

## **Recognizing and enhancing local innovation processes**

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### **ABSTRACT**

Agricultural development is driven by innovation at all levels, but the type of innovation that ultimately makes the difference is what farmers decide to do. “Local innovation” refers to the dynamics of indigenous knowledge, the process through which individuals or groups within a given locality discover or develop and apply improved ways of managing the available resources – building on and expanding the boundaries of their indigenous knowledge. There is a growing recognition that innovation is not a linear process from formal science through extension workers to farmer adopters but rather a social process involving a multitude of different actors, and that innovation processes can be enhanced by creating more possibilities for actors to interact. If they are to interact effectively, many social and psychological processes are involved and many personal and institutional changes need to be made. This paper reports on how actors within innovation systems are trying to find practical ways and means of enhancing these systems. A very effective first step towards enhancing this interaction is to identify innovation by farmers. In this paper, we look at how recognizing local innovation can lead to changes in behavior and attitudes of all actors in the system and can stimulate institutional change to enhance innovation processes.

## Recognizing and enhancing local innovation processes

### INTRODUCTION

Agricultural development is driven by innovation at all levels, but the type of innovation that ultimately makes the difference is what farmers decide to do. Normally, the term “innovation” at farmers’ level has been used to refer to farmers’ adoption of new technologies coming from outside. Until recently, little attention was given to the new technologies, management practices and institutions that farmers and farming communities have developed themselves – to “local innovation”. This refers to the dynamics of indigenous knowledge – the knowledge that has developed over time within a social group incorporating both learning from the experience of earlier generations and knowledge that has been gained in the meantime from whatever source and has been 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 within a given locality discover or develop and apply improved ways of managing the available resources – building on and expanding the boundaries of their indigenous knowledge.

Many local innovations are not of a technical nature but rather are socio-economic and institutional innovations such as new ways of gaining access to resource-use rights or new ways of organizing marketing activities. For example, after a road has been built or improved and vehicles are moving along it, groups of women organize themselves to sell their dairy products at more distant and lucrative markets and find innovative ways to do this at low cost per unit of dairy product sold.

Farmers – a term used here to denote also other natural resource users/managers, such as livestock-keepers, forest users and fisherfolk – have been carrying out most of the experimentation, discovery, 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 simply out of curiosity, sometimes by accident, farmers have come up with new ways of improving their farming. Although local innovation has always been happening, it has seldom been recognized even by people who have been documenting indigenous knowledge (IK) for decades. There is a widespread tendency to regard IK as a treasure chest of ancient jewels that must be stored well and documented for posterity – before it is lost – rather than seeing the dynamics in the knowledge of local people.

To be sure, it was recognized already several decades ago that farmers’ knowledge – particularly their knowledge of local conditions – can and should play a key role in formal agricultural research. This realization led to various forms of Farming Systems Research or Farmer Participatory Research, involving on-farm trials in which scientists asked farmers to test and possibly adapt the scientists’ ideas. Successful technologies were then disseminated through extension services. The scientists who developed the technology packages for extension seldom realized the extent to which farmers were experimenting informally with components of these packages. For example, when new, high-yielding cereal varieties are promoted in a package of seed, fertilizer, extension instructions and credit, many smallholder farmers continue to plant local varieties using the fertilizer intended for the new seeds and there are always a few farmers who carry out small, informal experiments on, e.g., the timing and amount of fertilizer application on the local varieties. It can probably be said that, even after the advent of formal research and extension, most of the original ideas and most of the successful adaptations of outside ideas to local conditions have been developed by farmers without direct support from research. But it is often only the less creative “model” farmers who have simply adopted introduced technologies who are described as the “innovators”.

There is, however – as is very obvious in this Symposium – a growing recognition that innovation is not a linear process from formal science through extension workers to farmer adopters. Agricultural scientists are beginning to realize that they are not the sole and seldom the most important producers of knowledge. The notion 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. If they are to interact effectively, many social and psychological processes are involved and many personal and institutional changes need to be made. This paper reports not on the results of scientific research into innovation systems but rather on how actors within innovation systems are trying to find practical ways and means of enhancing these systems. This process includes study and analysis of the experiences by the people directly involved, so that they have a better understanding about how they can interact better within an innovation system.

Our experience is that a very effective first step towards enhancing this interaction is to identify innovation by farmers. In this paper, we look at how recognizing local innovation can lead to changes in behavior and attitudes of all actors in the system and can stimulate institutional change to enhance innovation processes.

