial) level, the multi-stakeholder learning platforms (members of which are stimulating and advising the above-mentioned local-level processes) try to bring about institutional change at higher levels so that PID processes can be accommodated – or even encouraged. These Prolinnova platforms raise awareness among research managers, development administrators and policy-makers. They facilitate exposure to, and discussion of, local innovation and PID. They organize events such as farmer innovation markets. They bring policy-makers to visit innovative farmers and bring innovative farmers to workshops, conferences and agricultural exhibitions where the farmers can show and explain what they are doing. They publicize the innovations and PID processes in catalogues, posters, photographs, video films, radio, etc., and, in some cases, help farmers document their own innovations (see Wettasinha et al, 2006).

Five country programmes (Cambodia, Ethiopia, Nepal, South Africa and Uganda) are piloting alternative funding mechanisms to promote local innovation. The most powerful way for farmers to exert influence on ARD is through controlling funds. Prolinnova is therefore exploring ways of giving local people access to and control over resources for experimentation and innovation in the Farmer Access to Innovation Resources (FAIR) action research project funded by the French government. Using local innovation support funds, smallholder farmers and community-based organizations can 'hire in' research support to fit local agendas and needs (Waters-Bayer et al, 2005; Krone et al, 2006). This piloting includes exploring ways of institutionalizing such funding mechanisms without external support.

Thus, the seemingly simple activity of identifying local innovations marks the start along what becomes a long and far-reaching path. It is an activity carried out within the existing ARD institutions, facilitated in such a way that it leads to a complex process of reflection and change.

When the researchers and development agents start to bring examples of what they think are local innovations, and when farmers start showing what they regard as innovations – then everyone becomes involved in discussions about what is traditional and what is innovative; what is an invention and what is an innovation; is it something that is new here or new everywhere in the world; can an innovation here be a tradition there; where do the ideas for local innovation come from; what is indigenous and what is exogenous; does it make a difference in the end where the idea comes from if local people can make something useful out of it? This discussion is necessary to help the actors see each other's perspective and approach a common understanding of innovation systems and their potentials. Struggling to define 'local innovation' is part of the process of becoming more deeply aware of it. Each country programme within Prolinnova has come up with a somewhat different definition of local innovation – and that definition changes as the discussion and learning continue (Wettasinha et al, 2006).

WHAT IS BEING SHARED AND SCALED UP?

A question that many people pose about promoting local innovation is: to what extent can the local innovations be scaled up? The NGOs that conceived Prolinnova in a workshop in Rambouillet, France, in 1999 (Rambouillet Group, 2000) were originally thinking along these lines, and much of the discussion was about using a database and various media to store and disseminate locally developed technologies. But then we realized that this puts too much emphasis on the innovations, rather than on the process of social interaction to enhance innovation.

The aim in identifying local innovations and further developing them in PID is *not* primarily to disseminate them in a transfer of technology extension mode. Local innovations are site specific. Results from farmer-

led research and innovation in one locality can seldom be copied exactly ('adopted') somewhere else. In the diverse conditions of smallholder farming in Africa, the spread of a local innovation beyond the locality would not be a good indicator of success. However, sharing new ideas that have been discovered and developed in the course of PID can stimulate farmers' experimentation and innovation elsewhere. It can provide other farmers with options that they could try out and adapt for their own circumstances.

In the Prolinnova programme, identification of local innovations is meant to provide entry points for engaging in farmer-led participatory research as a *learning ground* for changes in stakeholders' attitudes and behaviour, in institutions and in policies – and, above all, in order to empower farmers in decision-making about ARD.

Box 15.2 *Vision, mission and goal formulated by Prolinnova partners*

Vision: a world in which farmers play decisive roles in agricultural research and development for sustainable livelihoods.

Mission: to foster a culture of mutual learning and synergy in local innovation processes in agriculture and NRM.

Goal: to develop and institutionalize partnerships and methodologies that promote processes of local innovation for the environmentally sound use of natural resources.

