

Clapping with two hands: bringing together local and outside knowledge for innovation in land husbandry in Tanzania and Ethiopia – a comparative case study

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Abstract

Promoting rural development in Africa involves learning to clap with two hands, that is to say, creating effective interaction between local knowledge and development initiatives, on the one hand, and the knowledge and initiatives of formal agricultural research and extension, on the other. Farmer innovators – men and women farmers who take their own initiative to change local agriculture – are key allies in rural development, as shown by the experience of the ISWC programme in Africa. Focusing on Ethiopia and Tanzania, the authors describe how formal research and extension services are made aware of farmers' innovative work and are encouraged to document the results, promote their spread, and support further development efforts by farmer innovators. A modified Participatory Technology Development (PTD) approach is thus emerging, which starts not with problem analysis but rather by linking up with local problem-solving initiatives. While the learning process on this approach continues, dialogue has been initiated with policy-makers with a view to incorporating the approach into regular government extension, research and training activities.

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Introduction

Rural development in Africa has been constrained because the people who regarded themselves as the "developers" were clapping with one hand. Attempts were made to transfer external knowledge, without recognising the local knowledge and development initiatives of the farmers. The second phase of the Netherlands-funded programme "Indigenous Soil and Water Conservation in Africa" (ISWC II) is encouraging a form of agricultural research and extension that explicitly considers and promotes farmers' creativity in dealing with their environment. Experiences from two of the seven African countries² involved in this programme are given here to illustrate how joint learning based on both external and local knowledge is being stimulated.

The ISWC programme was initiated in response to a growing frustration that formal agricultural

research was not generating technologies that answered the needs of poor farmers, including women, in dry and marginal areas of Africa. Extension services had little to offer such farmers. They therefore tended to focus on better-off male farmers in higher-potential areas. Extension workers in lower potential (and often remote) areas were demotivated by their vain efforts to extend inappropriate technologies. Some keen observers of rural peoples' struggle to gain a livelihood from the land noted that "farmers, especially resource-poor farmers, continuously experiment, adapt and innovate" (Chambers *et al.*, 1989). Paul Richards (1985) in his book *Indigenous Agricultural Revolution*, presented evidence of the "inventive self-reliance" of small-scale farmers, which thereafter was confirmed by many authors as summarised in van Veldhuizen *et al.* (1998). ISWC therefore started with the premise that "farmer innovators" or "farmer researchers" are an important source of knowledge and

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ingenuity that offers a promising basis for development activities.

In the first phase of the ISWC programme, indigenous technologies of soil and water conservation (SWC) were identified and documented in 23 African countries (Scoones *et al.*, 1996). The second phase is of a more complex nature and was therefore limited initially to only seven countries. Good examples of farmers' innovation and informal experimentation in land husbandry are sought and brought to the attention of extension workers, researchers and policy-makers. By means of iterative training workshops, extensionists learn to promote farmer-to-farmer extension and widespread local experimentation with a variety of innovations. Researchers are encouraged and guided to explore and validate the local innovations and to work together with farmers in further developing these ideas. Decision-makers are lobbied to create more favourable institutional arrangements and policy environment for recognising and building on the knowledge and creativity of farmers.

The basic hypotheses behind this approach are the following:

- The people who have long survived in a given agro-ecological setting have a good sense of local risks and possibilities and can best judge whether new ideas might be appropriate;
- Farmers generate new ideas and practices and/or adapt ideas of others to their own conditions through informal experiments (Prain & Fujisaka, 1998);
- Farmers are keen on appropriate information to help them solve their problems. They especially value information from others working under similar conditions;
- Extension agents need to become more aware of local creativity, to be able to take on a role of stimulating it;
- Scientists need exposure to the real world of farmers, to be able to conduct relevant research;
- To be able to design supportive policy, the policy-makers likewise need such exposure, and access to convincing information from farmers and scientists working with them;
- Conditions for land husbandry are constantly changing; therefore, innovation and joint learning must be a continuing process.