## **WHY DO LOCAL INNOVATION PROCESSES NEED TO BE ENHANCED?**

If the livelihoods of small-scale farmers in Africa are to be improved, it is important to enhance local innovation processes, because:

- **Diversity requires locally-specific practices.** Small-scale 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. In comparison with this diversity, there are very few research scientists and there is simply no way that they can generate the variety of innovations and adaptations required. In the face of this farming diversity, it is wasted effort to try to develop perfected technologies for blanket-like application. Local adaptation and locally specific development of options need to be key elements in any agricultural research and development (ARD) strategy to alleviate poverty in Africa (InterAcademy Council 2004). If scientists recognize and accept this, then they need not spend so much time and money on perfecting technologies and can spend more time on enhancing farmers' ongoing efforts to adapt extension recommendations 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. Only change is permanent. Conditions for farmers – also for small-scale farmers in resource-poor areas of Africa – are constantly changing. This is especially the case for those who are trying to link with markets, but also for everyone affected by the emergence of new pests and diseases (not only in plants and livestock but also in human, such as HIV/AIDS), changes in laws and regulations such as in land administration, effects of climate change, and for those who see new opportunities opening up, for example, as a result of infrastructural development. The key to sustainability in farming lies in farmers' capacities to adapt. They have to adapt more quickly than in the past. Recognizing local innovation is a step towards encouraging this process and helping farmers find ways to adapt more quickly by linking up with other actors in the wider innovation system.

Innovation at the local level is happening less rapidly that it could, because the key actors are not

working closely with each other. If many different actors have the opportunity to bring in their ideas and skills, innovation processes can be speeded up. However, if certain actors – particularly the farmers – feel that their capacities and potential contributions are not being valued by others, they are less likely to want to work together with them, less likely to enter into genuine collaboration. Recognizing the innovativeness of farmers creates fertile ground for their collaboration with other actors in innovation systems.

## **APPLYING THE THEORY IN PRACTICE**

How can diverse actors at local level enter into equitable and effective partnerships so that the innovation system can be enhanced? In several parts of the world, efforts are underway to build multi-stakeholder partnerships in ARD by entering through the window of identifying local innovations. We refer here primarily of the experience of the PROLINNOVA program, which builds on the experience of its predecessors PFI (Promoting Farmer Innovation) and ISWC (Indigenous Soil and Water Conservation). In Africa, PROLINNOVA (Promoting Local Innovation in ecologically-oriented agriculture and NRM) includes programs in Ethiopia, Ghana, Niger, South Africa, Sudan, Tanzania and Uganda. New programs are emerging in still more African countries (Burkina Faso, Kenya, Mali, Mozambique, Senegal). Similar work is underway in several countries of Asia, Latin America and the South Pacific.

In each country, a national NGO is facilitating multi-stakeholder partnerships to promote participatory research and development, taking local innovations as starting points. The Country Programs share common values and concepts, but are autonomous in their activities and design their own plan of action. In each country, somewhat different methods are applied, but the essence of each program consists of:

- Identifying and giving recognition to innovations developed by local people
- Participatory Innovation Development (PID): entering into partnerships at field level that bring difference sources of knowledge, ideas and skills together, focused on joint exploration or experimentation starting from the local innovations identified
- Combining forces of the different stakeholders involved to bring about policy and institutional change so that more space for PID processes can be opened up.

Capacity-building activities accompany and strengthen all of the above. They usually take the form of learning through action and reflection.

## **WHY START WITH IDENTIFYING LOCAL INNOVATIONS?**

There are four main reasons for starting off with the identification of local innovations:

- i. It changes the way potential partners in a local innovation system see each other, serves as a tool for learning to understand and value what farmers are already trying to do, builds mutual respect and, thus, lays a basis for partnership on a more equal footing – this is perhaps the most important reason and bears emphasizing.
- ii. It provides a point of departure for joint exploration and learning (i.e. PID) firmly embedded in local realities.
- iii. It provides concrete examples for raising wider awareness within the formal ARD institutions and to stimulate institutional change.
- iv. It is an activity that can be fairly quickly and simply introduced into the ongoing work of people involved in agricultural research and extension. No earthshaking paradigm shift is needed to start this – but it can lead to huge changes.