Source: Prolinnova (2005)

From the process of promoting local innovation, the major outcomes that are suitable for wider dissemination are therefore not the specific innovations, but rather:

- field-tested methods of discovering and stimulating local innovation processes (e.g. Wettasinha et al, 2006);
- lessons from experience in supporting personal and institutional change so that the formal ARD sector can support local innovation (e.g. Wettasinha et al, 2003);
- lessons about building partnerships at local level and higher institutional levels, forging alliances and engaging in policy dialogue to create enabling conditions for enhanced processes of local innovation (e.g. Critchley et al, 2006).

Analyses of and information about these processes allow others to find out what has been applied in real-life situations and to adapt the methods and tools for application in their own settings. The specific local innovations are often of only local relevance, whereas the principles and processes of building partnerships and learning to support farmer-led ARD are of global relevance.

As an international community of practice, Prolinnova provides a platform where these experiences can be shared. The partners in the different countries describe, analyse and exchange views on how they are giving recognition to local innovation, engaging different stakeholders in PID and stimulating institutional change, including the development of educational and training curricula and modules. Opportunities for mutual learning are created (e.g. through electronic discussion groups, international workshops, joint publications, and supporting South–South mentoring – particularly between existing and emerging country programmes).

CHALLENGES AND CONCLUSIONS

The challenges are many in trying to stimulate actors in formal ARD to recognize and enhance local innovation processes. Bringing about change in attitudes and behaviour is a long and slow process, particularly in research organizations. It is difficult to break habits: even scientists who recognize local innovation tend to dominate as soon as they enter into on-farm research. A great deal of reflection and self-critique are still needed before participatory research can become truly farmer led.

Some development agents lack confidence to embark on a PID approach because they fear sanctions for not meeting their superiors' expectations in transferring predetermined technologies. The middle level of extension management, in particular, finds it easier to monitor field staff according to the number of farmers whom they convince to adopt an introduced technology, rather than the degree to which they have strengthened farmers' capacities to experiment and innovate. There is still a great need for the managers to rethink how extension is done and how development agents are rewarded for their work.

Because scientists are normally assessed according to other criteria than helping farmers develop what works on the ground, not many of them have been eager to engage in PID (see, for example, Ejigu and Waters-Bayer, 2005). In many countries, public funds for research and extension services are decreasing as privatization expands. There are fewer researchers and development agents available to engage in PID with smallholders. On the other hand, many research institutions are now under greater pressure to do work relevant for smallholders in order to meet the Millennium Development Goal of reducing poverty and hunger. This could be an

opportunity as scientists may now be more willing to link up with farmers and other local actors engaged in PID.

We have described here how Prolinnova is trying to transform the theories of agricultural innovation systems into practical action at a local level in a way that leads to institutional innovation, above all to a change in culture, procedures and policies in formal ARD. We see promoting local innovation not primarily as an approach to research, but rather as an approach to development – not only of technologies and rural communities, but also of organizations. Recognizing local creativity serves as a point of entry into building partnerships for farmer-led joint research, which, in turn, triggers internal reflection and institutional change at higher levels. In this way, some space – however small – can be created to allow multi-stakeholder learning processes and, thus, innovation to happen from the grassroots upwards.

NOTES

- 1 Prolinnova is a Global Partnership Programme under the umbrella of the Global Forum on Agriculture Research (GFAR).
- 2 The International Support Team currently (2008) comprises advisers and trainers from ETC EcoCulture and the Centre for International Cooperation of the Vrije Universiteit Amsterdam, The Netherlands; the International Institute of Rural Reconstruction (IIRR), The Philippines; Innovations, Environnement Développement Afrique (IED Afrique), Senegal; and the FAIR sub-project coordinator, South Africa.
- 3 Reports on these activities – particularly on the national and provincial PID workshops – can be found on the Prolinnova website (www.prolinnova.net) on the country programme webpages. They are also documented in two recent booklets (Critchley et al, 2006; Wettasinha et al, 2006).

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