In Ethiopia and Tanzania, programmes managed

by local organisations are making a coherent approach out of these various elements: development choices by local people, attention to local experimentation and innovation, enhanced flows of information to and between farmers, changing the attitudes and roles of extension agents, exposure of scientists to the situation of farmers, providing convincing information to policy-makers, and stimulating processes of continued joint learning.

The following accounts are based on process documentation compiled on a continuous basis by the co-ordinators and backstoppers of the programmes in these two countries. The results of this have been summarised in a series of reports covering all main aspects of the programme in the two countries (list of country programme documents available with the authors).

The Ethiopian experience

In the semiarid mountainous area of Tigray in northern Ethiopia, Mekelle University has the mandate to support dryland development. Since its establishment in November 1993, it has given attention to farmers' knowledge. It is here that the ISWC programme in Ethiopia commenced. One of the programme coordinators (Mitiku Haile) is a soil scientist who has studied indigenous soil classification systems and is also the President of the University; the other (Fetien Abay) is a plant breeder with prior experience in farmer participatory research. They drew together interested individuals from various organisations concerned with dryland development to form a discussion platform and Steering Committee (SC). Besides the two coordinators from the university, these include people from the Bureau of Agriculture and Natural Resources (BoANR), Mekelle Research Centre (MRC) and several non-governmental organisations (NGOs) working in Tigray. The SC approves the annual work plans and budgets of ISWC-Ethiopia.

Seeking farmer innovators and innovation.

The first step was to promote recognition of local innovation in land husbandry. The programme defined an innovator as someone who develops new ideas without support from formal research and extension. Innovation includes both technical and institutional change, for example, in

regulating access to land and water. By means of a contest, development agents (DAs), research scientists and university lecturers and students in Tigray were encouraged to discover local creativity. Not only individuals but also groups of innovators were found, for example, neighbouring farmers who had further developed their traditional irrigation system. Outstanding men and women innovators were awarded prizes at district and regional ceremonies, where their innovations were made more widely known, also through radio, television and newspaper coverage. These activities help to raise the value of local knowledge and innovation in the eyes of students, lecturers, extensionists, scientists and the farmers themselves.

Female innovators are given particular attention. One of the programme coordinators and several DAs and students involved in the search are women. They have thus far identified 17 female innovators and two husband-wife innovator teams. The innovative women farmers are heads of poor households. Their informal experiments often involve small, low-cost changes, such as digging infiltration pits in backyard gardens or finding cheaper alternatives, for example, ploughing by donkey themselves instead of by ox on a sharecropping basis. Their innovations show how local resources can be used more intensively in smallholder agriculture.

The University's database of local innovators in Tigray now includes more than 100 farmers, many of whom have innovated in multiple ways on and around a single farm – as one example, combining different structural and biological means to control movements of water and soil, using multipurpose trees and modifying traditional methods of keeping bees which prefer these trees. DAs are now starting to submit reports on the themes and methods of farmers' informal experimentation, recorded according to a guideline that they prepared themselves during a training session. These reports are being included in the database.

Farmer-to-farmer extension

Outstanding men and women innovators took part in a travelling seminar organised by the University and BoANR. This gave them an opportunity to see and discuss each other's innovations and to pick up new ideas for themselves. Linkages between these innovators

has continued through informal visits and mutual advisory services. In addition, the innovators – who were, in most cases, people who had not been working with the formal extension service because they refused to accept the technologies being extended – are now being invited by DAs to explain their innovations to other farmers.

The University and BoANR are jointly organising village-level workshops during which the farmers compare the advantages and disadvantages of local innovations and introduced technologies. Such annual workshops have been held over the past two years in all districts of Tigray. This marks a change from the previous extension meetings, which were designed to promote an introduced technology package, demonstrated by a successful farmer, in an effort to convince the other farmers to take up credit to purchase the inputs needed for this package.

Farmers identified through the ISWC programme have also presented their innovations on Tigrigna radio, which is the most widespread medium of mass communication that reaches rural people.