### ***Changing images of others and self***

The main reason to start with identification on local innovativeness is a psychological one. In many cases, indigenous knowledge and local innovations are not valued by formal researchers, and sometimes not even by the farmers themselves. Despite the intellectual discussion of innovation systems theories, the practice in most African countries still follows the linear model of technology transfer, in which it is assumed that innovations are developed by scientists and spread by extensionists to be adopted by farmers. From the perspective of farmers, this means that innovations (in the sense of “modern” farming) come from outside. Thus, both the farmers and the outside professionals see farmers as receivers of technologies, information and instructions, instead of people who have something to offer.

When formally-educated agricultural professionals discover smallholder 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 and give more value to farmers’ capacities. They see farmers’ knowledge and innovation as being complementary to their own knowledge and skills. This changes the way they behave towards farmers (de Leener 2001a, 2001b). Thus far, our experience has been that the realization that formal research is not the only source of knowledge and innovation does not demoralize these professionals, because they become excited by the unexpected ideas and energies of the farmers.

Encouraging scientists and extension agents to reflect on this realization leads them to re-examine their own identity and role and how they interact with others in ARD. Thus, identifying local innovations is a means to change the attitudes of scientists and extension agents, and to help them recognize how they can complement and strengthen the creativity of farmers.

At the same time, giving recognition to local innovation raises the farmers’ self-esteem. They begin to see themselves not as the poor who have to be helped to solve their problems but rather as people who are rich in knowledge, ideas and ingenuity in surviving under difficult conditions – as people who are admirable. The recognition that formally-educated agricultural professionals give to local innovation generates pride in local knowledge and creativity. Being recognized as researchers in their own right builds up farmers’ self-confidence and they are more likely to regard people who admire them as being “friends” and partners in development.

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 (PID)***

The idea is not to focus exclusively on farmer innovators as independent, isolated individuals but rather to appreciate and enhance their links within an innovation system involving diverse individuals (e.g. other farmers, traders, craftspeople), institutions and organizations both inside and outside the farming community. The 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 the local innovation process. Recognition and understanding of this innovation system helps in understanding how information gaps can be filled, and linkages can be made or strengthened. Identifying and documenting local innovations is an entry point for linking holders of local and scientific knowledge in a better-functioning innovation system.

Once again, psychology plays an important role. Participatory Innovation Development (PID) does

not start by dwelling on farmers' weaknesses and problems. Instead, it takes a positive approach that starts from local ideas and achievements; it focuses on local people's strengths and explores the particular opportunities open to them. This is more likely to stimulate eagerness among farmers to collaborate with others in participatory ARD than is the negative entry point of problem analysis.

PID is aimed primarily at strengthening the capacities of rural people and local agricultural research and development services to collaborate in developing site-appropriate improvements. Facilitating discussion by the farming community, extensionists and formal researchers about the local innovations, their strengths and weaknesses, the opportunities or problems they address, leads into joint proposals and agreements about research to be conducted. This can include further research by individuals and groups of farmers in the villages with and without the support of extension agents, joint on-farm research by farmers and scientists, and work by scientists on research stations or in laboratories to answer questions raised by experimenting farmers.

The PID carried out on-farm or in herds, in forests etc – jointly implemented by farmers, researchers and relevant support agents – provides a platform for all actors to understand current conditions and opportunities, and the strengths and weaknesses of different alternative improvements. ARD becomes a “social learning process” (Röling & Jiggins 1998). Farmers play a central role, while formally-educated agricultural professionals have the role of supporting local innovation processes, of strengthening the dynamics that are already underway.

The experience thus far has been that the greatest enthusiasm for recognizing local innovation and venturing into PID with farmers is 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. Where their managers have allowed them to work in this way, extension workers have been encouraging farmers to try out and improve new ways of managing agricultural and natural resources. Thus, PID becomes an approach to extension, often without direct involvement of research scientists.

Development workers can encourage farmer-led experimentation in several ways:

- **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 their informal experimentation methods and helping them explore more systematic forms of experimentation
- **Filling local knowledge gaps**: increasing farmers' awareness of resource management principles and providing information on phenomena that farmers cannot observe on their own so that farmers can develop local ways of applying the principles in farming practice
- **Facilitating mutual learning**: creating opportunities for groups of farmers to analyze critically both local and external ideas for improving agriculture and NRM, to assess the results of farmer-led participatory research, e.g. through farmer learning groups or exchange visits.

### ***Raising awareness and stimulating institutional change***

The personal change described above – “making the flip”, as Robert Chambers would say – is the first step towards institutional change, i.e. changes in the way people in organizations think and behave and organize themselves for interaction with others. When formal researchers and extensionists and their managers examine how the structures and procedures in their institutions help or hinder their efforts to engage in local innovation processes, they begin to see what needs to be changed. In the national multi-stakeholder PROLINNOVA platforms, people from governmental and non-government organizations find space for mutual learning and devising strategies for policy

influence and institutional change.

A particular concern of PROLINNOVA partners is that this approach to promoting local innovation needs to be incorporated into the curricula of institutes of higher learning so that the next generations of scientists, extensionists and educationists regard and use this as an accepted, mainstream approach.

### ***Incorporating into ongoing activities of research and extension***

In several countries, the following types of activities have been undertaken in order to incorporate an approach to promoting local innovation within ongoing research and extension work:

- A core team composed of keen like-minded individuals from NGOs and government ARD organizations strategizes about how to promote local innovation. They make an inventory of existing experiences in the country, which are jointly analyzed in a workshop involving major stakeholders – both governmental and nongovernmental actors in research, development and education – to consider whether and, if so, how they want to collaborate.
- In different regions of the country, members of the core team arrange brief (1– or 2–day) workshops involving formally-educated agricultural professionals – development agents, research scientists, college/university staff – to introduce the concepts of local innovation and PID in a perspective of multi-actor innovation systems. They elicit participants' own experiences and observations about this. The workshops include examples – wherever possible local ones – of farmer- or community-led innovation. The participants are then given follow-up assignments to identify and document local innovation, informal experimentation or participatory research processes.
- After the workshop, during their regular work, the participants complete these assignments. In some cases, not only researchers and extensionists but also farmers themselves document local innovations. In the case of extension agents, what they document are often cases that they have already observed but had never been asked about. This was because their mandate was to extend technologies from research, but not to inform researchers about technologies being developed by farmers.
- In a follow-up workshop several weeks later, the participants present what they have found. In many cases, the farmer innovators themselves explain what they have developed and/or are experimenting with informally. The workshop participants review the local innovations and select those to be explored and developed further in participatory farmer-led experimentation. This workshop is usually combined with further training in PID.
  - At grassroots level, small research groups composed of one or more innovators and other nearby interested farmers, extension workers and – wherever possible – one or two scientists from a nearby research center or university plan and implement farmer-led PID activities.
  - The local partners in PID reflect jointly on their experiences and identify what factors help and hinder the experimentation and innovation processes and what can be done to improve them. This is the beginning of institutional change from below.
  - The national or regional multi-stakeholder PROLINNOVA platform (which stimulates and advises these local-level processes) tries to bring about institutional change at higher levels so that PID processes can be accommodated – or even encouraged. It raises awareness among research managers, development administrators and policymakers. It facilitates exposure to and discussion of local innovation and PID. It organizes events such as farmer innovation markets. It brings policymakers to visit innovative farmers and brings innovative farmers into workshops, conferences and exhibitions where they can show and explain what they are doing. It publicizes the innovations and PID processes in catalogues, posters, photographs, video films, mass media etc and, in some cases, helps farmers document their own innovations.

- In some of the countries, experiments with alternative funding mechanisms have started. The most powerful way in which farmers can exert influence on ARD agendas is through controlling funds. It is therefore a consequent step that PROLINNOVA is exploring ways of giving local people access to and control over resources for innovation. Programs in South Africa, Uganda and Ethiopia – along with two Asian country programs – are involved in FAIR (Farmer Access to Innovation Resources), an action-research project funded by the French Government. They are piloting Local Innovation Support Funds designed to make financial resources for experimentation and innovation available to small-scale farmers and community-based organizations, who can “hire in” research support according to local agendas and needs. More about this is presented in the sub-session of this Symposium on alternative funding mechanisms to promote local innovation.

Thus, simply identifying local innovation can lead a long way along a new path, but it starts from within the existing ARD system, inserting what appears to be a relatively simple activity – identifying local innovations – which leads into a complex process of reflection and change.