Building on local initiatives

Some DAs have started to record how the local innovators carry out their informal experiments. These reveal the types of technology that the farmers are seeking, the constraints they face, the opportunities they have already recognised and how they evaluate new ideas. Enhancing farmer experimentation could help to develop site-appropriate technology more quickly and could strengthen local capacities to adapt to new conditions (Haverkort *et al.*, 1991; van Veldhuizen *et al.*, 1998). Local innovators and experimenters are regarded as entry points into Participatory Technology Development (Veldhuizen *et al.*, 1997). Scientists keen to support this process are invited to study the farmers' innovations and informal experimentation more closely and to explore ways of developing the technologies further in experiments defined, led and assessed jointly by farmers, DAs and scientists.

The Participatory Technology Development (PTD) approach recognises the importance of both local and external knowledge. Farmers actively seek information to suit their needs, whatever the source. The ISWC programme creates situations where they are more likely to

find what they seek, because they interact with "outsiders" (researchers and DAs) who have sought to understand how local people are trying to change things. The outsiders are therefore better able to recognise what external knowledge might be useful, and can contribute this to the process of planning and evaluating joint experiments.

The results being sought in the PTD process in Ethiopia are not simply technologies to be transferred to other farmers for adoption. The findings provide information about the workability of a technology under particular circumstances; other farmers, knowing their own circumstances, can then judge whether the technology is worth testing and adapting to their area. The DAs are encouraged to "feed" local innovation by linking farmers with sources of new ideas to explore and options to test (Loevinsohn, 1990). At village-level workshops, they facilitate communication between farmers, who examine local innovations, discuss the advantages and disadvantages, and consider who would like to try them out.

Changing attitudes

The greatest challenge has been changing the attitudes of people in extension and research organisations. Besides stimulating the search for farmer innovation and the interaction of farmers, extensionists and scientists in PTD, Mekelle University educates students who will join government or NGO services. The curriculum increasingly emphasises the importance of learning from and with farmers. All students of agriculture and natural resource management are attached for five months to organisations in the field, and their work often involves studying indigenous knowledge and innovation. The PTD approach has now been included in the standard University course on research methodologies.

The University also upgrades current extension staff, in summer courses and short in-service training sessions. Here too, the concepts and methods of PTD are introduced. The trainees are given assignments, such as describing local innovation, to carry out during their regular work. In subsequent sessions, they reflect on their experience and results, and learn from each other.

The scientists who study local innovation and engage in PTD can publish through the Tigray programme's research series and the ISWC

international newsletter. The programme also assists them in contributing to international journals and conferences, so that they can gain wider recognition for their attention to indigenous knowledge.

Networking and policy influence

The Steering Committee (SC) initially consisted of a small group of interested individuals (seven persons) from the University, MRC, BoANR and NGOs involved in rural development in Tigray, plus two persons involved in land-management research at national level. An informal platform of the organisations in Tigray is gradually being built up through a process of joint learning based on concrete activities in the field, such as the search for farmer innovators and informal experimentation, and in a series of training workshops. Five Ethiopians from the University and other government agencies and NGOs represented in the SC took part in the anglophone Training of Trainers in PRA/PTD organised in Zimbabwe by the ISWC programme, and all have been active since then in PTD training in Tigray. Further activities such as field visits, workshops and award ceremonies for farmer innovators have drawn the attention of other people in the government agencies and NGOs to the dynamics of local knowledge and PTD.

Many innovations in the drylands are highly integrated, combining elements of animal and crop husbandry, forestry, engineering, socio-economics et cetera. Scientists from other disciplines were encouraged to join a process of team learning about these innovations. Interdisciplinary learning is also promoted by seminars involving staff from different departments of the University and the research centre to discuss local innovation and to reflect on experience in supporting farmer-led experimentation.

ISWC-Ethiopia is trying to influence policy throughout Tigray, as well as nationally, to achieve lasting impact. The coordinators invest much time in organising "exposure" workshops for policy-makers and in persuading strategic persons, including government ministers from regional and national levels, to visit innovators. This helps to raise the awareness of policy-makers about locally-driven development. Public discourse and concerted actions of networks of like-minded organisations often play a key role

in policy change (see e.g. Keeley and Scoones, 1999) and the co-ordinators have therefore sought like-minded individuals and organisations throughout Ethiopia, and collaborate with them to organise regional workshops on farmer innovation. The workshops plant the seeds for commencing further regional programmes to promote farmer innovation and experimentation in land husbandry in Ethiopia.