When the researchers and development agents start to bring examples of what they think are local innovations, when also farmers start showing what they regard as innovations – then everyone gets 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 a necessary part of seeing each other’s perspective and approaching a better understanding of innovation systems. Struggling to define “local innovation” is part of the process of becoming more deeply aware of it. Each Country Program within PROLINNOVA has come up with a somewhat different definition of local innovation – and that definition is changing as the discussion continues. It is all part of the learning process – and meetings such as this Symposium will doubtless feed more ideas into that process.

## **WHAT IS BEING SHARED AND SCALED UP?**

A question that many people pose about promoting local innovation is: to what extent can the innovations that are identified or further developed through PID be scaled up? The NGOs that conceived PROLINNOVA back in 1999 were originally thinking along these lines, and much of the discussion was about using databases and other media for storage and dissemination of local innovations. But then we realized that this puts too much emphasis on the innovations themselves rather than on the process of social interaction to enhance innovation.

The aim in identifying locally-developed innovations and further developing them in a PID mode is not primarily to document the innovations as perfected technologies to be stored and disseminated in a transfer-of-technology mode. Local innovations are site-specific. Results from farmer-led research and innovation in one locality can seldom be replicated exactly somewhere else. In the diverse conditions under which most smallholder farming is done in Africa, the spread of a local innovation beyond the locality is not a good indicator of success. However, sharing of innovations that are discovered and developed in the course of promoting local innovation processes can serve to stimulate experimentation and innovation elsewhere. It can provide farmers with new ideas about options that they could try out, adapt and appropriate for their own circumstances.

The exercise of identifying and giving recognition to local innovations is, above all, an entry point to joint experimentation to serve as a learning ground for institutional and policy change. It is meant to stimulate stakeholder interaction at the local level, in the field, building on local initiatives, as a concrete basis for learning by the individuals and the institutions in which they operate – including

farmer groups and organizations. Identifying local innovations and engaging in joint experimentation helps scientists, development workers and farmers – all of whom are accustomed to linear technology transfer – to change their attitudes and behavior toward each other, to see their interaction within a complex innovation system and to strengthen their capacities to engage with each other and innovate more quickly.

The major outcomes from the process of promoting local innovation that are suitable for wide dissemination are:

- field-tested methods of discovering and stimulating local innovation processes
- lessons from experience in supporting personal and institutional change so that the formal ARD sector can support local initiatives
- lessons about building partnerships at local level and higher institutional levels, forging alliances and engaging in policy dialogue to create enabling conditions for enhanced local innovation.

Analyses and information about these processes allow others to find out what has been actually applied in real-life situations and to re-invent or adapt the methods and tools for application in their own unique settings. The specific local innovations are usually of only local relevance. The principles and processes of building partnerships and learning to give support to 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, analyze and exchange how they are trying to give recognition to local innovation, engage different stakeholders in PID and stimulate institutional change, including the development of suitable educational and training curricula and tools. 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 programs.

## CONCLUSIONS

The challenges are many in trying to bring formal ARD to recognize and enhance local innovation processes. Changing attitudes and behavior is a long and slow process, particularly in research organizations. It is difficult to break habits: even researchers who recognize local innovation tend to dominate as soon as on-farm research is commenced. In many cases, still a great deal of reflection and self-critique is needed before participatory research can become truly farmer-led.

Because scientists are assessed according to other criteria than helping farmers develop what works on the ground, it cannot be expected that the majority of scientists will be eager to engage in PID. That is one reason why the input of formal scientists in farmer-led experimentation has thus far remained relatively small.

Some development agents lack the confidence to enter into a PID approach because of the possibility of sanctions for not meeting expectations in transferring technologies from research stations. Particularly the middle management in extension finds it easier to monitor field staff according to the number of farmers they convince to adopt an introduced technology, rather than the degree to which they have strengthened farmers' capacities to experiment and innovative.

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 smallholder farmers. On the other hand, researchers are now under greater pressure to do work that

is relevant for small-scale farmers. This could be an opportunity, as scientists may then be more willing to link up with the farmers and other local actors who are engaged in PID.

We have described here how we are trying to transform the theories of agricultural innovation systems into practical action at local level in a way that leads to institutional innovation, above all to change in policies, culture, procedures and activities in formal agricultural research and development. Thus, promoting local innovation is not primarily an approach to research but rather an approach to development – not only of technologies but also of institutions. Recognizing local creativity serves as a point of entry into building partnerships for joint experimentation 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-actor learning processes and, thus, innovation to happen from the grassroots upwards.

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