The approach of seeking local innovations, making them known through village-level workshops and encouraging other farmers to assess their merits and demerits is now been adopted by the BoANR in Tigray. The BoANR has taken over responsibility for organising the giving of awards to local innovators, and guides a participatory process of drawing up criteria and selecting innovators at village, district, zonal and regional level. The BoANR has also started to support local initiatives, such as the activities started by rural people to divide up rights to sloping lands among community members and to rehabilitate gullies for productive use. These developments were facilitated by the keen participation of the Head of the BoANR in the SC of the ISWC-Ethiopia programme.

Also farmer innovators themselves have been instrumental in changing land policies at the local level that had discouraged farmers from investing in rehabilitating degraded land. An example is given in Box 1.

The Tanzanian experience

The Tanzanian ISWC programme operates primarily in the Southern Highlands of the country. It provides a basis for comparison with the other ISWC country programmes, such as that in Ethiopia, which operate mainly in semiarid areas. The highlands have a relatively high potential for agricultural production. The rainy season is long, lasting from November to as late as June. Temperatures at the highest altitudes make cultivation of "exotic" vegetables feasible; in the lower areas, maize is by far the most important crop, providing the bulk of the maize consumed in the big towns of the country. The sloping character of most of the region makes it vulnerable to soil erosion. Basic soil fertility, which was relatively low to start with, has decreased as a result of over-use of chemical fertilisers, often urea.

Box 1: "This is how we influenced policy": testimony of a woman innovator

"During our travelling seminar, we visited a colleague in Southern Tigray in Raya Valley, where there was a very big and wide gully. It was not considered to be useful land during land allocation. This farmer had worked on the gully and made it productive, but when he started to grow crops there, the *baito* [local council] took the land over, saying that he had enough land and that this reclaimed gully should be distributed to others. We saw this problem during the seminar and discussed it. The *baito* in Raya Valley reviewed the mistake it had made and gave the land back to our colleague. This is how we influenced policy."

Leteyesus Gobena, ISWC Anglophone African Workshop on Farmer Innovation, 6-11 February 2000, Mekelle, Ethiopia (Mitiku 2000)

Building a partnership

In Tanzania, the ISWC programme spent considerable time (close to a year) and energy to build a partnership at national level: a platform under the name of National Steering Committee (NSC), bringing together all relevant actors. Partners in this are two research organisations (Sokoine University of Agriculture and the Ministry of Agriculture Research and Training Institute in Uyo), one representative from participating extension NGOs, one representative from the governmental (district) extension service, one representative (a woman) from the national farmers' association Mviwata and the president of the facilitating agency (Cooperative College Moshi, CCM). The National Coordinator (NC) of ISWC-Tanzania, O.T. Kibwana, who is a CCM staff member, acts as executive secretary. CCM was selected as facilitating agency because it has a long history of supporting participatory initiatives at grassroots level and has a staff with a diversity of professional backgrounds. The NC himself has a background in agriculture.

In order to create joint ownership of the programme, it was crucial to develop a shared vision among the organisations expected to work together at farm level and to define the "rules of the game". Through a series of meetings, visits to individual organisations by the NC, preparation

of a memorandum of understanding clearly defining the roles and responsibilities of the different partners, and discussion again of the nuts and bolts of this (use of funds, allowances!), the platform gradually took shape. The NSC is now responsible for approving the budget, and takes this task seriously.

It proved to be important for the success of the platform that CCM had no major interest in the field programme and thus could focus on facilitating and coordinating the work of the partner organisations in a transparent way.

Understanding the basic concepts

Although promotion of farmer participation was nothing new to the programme partners, the notion of farmer innovators and the ideas that farmers are experimenting to improve their practices and that research and extension would do well to link up with these efforts, were so new that a concerted effort had to be made to develop a common conceptual understanding at all levels. Four Tanzanians joined the anglophone Training of Trainers in PRA/PTD, while also the attendance of two Tanzanians of the first annual meeting of the Africa-wide programme helped to clarify the approach. Field staff, research and extension and some farmers in Tanzania received their own PRA/PTD training with subsequent refresher workshops (two, thus far). Development of a joint understanding continued during the subsequent fieldwork and during NSC meetings.

Seeking farmer innovators and innovations

With a common understanding thus developed, teams were set up in five districts in the three regions of the Southern Highlands with a first aim of seeking farmer innovators and innovations. These teams were made up of the Divisional Extension Officer, some selected village extension workers (VEWs) and a scientist from one of the two research organisations involved. The five teams went about their work in different ways. In some areas, the teams started by asking VEWs to identify local farmer innovators. Other used the VEWs only to identify influential community leaders, who were invited to a meeting together with the local VEWs and the research-extension team. During such meetings, the general topic of farmer innovation and experimentation was discussed. Then the leaders were asked to identify innovative farmers in their village areas. In all cases, this was

followed by extensive field visits, discussions with the suggested farmers, and cross-checking with other sources of information.

Within a relatively short period, only two months, the programme identified 63 farmer innovators, while more than 60 other farmers were visited but did not appear to be unusually innovative in the eyes of the teams. A recent study (Verhoeven & van der Kroon, 1999) confirmed the innovative work being done by many of the identified farmers. Moreover, it showed that these farmers are not necessarily the resource-rich ones that have featured strongly in other extension models in the past, for example, as contact farmers or farmer-leaders. Farmers may innovate because they have resources and can take risks, or because they do not have resources and are forced to look for new ways of doing things. They can be young with some formal education, or old without. And they include both men and women. The process of seeking farmer innovators has not stopped; it continues while the programme develops. In fact, in at least one of the five districts, it has become part and parcel of the regular extension work to be open for farmers' own innovations and to document these as a basis for further extension work.

Changing attitudes

As the programme proceeded, it became clear that acceptance of the new concepts and approach requires a change in the attitudes of scientists and extension agents. This was actively pursued, but sometimes came about almost unintentionally. Probably the strongest impact was achieved by systematically confronting research and extension staff with farmer innovation. The farmer-innovator workshops of a three to four day duration (see below) were particularly convincing. Field staff were greatly impressed by the farmers' presentation of their own innovations and the subsequent SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis by their fellow farmers. The participatory approach taken during the staff training and workshops helped the field staff to experience the benefits of working together on an equal basis, of encouraging all participants to contribute, and of critically analysing the knowledge of participants and trainers alike. The role of the farmer representative in the NSC should not be underestimated either. At critical moments, she has been able to challenge research

and extension on the relevance of their proposals in addressing farmers' concerns.

There is ample evidence of the impact this change in attitude is having on extension and research methods being applied by the staff directly involved, also in their regular work outside the project framework. During farmer field days of the extension service, for example, field staff is now taking the initiative to give farmers the central place, and to organise room for discussion, while presenting relevant technologies as good options to try rather than prescribed messages. Two researchers have developed their own research proposals to work in more detail on farmer innovations identified during project activities.

Influencing the education agenda

As an unexpected spin-off, the work of ISWC-Tanzania is already influencing the content and methods of teaching in CCM, which is a major institute of higher learning for rural development in Tanzania. Through existing mechanisms within the college, experiences generated by college projects are taken up and fed into the college system. The training methodology used in ISWC has been incorporated into several short courses, and attempts are being made to infuse the experience into the long-term curricula. Not only the organisation and methods but also the contents of these courses are being borrowed from the ISWC programme: emphasis is now on changing roles and attitudes, working with what farmers know, encouraging farmers to engage in discussion, et cetera. There has been a move away from fragmented and more academic content towards a more logically compiled whole, and away from lecturing towards facilitating processes during the actual training.

Building on farmer innovation

The major part of the ongoing programme now consists of developing and implementing extension and research activities that build on and encourage the initiatives of farmer innovators.

- **in extension:** all 63 farmers attended three to four day farmer-innovator workshops in their districts, during which they critically assessed each other's activities and took part in various cross-visits; case studies are being published in the farmer magazine of Mviwata; extension staff are also organising one-day meetings where many farmers come together to study the

work of the farmer innovators, assess this in discussion groups and propose possible areas for further experimental work; this last activity is vital to ensure sufficient integration of the support to the farmer innovator into the agenda of the wider community;

- **in research:** interested farmers are encouraged by researchers to monitor more systematically some critical components of their innovation (e.g. yield, or most critical input, such as farmyard manure), assisted if necessary by extension staff; systematic comparison with more common practices may be included in such monitoring; Researchers are also requested to gather further information on technical aspects of the innovation and to monitor the spread of innovations and the possible adaptations. In the 1999-2000 season, for example, joint farmer-extension-research experiments were undertaken on farmer agenda's such as the induced flowering in coffee to prevent CBD (6 farmers), use of cattle urine to combat maize stalk borer (3 farmers), maize planting in pits rather than in lines (12), application methods of manure (3), and mulching and use of a cover crop under coffee (4). While this joint research is done in a structured manner, collaborating farmers also continue their own research, for example, to find best ways of making, distancing and using the maize pits.

It is not absolutely necessary that the work by researchers be done directly with farmers in their fields. When interacting with farmers, the scientists recognise topics that should be investigated on station or through literature studies. If the linkage with farmers' concerns is clear, this is also funded by the ISWC programme.

Differences and similarities in the approaches

ISWC II gave considerable freedom to the facilitating agencies and steering committees in each country to design their own programmes. Three major differences between the approaches taken in Ethiopia and Tanzania are apparent:

1. **Entry point for joint learning:** In Ethiopia, the start-up activities focused on seeking farmer innovators, in a way designed to change attitudes and to generate enthusiasm among potential partners (farmers, extensionists, scientists) to work together. In contrast, the

initial focus in Tanzania was on building up a common understanding of concepts and shared vision between partners, before moving into a joint search for farmer innovators and then into a PTD process.

2. **Initial geographical spread:** The Ethiopian programme started in only one region in the country. It stimulated people in several organisations in Tigray to take small steps: first, simply recognising local innovation, then feeding informal experimentation with new ideas, and gradually moving into PTD. Simultaneously, it supported like-minded organisations in other regions of Ethiopia to start up their own programmes to promote farmer innovation. In contrast, the Tanzanian programme started by building up a national programme with a National Steering Committee, even though the initial work with farmer innovators and experimenters was limited to five districts in the south of the country. To a large extent, these differences in approach reflect differences in policy between the two countries: Tanzania has for several decades been trying to design national development policies and programmes, whereas Ethiopia was torn by civil war for many years and has now adopted a policy of regionalisation based on ethnic groupings. Within the ISWC programme, the facilitating agency chose the approach it felt to be most suitable.
3. **Role of the facilitating agency:** In Ethiopia, the staff and students in Mekelle University are among the actors in seeking farmer innovations and promoting farmer-led experimentation in the field, and the University is located close to its partner organisations in Tigray. This makes it fairly easy to facilitate the programme implementation process. In contrast, in Tanzania, CCM has taken a more neutral position: it has assumed a coordinating role but is not directly involved in field activities. Moreover, it is located about 1000 km from the areas where the ISWC fieldwork is being carried out, although it has branches in all the regions assisting in co-ordination of day-to-day activities.

The Ethiopian and Tanzania experiences having been made under the umbrella of a seven-country programme with common objectives, it is not unexpected that there are many similarities in their approaches:

1. **Innovators as entry points to PTD:** In both

countries, the focus has not been on problem analysis but rather on how farmers are already trying to solve their problems. Major attention is given to documenting and supporting farmers' own problem-solving. It is assumed that the local innovators have already analysed their situation and set their priorities.

2. **Promoting farmer learning instead of technology transfer:** In both countries, the main idea is not to spread techniques but rather to increase local capacities to access information, to experiment locally and to adapt to changing conditions, for example, to continue learning.
3. **Multi-stakeholder learning platform:** In Tigray, as in Tanzania, attention was given to building up a platform that includes a variety of development actors from NGOs, research, extension and teaching. The focus is on learning through concrete activities in the field. Team learning is promoted in seeking farmer innovators and in supporting farmer-led experimentation, in order to benefit from different disciplines and from the knowledge of both scientists and practitioners.
4. **Facilitation by institution of higher learning.** In both cases, the facilitating agency is an institution of higher learning with a specific mandate for development, Mekelle University for the drylands of Ethiopia and CCM for cooperative efforts throughout Tanzania. In both institutions, the curricula and teaching methods now instil a greater respect for farmers' capabilities, draw from field experience and prepare for continued learning. The positive impact on future research and development in Ethiopia and Tanzania therefore promises to be long-lasting.

This last point is not common to all seven countries in the ISWC programme. With a view to future work to promote PTD, it would be worthwhile to evaluate the influence of choice of facilitating agency on the development and outputs of the programme.

Lessons learned thus far

These experiences made in Ethiopia and Tanzania, as well as those made in the five other countries involved in ISWC II, are helping to further develop the concepts and methods of PTD, and are drawing attention to some key factors in the process of institutionalising this

approach within agricultural research and development. The lessons learned thus far include the following:

- The focus on farmer innovators and innovations generates enthusiasm among extension workers and researchers, and gives a new impulse to their work. They respond very positively to direct exposure to farmer innovators and particularly to open exchanges among these innovators. Such opportunities for exposure need to be deliberately created. For instance, this is why the SC of ISWC-Ethiopia has suggested that, at the end of the next travelling seminar, a meeting be held where the farmer innovators can explain what they are doing and what they have seen to scientists, extension staff and policy-makers. This will mean that the travelling seminar, although involving only a few farmers, will have a wider impact;
- It is indeed possible to change attitudes towards active farmer participation within research and extension institutions with long exposure to conventional top-down approaches. This process can be facilitated in many ways, for example, training workshops and coaching, steering committee with members active in the field, mixed district teams of scientists and extension workers, including farmer representatives who constantly remind scientists of farmers' concerns;
- Change in roles and change in attitudes go hand-in-hand: a person learns and changes attitudes by doing something different. In the case of Ethiopia, this was brought about by giving extension agents assignments to document farmer innovation and experimentation. In the case of Tanzania, the mixed teams of scientists and divisional extension agents were given this task;
- It is very effective to create an environment in which farmers can inform each other about what they are doing and can criticise each other. This is being achieved in the farmer-innovator

- workshops and community meetings in Tanzania and in the travelling seminars for farmer innovators and the village-level workshops to discuss local innovations in Ethiopia;
- Although the entry point to PTD is through local innovators who have already (informally) analysed their own problems and opportunities, there is still a role for situation analysis by farmer groups or communities in order to establish group and community priorities (rather than those of individual innovators). This process also helps to mobilise community effort and gives a visible sign that a community-defined agenda is being sought;
- Some innovations may be interesting, but eccentric and applicable only under very specific circumstances. It is necessary that farmers and extension agents identify those innovations which would be relevant for many other farmers, that is, in which it is worth investing time and money to improve them. These are the innovations which deserve further support and development;
- There is a wealth of local creativity in rural areas, reflected in innovations both large and small, which has been largely unobserved in the past – and it takes very little effort to open peoples' eyes to this creativity.

Both the Ethiopian and the Tanzanian programmes have succeeded in uncovering the hitherto unseen hand – that of local innovation, i.e. the dynamics of farmers' knowledge – but are still at an early stage in efforts to promote more direct links between local innovation and the external knowledge of conventional science. Through continuous joint evaluation of the ongoing process of supporting farmer-led research and extension, the farmers, researchers, development workers and PTD facilitators involved in the ISWC programme are all learning how best to clap with two hands for improved land husbandry.

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Endnotes

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Acronyms

BoANR	Bureau of Agriculture and Natural Resources
CCM	Community College Moshi
DA	Development Agent
ILEIA	Information Centre for Low-External-Input and Sustainable Agriculture
ISWC	Indigenous Soil and Water Conservation Programme
MRC	Mekelle Research Centre
NC	National Coordinator
NSC	National Steering Committee
PRA	Participatory Rural Appraisal
PTD	Participatory Technology Development
SC	Steering Committee
SWOT	Strengths, Weaknesses, Opportunities, Threats
VEW	Village Extension Worker